

Substance use behaviour among 14 and 15-year-olds

Results from a nationally representative
survey

March 2020

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Key Findings

The Youth Insights Survey (YIS) formed part of the New Zealand Youth Tobacco Monitor (NZYTM) and was conducted in schools every two years from 2006 to 2018. This report presents key findings from the 2018 YIS about the substance (alcohol, tobacco or cannabis) use behaviour of adolescents aged 14 and 15-years-old.



1 in 3 adolescents have used at least one substance in the past month



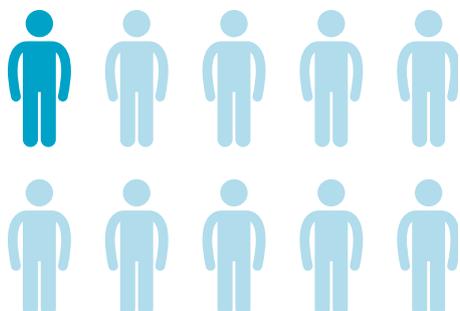
Alcohol (30%) was the most frequently used substance



8% smoked **tobacco**



8% smoked **cannabis**



1 in 10 adolescents have used two or more substances in the past month

Māori were almost **3 times more** likely to use **two or more substances** in the past month when compared to non-Māori



Adolescents with **low to moderate self-esteem** were nearly **4 times** more likely to use **two or more substances** than those who had high self-esteem



Adolescents with **low social connectedness** were nearly **2.5 times** more likely to use **two or more substances** than those with medium to high social connectedness

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EXECUTIVE SUMMARY

BACKGROUND

The harm caused by alcohol, tobacco and cannabis use in adolescents is substantial. In addition to increased risk of addiction, adolescent substance use can lead to accidents and injuries, medical conditions such as asthma, anxiety, depression, psychosis and impaired brain function, poor academic performance, unintended pregnancies, criminal involvement and even death. These negative consequences are more pronounced with the use of two or more substances by adolescents (comorbid substance use).

Understanding patterns and predictors of comorbid substance use among adolescents is important to minimise the resulting harm. The current study explored the patterns of individual and comorbid use of substances (alcohol, tobacco or cannabis) among a nationally representative sample of 14 and 15-year-olds in New Zealand. The study also examined trends in the prevalence of individual and comorbid substance use over time.

METHODS

The Youth Insights Survey (YIS) is a nationally representative survey of Year 10 students (predominantly 14 and 15-year-olds) in New Zealand. The survey used a two-stage cluster sample design and was conducted in schools every two years from 2006 to 2018. While the current study focuses predominantly on findings from 2018, to compare the results over time we also used data from the 2012, 2014 and 2016 YIS.

RESULTS

In 2018, two-thirds (67.0%) of adolescents reported not using substances (tobacco, alcohol or cannabis) in the past month while one-third (33.0%) reported using any substance at least once.

Alcohol was the most frequently used substance by adolescents

Alcohol (30.3%) was the most frequently used substance by adolescents, followed by tobacco (7.9%) and cannabis (7.8%).

Māori, students with low to moderate self-esteem and low social connectedness were more likely to use alcohol, tobacco or cannabis during the past month (see Table 1).

Table 1: Adjusted risk-ratios for the past month substance use, 2018

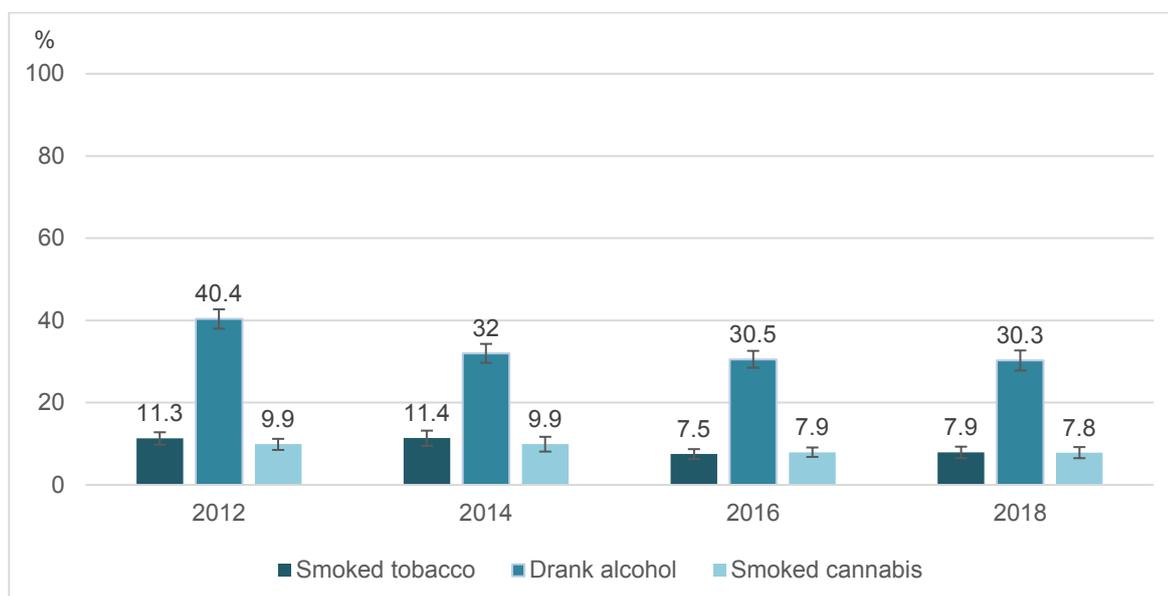
	Drank alcohol	Smoked tobacco	Smoked cannabis
Māori vs non-Māori	1.5	2.4	3.6
Students with low to moderate self-esteem vs those with high self-esteem	2.3	3.2	3.4
Students with low social connectedness vs those with medium to high social connectedness	2.2	2.4	2.5

Note: Only statistical significant differences ($p < 0.05$) are presented

The use of alcohol, tobacco and cannabis has decreased since 2012

As shown in Figure 1, the past month use of alcohol, tobacco and cannabis among 14 and 15-year-olds decreased between 2012 and 2018.

