



VIEWPOINT

Downwards trends in adolescent risk-taking behaviours in New Zealand: Exploring driving forces for change

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Trends in Risk-Taking Behaviours among High School Students in New Zealand and Elsewhere

The most significant causes of adolescent morbidity and mortality in developed nations are related to risk-taking behaviours such as risky driving, substance use, unsafe sex, violence perpetration and injuries.¹ We previously reported findings from a nationally representative secondary school self-report survey carried out in New Zealand (NZ) in 2001, 2007 and 2012.^{2–4} In brief, there were large improvements between 2001 and 2012 in overall population rates of major areas of risk taking, specifically: smoking, binge drinking, drug use, risky driving and violence perpetration. Some gains were greater in the 2001–2007 period and others in the 2007–2012 period (Fig. 1).² The initiation of sexual behaviour and teenage pregnancy also declined, although there was little change in condom or contraceptive use among sexually active students. We also found concurrent, generally small improvements in many determinants of health, including family relationships, school connectedness and violence exposure but not socio-economic indicators nor access to health care. Other critical health outcomes, including depression, physical activity and obesity, did not improve or worsen.^{3,4}

Recent national data provide further evidence for decreases in substance use,^{5,6} risky driving behaviours⁷ and pregnancies⁸ among teenagers in NZ. National surveys from Europe, North America and Australia also report significant reductions in substance use,^{9–13} physical fighting, injury-related mortality¹⁴ and risky motor vehicle use¹⁵ among young people. This suggests that declines in adolescent risk taking may be part of a wider trend in high-income countries. International trends in sexual initiation

and condom use have been more variable,¹⁶ but reductions in teenage pregnancy have also been reported in many European countries, Australia and the United States.^{17,18}

Learning from these positive trends might be important for capitalising on health gains, extending them to groups who have not benefited so far and identifying opportunities to avoid losing ground in the future. This paper briefly outlines key findings and explores potential causal pathways for apparent positive secular trends in adolescent risk taking.

Hypothesising Possible Reasons for Trends in Risk-Taking Behaviours

Our study, as well as much of the body of evidence from elsewhere, is based on cross-sectional surveys, which limits our ability to make causal inferences. However, it is important to consider what may have contributed to these profound shifts and to explore possible causal pathways that might inform the development of future intervention studies.

Research has typically focused on looking at interventions and risk factors that affect specific, individual health outcomes, but a focus on broader trends suggests that the changes across several adolescent risk-taking behaviours may be linked. As risk behaviours tend to cluster, with the same students often engaging in multiple risk behaviours, interventions that address one risk behaviour may affect other risk behaviours.^{19,20} This might be due to common underlying causal pathways for multiple risk behaviours. For example, shifts in macro-economic conditions might affect the ability of youth to purchase cigarettes and alcohol and also limit the use of other recreational drugs. Interventions targeting individual risk factors or behaviours may also achieve reductions in other areas through a cascade effect. For example, exposure to alcohol may lower inhibitions and make further risk taking more likely, so reductions in binge drinking might influence other risk behaviours like smoking, risky driving and unprotected sex.

The following section explores possible explanations for these positive trends in NZ and is summarised in Table 1. First, we consider the policies and programmes that have targeted individual risk behaviours and outcomes during the study period. Second, we discuss broader societal changes that might have influenced declines in multiple risk behaviours simultaneously. An overview of potential causal pathways was developed based on expert consultation and review of the literature. We talked to lead NZ experts in

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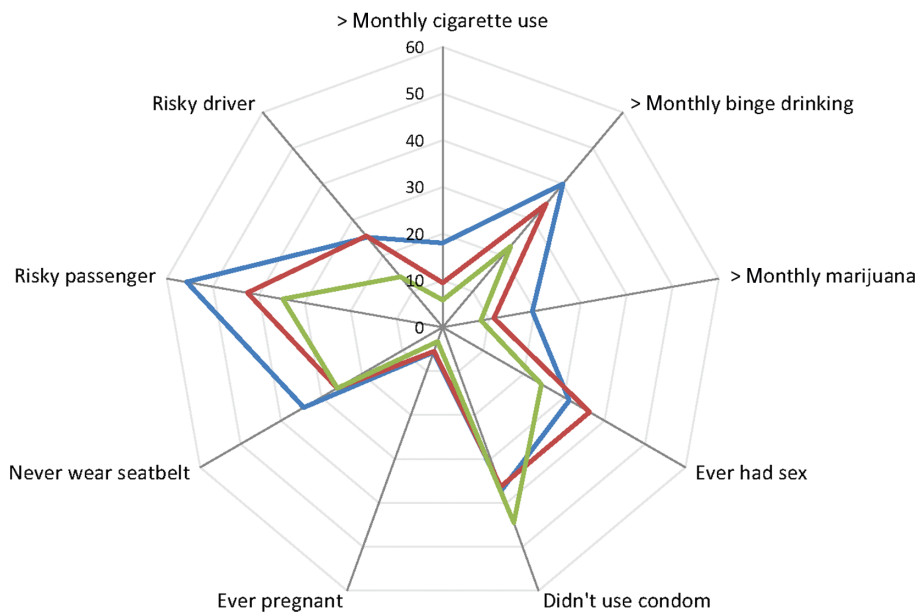


Fig. 1 Changes in adolescent risk-taking behaviours in New Zealand between 2001 and 2012. (—), 2001; (—), 2007; (—), 2012.

population health and epidemiology and consulted international adolescent health specialists. Second, we reviewed the literature for discussion of causes or reasons for change in adolescent risk behaviour during this time period. Plausible mechanisms with at least

some evidence and/or robust rationale included specific health and education policies and programmes and changes in both the immediate environments in which young people live and their broader social contexts.

