Factors associated with support for reducing and ending tobacco sales among university students in Queensland, Australia and New Zealand

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The past decade has seen some countries announce a policy intention to achieve a 'smoke-free nation' status. This is often defined as reducing the prevalence of cigarette smoking to less than 5%. Countries with 'endgame goals' of less than 5% smoking include: New Zealand (NZ) ('minimal smoking prevalence' by 2025 defined as <5% among all population groups),[1] Finland (<5% smoking by 2030 and 2% smoking by 2040),[2,3] the United Kingdom ('Smoke-Free' by 2030),[4] Scotland (<5% smoking by 2034),[5] Ireland (<5% smoking by 2025),[6] and Canada (<5% smoking by 2035).[7] Australia also recently announced a goal of in the draft National Preventive Health Strategy (<5% smoking by 2030).[8] Local-level efforts have been reported in the USA to end tobacco sales, with the local governments of Beverly Hills and Manhattan Beach, California, becoming the first American cities to end the sale of tobacco products in their jurisdictions.[9,10]

Discussion about how to achieve these smoke-free goals is increasing. Several 'endgame' strategies that aim to address the commercial tobacco retail environment have been proposed, including phasing out commercial sales of cigarettes or prohibiting supply of tobacco products to anyone born after a set year.[11] Other possible strategies include a regulated market model and transferring ownership of tobacco companies to a non-profit entity.[11]

The findings of surveys in several countries indicate there is public support for tobacco

Abstract

Objective: To assess the factors associated with support for reducing tobacco retail availability and ending the legal sale of cigarettes in Australia and New Zealand (NZ).

Methods: Cross-sectional surveys were conducted in NZ (eight universities, n=1,932) and Queensland (University of Queensland or UQ, n=5,172). Participants were asked how much they agreed or disagreed with reducing the number of places allowed to sell cigarettes/tobacco and ending the legal sale of cigarettes within 10 years. Multinomial logistic regression models assessed associations between support with student characteristics.

Results: More than half the respondents in both samples supported reducing the number of tobacco outlets (NZ 69.3%; UQ 62.3%), and ending the legal sale of cigarettes within 10 years (NZ 53.3%; UQ 51.6%) with marginally more support among NZ students. Men and students who smoked or vaped had lower odds of supporting both strategies compared with women and non-users.

Conclusions: The results suggest widespread support for reducing tobacco retail availability among university students in NZ and Queensland, and sex, and smoking and vaping status were strong predictors for support. Around half supported phasing out tobacco sales within 10 years.

Implications for public health: Collaborative research should be encouraged to enhance cross-country approaches on tobacco control.

Key words: Australia, New Zealand, reduce tobacco sales, end tobacco sales, university students.

endgame strategies such as ending tobacco sales, including among people who smoke. Studies among New Zealanders who smoke or have recently quit show support for such strategies, with 46% of participants supporting banning cigarette sales in 10 years, "if effective nicotine substitutes were available".[12] Support for a complete ban of tobacco sales in Australia ranged from 32% among people who smoked to 59% among people who did not smoke.[13] Public support for a sales ban on tobacco ranged from 30%–45% in the USA, UK and Canada[14,15] and from 58%–61% in Italy, Croatia and Albania.[16] In Hong Kong, a previous study found that 75% of people who never smoked, 64% of people who previously smoked, and 49% of people who currently smoked supported a total ban on tobacco use and possession.[17]

However, information about support for tobacco endgame strategies among specific population groups, such as tertiary students, is lacking. Young adulthood (18–24 years of age, main demographic of university students)[18,19] is a key time for taking up smoking. Furthermore, university students

face a range of social and emotional challenges as they transition to life away from home, which may predispose them to experiment with substances, including smoking and vaping.[20] Furthermore, university is also a critical time for forming views on how society responds to important issues and actively advocating for policy responses. University students also comprise a cohort of future leaders across a range of disciplines, including public policy. Therefore, understanding the level of support for endgame strategies in this population group is of interest as it may indicate a key population group who may advocate for policy reform on tobacco supply, or alternatively a population group that could benefit from messages about proposed policies to increase engagement.

We examined the associations between university students' level of support for: (1) reducing the number of places allowed to sell cigarettes and tobacco and (2) ending all cigarette sales (in Australia or NZ) within 10 years, and student characteristics (age, sex, student type and smoking and vaping status).