Figure 1: Past month use of tobacco, alcohol and cannabis among 14 and 15-year-olds, 2012-2018



Māori, adolescents with low to moderate self-esteem and low social connectedness are more likely to use two or more substances

One in four (23.8%) adolescents reported using one substance only, 5.5% reported using two substances only and 3.7% reported using all three substances.

In 2018 around one in 10 (9.2%) adolescents reported using two or more substances during the past month. This is a significant change from the 2012 prevalence of 12.6%.

Those who were more likely to be engaged in comorbid substance use behaviour were:

- Māori (2.9 times), compared to non-Māori
- students with low to moderate self-esteem (3.8 times), compared to those who had high self-esteem
- students with low social connectedness (2.5 times), compared to those who reported having medium to high social connectedness.

CONCLUSION

The current study provides important information on both individual and comorbid substance use among New Zealand adolescents aged 14 and 15-years-old. We found that the prevalence of both individual and comorbid substance use among adolescents has continued to decline since 2012. Despite this decrease, a significant minority of adolescents still engage in these behaviours. Predictors associated with both individual and comorbid substance use were Māori ethnicity, low to moderate self-esteem, and low social connectedness.

One of the limitations of the current study is that the cross-sectional nature of the survey did not allow us to explore the trajectory of these risk behaviours among individual respondents. Public health interventions seeking to address comorbid substance use need to consider disparities between Māori and non-Māori, and the importance of increasing self-esteem and social connectedness among young people.

GLOSSARY

ASH	Action for Smokefree 2025
HPA	Health Promotion Agency/Te Hiringa Hauora
NZYTm	New Zealand Youth Tobacco Monitor
<i>p</i> -value	The <i>p</i> value for a statistical test is the probability of getting our observed test result (or a more extreme result), if there is really no difference. The usual convention of interpreting test results with <i>p</i> values below 5% as statistically significant was followed.
R	Reference group is a group to which an individual or another group is compared.
RR	Relative Risk (or Risk Ratio) is a ratio of the probability of an event occurring in the exposed group versus the probability of the event occurring in the non-exposed group. Values of RR can be interpreted as follows: <ul style="list-style-type: none">• RR = 1 means that exposure does not affect the event• RR < 1 means that the risk of the event is decreased by the exposure• RR > 1 means that the risk of the event is increased by the exposure
SDQ-1	Self-Description Questionnaire-1
YIS	Youth Insights Survey
95% CI	Ninety-five percent confidence intervals (95% CI) are used to represent the sample error for estimates. A 95% CI means that if repeated samples were taken and the 95% CI was computed for each sample, 95% of the intervals would contain the true value.

1. INTRODUCTION

1.1 BACKGROUND

In recent years, substance use among adolescents has become a major public health concern globally (Birhanu, Bisetegn, & Woldeyohannes, 2014). Adolescence is the critical period involving increased risk of substance use and its adverse consequences (Gray & Squeglia, 2018). In addition to increased risk of addiction, adolescent substance use can lead to accidents and injuries, medical conditions such as asthma, anxiety, depression, psychosis and impaired brain function, poor academic performance, unintended pregnancies, criminal involvement, and even death (The National Center on Addiction and Substance Abuse at Columbia University, 2011). Substances most commonly used by adolescents are alcohol, tobacco and cannabis (Faeh, Viswanathan, Chiolero, Warren, & Bovet, 2006; Johnston, O'Malley, Bachman, Schulenberg, & Miech, 2016).

The harm caused by alcohol, tobacco and cannabis in adolescents is substantial. Evidence suggests that earlier initiation of alcohol is associated with more frequent use, higher quantity alcohol consumption and harmful outcomes in adulthood (National Health and Medical Research Council, 2009). Smoking initiation during adolescence is strongly associated with future smoking behaviour, increased risk of nicotine dependence, and increased intensity of smoking (U.S. Department of Health and Human Services, 2012). Evidence suggests that cannabis use may affect the trajectory of normal brain maturation and is associated with increased risk of hallucinations, psychosis, and poorer cognitive performance (Ashtari, Cervellione, Cottone, Ardekani, & Kumra, 2009; Hilt, 2014; Pope et al., 2003).

Among adolescents, the use of alcohol, tobacco and cannabis tend to cluster together and use of one substance increases the risk of using other substances (Faeh et al., 2006). The aforementioned negative consequences are more pronounced with the use of two or more substances (comorbid substance use) (Hoffman, Welte, & Barnes, 2001; Johnson & Richter, 2002). Understanding patterns and predictors of comorbid substance use among adolescents is important to minimise the resulting harm.

Although there is substantial evidence examining the underlying predictors of individual substance use, the current understanding of comorbid substance use among adolescents in New Zealand remains limited. Results from the 2012 Youth Insights Survey (YIS) showed that around one in five (22.4%) New Zealand students aged 14 and 15 reported using at least one substance among tobacco, cannabis and alcohol (heavy episodic use) in the past month. One in 20 (4.7%) used all three, 5.8% used two, while 12.0% used one substance in the past month (White, Walton, & Walker, 2015). The study also found that comorbid substance use among adolescents was significantly associated with gender, ethnicity, school decile status, past week income, social connectedness, and parental monitoring and rule enforcement (White et al., 2015). To date, there are few studies that have examined trends in the prevalence of comorbid substance use among adolescents over time.