Table 1 Driving forces for change in adolescent risk-taking in New Zealand between 2001 and 2012

Factor	Changes during the time period	Behaviours affected	Likely role as a driving force for change
Policies and programmes targeting specific risk behaviours			
Policy and legislative environment	Many policy changes occurred during the study period and were better enforced	Smoking, alcohol use and risky driving	Very likely
Public health and social marketing campaigns	Many public health and social marketing campaigns occurred during the study period	Smoking, alcohol use and risky driving	Very likely
School-based health services and curricula	New curriculum launched in 2007, but many large changes in risk taking occurred before 2007 Improvements in school-based health services over study period	Sexual health and risky driving	Likely
Societal influences on multiple risk behaviours			
Macroeconomic environment and global recession	Global financial crisis in 2008, associated with increased unemployment, but many large changes in risk taking occurred before 2008	Alcohol use, risky driving	Unlikely major driving force, although may have contributed
Wealth and income inequality	Remained stable over study period	Smoking, alcohol use and risky driving	Unlikely driving force for change
Family, school and neighbourhood environments and social norms	Small but significant improvements in family connectedness, parental involvement and monitoring Shifting social norms related to smoking and alcohol use Possible secular changes in preference for risk-taking	General risk-taking	Possible
Social media and internet	Increased use of social media	General risk-taking	Possible
Physical environment	Increased national investment in infrastructure	General risk-taking	Possible

Policies and Programmes Targeting Specific Risk Behaviours

Policy and legislative environment

A growing body of evidence supports the impact of policy changes that increase regulation and enforcement of laws around availability and accessibility of alcohol and cigarettes, through measures such as taxation, increased pricing, licensing hours, legal purchasing age, stricter penalties and regulation of advertising.^{19,21–23} Research on adolescent brain development suggests that factors that lead adolescents to engage in risky activity are social and emotional, not cognitive, and therefore, efforts to prevent risk taking that focus on changing the context and opportunities for risky activities will be more successful than focusing on knowledge and attitudes alone.²⁴

Policies and legislation targeting substance use and risky driving have undergone significant changes in recent decades in NZ and other developed nations. In NZ, many policy changes occurred before 2001, but the World Health Organization Framework Convention on Tobacco Control provided additional impetus on policies to reduce smoking from 2003.²⁵ No similar framework conventions exist for alcohol, other drugs or risky driving. Policy changes in the 1990s and early 2000s increased the availability of and access to alcohol, but alcohol-related problems gained visibility, and legislative acts and multiple amendments were made during the study period²² (Table 2). From 2001 to 2012, additional measures included increased taxation on alcohol, introduction of stricter laws and penalties to reduce motor vehicle crashes, raising the driving age to 16 and lowering the legal breath and blood alcohol limit to zero for drivers under 20 years of age. The evidence for the impact of policy and legislative changes, and the timing of these changes in NZ, make it very likely that these contributed towards the downwards trends in risk-taking behaviours.

Public health and social marketing campaigns

Public health campaigns using mass media and social marketing can play an important role in changing attitudes and social norms.²⁶ While there is evidence that mass media interventions impact smoking initiation among young people,^{27,28} the evidence of impact on other substance use and sexual risk behaviour is unclear.²⁸ There have been extensive public health and social marketing campaigns in NZ targeting smoking, alcohol use and safe driving (Table 2). Building on international evidence, these campaigns have become better researched over time and increasingly use a combination of approaches and different media forms, which is likely to have increased their effectiveness.²⁶ Public health and social marketing campaigns may be the most effective when accompanied by policy changes and increased enforcement activities,^{29,30} such as those described above. Public health and social marketing campaigns are very likely to have contributed towards downwards trends in risk-taking behaviours.

School-based health services and curricula

Better availability and quality of health services in NZ schools are associated with improved reproductive health outcomes and reduced teenage pregnancy.³¹ Youth health quality standards were drafted in

2002³² and further refined in 2006,³³ and school-based health services have expanded over this period. In addition, a new curriculum was launched in 2007 and was rolled out across all NZ mainstream schools by 2010.³⁴ This curriculum emphasises developing values and competencies that enable children to live full and active lives. The health and physical education curriculum includes sexuality education; physical safety; and teaching on smoking, alcohol and drugs. The NZ secondary school health curriculum has been internationally recognised as innovative.³⁵

Our data suggest that the biggest drops in substance use occurred before the new curriculum was introduced, but there were improvements in sexual health and risky driving indicators between 2007 and 2012 and a reduction in students involved in physical fights. The changes in youth health services and curriculum may have contributed to these effects.