Methods

Design and data source

We conducted cross-sectional surveys in NZ (all universities, March–May 2018) and Queensland (the University of Queensland or UQ, August–November 2017).

In NZ, the survey was advertised on student associations' Facebook pages with additional contact from research assistants recruited from all universities. The research assistants distributed paper questionnaires and collected responses from participants.[21] Data were weighted to account for under-sampling and over-sampling, based on sex and university size. The eight universities included Auckland University of Technology, Lincoln University, Massey University, University of Auckland, University of Canterbury, University of Otago, University of Waikato and Victoria University of Wellington.

The UQ data were collected from students enrolled at three campuses (St Lucia, Herston and Gatton), and distance-learning students.[22] Students were invited by e-mail to participate online and some were approached on campus by volunteers and invited to complete the survey on portable tablet devices.[22]

The surveys used similar questions and could be completed anonymously. Participation was voluntary and informed consent was required. Students could enter a draw to win a prize after survey completion as a token of appreciation (NZ: NZD100 cash prize, UQ: AUD500 Travel Voucher). Internet protocol (IP) address was used to identify and remove duplicate online entries in NZ.

All procedures were performed in compliance with relevant laws and institutional guidelines: the NZ survey was approved by the University of Canterbury Human Ethics Committee (HEC 2017/42/LR-PS), and the UQ survey was approved by the University of Queensland School of Public Health Low and Negligible Risk Research Ethics Committee (Approval number: 2019002535).

Measures

Demographic information

Participants were asked their age, which was grouped into <25 years, 25-34 years, and ≥35 years (for age-specific analyses). Gender was asked in the questionnaires (responses: male, female, other, prefer not to say, and X). However, only responses from males and females were used in the gender-specific analysis because of the small number of participants with a non-binary gender (n=30 NZ, n=40 UQ). Student type was categorised as domestic or international. Participants who had lived in NZ for >5 years were defined as domestic in NZ, whereas participants born in Australia or NZ were defined as domestic in UQ.

Smoking and vaping status

Smoking and vaping were categorised as: exclusive smoking (smoking at least monthly and not vaping currently), exclusive vaping (vaping at least monthly and not smoking currently), dual use (smoking and vaping currently) and non-use (neither smoking nor vaping currently).

Tobacco endgame statements

We asked participants how much they agreed or disagreed with the following statements: (1) The number of places allowed to sell cigarettes and tobacco should be reduced (i.e. reducing the number of tobacco outlets), and (2) Cigarettes should not be sold (in Australia or NZ) in 10 years' time (i.e. ending tobacco sales). The responses were categorised into agree/strongly agree ('support'), neutral, and disagree/strongly disagree ('oppose').

Data analysis

The analyses proceeded at two levels: (1) using all eligible participants regardless of age or gender, and (2) age- and sex-specific analyses. This approach was taken to include as many participants as possible in the analysis.

We first ran descriptive statistics on the demographic characteristics of the study participants. We then assessed the relationship between the outcome variables (reducing the number of tobacco outlets and ending tobacco sales) and independent variables (age, sex, student type, and smoking and vaping status) using multinomial logistic regression models. This was based on previous literature showing that these characteristics were likely to be relevant.[19,23,24] Probability modelled were the odds of supporting reducing and ending tobacco sales. Predictor variables were entered simultaneously. The variables were coded as follows: support for reducing the number of tobacco outlets (1=support, 2=neutral, 3=oppose); support for ending tobacco sales (1=support, 2=neutral, 3=oppose); age (1=≥35 years, 2=25-34 years, 3=<25 years); sex (1=male, 2=female); student type (1=domestic, 2=international), and smoking and vaping status (1=dual use, 2=exclusive smoking, 3=exclusive vaping, 4=non-use). The last category was used as the reference category. All statistical analyses were performed using IBM SPSS Statistics V.27 and two-sided $p<0.05$ was considered statistically significant. Confidence intervals (95% CI) were reported.

Results

Participants

A total of 7,104 students were included in the analysis (1932 NZ, 5172 UQ). The demographic characteristics of participants are summarised in Table 1.

Overall support for reducing and ending tobacco sales

There were modest differences between NZ and UQ students with slightly more NZ than UQ students supporting reducing the number of tobacco outlets (69.3% vs 62.3% supported; 10.6% vs 17.9% opposed; and 20.1% vs 19.9% were neutral), and ending tobacco sales in 10 years (53.3% vs 51.6% supported; 18.6% vs 24.1% opposed, and 28.1% vs 24.3% were neutral).