Evidence suggests that adolescents with high social connectedness report high psychological wellbeing (Jose, Ryan, & Pryor, 2012). In contrast, research shows that low self-esteem and low social connectedness are associated with the use of multiple substances among adolescents (White et al., 2015; Wild, Flisher, Bhana, & Lombard, 2004; Wu, Wong, Shek, & Loke, 2014). Results from the 2012 YIS found that low social connectedness was significantly associated with comorbid tobacco use, cannabis use and heavy episodic drinking among adolescents (White et al., 2015). International studies¹ have demonstrated a significant association between low self-esteem and substance use, but studies within the New Zealand context are limited (Wild et al., 2004; Wu et al., 2014).

1.2 RESEARCH OBJECTIVES

The current study explored the patterns of comorbid use of alcohol, tobacco and cannabis among adolescents aged 14 and 15 in New Zealand. The study aimed to examine:

- the prevalence of individual substance use and comorbid substance use during the past month by gender, ethnicity and school decile status
- the relationship between self-esteem and comorbid substance use
- the relationship between social connectedness and comorbid substance use
- trends in the prevalence of individual and comorbid substance use over time.

¹ Wild et al. (2004) and Wu et al. (2014) used the multidimensional self-esteem questionnaire (SEQ) that has six subscales (global self-worth, social competence, academic competence, family bonding and recognition, body image and athletic competence) (DuBois, Felner, Brand, Phillips, & Lease, 1996). The current study explored the association between self-esteem and comorbid substance use using a 10-item instrument adapted from the Self-Description Questionnaire (SDQ-1), that measures several dimensions of self-concept (Marsh, 1988).

2. METHODS

2.1 SURVEY

The YIS is a nationally representative survey of Year 10 students (predominantly 14 and 15-year-olds) in New Zealand. The survey used a two-stage cluster sample design, where schools were first randomly selected and then classes were selected within the school. The survey collected information on smoking-related knowledge, attitudes, behaviour and responses to tobacco control initiatives. It also collected data on other health-related behaviours, lifestyles, activities and social connectedness to family and friends. A full description of the methodology and complete questionnaire for the 2018 YIS can be found on the HPA website (Health Promotion Agency, 2019).

A total of 186 schools were randomly selected and invited to take part in the 2018 survey. Overall 126 participated - a school response rate of 68%. One Year 10 class at each school participated in the survey with a student response rate of 85%. The overall response rate for the 2018 YIS was 59%. To compare trends, we also used data from the 2012, 2014 and 2016 YIS. Ethical approval for YIS was granted from the Ministry of Health's Multiregional Ethics Group in 2007 and since then from the Health and Disability Ethics Group on an annual basis (Number MEC/07/10/141).

2.2 VARIABLES

2.2.1 Substance use

Respondents were asked to indicate how many times in the past month they drank alcohol, smoked tobacco and smoked cannabis. To determine whether some sub-groups were using multiple substances, we also have used a categorical outcome variable that measured the use of any one, any two and all three substances during the past month. For more information on outcome variables, see Appendix 1.

2.2.2 Sociodemographic variables

Substance use behaviour was assessed by gender, ethnicity and school decile groups:

- For gender, participants were given three options: male, female and other. Students who gave an invalid (missing; $n = 2$) or 'other' response ($n = 30$) were assigned the weight of a male or female using proportional random allocation because the Ministry of Education data only records gender as male or female (for the purpose of weighting only).
- For ethnicity, individuals who identified with more than one ethnic group were allocated to a single ethnic group, based on whether or not they identified with Māori ethnicity.
- School decile is used as a measure of students' socio-economic status and was obtained from the Ministry of Education website (Ministry of Education, 2019). For our analyses these deciles were grouped into: low (deciles 1 to 4), medium (deciles 5 to 7) and high (deciles 8 to 10).

2.2.3 Predictors

Self-esteem

Self-esteem was measured using a 10-item instrument adapted from SDQ-1, that measures several dimensions of self-concept (Marsh, 1988). Participants rated themselves on a 5-point scale from 1 (true) to 5 (false). Responses for eight of the 10 items were reverse coded. Response values for all 10 items were added to calculate the total possible score, ranging from 10 to 50. The higher scores are associated with greater self-esteem. The scale had a high internal consistency, with Cronbach's alpha of 0.87. We used the 10%/15%/75% rule to classify 10% of respondents as having low self-esteem (total scores 10 to 28), 15% as having moderate self-esteem (total scores 29 to 33) and 75% having high self-esteem (total scores 34 to 50). Females were 1.4 times (ARR: 1.4; $p < .01$) more likely to have low to moderate self-esteem when compared to males. Students attending low decile schools were 1.5 times (ARR: 1.5; $p < .05$) more likely to have low to moderate self-esteem when compared to those attending high decile schools (see Table 6 in Appendix 2).

Social connectedness

Social connectedness was an 8-item scale with high internal consistency (Cronbach's alpha of 0.79) and was measured by combining all eight items relating to family, peer and school connectedness. Participants were asked to rate themselves on a 5-point scale from strongly agree to strongly disagree. Based on the three quantile distribution that divided the sample into three equal groups, scores were categorised into: low (scores 0 to 30), medium (scores 31 to 34) and high (scores 35 to 40) social connectedness. There were no significant differences observed by gender, ethnicity and school decile group (see Table 7 in Appendix 2).

2.3 ANALYSES

To understand changes over time, data from the 2012, 2014, and 2016 YIS were used in addition to the 2018 data. As the survey was designed to represent the New Zealand Year 10 school population, it was necessary to make sure that no population group was over- or under-represented in our analyses. For each survey year, responses were weighted using the gender and ethnicity information of Year 10 students in New Zealand, published by the Ministry of Education (2018). Analyses were performed using STATA version 15.0 and were restricted to 14 and 15-year-olds.

