Smoking in NZ Pacific adolescents

Samoan, Cook Island Māori, Tongan and Niuean

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ASPIRE2025 | Research for a tobacco-free Aotearoa

ASH Action for Smokefree 2025

Contents

Summary of key points

This report explores adolescent smoking in New Zealand's four largest Pacific ethnicities: Samoan, Cook Island Māori, Tongan, and Niuean. The findings are based on data from the annual ASH Year 10 Snapshot survey, 2004–2019, which involves students aged 14–15 years.

Adolescent smoking trends

Adolescent smoking declined greatly between 2004 and 2015 in all ethnicities, including Samoan, Cook Island Māori, Tongan, and Niuean. Progress in reducing smoking prevalence has slowed or stalled among Pacific adolescents from about 2015.

Differences in adolescent smoking between ethnicities

In 2018/19 the proportion of Year 10 students who smoked regularly (monthly or more often) was about 5% overall. Among Pacific ethnicities, regular smoking was highest in Cook Island Māori (11%) followed by Niuean and Tongan (8%), and lowest in Samoan (6%) adolescents. Regular smoking remains high in Pacific ethnicities compared with non-Māori/non-Pacific (3%) students.

What puts adolescents at risk of smoking?

There are many known risk factors for smoking uptake. Of the risk factors included in this study, exposure to second-hand smoke (at home or in vehicles) was the most important independent preventable risk factor for all Pacific ethnicities.

Why is adolescent smoking higher in some ethnicities than others?

Differences in regular smoking between ethnicities were largely explained by differences in socioeconomic status and higher exposure to risk factors (e.g. more second-hand smoke exposure, more maternal smoking) in some ethnicities than others. After adjusting for the risk factors included in the study, ethnic differences between non-Māori/non-Pacific, Samoan, Tongan and Niuean students disappeared. However, adolescent smoking in Cook Island Māori was higher than other ethnicities even after adjusting for key risk factors.

Recommendations

- Lack of recent progress in reducing adolescent smoking in most ethnicities is concerning. A renewed focus on smoking prevention is needed.
- New Zealand tobacco control research and practice needs to reflect the important differences between Pacific ethnicities rather than treating Pacific peoples as a single entity.
- Greater investment is needed in 'by Pacific, for Pacific' community action to support smokefree homes and cars, and other actions to achieve Pacific smokefree aspirations. The need is greatest in Cook Island Māori communities, who may require greater support to achieve equity of outcomes.

- An increase in the number of Pacific homes and cars that are smokefree will improve the health of Pacific families and is likely to reduce smoking uptake in Pacific youth. Therefore, initiatives to promote smokefree homes and cars should be a priority, as well as efforts to reduce smoking prevalence among Pacific adults.
- The impact of the new smokefree cars law (from Nov 2021) should be monitored, including desirable impacts on young people's exposure to second-hand smoke and any adverse impacts on Pacific communities (e.g. stigma, unfair police targeting).
- Upstream factors are important. To support the Smokefree2025 goal and the wellbeing aspirations of Pacific peoples, structural barriers that disadvantage Pacific peoples must be removed, and living and working conditions must be improved.
- Smoking uptake increasingly occurs in those aged 16–24. Hence, ongoing surveillance of youth smoking is needed, not only in 14–15-year-olds but also in older adolescents and young adults. Surveys need boosted Pacific samples to allow robust analysis for Pacific ethnicities.

About this report

Origins of the study and people behind it

A study into adolescent smoking in specific Pacific ethnicities was suggested in 2016 by the Advisory Group for another ASPIRE2025 research project that was using ASH Year 10 Snapshot Survey data. The Advisory Group comprised Stephanie Erick and Sally Wong (ASH), El-Shadan Tautolo (AUT), Suaree Borell (Hāpai Te Hauora), Sicily Sunseri (Health Promotion Agency), and Anaru Waa (University of Otago).

We applied for and received funding for the project from the Wellington Division of the Cancer Society in late 2016. The project team that carried out the study was: Dalice Sim (Principal Investigator), Jude Ball, Richard Edwards (all University of Otago) and El-Shadan Tautolo (AUT). The findings were presented to the Pacific Smokefree Network in Auckland (August 2018) and at two conferences in 2018.[1,2]

This updated report

Because there is a lot happening in the tobacco control sector this year, we wanted to update the findings and make them widely available to policy makers and Pacific communities. This report presents updated (2004–2019) data on adolescent smoking by Pacific ethnicity, provided by ASH, along with more detailed analyses (e.g. about risk factors) taken from our original study which includes only 2004–2015 data. Although this latter analysis does not include more recent data, we are confident that the key conclusions still hold, since adolescent smoking in Pacific ethnicities has changed little since 2015. Detail about the methods for the ASH survey and our analysis are provided in Appendix 1.

Peer review

This report was peer reviewed by Associate Professor Collin Tukuitonga (University of Auckland, ASH Board member) before publication.

How to read the information in this report

The ASH Year 10 Snapshot survey is a large survey, involving nearly half of New Zealand's Year 10 students each year. As such, the margin of error for population estimates such as smoking prevalence is small for Year 10 students overall. However, when reading this report, it is important to be aware that for smaller sub-populations (e.g. Niuean) the margin of error is large because of the number of survey participants in that group is small. The smaller the sub-population the less certain we can be that year to year variations represent 'real' changes in smoking prevalence rather than random variance. The uncertainty of the estimates is indicated by 95% confidence intervals (CI). For smoking prevalence estimates, CIs are provided in data tables in Appendix 2. Confidence intervals provide a range of values within which it is fairly certain that the true estimate lies. As a general rule, if the confidence intervals of two values do not overlap,

we can be reasonably confident that the difference between the two values is not due to chance. This is sometimes called a ‘statistically significant’ difference.

In this report we use odds ratios (ORs) to describe the association between a risk factor (or ‘exposure’) and an outcome (in this case, regular smoking). An OR gives the likelihood (or ‘odds’) of smoking in the exposed group compared to the group who are not exposed (the reference group). An OR of 1.0 indicates there is no difference between groups, and an OR of greater than 1.0 suggests that the exposed group are more likely to smoke than the reference group. For example, if the association between maternal smoking and adolescent smoking was OR 2.5, it means the odds of smoking among students whose mother smokes are 2.5 times greater than for students whose mothers don’t smoke. Odds ratios can also be used to compare the likelihood of smoking between different ethnicities compared to a reference ethnicity. Adjusted ORs control for other factors and allow us to estimate the *independent* association between a risk factor and an outcome (i.e. independent of the other factors). For example, we might find that after adjusting for socio-economic status and exposure to smoking in the home, the OR for maternal smoking reduces to 1.0, meaning maternal smoking is not independently associated with adolescent smoking. In other words, students whose mothers smoke are more likely to smoke due to low socio-economic status and exposure to second-hand smoke at home (which are both related to maternal smoking), rather than maternal smoking itself.

For preventing smoking in communities and populations, the most important risk factors are those that are both *common* (i.e. prevalence of exposure is high) and *strongly associated* with smoking (i.e. the OR is much greater than 1.0). Population attributable risk (PAR) is a measure that combines both these elements, allowing us to rank the importance of different risk factors in influencing smoking prevalence at the population level. The higher the PAR, the more important the risk factor for that ethnic group.

What’s happening in the tobacco control sector?

Now is an exciting time for tobacco control in Aotearoa. The Government has announced a draft plan aimed at achieving the Smokefree2025 goal.[3] The goal is to have minimal tobacco use and availability (i.e. less than 5% smoking prevalence across all ethnic groups) in Aotearoa by 2025. (Note: there is no plan to ban tobacco altogether). There is still a long way to go to achieve the goal, but the draft plan sets out a comprehensive set of initiatives that could realistically get us there, including more support for community action on smokefree cars and homes. To find out more about the plan, go to: https://www.health.govt.New Zealand/publication/proposals-smokefree-aotearoa-2025-action-plan

Last year Parliament passed a law to make all cars carrying children smokefree, and it will come into force later this year. From 28 November 2021, it will be against the law to smoke or vape in a vehicle that has young people (under 18 years of age) in it, whether the vehicle is moving or not.

Introduction

New Zealand's Pacific peoples

New Zealand's Pacific population was about 400,000 people (8% of the total population) at the 2018 Census,[4] with about two thirds born in New Zealand.[5] Almost half (49%) of New Zealand's Pacific residents are Samoan, followed by Cook Island Māori (21%), Tongan (20%) and Niuean (8%).[5] Each ethnicity has a distinct history, language and culture, which have continued to evolve in the New Zealand context, where new forms of Pacific identity and community have emerged.[6]

Pacific peoples constitute a young, fast growing population. Over half of New Zealand's Pacific population are aged under 25 years,[7] making preventive, youth-focused interventions particularly important for improving Pacific health.

Smoking and Pacific health

Smoking is a leading preventable cause of premature death and morbidity throughout the Pacific including New Zealand, where Māori and Pacific peoples are disproportionately affected.[8] In 2018/19, 24% of NZ Pacific adults were current smokers, well above the overall national prevalence of 14%.[9]

In 2011 the Government adopted a goal of making New Zealand a smokefree nation by 2025,[3] with an interim goal of halving Māori and Pacific smoking prevalence by 2018. However, smoking among Pacific adults has declined little since 2011, when it was 26%.[9]

More promisingly, adolescent smoking has declined dramatically since 2000 in all New Zealand's main ethnic groups, including Pacific. The proportion of Pacific Year 10 students (aged 14-15) who smoke regularly (monthly or more often) fell from 28% in 2000 to 7% in 2015, where it has hovered since.[10,11] However, ethnic disparities remain pronounced and smoking in Pacific adolescents is much more common than in NZ European adolescents.[12]

Smoking disparities reflect structural inequities and are a major cause of ill health in Māori and Pacific communities.[13,14] In order to achieve New Zealand's Smokefree 2025 goal there is an urgent need for evidence-informed action to eliminate ethnic disparities and reduce smoking in Pacific adults and Pacific youth.