Support for reducing the number of tobacco outlets and ending tobacco sales

Table 2 displays the results of the models predicting the likelihood of support for reducing the number of tobacco outlets. Both models were significant. In the NZ model, χ^2 (14, N=1,817) = 219.123, $p<0.001$; students who smoked (OR=0.07, 95%CI: 0.05-0.11), vaped (OR=0.39, 95%CI: 0.20-0.74), or dual used (OR=0.06, 95%CI: 0.03-0.14) had lower odds of supporting reducing tobacco outlets compared to non-users. Likewise, in the UQ model, χ^2 (14, N=4,251) = 839.772, $p<0.001$; men (OR=0.38, 95%CI: 0.31-0.46) had lower odds than women, and students who smoked (OR=0.03, 95%CI: 0.02-0.04), vaped (OR=0.12, 95%CI: 0.05-0.27) or dual used (OR=0.01, 95%CI: 0.00-0.06) had lower odds of supporting reducing tobacco outlets compared to non-users.

Table 3 displays the results of the models predicting the likelihood of support for ending tobacco sales in 10 years. Both models were significant. In the NZ model, χ^2 (14, N=1,819) = 201.407, $p<0.001$, men (OR=0.64, 95%CI: 0.49-0.84) had lower odds than women, and students who smoked (OR=0.15, 95%CI: 0.10-0.22), vaped (OR=0.28, 95%CI: 0.16-0.47), or dual used (OR=0.08, 95%CI: 0.03-0.19) had lower odds of supporting ending tobacco sales compared to non-users. Likewise, in the UQ model, χ^2 (14, N=4,251) = 665.884, $p<0.001$, men (OR=0.54, 95%CI: 0.45-0.63) had lower odds than women, and students who smoked (OR=0.06, 95%CI: 0.04-0.08), vaped (OR=0.16, 95%CI: 0.07-0.36) or dual used (OR=0.02, 95%CI: 0.01-0.10) had lower odds of supporting ending tobacco sales compared to non-users, whereas domestic students (OR=1.32, 95%CI: 1.10-1.57) had higher odds of supporting it than international students.

Discussion

This study was the first to measure support for reducing the number of tobacco retail outlets and phasing out tobacco sales among a large sample of university students in Australia and New Zealand. The majority of respondents supported reducing the number of tobacco outlets, while only a minority opposed them (10-25%). Support for reducing the number of tobacco outlets was higher in NZ than among UQ students, as was support for ending the sale of cigarettes in 10 years. Men and students who smoked

Table 1: Demographic characteristics of participants: New Zealand (NZ) and University of Queensland (UQ) students.

		NZ, % (n=1,932)	UQ, % (n=5,172)
Age	<25 years	82.6 (1595)	68.5 (3543)
	25-34 years	14.0 (270)	18.2 (943)
	≥35 years	3.4 (66)	7.4 (384)
	Data missing	0.1 (1)	5.8 (302)
Gender	Male	38.3 (740)	35.5 (1834)
	Female	57.7 (1114)	60.4 (3123)
	Other	1.2 (24)	0.8 (40)
	Data missing	2.8 (54)	3.4 (175)
Student type	Domestic	74.2 (1434)	64.7 (3348)
	International	25.8 (498)	35.3 (1824)
Smoking and vaping status	Dual use	1.9 (37)	0.9 (44)
	Exclusive smoking	8.6 (167)	7.8 (401)
	Exclusive vaping	4.9 (94)	0.9 (47)
	Non-use	84.6 (1634)	90.5 (4680)

Table 2: Multinomial logistic models predicting the likelihood of support for reducing the number of tobacco outlets (in NZ, and Australia); by age, sex, student type and smoking and vaping status.