Proportions were calculated using the delete-a-group jackknife method. Ninety-five percent confidence intervals² (95% CI) have been used to represent the sample errors for estimates. Unadjusted and adjusted risk-ratios were calculated using multinomial logistic regression. For adjusted risk-ratios (ARR), we have controlled for other demographic variables (ie, gender, ethnicity, school decile group). Any differences between groups were confirmed using p -values that

² The Korn and Graubard method has been used to produce 95% CI when the proportion estimates are either very small (less than 5%) or very large (more than 95%), or when groups have small sample sizes (< 30) (Korn & Graubard, 1998).

were calculated using Pearson’s chi-square test. We followed the usual convention of interpreting test results, with $p < .05$ as statistically significant.

2.4 SAMPLE CHARACTERISTICS

The weighted sample characteristics for the 2018 YIS are outlined in Table 1.

Table 1: Sample characteristics for the 2018 YIS

	<i>n</i>	% (weighted)
Total	2,689	
Gender		
Female	1,308	48.6
Male	1,354	50.4
Other	27	1.0
Ethnicity		
Māori	624	24.2
Non-Māori	2,065	75.8
School decile group		
Low	675	25.6
Mid	961	35.3
High	1,031	38.4

3. FINDINGS

3.1 TWO-THIRDS OF ADOLESCENTS DID NOT USE ANY SUBSTANCES

Two-thirds (67%) of adolescents reported not using substances, while one-third (33%) reported using any substance (tobacco, alcohol and cannabis) at least once during the past month.

3.1.1 Alcohol was the most frequently used substance

Three in 10 (30.3%) adolescents reported drinking alcohol at least once during the past month. As shown in Table 2, Māori (1.5 times), students with low to moderate self-esteem (2.3 times) and low social connectedness (2.2 times) were most likely to drink alcohol during the past month. There were no significant differences observed by gender and school decile group.

Table 2: The prevalence of past month alcohol use among 14 and 15-year-olds in 2018

	<i>n</i>	% (95% CI)	Unadjusted RR	Adjusted RR	Adjustment variables
Total	801	30.3 (27.8-32.7)			
Gender					
Females	406	31.1 (27.9-34.3)	1.1	1.1	Ethnicity, school decile group
Males	383	29.2 (26.1-32.3)	1 (reference)	1 (reference)	
Ethnicity					
Total Māori	232	37.3 (32.2-42.5)	1.5**	1.5**	Gender, school decile group
Total non-Māori	569	28.0 (25.3-30.7)	1 (reference)	1 (reference)	
School decile					
Low	203	29.7 (24.1-35.3)	1	0.9	Gender, ethnicity
Mid	303	31.4 (27.8-35.0)	1.1	1.1	Gender, ethnicity
High	282	29.0 (24.5-33.5)	1 (reference)	1 (reference)	
Self-esteem					
Low to moderate	284	44.6 (40.4-48.7)	2.3***	2.3***	Gender, ethnicity, school decile group
High	479	25.6 (23.1-28.1)	1 (reference)	1 (reference)	
Social connectedness					
Low	364	41.0 (37.0-44.9)	2.2***	2.2***	Gender, ethnicity, school decile group
Medium to high	395	24.2 (21.5-26.9)	1 (reference)	1 (reference)	

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

Note. RR= Relative risk; CI = confidence interval

3.1.2 Nearly 8% of 14 and 15-year-olds smoked tobacco

Of the 2,689 14 and 15-year-olds participating in the survey, 7.9% reported smoking at least once during the past month. As shown in Table 3, Māori were 2.4 times more likely to smoke when compared to non-Māori. After adjusting for gender and ethnicity, there were no statistically

significant differences by school decile group. Low to moderate self-esteem and low social connectedness were found to be associated with past month use of tobacco among respondents.

Table 3: The prevalence of past month smoking among 14 and 15-year-olds in 2018

	<i>n</i>	% (95% CI)	Unadjusted Risk Ratio	Adjusted Risk Ratio	Adjustment variables
Total	205	7.9 (6.5-9.3)			
Gender					
Females	115	8.7 (6.6-10.8)	1.3	1.3	Ethnicity, school decile group
Males	86	6.9 (5.3-8.5)	1 (reference)	1 (reference)	
Ethnicity					
Total Māori	90	14.8 (11.1-18.5)	2.9***	2.4***	Gender, school decile group
Total non-Māori	115	5.6 (4.4-6.9)	1 (reference)	1 (reference)	
School decile					
Low	77	11.9 (7.7-16.0)	2.2**	1.6	Gender, ethnicity
Mid	65	6.7 (4.6-8.8)	1.2	1	Gender, ethnicity
High	56	5.8 (4.3-7.2)	1 (reference)	1 (reference)	
Self-esteem					
Low to moderate	99	15.7 (12.0-19.5)	3.6***	3.2***	Gender, ethnicity, school decile group
High	91	4.9 (3.7-6.1)	1 (reference)	1 (reference)	
Social connectedness					
Low	105	11.7 (9.0-14.4)	2.4***	2.4***	Gender, ethnicity, school decile group
Medium to high	82	5.2 (3.7-6.6)	1 (reference)	1 (reference)	

- Statistically significant results as $p < .05$ are in bold. * $p < .05$; ** $p < .01$; *** $p < .001$
- Note. RR= Relative risk; CI = confidence interval

3.1.3 Cannabis use among 14 and 15-year-olds is very similar to tobacco use

Cannabis was used by 7.8% of adolescents during the past month. As shown in Table 4, Māori ethnicity was found to be a stronger predictor of past month cannabis use than tobacco and alcohol use. Differences in the cannabis prevalence by school decile group were not statistically significant after adjusting for gender and ethnicity. Low to moderate self-esteem and low social connectedness also predicted the past month use of cannabis among respondents.