Pacific diversity

New Zealand's Pacific peoples have distinct histories, cultures and languages. Pacific communities, leaders and researchers have consistently advocated against a 'one size fits all' approach to Pacific health.[15] Despite this, Pacific peoples are frequently treated as a single entity in health research and policy. Such aggregation risks obscuring important differences between Pacific ethnicities, and failure to allow for these differences could adversely affect the successful development and delivery of health interventions. Thus, a more nuanced investigation is necessary to provide ethnic-specific information about adolescent smoking among Pacific ethnicities in New Zealand.

What was already known about adolescent smoking in NZ Pacific ethnicities?

A report of findings from the ASH Year 10 Snapshot survey from 1999 to 2010 is one of few publications that presented smoking prevalence for different Pacific ethnicities in New Zealand.[16] It revealed marked differences with Cook Island adolescents having the highest regular smoking prevalence (24% for girls and 13% for boys) and Samoans the lowest (10% for girls and 9% for boys) in 2009/10.[16] More recent research by Te Hiringa Hauroa/Health Promotion Agency using data from the Youth Insights Survey also found marked differences between Pacific ethnicities for adolescent smoking in the 2014–2018 period.[17]

What this report adds

To date there has been little, if any, investigation into the reasons for such wide ethnic variation in adolescent smoking, nor analysis of key risk factors for smoking uptake in Pacific peoples. The objective of our study was to fill these knowledge gaps by describing recent trends in adolescent smoking and investigating the exposure to and importance of risk factors for smoking among different Pacific ethnic groups in New Zealand. This report presents the findings of that study and up to date data on adolescent smoking in NZ's Pacific ethnicities.

Methods

A detailed description of the methods are provided in Appendix 1.

This report is based on data from the ASH Year 10 Snapshot Survey series, an annual school-based survey of Year 10 students aged 14-15 years (N=20,000 – 30,000 per year). It presents updated data on adolescent smoking prevalence by Pacific ethnicity (provided by ASH) along with findings from an ASPIRE2025 study conducted in 2017 on risk factors for adolescent smoking in Pacific ethnicities.

For the presentation of smoking trends (2004 - 2019), data were pooled across two years to reduce random variation and reveal more clearly the underlying trend. For this component of the analysis (provided by ASH) the Ministry of Health ethnicity prioritisation protocol was applied.[18] Participants that identified with more than one ethnic group were allocated to a single ethnicity – Māori, then Pacific, then Asian, then non-Māori/non-Pacific. Thus, the smoking prevalence estimates for Pacific ethnicities reported here *do not include participants that also identify as Māori*. Within Pacific, the following prioritisation was used: Samoan > Cook Island Māori > Tongan > Niuean > Other Pacific, for consistency with previous ASH analyses.

For the more detailed analysis of risk factors and their association with adolescent smoking (from the 2017 study) only data from 2004-2015 were used, since these were the latest data available at the time. Those with dual Māori and Pacific ethnicity were included in the appropriate Pacific ethnicity. The prioritization used was: Niuean >Tongan> Cook Island>Samoan>Other Pacific > non-Māori/non-Pacific (NMNP). (Those with sole Māori ethnicity were not included in the analysis). This inclusive approach was appropriate given the Pacific-specific nature of the study and maximised the sample size for each ethnicity, and hence the statistical power of the study.

Adolescent smoking trends

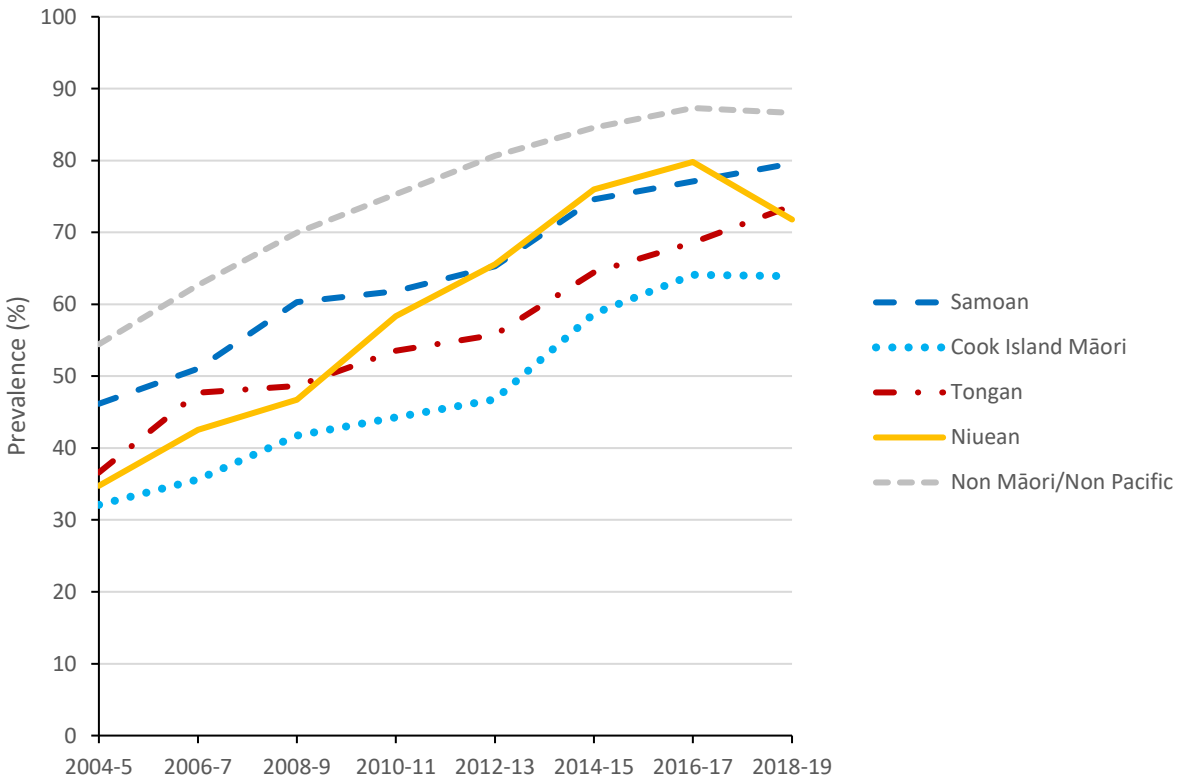
Never tried smoking

The proportion of Year 10 students who have never smoked (not even a puff) increased greatly between 2004 and 2019 in all ethnicities (Figure 1). By 2018/19, between 64% and 80% of Pacific Year10 students (14-15 years) had never smoked.

There were marked differences between Pacific ethnicities, with the proportion who had never smoked highest in Samoan adolescents and lowest in Cook Island Māori adolescents in most years. Non-Māori/Non-Pacific adolescents were more likely to be completely smokefree than any Pacific ethnicity.

The proportion of Niuean students who have never smoked appears to have fallen sharply since 2016/17. However, it should be noted that, because the number of Niuean students surveyed is small, there is a lot of random variation year to year for this group. The change since 2016/17 is within the margin of error (i.e. it might be due to chance.)

Figure 1: Proportion (%) of Year 10 students who have never smoked by ethnicity, 2004–2019

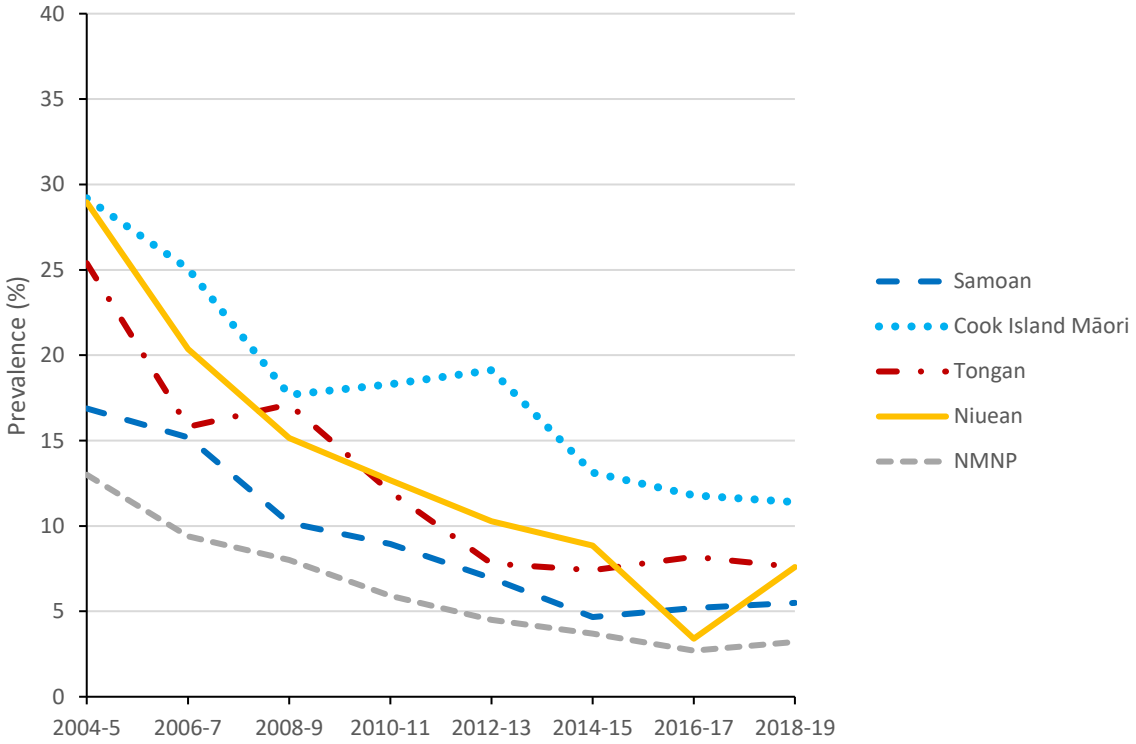


Regular smoking

The proportion of Year 10 students who smoke regularly (at least one a month) declined greatly in all ethnicities between 2004 and 2019 (Figure 2). Since about 2014/15, the declines appear to have slowed, stalled or reversed. The increase in regular smoking among non-Māori/non-Pacific since 2016/17 was statistically significant, but recent changes for other ethnicities were within the margin of error.