The number of places allowed to sell cigarettes and tobacco should be reduced	NZ students			UQ students		
	OR	95%CI	*p*-value	OR	95%CI	*p*-value
Support vs oppose						
Age						
<25 years	Ref			Ref		
25–34 years	0.64	0.41–1.01	0.055	0.93	0.74–1.18	0.547
≥35 years	1.40	0.51–3.82	0.513	0.80	0.58–1.10	0.174
Sex						
Female	Ref			Ref		
Male	0.81	0.58–1.14	0.227	0.38	0.31–0.46	<0.001
Student type						
International	Ref			Ref		
Domestic	1.08	0.73–1.61	0.698	0.86	0.70–1.05	0.133
Smoking and vaping status						
Non-use	Ref			Ref		
Dual use	0.06	0.03–0.14	<0.001	0.01	0.00–0.06	<0.001
Exclusive smoking	0.07	0.05–0.11	<0.001	0.03	0.02–0.04	<0.001
Exclusive vaping	0.39	0.20–0.74	0.004	0.12	0.05–0.27	<0.001
Neutral vs oppose						
Age						
<25 years	Ref			Ref		
25–34 years	0.64	0.39–1.05	0.077	1.16	0.90–1.50	0.256
≥35 years	0.83	0.27–2.58	0.744	1.01	0.71–1.45	0.944
Sex						
Female	Ref			Ref		
Male	1.15	0.79–1.67	0.473	0.55	0.45–0.68	<0.001
Student type						
International	Ref			Ref		
Domestic	0.54	0.35–0.83	0.005	0.86	0.69–1.08	0.203
Smoking and vaping status						
Non-use	Ref			Ref		
Dual use	0.16	0.06–0.42	<0.001	0.11	0.04–0.28	<0.001
Exclusive smoking	0.30	0.19–0.48	<0.001	0.19	0.14–0.26	<0.001
Exclusive vaping	0.61	0.29–1.29	0.197	0.57	0.28–1.15	0.115

or vaped were less likely to support both strategies. These findings were consistent with those of a recent survey among a general population sample in Victoria, Australia, which found approximately half (53%) of all participants agreed that ending tobacco sales would be a good thing, with support highest among people who don't smoke.[13] Furthermore, among all participants of that survey, 64% indicated that within 10 years was a fair timeframe for phasing out sales, with a majority of these participants indicating that five years was a fair timeframe. Previous Australian research also found that 77.7% of people who did not smoke and 43.0% of people who smoked supported reducing "number & type of tobacco outlets" while 59.9% of people who did not smoke and 37.2% of people who smoked supported "complete tobacco prohibition within ten years".[25]

Our finding of men being less likely to support ending tobacco sales was unexpected. A population study in Denmark (n=41,356) found men were marginally more likely to support a ban on smoking than women (31.9% vs 29.5%).[26] Furthermore, never smokers were more likely to support a ban on smoking (37.5%) compared to smokers (occasional 21.0%, daily 18.2%), consistent with our study. It might be that the men in our study were younger and less addicted to smoking, or mostly smoked in social settings (e.g. at parties with their peers) and had somewhat less restrictive views toward smoking than would be expected from older smokers struggling to quit smoking.

Previous research among New Zealanders who smoked, on support for banning sales of cigarettes in 10 years,[12] reported substantially lower support than the current study (46% vs 53.3%). However, our study included more young participants (82.6% aged <25 years vs 64.7% ≥35 years) with a lower prevalence of smoking (10.5% vs 100%) than the previous study. Our sample also has higher education than a general population sample, which is associated with lower smoking prevalence. The smoking prevalence among the UQ sample (8.7%) was similar to that reported for the general Australian population with a Bachelor degree or higher (7.9% in 2016).[27]

A key finding was that in the UQ sample, domestic students had higher odds of supporting ending the legal sale of cigarettes/tobacco (in Australia) in 10 years than international students. However, there were no significant differences between domestic and international students in the NZ sample. We expected more support for ending cigarette sales from NZ students (overall and by student type) for two reasons. First, public health messaging – a smoke-free country goal had not been set or promoted by public health advocates in Australia (e.g. Cancer Councils and Heart Foundations), whereas the NZ Smokefree Aotearoa 2025 goal is better publicised.[1] Although, research findings suggest that this goal may not be well understood by the general public.[28] Second, access to nicotine vaping products has been easier in NZ than Australia, which could increase public support for ending cigarette sales due to the availability of a consumer acceptable substitute.[12] However, it should be noted that in both samples (NZ and UQ), participants who vaped and did not smoke had lower odds of supporting reducing the number of places allowed to sell cigarettes/tobacco, and ending cigarette sales compared with participants who neither vaped nor smoked.