Table 4: The prevalence of past month cannabis use among 14 and 15-year-olds in 2018

	<i>n</i>	% (95% CI)	Unadjusted RR	Adjusted RR	Adjustment variables
Total	211	7.8 (6.4-9.1)			
Gender					
Females	109	7.9 (6.0-9.9)	1	1	Ethnicity, school decile group
Males	100	7.6 (6.0-9.3)	1 (reference)	1 (reference)	
Ethnicity					
Total Māori	109	17.1 (13.4-20.8)	4.1***	3.6***	Gender, school decile group
Total non-Māori	102	4.8 (3.7-5.9)	1 (reference)	1 (reference)	
School decile					
Low	79	11.1 (7.4-14.8)	2.4**	1.5	Gender, ethnicity
Mid	74	7.9 (5.5-10.2)	1.6*	1.3	Gender, ethnicity
High	50	4.9 (3.2-6.6)	1 (reference)	1 (reference)	
Self-esteem					
Low to moderate	102	15.7 (12.0-19.5)	3.7***	3.4***	Gender, ethnicity, school decile group
High	93	4.8 (3.5-6.0)	1 (reference)	1 (reference)	
Social connectedness					
Low	105	11.4 (8.7-14.2)	2.5***	2.5***	Gender, ethnicity, school decile group
Medium to high	85	4.9 (3.6-6.3)	1 (reference)	1 (reference)	

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

Note. RR= Relative risk; CI = confidence interval

3.2 ONE IN 10 ADOLESCENTS USED TWO OR MORE SUBSTANCES

Almost one-quarter (23.8%) of adolescents reported using one substance only, 5.5% reported using two substances only and 3.7% reported using all three substances. In terms of specific substances:

- 22% reported using alcohol only
- 2.6% reported using alcohol and cannabis only
- 2.3% reported using tobacco and alcohol only
- 1.3% reported using tobacco only
- Very few respondents (less than 30) had used cannabis only or cannabis along with tobacco only.

Around one in 10 (9.2%) adolescents reported using any two or all three substances during the past month. As shown in Table 5, Māori were 2.9 times more likely to use two or more substances in the past month. Adolescents with low to moderate self-esteem were 3.8 times more likely to engage in comorbid substance use behaviour when compared to those who had high self-esteem.

Adolescents with low social connectedness were 2.5 times more likely to use two or more substances than those with medium to high social connectedness.

Table 5: The prevalence of past month comorbid substance use among 14 and 15-year-olds in 2018

	n	% (95% CI)	Unadjusted RR	Adjusted RR	Adjustment variables
Total	245	9.2 (7.7-10.7)			
Gender					
Females	137	10.3 (8.1-12.5)	1.0	1.3	Ethnicity, school decile group
Males	105	8.1 (6.4-9.8)	1 (reference)	1 (reference)	
Ethnicity					
Total Māori	115	18.5 (14.5-22.4)	3.4***	2.9***	Gender, school decile group
Total non-Māori	130	6.2 (4.9-7.6)	1 (reference)	1 (reference)	
School decile					
Low	87	12.6 (8.5-16.8)	2.1**	1.5	Gender, ethnicity
Mid	85	8.9 (6.5-11.4)	1.4	1.2	Gender, ethnicity
High	63	6.4 (4.7-8.2)	1 (reference)	1 (reference)	
Self-esteem					
Low-moderate	125	19.5 (15.2-23.7)	4.2***	3.8***	Gender, ethnicity, school decile group
High	102	5.5 (4.1-6.8)	1 (reference)	1 (reference)	
Social connectedness					
Low	122	13.5 (10.4-16.5)	2.4***	2.5***	Gender, ethnicity, school decile group
Medium-high	100	6.1 (4.5-7.6)	1 (reference)	1 (reference)	

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

Note. RR= Relative risk; CI = confidence interval

3.2.1 Low social connectedness and low to moderate self-esteem are strong predictors of comorbid use of all three substances

More than one in 10 (11.4%) respondents who reported using any substance during the past month were engaging with all three substances (alcohol, tobacco and cannabis). Additionally, we found that low to moderate self-esteem and low social connectedness were strongly associated with the use of all three substances. Those who were more likely to use all three substances during the past month were:

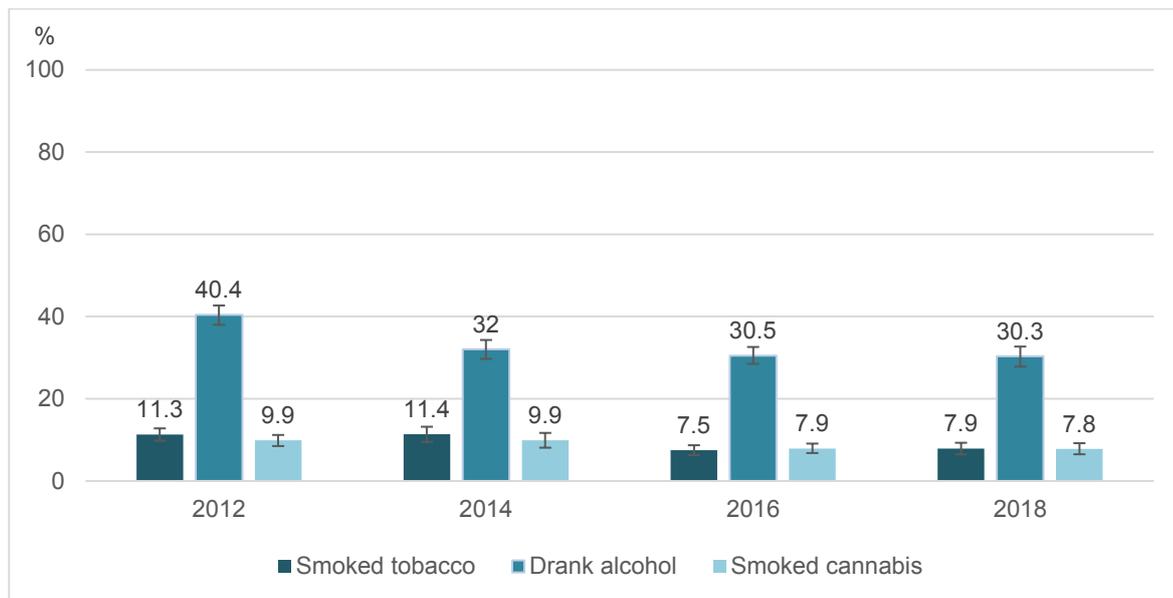
- Māori (3.1 times), compared to non-Māori
- students with low to moderate self-esteem (4.8 times), compared to those who had high self-esteem
- students with low social connectedness (4.2 times), compared to those who reported having medium to high social connectedness.