There were marked differences between Pacific ethnicities, with regular smoking highest in Cook Island Māori and lowest in Samoan students for most of the study period. In 2018/19 regular smoking prevalence was 6% in Samoan, 11% in Cook Island Māori, and 8% in both Tongan and Niuean Year 10 students. Prevalence of regular smoking was lower in Non-Māori/Non-Pacific (3%) than in any Pacific ethnicity.

Figure 2: Regular smoking prevalence (%) in Year 10 students by ethnicity, 2004 – 2019

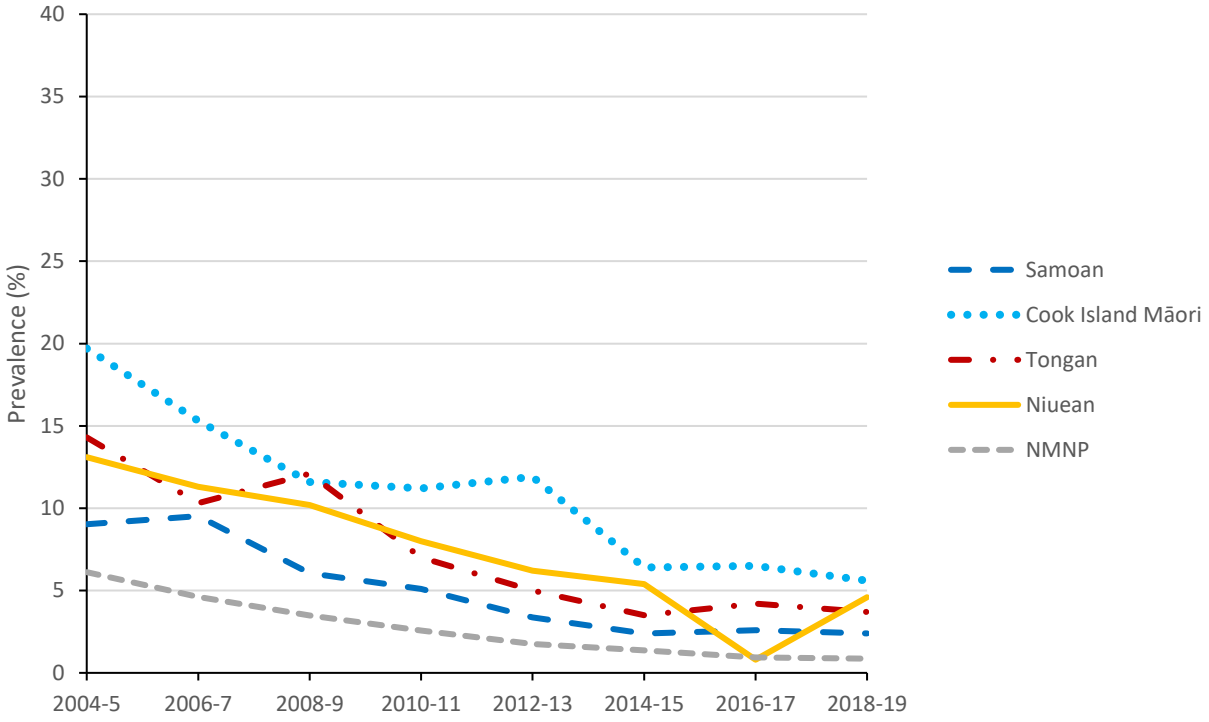


Note that the estimates above exclude participants with dual Māori and Pacific ethnicity because they are counted as Māori under the Ministry of Health ethnicity prioritization protocol[18] used by ASH. When those who also identify as Māori are included, estimated prevalence of regular smoking in 2018/19 is 8% in Samoan, 13% in Cook Island Māori, 9% in Tongan and 12% in Niuean Year 10 students.

Daily smoking

Daily smoking in Year 10 students has declined markedly since 2004 but the decline appears to have slowed or stopped in all ethnicities in recent years (Figure 3). In 2018/19 daily smoking was highest in Cook Island Māori students (5.6%), followed by Niuean (4.6%), Tongan (3.7%), Samoan (2.4%) and Non-Māori/Non-Pacific (1%) students.

Figure 3: Daily smoking prevalence (%) in Year 10 students by ethnicity, 2001–2019



Note that the estimates above exclude participants with dual Māori and Pacific ethnicity. When those who also identify as Māori are included, estimated prevalence of daily smoking in 2018/19 was 6.2% in Cook Island Māori, 4.7% in Niuean, 3.9% in Tongan, and 3.6% in Samoan students.

Summary

Never smoking has increased and smoking has decreased greatly in adolescents of New Zealand's four largest Pacific ethnicities over the past 15 years. However, most of the decline was concentrated in the decade from 2004/5 to 2014/15. Progress appears to have largely stalled since 2014/15 for most Pacific ethnicities and for non-Māori/non-Pacific.

We found big differences in adolescent smoking rates between Pacific ethnicities. Over the study period, smoking was generally lowest in Samoan and highest in Cook Island Māori adolescents. This is consistent with earlier studies.[16,17] Adolescent smoking in all four Pacific ethnicities was higher than in non-Māori/non-Pacific students.

Key risk factors for youth smoking

Risk factors are things that make young people more likely to smoke. Reducing exposure to risk factors can help to prevent smoking uptake. The risk factors we looked at in this study were: parental smoking, older sibling smoking, exposure to second-hand smoke at home and in vehicles, and best friend smoking. Note that this is not the full range of risk factors (there are many others) but we were limited to the factors for which there was data available from the ASH Year 10 Snapshot survey.

Association with smoking

Some factors increase the risk of smoking more than others (in other words, their *association* with smoking is stronger). We found, for all ethnicities, best friend smoking had the strongest independent association with regular smoking, after adjusting for demographic factors and the other risk factors in the study. The next strongest independent association was exposure to smoking in vehicles for Samoan and Niuean, smoking in the home for Cook Island Māori, both parents smoking for Tongan, and older sibling(s) smoking for non-Māori/non-Pacific.

The most important risk factors at the community/population level

For preventing smoking in communities and populations, the most important risk factors are preventable factors that are both *common* (i.e. prevalence of exposure is high) and *strongly associated* with smoking. Population attributable risk (PAR) is a measure that combines both these elements, allowing us to rank the importance of difference risk factors at the population level. The higher the PAR, the more important the risk factor for that ethnic group.

The patterns of the PARs were similar for non-Māori/non-Pacific, Samoan, Tongan and Cook Island Māori ethnicities. The highest PARs were for best friend smoking (ranging from 45.7% for Tongan to 55.6% for non-Māori/non-Pacific), and the second highest PAR was for past week exposure to smoking in the home, though this was much higher for Samoans (31%) and Cook Island Māori (46.1%) than for Tongans (19.6%) or non-Māori/non-Pacific (17.5%). The next most important risk factor for most ethnicities was smoking in cars. The PAR for this risk factor was higher in Samoans (26%) than for Cook Island Māori (15%), Tongans (10.5%) and non-Māori/non-Pacific (10.8%). The pattern for Niuean adolescents was different with the PARs for best friend smoking, exposure to smoking in the home, and exposure to smoking in cars all substantial and similar in size (32.4% to 39.2%). The PARs for parental and older sibling smoking were modest for all Pacific ethnicities and non-Māori/non-Pacific.

Summary

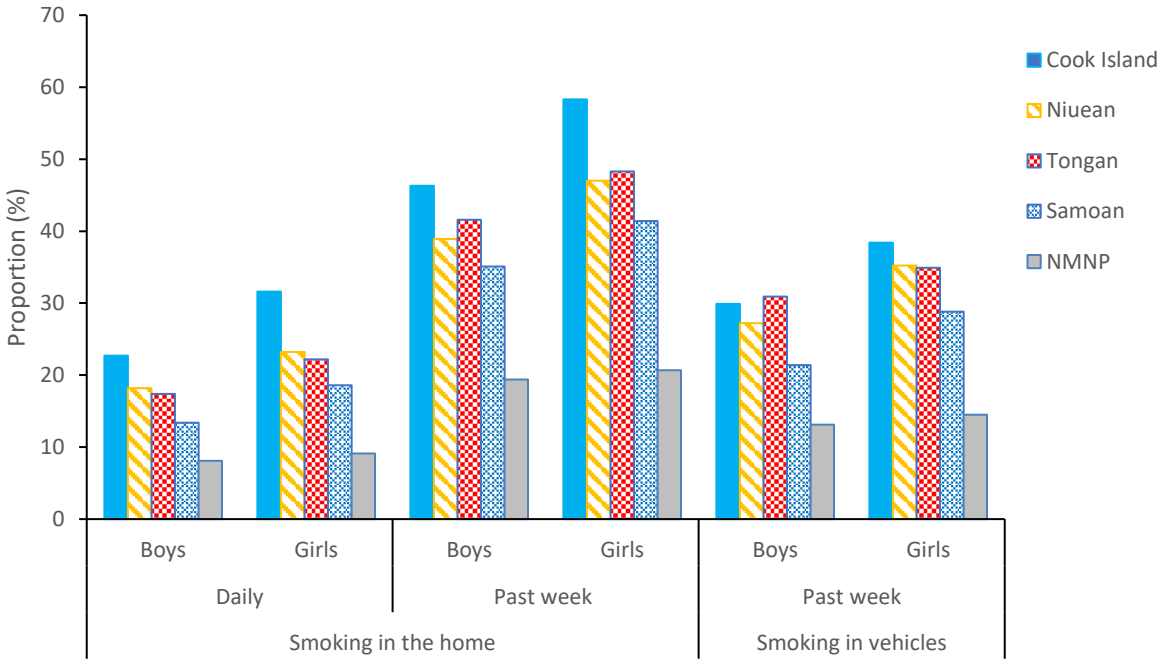
Broadly, the important risk factors for adolescent smoking were similar across ethnicities. ‘Best friend smoking’ was the strongest independent risk factor for smoking in all ethnicities, but it is not a factor that is modifiable through policy changes or community action. Therefore, out of the factors we investigated, exposure to second-hand smoke (in the home and in vehicles) was the most important modifiable risk factor in all Pacific ethnicities. Initiatives to encourage people to ‘take the smoke outside’ and reduce smoking in cars are therefore potentially very important for youth smoking prevention in Pacific communities.