Strengths and limitations

The strengths of this research include the use of similar research questions (in both countries) and large samples that resembled the student populations in NZ and UQ in regards to demographic characteristics. These make our findings potentially generalisable to the wider NZ and Queensland university populations. The main limitation was that we used convenience samples, which are prone to volunteer bias that could lead to overestimation or underestimation of prevalence estimates.[21]

Policy implications

Both the NZ and Australian governments have proposed reducing retail availability of tobacco in policy documents released for consultation in 2021.[8,29] Our findings suggest good support for this policy

Table 3: Multinomial logistic models predicting the likelihood of support for ending the sale of cigarettes in 10 years (in NZ, and Australia); by age, sex, student type and smoking and vaping status.

Cigarettes should not be sold (in Australia or NZ) in 10 years	NZ students			UQ students		
	OR	95%CI	*p*-value	OR	95%CI	*p*-value
Support vs oppose						
Age						
<25 years	Ref			Ref		
25−34 years	1.23	0.82 - 1.85	0.308	0.85	0.69 - 1.04	0.118
≥35 years	1.26	0.60 - 2.65	0.540	0.90	0.67 - 1.22	0.508
Sex						
Female	Ref			Ref		
Male	0.64	0.49 - 0.84	0.001	0.54	0.45 - 0.63	<0.001
Student type						
International	Ref			Ref		
Domestic	1.33	0.96 - 1.83	0.086	1.32	1.10 - 1.57	0.002
Smoking and vaping status						
Non-use	Ref			Ref		
Dual use	0.08	0.03 - 0.19	<0.001	0.02	0.01 - 0.10	<0.001
Exclusive smoking	0.15	0.10 - 0.22	<0.001	0.06	0.04 - 0.08	<0.001
Exclusive vaping	0.28	0.16 - 0.47	<0.001	0.16	0.07 - 0.36	<0.001
Neutral vs oppose						
Age						
<25 years	Ref			Ref		
25-34 years	1.16	0.75 - 1.77	0.510	0.94	0.75 - 1.18	0.579
≥35 years	1.08	0.49 - 2.40	0.842	1.14	0.82 - 1.58	0.433
Sex						
Female	Ref			Ref		
Male	0.67	0.50 - 0.89	0.007	0.50	0.41 - 0.60	<0.001
Student type						
International	Ref			Ref		
Domestic	0.57	0.41 - 0.79	0.001	0.81	0.67 - 0.99	0.038
Smoking and vaping status						
Non-use	Ref			Ref		
Dual use	0.16	0.06 - 0.40	<0.001	0.13	0.05 - 0.35	<0.001
Exclusive smoking	0.26	0.17 - 0.41	<0.001	0.13	0.09 - 0.18	<0.001
Exclusive vaping	0.49	0.28 - 0.87	0.014	0.56	0.27 - 1.15	0.115

among this population, with the majority of university students in NZ and Queensland (Australia) supporting reducing tobacco retail availability. Furthermore, around half supported phasing out tobacco sales, which is similar to levels of support reported for general population samples. While there has been limited public promotion of the concept of ending tobacco sales in Australia and NZ, this situation is rapidly changing with the public consultation on the proposed NZ Smokefree Aotearoa 2025 Action Plan and some advocacy groups such as Australian Council on Smoking and Health advocating a tobacco retail phaseout.[29,30] Additional public discussion of supply side policies could be helpful for challenging current perceptions of tobacco as a normal consumer product and universities could be key settings for such discourse given that many campuses have become smoke-free and some have also ended tobacco sales on campus. This could be facilitated through assessment activities and public seminars and debates. Further research is needed on message framing[31] and the types of complementary policies that will increase public support for phasing our tobacco retail sales, such as government assistance for tobacco retailers to adjust to a phase out.[32] At the same time research needs to continue in smoking cessation assistance, particularly increasing uptake of existing programs and trialing innovative approaches. Our study provides baseline data that can be used to compare changes in support for supply side tobacco control strategies among this population group, as discourse on, and implementation of these policies increases. More research beyond university populations is, however, needed to understand the perspectives of other players, including tobacco retailers who have stopped selling tobacco in their communities.

Conclusions

The results suggest the majority of students in NZ and Queensland supported reducing tobacco retail availability, and sex and smoking and vaping status were strong predictors for support. Around half supported phasing out tobacco sales within 10 years. Substantial differences were observed between NZ and Queensland students in support for these supply-side strategies.

Implications for public health

Collaborative research should be encouraged to enhance cross-country approaches on tobacco control.

Acknowledgements

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