3.3 THE PREVALENCE OF SUBSTANCE USE IS DECLINING

As shown in Figure 1, the individual use of alcohol, tobacco and cannabis among those aged 14 and 15-years-old significantly decreased between 2012 and 2018.

At the same time, there was a significant decrease in the prevalence of comorbid substance use from 12.6% in 2012 to 9.2% in 2018. For the prevalence of past month individual and comorbid substance use from 2012 to 2018 by demographics, see Appendix 3.

Figure 1: Past month use of tobacco, alcohol and cannabis among 14 and 15-year-olds, 2012-2018



4. DISCUSSION

The current study provides important information about the substance use behaviour of 14 and 15-year-olds in New Zealand. It found the prevalence of both individual and comorbid substance use among adolescents has continued to decline since 2012. Māori, respondents who had low to moderate self-esteem and low connectedness to family, peers and schools were significantly more likely to have used two or more substances in the past month.

4.1 PREVALENCE OF SUBSTANCE USE

The prevalence of past month alcohol use among New Zealand Year 10s (30.3%) is high when compared to grade 10 students in the U.S. (19.7%) (Johnston et al., 2017). In the current study alcohol was the most frequently used substance by respondents in the past month. This is despite the prohibition of alcohol sales to those aged under 18 years in New Zealand. There were very few respondents using tobacco and cannabis without using alcohol. These results are consistent with a study that examined the prevalence of tobacco, cannabis and alcohol among Canadian youth (Leatherdale & Burkhalter, 2012). We also found that Māori, those having low to moderate self-esteem and those with low social connectedness were more likely to have drunk alcohol at least once during the past month.

The prevalence of smoking among New Zealand adolescents decreased significantly between 2012 and 2018. The past month smoking prevalence among adolescents in New Zealand (7.9%) is almost the same as the prevalence among high school students in the United States (8.1%) (Centers for Disease Control and Prevention, 2018). In 2018, less than two percent of New Zealand adolescents were engaged with smoking tobacco only; about six percent were engaged in tobacco smoking behaviour along with cannabis and/or alcohol. With the increase in the popularity of vaping during recent years, further research exploring comorbid use of tobacco, alcohol, cannabis and vaping is required.

The prevalence of cannabis use among New Zealand adolescents (7.8%) is low when compared to Canadian youth (40.5%) (Zuckermann et al., 2019). The prevalence of cannabis use during the past month decreased significantly between 2012 and 2018. There were very few participants in the 2018 survey who reported using cannabis without using tobacco and/or alcohol. This further reinforces the benefit of future studies considering comorbid substance use, rather than examining individual substance use.

4.2 FACTORS AFFECTING SUBSTANCE USE

Previous research using a nationally representative sample of adolescents in New Zealand found that comorbid substance users (tobacco, alcohol and cannabis) were more likely to be female, of Māori ethnicity, attend a low decile school and have low social connectedness (White et al., 2015). Our findings were consistent for Māori and those who had low social connectedness. We did not find any significant differences by gender and school decile group. We also found that low to moderate self-esteem was strongly associated with comorbid substance use. Predictors such as

low social connectedness and low to moderate self-esteem were more strongly associated with the use of all three substances.

Despite the decrease in the prevalence of substance use behaviours, a significant minority of adolescents still engage in these behaviours. Public health interventions seeking to address individual and comorbid substance use behaviours need to consider disparities between Māori and non-Māori, and the importance of increasing self-esteem and social connectedness among young people.

4.3 STRENGTHS

The strength of the study was the use of a nationally representative sample to measure the prevalence of both individual and comorbid substance use among adolescents. Our data highlight differences in individual and comorbid substance use by socio-demographics. The study also examined the trends in these behaviours between 2012 and 2018. The study demonstrated the importance of self-esteem and social connectedness among adolescents engaged in both individual and comorbid substance use behaviours.

4.4 LIMITATIONS

The study had some limitations. First, the cross-sectional nature of the survey did not allow us to explore the trajectory of these risk behaviours among individual respondents. Second, the self-reported survey questionnaire would have caused some information bias about these behaviours. This could have resulted in an under or overestimation of substance use. Third, the sample only included 14 and 15-year-old Year 10 students thus reducing the ability to generalise findings to adolescents not attending schools and belonging to other age groups. Fourth, the small sample size of Asian and Pasifika people did not allow us to study the substance use behaviour among these cohorts. Despite these limitations, we were able to identify specific sub-groups that had higher risk for substance use.