What explains ethnic differences?

Compared with non-Māori/non-Pacific (with a prevalence of 3.8%), prevalence of regular smoking was about one and a half times higher in Samoan (5.9%), about twice as high in Tongan (7.7%), three times higher in Niuean (10.2%) and almost four times higher in Cook Island Māori (14.2%) students in 2013–15. We found that ethnic differences in adolescent smoking were largely explained by differences in socio-economic status and differing exposure to key risk factors.

For example, in the 2013–15 period, Pacific students were 2-4 times more likely to report both their parents smoked compared to non-Māori/non-Pacific students. Pacific adolescents of all ethnicities were also much more likely to be exposed to second-hand smoke in the home and in cars than non-Māori/non-Pacific adolescents (Figure 2). Girls reported higher exposure in both settings than boys in all Pacific ethnicities. In 2013–15, the highest exposures were seen in Cook Island Māori adolescents with 53% and 35% exposed to past week smoking in homes and vehicles respectively.

Figure 4: Proportion (%) exposed to smoking in the home and in vehicles, by ethnicity and gender, 2013–15



We used logistic regression to test whether key risk factors – socio-economic status (school decile), parental smoking, sibling smoking, best friend smoking and past week exposure to

second-hand smoke at home and in cars – accounted for these ethnic differences in adolescent smoking. (We also included age and gender in the model to account for the possibility of differing age or gender structures by ethnicity). After adjusting for these factors, there was no meaningful difference in adolescent smoking between non-Māori/non-Pacific, Samoan, Tongan and Niuean ethnicities. However, Cook Island Māori adolescents continued to have an elevated risk of smoking compared with other ethnicities, even after adjustment (Table1).

Table 1: Prevalence of regular smoking and association with ethnicity, 2013–15 (pooled)

	Unadjusted smoking prevalence	Unadjusted OR	95% CI	Fully Adj OR*	95% CI
NMNP (reference)	3.8%	1.0		1.0	
Samoan	5.9%	1.6	(1.3, 1.9)	1.0	(0.8, 1.2)
Tongan	7.7%	2.2	(1.8, 2.7)	1.1	(0.8, 1.3)
Niuean	10.2%	3.0	(2.2, 3.9)	1.2	(0.8, 1.6)
Cook Island Māori	14.2%	3.9	(3.2, 4.6)	1.7	(1.4, 2.1)

* Adjusted for age, gender, school decile, parental smoking, sibling smoking, best friend smoking, past week exposure to smoking in the home, past week exposure to smoking in cars.

CI: Confidence Interval

Summary

Ethnic differences in adolescent smoking are largely explained by differences between ethnicities in socioeconomic status, parental smoking, exposure to second-hand smoke at home and in vehicles and other risk factors in the study. Even after adjusting for these factors, Cook Island Māori students had higher rates of adolescent smoking than other ethnicities, suggesting that there are additional factors (not included in our study) underlying high smoking prevalence in this ethnic group.

Samoan findings

Smoking prevalence and trends for Samoan adolescents, 2004–2019

As shown in Figures 5 and 6, smoking in Samoan Year 10 students has declined markedly since 2004. However, since 2014/15 progress has stalled and, for regular smoking, the gap between Samoan and non-Māori/non-Pacific has widened.

Figure 5: Regular smoking in Samoan Year 10 students, 2004-2019

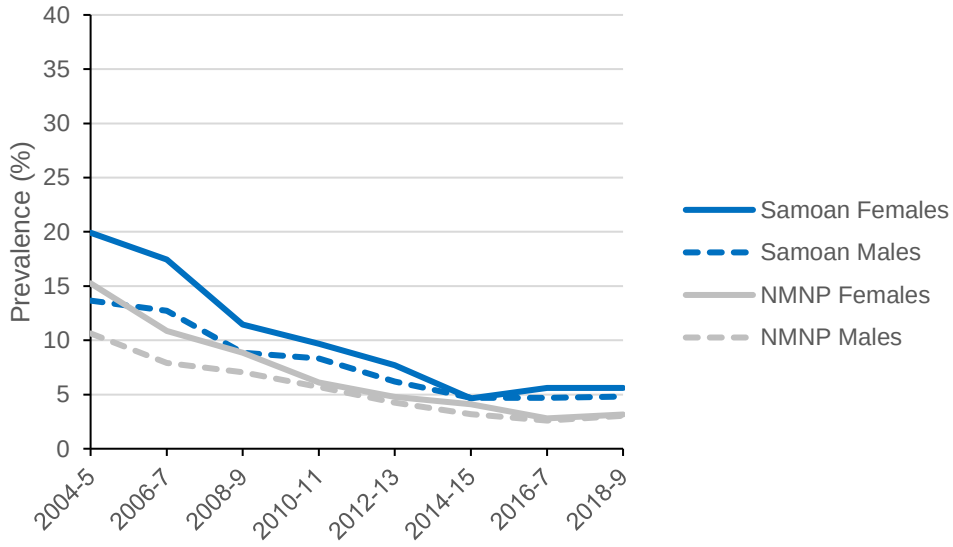
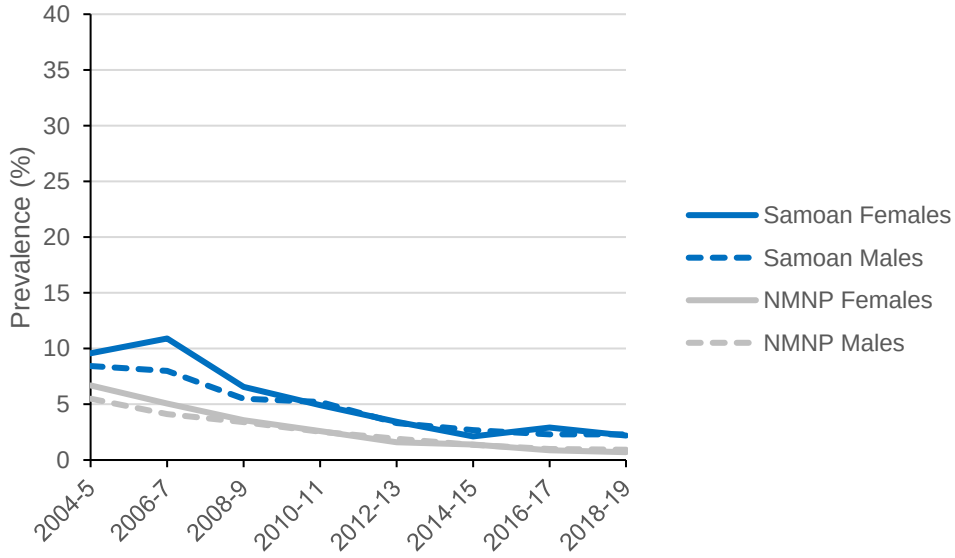


Figure 6: Daily smoking in Samoan Year 10 students, 2004-2019



Risk factors for smoking in Samoan adolescents

Trends for risk factors (2004–2015) are presented in Table 2. For Samoan students, parental smoking and exposure to smoking in the home declined modestly. Other risk factors declined more substantially over time.

Table 2: Prevalence (%) of exposure to risk factors for Samoan Year 10 students, 2004-2015

	2004–06 N=3,327	2007–09 N=3,496	2010–12 N=4,318	2013–15 N=3,580
Maternal smoking	31.9	30.3	28.9	27.3
Paternal smoking	36.5	33	31.3	29.8
Both Parents Smoke	19.1	17.2	15.8	15.6
Older Sibling(s) smoke	33.4	29.3	27.7	23.8
Past week exposure to smoking in the home	46.3	39.8	42.0	38.2
Past week exposure to smoking in vehicles	41.6	34.8	32.1	25.0

Table 3 shows exposure to smoking in the home (PAR 31%) and in vehicles (PAR 26%) were the most important modifiable risk factors for Samoan adolescents. (Best friend smoking had a higher PAR of 51% but cannot be considered a modifiable factor).

Table 3: Risk factors for smoking in Samoan Year 10 students: association with smoking and population attributable risk, 2013–2015 (pooled)

	Adjusted* OR (95% CI)	Population attributable risk (PAR)
Past week smoking in home	2.2 (1.4, 3.3)	31.0%
Past week smoking in vehicles	2.4 (1.7, 3.5)	26.2%
Only mother smokes	0.8 (0.5, 1.5)	-2.1%
Only father smokes	1.1 (0.7, 1.8)	1.3%
Both parents smoke	1.1 (0.7, 1.8)	1.5%
Older sibling(s) smoke	1.4 (1.0, 2.0)	8.6%
Best friend smokes	10.4 (7.3, 14.8)	50.8%

**Models are adjusted for age gender, school decile and all the other risk factors in the table OR: Odds ratio. CI: Confidence Interval*

Cook Island Māori Findings

Smoking prevalence and trends for Cook Island Māori adolescents, 2004–2019

As shown in Figures 7 and 8, smoking in Cook Island Māori Year 10 students has declined markedly since 2004, particularly among girls. However, progress appears to have slowed since 2014/15, and the gap between Cook Island Māori and non-Māori/non-Pacific remains substantial.