4.5 CONCLUSION

In New Zealand, the individual and comorbid use of alcohol, tobacco and cannabis has continued to decline. Of these substances, alcohol was the most frequently used by Year 10 students in 2018. Predictors associated with both individual and comorbid substance use were Māori ethnicity, low self-esteem and poor social connectedness. Self-esteem and social connectedness emerged as stronger predictors for the past month use of all three substances. Our findings suggest that there can be common underlying risk factors for substance use among young people. Interventions to increase young people's self-esteem and social connectedness have the potential to positively impact on comorbid substance use outcomes and ultimately public health.

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APPENDIX 1: OUTCOME MEASURES

ALCOHOL

Alcohol use during the past month was measured by responses to the question “*During the past 30 days (one month), how often did you drink alcohol?*”. Past month drinkers were defined as those who reported drinking alcohol at least once during the past month.

SMOKING

Smoking behaviour during the past month was measured by responses to the question “*During the past 30 days (one month), on how many days did you smoke cigarettes?*”. Past month tobacco smokers were defined as those who reported smoking cigarettes at least once in the past month.

CANNABIS

Cannabis use during the past month was measured by responses to the question “*During the past 30 days (one month), how often did you smoke marijuana (pot, grass, weed, cannabis)?*”. Past month cannabis smokers were defined as those who reported cannabis use at least once in the past month.

COMORBID SUBSTANCE USE

Comorbid substance users were defined as students who used any two or all three substances (tobacco, alcohol and cannabis) during the past month. To determine whether some sub-groups were using multiple substances, we also used a categorical outcome variable that measured use of any one, any two and all three substances during the past month.

APPENDIX 2: 2018 PREDICTOR ANALYSIS

Table 6: Self-esteem among 14 and 15-year-olds in 2018

Self-esteem categories	Low self-esteem		Moderate		High self-esteem	
	<i>n</i>	% (95%CI)	<i>n</i>	% (95%CI)	<i>n</i>	% (95%CI)
Total	238	9.1 (7.8-10.3)	414	15.3 (13.8-16.8)	1894	70.3 (68.0-72.6)
Gender						
Female	145	11.1 (9.2-13.0)	218	16.2 (14.1-18.2)	889	68.4 (65.4-71.4)
Male	85	6.7 (5.1-8.2)	190	14.3 (11.9-16.8)	994	72.8 (69.6-76.1)
Ethnicity						
Total Māori	59	9.9 (6.9-12.9)	122	19.6 (15.5-23.6)	394	62.7 (57.1-68.3)
Total non-Māori	179	8.8 (7.6-10.0)	292	13.9 (12.2-15.6)	1,500	72.8 (70.5-75.0)
School decile group						
Low	63	9.9 (7.0-12.9)	129	19.7 (16.1-23.3)	446	64.8 (59.7-70.0)
Mid	83	8.4 (6.2-10.7)	149	15.1 (12.5-17.7)	673	70.9 (66.9-74.9)
High	91	9.2 (7.4-10.9)	128	12.1 (10.2-14.0)	766	74.1 (71.0-77.2)

Table 7: Social connectedness among 14 and 15-year-olds in 2018

Social connectedness categories	Low		Medium		High	
	<i>n</i>	% (95%CI)	<i>n</i>	% (95%CI)	<i>n</i>	% (95%CI)
Total	903	33.6 (31.2-36.1)	917	33.8 (31.9-35.7)	745	27.9 (25.6-30.3)
Gender						
Female	419	32.3 (29.0-35.6)	456	34.9(32.4-37.4)	392	29.9 (26.4-33.3)
Male	466	34.3 (31.0-37.5)	455	33.0 (30.0-35.9)	350	26.4 (23.4-29.3)
Ethnicity						
Total Māori	215	34.8 (29.8-39.9)	194	31.0 (26.8-35.3)	177	27.5 (23.3-31.7)
Total non-Māori	688	33.2 (30.5-35.9)	723	34.7 (32.6-36.8)	568	28.1 (25.4-30.8)
School decile group						
Low	220	33.2 (27.7-38.7)	214	30.3 (25.2-35.3)	199	30.1 (25.0-35.3)
Mid	335	35.0 (31.1-38.9)	322	33.5 (30.8-36.2)	259	26.8 (22.9-30.7)
High	341	32.7 (28.6-36.7)	374	36.6 (33.5-39.6)	280	27.5 (23.4-31.6)

APPENDIX 3: TIME-TRENDS FROM 2012-2018

Table 8: The prevalence of past month alcohol use among 14 and 15-year-olds, 2012-2018

	2012		2014		2016		2018 ^R	
	<i>n</i>	% (95% CI)	<i>n</i>	% (95% CI)	<i>n</i>	% (95% CI)	<i>n</i>	% (95% CI)
Total	1203	40.4*** (38.0-42.7)	884	32.0 (29.7-34.3)	878	30.5** (28.5-32.6)	801	30.3 (27.8-32.7)
Gender								
Females	548	38.9** (35.7-42.1)	472	33.2 (30.1-36.3)	446	29.3 (26.3-32.3)	406	31.1 (27.9-34.3)
Males	655	41.7*** (38.8-44.6)	412	30.9 (27.9-33.8)	421	31.6** (28.8-34.3)	383	29.2 (26.1-32.3)
Ethnicity								
Total Māori	338	50.1*** (46.1-54.1)	254	37.2 (32.9-41.5)	262	37.4* (33.1-41.7)	232	37.3 (32.2-42.5)
Total non-Māori	865	37.5*** (34.8-40.1)	630	30.4 (28.0-32.9)	616	28.4* (26.2-30.7)	569	28.0 (25.3-30.7)
School decile								
Low	388	43.8*** (39.4-48.2)	190	29.2 (24.2-34.2)	201	30.8 (26.0-35.7)	203	29.7 (24.1-35.3)
Mid	366	39.3** (34.6-44.1)	358	32.5 (29.0-36.0)	403	33.1* (29.6-36.5)	303	31.4 (27.8-35.0)
High	449	38.3** (34.1-42.6)	336	33.5 (28.7-38.3)	274	27.2 (23.6-30.8)	282	29.0 (24.5-33.5)