Figure 7: Regular smoking prevalence in Cook Island Māori Year 10 students, 2004–2019

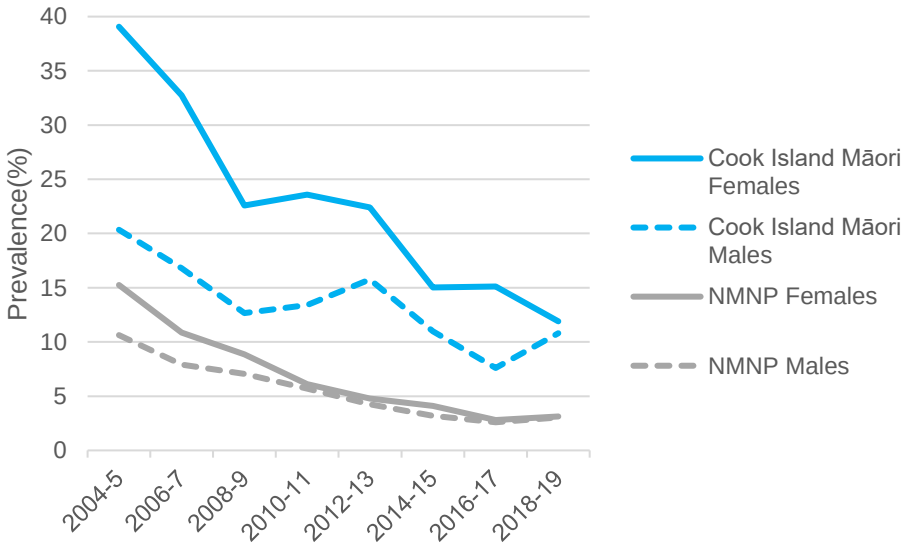
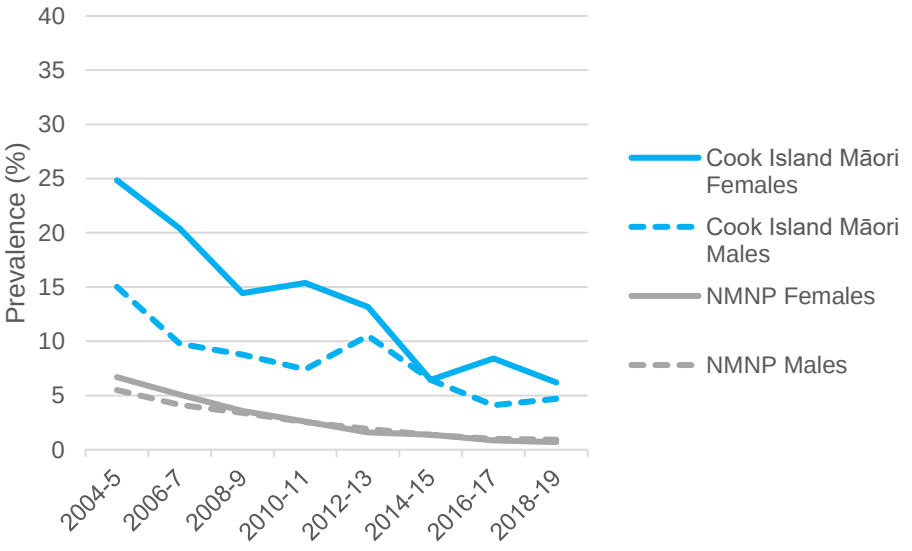


Figure 8: Daily smoking prevalence in Cook Island Māori Year 10 students, 2004–2019



Risk factors for smoking in Cook Island Māori adolescents

Trends for risk factors (2004–2015) are shown in Table 4. Cook Island Māori adolescents' exposure was highest among Pacific ethnicities for all factors. Parental smoking and exposure to smoking in the home declined only slightly over the study period, while declines in other risk factors were more substantial.

Table 4: Prevalence (%) of exposure to risk factors, Cook Island Māori adolescents, 2004–2015

	2004–06 N=1,689	2007–09 N=1,544	2010–12 N=1,952	2013–15 N=1,595
Maternal smoking	47.8	47.4	46.9	45.1
Paternal smoking	42.3	40.7	42.3	39.0
Both Parents Smoke	27.9	27.5	27.8	26.0
Older Sibling(s) smoke	43.1	40.5	38.5	33.8
Past week exposure to smoking in the home	56.1	52.9	56.0	52.8
Past week exposure to smoking in vehicles	48.5	42.6	40.8	34.5

Table 5 shows exposure to smoking in the home (PAR 46.1%) was by far the most important modifiable risk factor for Cook Island Māori adolescents. (Best friend smoking had a higher PAR of 52% but cannot be considered a modifiable factor).

Table 5: Risk factors for smoking, Cook Island Māori adolescents: association with smoking and population attributable risk, 2013–2015 (pooled)

	Adjusted* OR (95% CI)	Population attributable risk (PAR)
Past week smoking in home	2.6 (1.7, 4.1)	46.1%
Past week smoking in vehicles	1.5 (1.1, 2.2)	15.0%
Only mother smokes	0.8 (0.5, 1.4)	-3.5%
Only father smokes	0.7 (0.4, 1.3)	-3.9%
Both parents smoke	1.0 (0.6, 1.5)	-1.1%
Older sibling(s) smoke	1.4 (1.0, 2.0)	11.1%
Best friend smokes	6.7 (4.7, 9.4)	51.9%

**Models are adjusted for age gender, school decile and all the other risk factors in the table OR: Odds ratio. CI: Confidence Interval*

Tongan findings

Smoking prevalence and trends

As shown in Figures 9 and 10, smoking in Tongan Year 10 students has declined markedly since 2004. However, progress has stalled since 2012/13 and the gap between Tongan and non-Māori/non-Pacific remains substantial.

Figure 9: Regular smoking in Tongan Year 10 students, 2004–2019

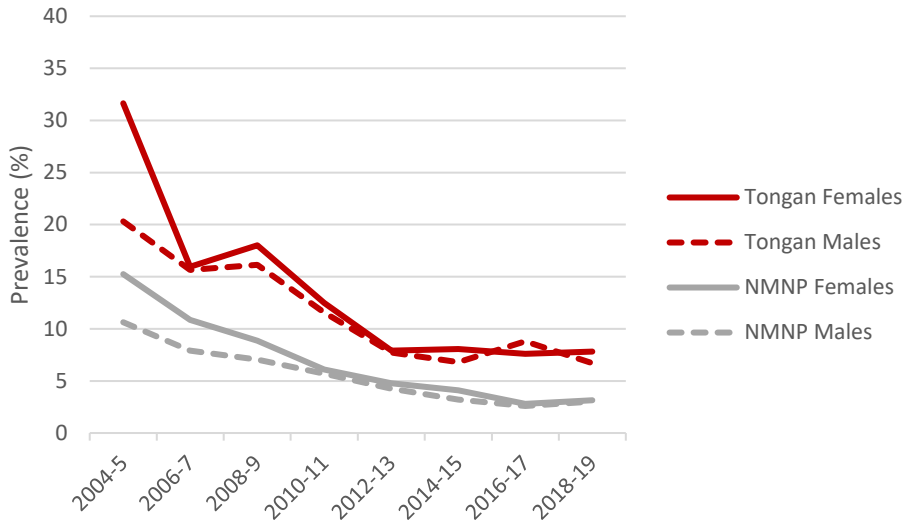
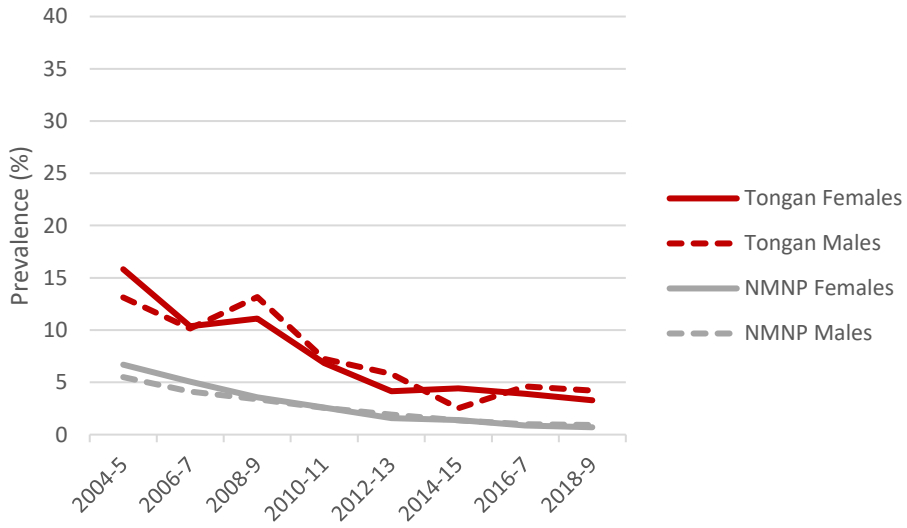


Figure 10: Daily smoking in Tongan Year 10 students, 2004–2019



Risk factors for smoking in Tongan adolescents

Trends for risk factors (2004–2015) are shown in Table 6. There was little change in maternal smoking over time. Exposure to other risk factors decreased modestly.

Table 6: Prevalence (%) of exposure to risk factors, Tongan adolescents, 2004–2015

	2004–06 N=1,283	2007–09 N=1,571	2010–12 N=2,066	2013–15 N=2,019
Maternal smoking	26.7	25.5	26.2	24.8
Paternal smoking	41.4	36.2	35.9	33.7
Both Parents Smoke	18.6	16.0	16.1	14.0
Older Sibling(s) smoke	36.6	32.4	31.4	27.3
Past week exposure to smoking in the home	50.6	47.1	48.3	44.7
Past week exposure to smoking in vehicles	46.5	41.2	35.9	32.8

Table 7 shows exposure to smoking in the home (PAR 19.6%) was the most important modifiable risk factor for Tongan adolescents. (Best friend smoking had a higher PAR of 45.7% but cannot be considered a modifiable factor).

Table 7: Risk factors for smoking, Tongan adolescents: association with smoking and population attributable risk, 2013–2015 (pooled)

	Adjusted* OR (95% CI)	Population attributable risk (PAR)
Past week smoking in home	1.5 (1.0, 2.5)	19.6%
Past week smoking in vehicles	1.4 (0.9, 2.1)	10.5%
Only mother smokes	0.8 (0.4, 1.6)	-2.3%
Only father smokes	0.8 (0.5, 1.4)	-4.0%
Both parents smoke	1.8 (1.1, 3.0)	10.8%
Older sibling(s) smoke	1.5 (1.0, 2.3)	12.1%
Best friend smokes	6.8 (4.6, 10.2)	45.7%

**Models are adjusted for age gender, school decile and all the other risk factors in the table OR: Odds ratio. CI: Confidence Interval*

Niuean findings

Smoking prevalence and trends

Due to the small sample size for this ethnicity, the margin of error is large and it is difficult to interpret recent trends. Over the study period as a whole, smoking has declined among Niuean students (Figures 11 and 12).

Figure 11: Regular smoking prevalence in Niuean Year 10 students, 2004–2019

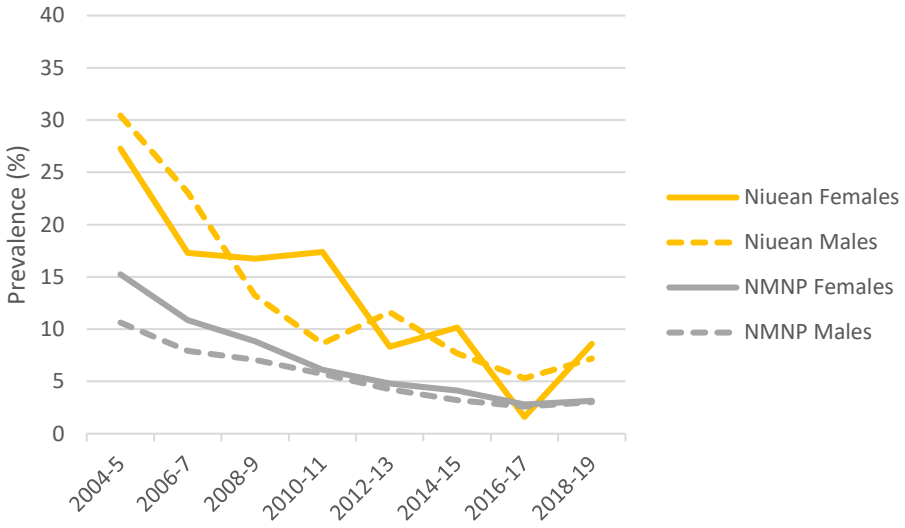
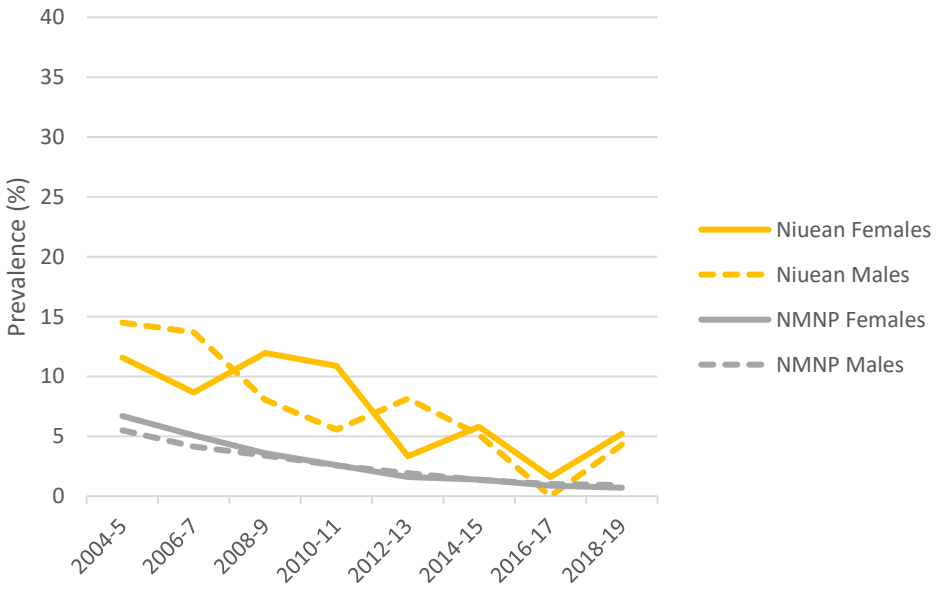


Figure 12: Daily smoking prevalence in Niuean Year 10 students, 2004–2019



Risk factors for smoking in Niuean adolescents

Trends for risk factors (2004–2015) are shown in Table 8. There was no meaningful change in paternal smoking, but exposure to other risk factors decreased over time.

Table 8: Prevalence (%) of exposure to risk factors, Niuean adolescents, 2004–2015

	2004–06 N=743	2007–09 N=765	2010–12 N=860	2013–15 N=682
Maternal smoking	41.9	39.6	39.4	35.5
Paternal smoking	38.9	38.7	37.2	38.0
Both Parents Smoke	25.4	23.9	23.4	20.9
Older Sibling(s) smoke	41.2	39.2	36.5	29.9
Past week exposure to smoking in the home	52.7	45.8	52.2	43.2
Past week exposure to smoking in vehicles	43.0	44.4	37.3	31.4

Table 9 shows exposure to smoking in vehicles (PAR 39.2%) and in the home (PAR 32.4%) were the most important modifiable risk factors for Niuean adolescents. (Best friend smoking also had a high PAR of 36.5% but cannot be considered a modifiable factor).

Table 9: Risk factors for smoking, Niuean adolescents: association with smoking and population attributable risk, 2013–2015 (pooled)

	Adjusted* OR (95% CI)	Population attributable risk (PAR)
Past week smoking in home	2.1 (1.0, 4.6)	32.4%
Past week smoking in vehicles	3.1 (1.6, 6.0)	39.2%
Only mother smokes	1.6 (0.6, 4.0)	7.6%
Only father smokes	1.2 (0.5, 3.2)	3.7%
Both parents smoke	1.0 (0.4, 2.4)	-0.6%
Older sibling(s) smoke	0.9 (0.5, 1.7)	-2.5%
Best friend smokes	4.2 (2.2, 7.8)	36.5%

**Models are adjusted for age gender, school decile and all the other risk factors in the table OR: Odds ratio. CI: Confidence Interval*

Discussion

Key findings

Adolescent smoking decreased among all Pacific ethnicities over the study period, however progress has slowed or stalled in recent years (2014/15 to 2018/19). Prevalence of regular smoking differed markedly by Pacific ethnicity. Ethnic differences in adolescent smoking were largely explained by differences in socio-economic status and exposure to established risk factors (in particular exposure to second-hand smoke), which suggests the increased risk of smoking among Pacific adolescents is preventable. The persisting higher risk among Cook Island Māori even after adjustment is concerning and suggests targeted preventive interventions may be required for this population. Further research is needed to understand the high smoking prevalence in Cook Island Māori, and additional risk factors to be targeted.

What are the preventable risk factors to focus on?

Exposure to second-hand smoke in the home and, for some ethnicities, in cars were the most important preventable risk factors for adolescent smoking identified in this study. This was particularly true for Cook Island Māori, Samoan and Niuean adolescents, who had much higher Population Attributable Risk for second-hand smoke exposure than did Tongan and Non-Māori/Non-Pacific adolescents.

The association between exposure to second-hand smoke and adolescent smoking uptake is well established in the literature.[19] Possible causal pathways include both pro-smoking socialisation and the physiological effects of second-hand smoke exposure on the brain, priming young non-smokers for nicotine addiction.[20-22] If indeed the association is causal, improving the protection of children and adolescents from tobacco smoke will help to prevent smoking uptake among adolescents. To that end, New Zealand's new Smokefree Cars legislation disallowing smoking in cars carrying children aged under 18, which will come into effect in November 2021, is an important milestone. From early 2021, a 'Drive smokefree for tamariki' campaign has been run by Te Hiringa Hauroa/Health Promotion Agency. The positive impact of this legislation and associated campaign on children's exposure to second-hand smoke and adolescent smoking uptake should be monitored, along with any adverse effects on Māori and Pacific communities (e.g. stigma, unfair police targeting).

We found best friend smoking had the highest PAR across ethnicities, which is consistent with previous research.[17,23] However, because survey respondents and their best friends are part of the same population, it is not feasible to reduce 'best friend' smoking without also reducing smoking in adolescents overall. Because of the potential circularity of this factor and lack of feasible interventions to address it, best friend smoking cannot be considered a preventable risk factor.

It is interesting that, for most ethnicities, parental smoking was not an independent risk factor for adolescent smoking when other factors (exposure to second-hand smoke, older sibling smoking, best friend smoking and demographic factors) had been controlled for.

What Pacific-specific interventions are recommended?

Despite New Zealand's overall tobacco control success, ethnic differences in smoking remain pronounced, and further efforts are needed to prevent smoking uptake in New Zealand's Pacific communities. So, what Pacific-specific interventions might be encouraged?

- Firstly, effective communication of the new Smokefree cars rules (and the reasons behind them) to Pacific communities will be important, to maximise behaviour change.

- Secondly, interventions to support smokefree homes are recommended, such as social marketing campaigns and associated community-level action to encourage people (if they cannot quit) to "take the smoke outside". Increasing the prevalence of smokefree homes and cars is not only likely to reduce smoking uptake in adolescents, but will also improve respiratory health of the whole household, particularly young children.[24]

- Despite parental smoking not being found to be an independent risk factor, interventions that support Pacific adults to quit will reduce children's and adolescents' exposure to secondhand smoke, and hence will help reduce smoking uptake and advance the achievement of Smokefree 2025.

It is important to note that we were only able to investigate a small number of risk factors, and there may be other modifiable factors that could be the target for interventions. Further research would therefore be useful to explore other potential risk factors and to evaluate the impact of interventions.

While the key risk factors to be targeted are likely to be similar across ethnicities (e.g. exposure to second-hand smoke at home and in cars), interventions should be culturally tailored and appropriate. For example, social marketing interventions should use Pacific languages and imagery and appeal to Pacific values.

The Covid19 experience has highlighted the importance of Pacific leadership, and the way Pacific communities mobilise effectively, given the opportunity and resources to do so. Lessons from the Covid response may also applicable to the implementation of the Smokefree2025 Action Plan in Pacific populations.[25] Intervening in places where Pacific peoples gather (churches, sports and other community groups) using community-led and family-centred approaches is likely to be more effective for Pacific peoples than general population interventions.[26] Evaluation of the effectiveness of such targeted interventions in changing norms and behaviours in Pacific communities (relative to general population approaches) is an area for future research.