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

Note. CI = confidence interval; R = Reference group

Table 9: The prevalence of past month smoking among 14 and 15-year-olds, 2012-2018

	2012		2014		2016		2018 ^R	
	<i>n</i>	% (95% CI)	<i>n</i>	% (95% CI)	<i>n</i>	% (95% CI)	<i>n</i>	% (95% CI)
Total	335	11.3** (9.8-12.8)	316	11.4** (9.5-13.2)	212	7.5 (6.3-8.7)	205	7.9 (6.5-9.3)
Gender								
Females	186	13.2** (10.9-15.6)	193	13.7** (11.3-16.2)	119	8.4 (6.7-10.0)	115	8.7 (6.6-10.8)
Males	149	9.4* (7.8-11.1)	123	9.1 (6.9-11.3)	89	6.5 (5.1-7.9)	86	6.9 (5.3-8.5)
Ethnicity								
Total Māori	147	21.3* (17.5-25.1)	137	21.1* (16.7-25.4)	104	15.1 (12.1-18.2)	90	14.8 (11.1-18.5)
Total non-Māori	188	8.3** (6.9-9.7)	179	8.4** (6.9-9.9)	108	5.1 (3.9-6.3)	115	5.6 (4.4-6.9)
School decile								
Low	166	18.2* (14.4-22.1)	123	18.4 (12.8-23.9)	80	12.8 (9.4-16.3)	77	11.9 (7.7-16.0)
Mid	87	9.0 (6.4-11.6)	118	10.7* (8.1-13.3)	90	7.1 (5.3-9.0)	65	6.7 (4.6-8.8)
High	82	7.4 (5.6-9.1)	75	7.2 (5.0-9.5)	42	3.9 (2.7-5.2)	56	5.8 (4.3-7.2)

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

Note. CI = confidence interval; R = Reference group

Table 10: The prevalence of past month cannabis use among 14 and 15-year-olds, 2012-2018

	2012		2014		2016		2018 ^R	
	<i>n</i>	% (95% CI)	<i>n</i>	% (95% CI)	<i>n</i>	% (95% CI)	<i>n</i>	% (95% CI)
Total	290	9.9* (8.6-11.3)	271	9.9* (8.1-11.7)	225	7.9 (6.7-9.0)	211	7.8 (6.4-9.1)
Gender								
Females	142	10.0 (8.2-11.8)	135	9.9 (7.5-12.3)	124	8.5 (6.8-10.2)	109	7.9 (6.0-9.9)
Males	148	9.9 (8.2-11.5)	136	10.0 (7.7-12.2)	96	7.1 (5.5-8.6)	100	7.6 (6.0-9.3)
Ethnicity								
Total Māori	153	22.4 (18.2-26.6)	132	20.5 (15.9-25.1)	117	17.2 (14.1-20.3)	109	17.1 (13.4-20.8)
Total non-Māori	137	6.2 (5.0-7.5)	139	6.7* (5.3-8.1)	108	5.0 (3.9-6.1)	102	4.8 (3.7-5.9)
School decile								
Low	152	17.0* (13.3-20.8)	113	17.2* (11.8-22.5)	79	12.5 (9.4-15.5)	79	11.1 (7.4-14.8)
Mid	74	7.8 (5.8-9.7)	99	9.2 (6.3-12.2)	96	7.6 (5.7-9.4)	74	7.9 (5.5-10.2)
High	64	5.8 (4.2-7.3)	59	5.7 (3.8-7.6)	50	4.9 (3.2-6.6)	50	4.9 (3.2-6.6)

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

Note. CI = confidence interval; R = Reference group

Table 11: The prevalence of past month comorbid substance use among 14 and 15-year-olds, 2012-2018

	2012		2014		2016		2018 ^R	
	<i>n</i>	% (95% CI)	<i>n</i>	% (95% CI)	<i>n</i>	% (95% CI)	<i>n</i>	% (95% CI)
Total	368	12.6** (11.1-14.1)	317	11.4 (9.6-13.3)	256	8.9 (7.7-10.2)	245	9.2 (7.7-10.7)
Gender								
Females	193	13.8* (11.6-16.0)	180	12.6 (10.2-15.1)	148	10.2 (8.5-12.0)	137	10.3 (8.1-12.5)
Males	175	11.5* (9.7-13.2)	137	10.3 (8.0-12.6)	103	7.6 (6.0-9.1)	105	8.1 (6.4-9.8)
Ethnicity								
Total Māori	177	25.9* (21.7-30.0)	146	22.1 (17.7-26.5)	131	18.9 (15.7-22.1)	115	18.5 (14.5-22.4)
Total non-Māori	191	8.7* (7.3-10.1)	171	8.2 (6.5-9.8)	125	5.9 (4.8-7.0)	130	6.2 (4.9-7.6)
School decile								
Low	182	20.4* (16.6-24.3)	116	17.4 (12.3-22.5)	90	14.3 (11.0-17.6)	87	12.6 (8.5-16.8)
Mid	97	10.3 (8.0-12.7)	122	11.2 (8.2-14.2)	116	9.1 (7.2-11.1)	85	8.9 (6.5-11.4)
High	89	7.9 (6.1-9.7)	79	7.6 (5.1-10.2)	50	4.8 (3.2-6.4)	63	6.4 (4.7-8.2)

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

Note. CI = confidence interval; R = Reference group