The importance of 'upstream' factors

Although our study seems to have captured most of the important proximal predictors of adolescent smoking, the findings should be viewed in the context of 'upstream' factors such as socio-economic disadvantage, ethnic discrimination and colonisation which are also important determinants of smoking, and may help to explain higher exposure to proximal risk factors in Pacific adolescents.[13,14,27,28] New Zealand's Pacific peoples are generally less advantaged in income, education, housing, and health compared to their European counterparts.[29] Government action to remove structural barriers to the social and economic wellbeing of New Zealand's Pacific populations is needed. Such action will improve the health of Pacific peoples, reduce health inequities, and is likely to reduce smoking uptake in Pacific adolescents.

Recent research by Te Hiringa Haurora highlights that adolescent substance use is highest in adolescents from New Zealand's Pacific Realm countries (i.e. those in which the monarch of New Zealand functions as head of state) such as the Cook Islands and Niue, and posits the possible effects of colonisation by New Zealand as a factor.[17] Further research is needed to understand how migration patterns, acculturation and colonisation may impact on smoking in Pacific peoples, and may help to explain higher smoking prevalence in people of Cook Island descent.

What accounts for New Zealand's success in reducing adolescent smoking?

With shared Smokefree 2025 goals, there is potential for New Zealand and other Pacific nations to learn from one another's successes. New Zealand has achieved remarkable success in reducing adolescent smoking, including among Pacific adolescents. This is likely due to the synergistic effects of a comprehensive range of tobacco control interventions over the past 30 years including tobacco tax increases, a ban on tobacco advertising and sponsorship, youth-focused social marketing campaigns (e.g. 'Smoking, not my future' and 'Stop before you start'), implementation and enforcement of a minimum purchase age of 18 years, reduction in the amount of duty free tobacco that can be brought into the country, a point-of-sale display ban, and measures to stop tobacco industry influence. Many of these policies have been found to be effective in a range of contexts and are recommended by the World Health Organisation in the MPOWER policy package.[30]

Concerningly, this report shows the decline in smoking in NZ Pacific adolescents has largely stalled, and another study (based on the same data set) shows regular smoking has significantly increased in Māori and non-Māori/non-Pacific, since 2016.[31] Hence, a renewed focus on smoking prevention is needed. Our findings suggest that reducing smoking prevalence in the general population and protecting people from tobacco smoke (the 'P' in MPOWER) may be particularly important for preventing smoking uptake in Pacific young people, and should be prioritised both in New Zealand and across the Pacific. Investing in national-level tobacco control monitoring and research across the Pacific should also be a priority, to inform locally-tailored policy and programme development. Given the youthful profile of Pacific populations, preventive interventions and monitoring of adolescent smoking in New Zealand and across the Pacific is particularly important.

Strengths and limitations of the study

Key strengths of the study were its large sample size, allowing analysis by specific Pacific ethnicity (at least for the four largest Pacific ethnicities in New Zealand), and consistent question wording, enabling robust trend analysis. A limitation was the use of cross-sectional data, meaning causality for the observed associations (and their direction) is uncertain. Also, the range of potential risk factors for smoking in the dataset was limited. For example, we did not have data on parental attitudes towards smoking or parent-child connectedness, which have been shown to be important determinants of adolescent smoking in previous New Zealand research.[17,32] Further, e-cigarette use, an emerging issue in Pacific adolescents, was not covered in the current study and remains to be explored in future research.

It should be noted that much of the analysis in this report was conducted in 2017. Only the overall smoking trend analysis incorporates more recent data collected since the original study was initiated. However smoking prevalence in Pacific adolescents has changed little since 2015, so inclusion of more recent data would be unlikely to make a substantive difference to our findings.

Smoking trend graphs use prioritised ethnicity data and exclude individuals with dual Māori and Pacific ethnicity, which may result in underestimates of smoking prevalence for Pacific ethnicities. Estimates for the most recent period (2018-19) both including and excluding individuals who also identify as Māori are provided in the text on p11-12. The analysis of risk factors includes individuals with dual Māori and Pacific ethnicity. The lack of consistency in ethnicity categorization is due to this report drawing on analyses completed by different organisations for different purposes, and could be considered a limitation. However, key findings were consistent across prioritisation methods e.g. Samoan adolescents had the lowest smoking rates and Cook Island Māori the highest using both methods. For future Pacific-specific analyses, consideration should be given to using total ethnicity to investigate adolescent smoking in specific Pacific ethnicities. This would maximise sample size (and therefore statistical power) for each ethnicity and provide a more inclusive approach.

Conclusions

If New Zealand's Smokefree 2025 goal is to be achieved, urgent action is needed to prevent smoking uptake in youthful Pacific populations and reduce smoking rates in Pacific adults. Declines in smoking in Pacific adolescents achieved between 2004/5 and 2014/15 are impressive, but it is concerning to see progress slowing or stalling in more recent years. Although New Zealand has been successful in reducing smoking among adolescents overall, persistent ethnic differences must be addressed. This study shows that adolescents of different Pacific ethnicities differ in their smoking practices and exposure to risk factors. Such heterogeneity is important to recognise and should inform prevention efforts. Our findings highlight the importance of reducing exposure to second-hand smoke, and point to the potential of ethnic-specific, community-led prevention strategies. To reduce smoking and enhance Pacific wellbeing more broadly, structural inequities must also be addressed

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Appendix 1: Methods

This report is based on data from the ASH Year 10 Snapshot Survey series, an annual school-based survey of Year 10 students (14–15 years old). Note that it was not conducted in 2020 due to the Covid19 pandemic. Therefore 2019 is the most recent data available.

Survey design

The ASH Year 10 Snapshot is a census-style survey. All public and private schools with Year 10 students are eligible and invited to participate. Further details on survey methodology are available elsewhere.[33]

Ethics

The survey was approved, as a component of the New Zealand Youth Tobacco Monitor, by the Ministry of Health Multiregional Health and Disability Ethics Committee in 2007.

Participants and response rate

The sample (N=20,443 – 31,883 per year) comprised 34%-52% of the NZ Year 10 population each year, and closely resembled the Year 10 population. Non-response occurred mainly at the school level. From 2004-2015, school response rates ranged from 39-67%.

Classification of ethnicity

For the trend analysis (2004–2019) participants that identified with more than one ethnic group were allocated into a single ethnicity following the Ministry of Heath prioritisation protocol:[18] Māori, then Pacific, then Asian, then non-Māori/non-Pacific. Thus, the smoking prevalence estimates for Pacific ethnicities in this report do not include participants who also identified as Māori (e.g. a student who identified as both Māori and Niuean would be counted as Māori). Within Pacific, ethnicity was prioritised Samoan > Cook Island Māori >Tongan > Niuean > Other Pacific. This is the standard approach used by ASH and means that the findings presented here are comparable with findings previously reported by ASH, e.g. in ASH Year 10 Snapshot factsheets.

For the more detailed analysis of risk factors, those with dual Māori-Pacific ethnicity were included in the appropriate Pacific ethnicity (e.g. a student who identified as both Māori and Niuean would be counted as Niuean). Within Pacific, ethnicity was prioritised: Niuean >Tongan> Cook Island>Samoan>other Pacific peoples. The non-Māori/non-Pacific ethnic comparator group comprised those of neither Māori nor of any Pacific ethnicity. The group classified as “Other Pacific” included diverse Pacific ethnicities likely to have varying exposures and smoking rates. It was therefore difficult to interpret results for this group, and results are not presented in this report. Results for similar investigations among Māori are available elsewhere.[23]

Variables

The outcome variable, 'regular smoking' (Y/N) was defined as smoking at least monthly, based on the question: 'How often do you smoke now?'

Demographic variables were age (14 or 15 years old), gender (male or female), and school decile (1-10, where 1 is most deprived). School decile is a school-level measure of the socio-economic position of a school's student community.[34]

Established risk factors included in the analysis were smoking status of family members and best friend and exposure to smoking in the home and car. Smoking status of mother, father, older sibling(s), and best friend were based on the question 'Which of the following people smoke?' with a dichotomous variable (current smoker, yes/no) created for each. Parental smoking was grouped into one variable for the multivariable analysis, coded 0 = neither parent smokes, 1 = only mother smokes, 2 = only father smokes, 3 = both parents smoke.

Past week exposure to smoking in the home was based on the question 'During the past 7 days, on how many days have people smoked around you in your home?' Response categories were 0 days, 1-2 days, 3-4 days, 5-6 days and 7 days. A response of 7 days was categorised as 'Daily exposure' and any response above 0 days was categorised as 'Past week exposure'. Past week exposure to smoking in vehicles was based on the question: 'During the past 7 days, did anyone smoke in your presence while you were travelling in cars or vans?' with a dichotomous (Yes/No) response.

Analysis

For the presentation of smoking trends (2004 – 2019), data were pooled across two years to reduce random variation and reveal more clearly the underlying trend.

To increase statistical power for more detailed subgroup analysis of risk factors, data from three years were combined to create four time-periods: 2004-06, 2007-09, 2010-12 and 2013-15. We tabulated prevalence of exposure to risk factors by ethnicity for each time period.

Multivariable logistic regression (PROC Glimmix) using SAS/STAT software, (SAS Version 9.4) was used to assess the independent relationship, expressed as an adjusted odds ratio (aOR), between each risk factor and regular smoking for 2013-15 by ethnicity, adjusting for gender, age, school decile and other risk factors in the model. To adjust for clustering at the school level, school ID was entered as a random effect in the estimation of odds ratios. Only respondents with complete data for all variables were included in the multivariable analyses. For each risk factor we calculated the Population Attributable Risk (PAR), a measure that combines the proportion of the population exposed with the strength of the association between the exposure and the outcome, thus providing an indication the impact of each risk factor on adolescent smoking at the population level. Finally, we fitted a fully adjusted model (including demographic factors and risk factors) to determine whether differential exposure to the included risk factors accounted for ethnic differences.

Appendix 2: Data tables

Never smoked

	Samoan % (95% CI)	Cook Island Māori % (95% CI)	Tongan % (95% CI)	Niuean % (95% CI)	Non-Māori/ non-Pacific % (95% CI)
2004	46.2 (43.4, 49.1)	29.7 (25.7, 33.7)	37.2 (32.0, 42.4)	35.4 (27.2, 43.6)	53.3 (52.7, 53.9)
2005	46.1 (43.1, 49.1)	34.5 (30.3, 38.7)	36.1 (31.2, 41.0)	34.1 (25.9, 42.3)	55.5 (54.9, 56.2)
2006	49.1 (46.2, 51.9)	32.2 (27.8, 36.7)	45.3 (40.2, 50.4)	40.2 (29.9, 50.5)	61.3 (60.7, 61.9)
2007	54.0 (50.5, 57.6)	39.9 (34.7, 45.2)	50.1 (45.0, 55.3)	44.0 (35.6, 52.4)	64.4 (63.7, 65.0)
2008	60.3 (57.6, 63.0)	40.1 (35.7, 44.6)	44.9 (40.7, 49.2)	46.0 (39.5, 52.5)	68.8 (68.2, 69.4)
2009	60.4 (57.2, 63.6)	43.6 (38.8, 48.4)	52.9 (48.4, 57.5)	47.8 (40.0, 55.6)	71.3 (70.7, 72.0)
2010	58.8 (56.1, 61.5)	41.3 (36.9, 43.0)	51.0 (47.1, 54.9)	52.2 (45.7, 58.8)	72.8 (72.2, 73.4)
2011	65.1 (62.3, 67.8)	47.5 (43.0, 52.1)	57.4 (52.6, 62.1)	76.3 (66.8, 85.9)	78.4 (77.8, 79.0)
2012	60.1 (57.5, 62.8)	40.8 (36.2, 45.4)	49.8 (45.3, 54.3)	55.7 (44.7, 66.7)	79.1 (78.6, 79.7)
2013	70.4 (68.0, 72.9)	53.1 (48.3, 58.0)	61.1 (56.9, 65.2)	76.8 (66.9, 86.8)	82.2 (81.7, 82.7)
2014	74.3 (72.1, 76.5)	60.4 (56.1, 64.7)	61.9 (58.2, 65.6)	75.3 (66.3, 84.2)	83.8 (83.3, 84.3)
2015	75.1 (72.3, 77.8)	56.0 (50.4, 61.5)	68.9 (64.2, 73.7)	77.1 (66.5, 87.6)	85.7 (85.1, 86.2)
2016	74.9 (72.4, 77.4)	62.9 (54.1, 62.3)	62.7 (58.6, 66.7)	71.4 (51.8, 70.0)	86.7 (86.2, 87.2)
2017	79.4 (77.1, 81.8)	65.1 (59.0, 66.7)	75.2 (71.4, 79.0)	86.8 (68.2, 82.9)	87.9 (87.4, 88.3)
2018	79.9 (77.6, 82.2)	64.2 (56.8, 64.2)	71.1 (67.1, 75.1)	73.1 (61.2, 76.2)	87.2 (86.8, 87.7)
2019	79.3 (77.0, 81.7)	63.7 (56.1, 64.1)	77.1 (72.9, 81.2)	69.8 (51.3, 69.5)	86.1 (85.6, 86.5)

Regular smoking

	Samoan % (95% CI)	Cook Island Māori % (95% CI)	Tongan % (95% CI)	Niuean % (95% CI)	Non-Māori/non-Pacific % (95% CI)
2004	17.0 (14.8, 19.1)	31.3 (27.3, 35.4)	26.0 (21.3, 30.7)	29.2 (21.4, 37.1)	13.0 (12.6, 13.5)
2005	16.8 (14.6, 19.0)	27.0 (23.1, 30.9)	24.9 (20.5, 29.3)	28.7 (20.9, 36.5)	13.0 (12.6, 13.4)
2006	16.6 (14.4, 18.7)	27.1 (22.9, 31.3)	14.0 (10.5, 17.6)	24.1 (15.2, 33.1)	9.8 (9.4, 10.2)
2007	13.2 (10.8, 15.5)	22.5 (18.0, 26.9)	17.7 (13.7, 21.6)	17.9 (11.4, 24.4)	9.0 (8.6, 9.4)
2008	10.4 (8.7, 12.1)	19.1 (15.6, 22.7)	19.9 (16.5, 23.3)	15.6 (10.9, 20.4)	8.2 (7.8, 8.5)
2009	9.9 (8.0, 11.8)	16.0 (12.4, 19.6)	13.9 (10.7, 17.0)	14.5 (9.0, 19.9)	7.8 (7.4, 8.1)
2010	9.2 (7.6, 10.8)	19.7 (16.2, 23.2)	12.9 (10.3, 15.5)	13.0 (8.6, 17.3)	6.5 (6.2, 6.9)
2011	8.7 (7.1, 10.3)	16.8 (13.4, 20.2)	10.6 (7.6, 13.6)	11.8 (4.6, 19.1)	5.2 (4.8, 5.5)
2012	7.9 (6.5, 9.4)	22.0 (18.1, 25.9)	8.9 (6.3, 11.5)	13.9 (6.3, 21.6)	4.6 (4.3, 4.9)
2013	5.9 (4.7, 7.2)	16.1 (12.5, 19.6)	6.8 (4.7, 9.0)	6.0 (0.3, 11.6)	4.5 (4.2, 4.8)
2014	4.5 (3.4, 5.5)	12.7 (9.7, 15.7)	6.8 (4.7, 9.0)	10.5 (4.0, 16.9)	3.8 (3.6, 4.1)
2015	5.0 (3.6, 6.4)	13.8 (10.0, 17.7)	8.5 (5.6, 11.3)	6.6 (0.4, 12.8)	3.4 (3.1, 3.7)
2016	4.8 (3.6, 6.1)	9.8 (6.6, 12.9)	8.7 (6.2, 11.1)	0.0 (0.0, 0.0)	2.6 (2.4, 2.8)
2017	5.5 (4.2, 6.8)	13.6 (10.1, 17.0)	7.7 (5.3, 10.1)	6.3 (0.3, 12.2))	2.8 (2.6, 3.0)
2018	4.6 (3.4, 5.8)	10.5 (7.5, 13.5)	7.7 (5.3, 10.1)	7.7 (1.8, 13.6)	2.9 (2.7, 3.1)
2019	6.3 (4.9, 7.8)	12.5 (8.9, 16.1)	7.6 (4.9, 10.2)	7.5 (0.4, 14.7)	3.5 (3.2, 3.7)

Daily smoking

	Samoan % (95% CI)	Cook Island Māori % (95% CI)	Tongan % (95% CI)	Niuean % (95% CI)	Non-Māori/ non-Pacific % (95% CI)
2004	8.6 (7.0, 10.2)	21.2 (17.6, 24.7)	14.2 (10.4, 18.0)	14.6 (8.5, 20.7)	6.1 (5.8, 6.4)
2005	9.5 (7.7, 11.2)	18.2 (14.8, 21.5)	14.4 (10.9, 18.0)	11.6 (6.1, 17.2)	6.1 (5.8, 6.4)
2006	10.3 (8.6, 12.1)	16.4 (12.9, 19.9)	9.1 (6.1, 12.0)	14.9 (7.5, 22.4)	4.8 (4.5, 5.0)
2007	8.3 (6.4, 10.3)	13.9 (10.2, 17.6)	11.5 (8.2, 14.8)	9.0 (4.1, 13.8)	4.4 (4.1, 4.7)
2008	7.0 (5.6, 8.3)	13.4 (10.3, 16.5)	15.2 (12.2, 18.3)	10.3 (6.3, 14.2)	3.7 (3.4, 3.9)
2009	4.8 (3.4, 6.2)	9.6 (6.7, 12.5)	8.5 (5.9, 11.0)	10.1 (5.4, 14.7)	3.3 (3.0, 3.5)
2010	5.4 (4.2, 6.6)	11.9 (9.0, 14.7)	7.7 (5.6, 9.8)	8.0 (4.5, 11.6)	2.9 (2.7, 3.1)
2011	4.8 (3.4, 6.2)	10.5 (7.8, 13.3)	6.0 (3.7, 8.3)	7.9 (1.8, 14.0)	2.2 (2.0, 2.4)
2012	4.1 (3.0, 5.2)	15.2 (11.8, 18.5)	6.4 (4.2, 8.6)	7.6 (1.8, 13.4)	1.8 (1.6, 2.0)
2013	2.6 (1.8, 3.5)	8.3 (5.6, 10.9)	3.8 (2.2, 5.4)	4.5 (0.0, 10.3)	1.7 (1.5, 1.9)
2014	2.3 (1.6, 3.1)	6.4 (3.7, 9.2)	3.0 (1.6, 4.3)	5.8 (0.9, 10.8)	1.5 (1.3, 1.7)
2015	2.5 (1.5, 3.5)	6.4 (3.7, 9.2)	4.4 (2.3, 6.5)	4.9 (0.0, 10.3)	1.2 (1.0, 1.4)
2016	2.3 (1.5, 3.2)	4.7 (2.2, 7.2)	5.0 (3.6, 7.2)	0.0 (0.0, 0.0)	0.9 (0.8, 1.1)
2017	2.9 (1.9, 3.9)	8.1 (5.4, 10.8)	3.4 (3.1, 6.9)	1.6 (0.0, 4.6)	0.9 (0.8, 1.1)
2018	2.2 (1.3, 3.0)	5.1 (3.0, 7.3)	4.4 (2.5, 6.2)	5.1 (0.2, 10.0)	0.8 (0.7, 0.9)
2019	2.6 (1.7, 3.5)	6.1 (3.5, 8.7)	2.9 (1.2, 4.5)	3.8 (0.0, 8.9)	1.0 (0.8, 1.1)