Societal Influences on Multiple Risk Behaviours

Macroeconomic environment and global recession

Economic recession has been linked to multiple health outcomes among adults, particularly through unemployment, income insecurity and reduced public spending. Temporary economic recessions in wealthy nations have been linked to reductions in many areas of health risk among adults, including substance use and road traffic accidents,³⁶ perhaps due to people having less disposable income and being more risk-averse and fewer commuters on the roads. Less is known about the effects on adolescents. Government policies and public health programmes can help to buffer the negative impact of recession so that not all countries experience effects of recession on health in the same way and not all population subgroups are equally affected.³⁶ For example, children from low-income families may be disproportionately affected.³⁷ The recent recession had a relatively lower impact on NZ compared to other countries in the Organisation for Economic Co-operation and Development (OECD),³⁸ although unemployment rates did increase post-2008.³⁹

Many of the large reductions in risk behaviours observed in our study occurred before the recession, between the 2001 and 2007 surveys. This suggests that the recession may have contributed by adding further pressure in the same direction (e.g. risky driving and binge drinking) but is unlikely to be the major driving force for change.

Wealth and income inequality

Socio-economic inequalities have been linked to poor health, independent of individual socio-economic position.⁴⁰ We found that, in 2012, socio-economically deprived students living in wealthier neighbourhoods had higher levels of smoking than deprived students living in poorer neighbourhoods, suggesting that the stress of inequality and social incongruity may be an important driver for youth behaviours in NZ.⁴¹ Macroeconomic recession can lead to increasing socio-economic inequality, with the poorest families being the hardest hit by rising unemployment and cuts in public spending.⁴² In an international study of adolescent self-reported health, socio-economic inequalities existed but were stable in most countries over time.⁴³ Income inequality in NZ is higher than the OECD average and rose rapidly in the 1980s but has remained stable since the mid-1990s.⁴⁴ As with most OECD countries, the trend of increasing inequality slowed down or

Table 2 Policies and programmes targeting individual risk behaviours in New Zealand

Year	Policy changes
	Smoking
Pre-2001	Cigarette advertising banned on TV, radio, billboards and in cinemas Health warnings appear on cigarette packets Tobacco control programme introduced, a 'comprehensive policy to promote non-smoking', including public involvement, health education, quit clinics, restricted adolescent access to tobacco (legal age of purchase raised to 18), increased taxation, smoke-free environments, health warnings and ban on tobacco advertising and sponsorships Smoke-free environments bill introduced, placing restrictions on smoking in indoor workplaces, public transport, cafes, restaurants and casinos National Quitline launched and subsidised nicotine patches and gum available through Quitline
2003	WHO framework convention on tobacco control developed to reduce the health and economic effects of tobacco. Provides basic tools for countries to enact comprehensive tobacco control legislation
2004	New Zealand ratified framework convention on tobacco control. The Smoke-free Environment Act introduces complete bans on indoor smoking in licensed premises and workplaces
2007	New Zealand, Ireland and Finland jointly awarded the Global Smoke-free Partnership's Extraordinary Award in recognition of 'exceptional and outstanding' commitment in the development of guidelines for protection from exposure to tobacco smoke (Article 8 FCTC)
2008	Graphic pictorial warnings appear on all tobacco packages – 30% of front and 90% of back of packages must be covered with graphic health warnings
2011	Government sets goal for Smoke-free New Zealand by 2025
2010	Package of increased control measures on tobacco retail environment – including prohibiting visible display, tightening infringement fines for those selling tobacco products to under-18
2012	Ban on tobacco products being visible to the public at retail outlets, with \$10 000 fine
	Alcohol
Pre-2001	Sale of Liquor Act 1989, aiming to reduce liquor abuse by legislative means Sale of Liquor Amendment Act 1999 Better enforcement of legal age requirements when legal age lowered to 18 years
2003	Increased taxation on light spirits
2013	Sale and Supply of Alcohol Act 2012 came into force, restricting licensing, alcohol promotion and supply to young people
	Risky driving
Pre-2001	The Land Transport Act 1998 outlines legal alcohol limits for drivers
2004	Introduction of compulsory random breath testing
2009	Introduction of penalties for driving under the influence of drugs
2011	Minimum age for driver licensing increased from 15 to 16 years and more rigorous licensing provisions
2011	Zero blood alcohol concentration for drivers under 20 – zero tolerance on drinking and driving
2011	Increase penalties for dangerous drink driving offences
Year	Public health and social marketing campaigns
	Smoking
Pre-2001	Great smoke-free week with NZD0.5 million on TV advertising Launch of Auahi Kore programme by Te Hotu Manawa Maori to coordinate and strengthen tobacco control among Maori Public health commission sets target for $\leq 20\%$ adult smoking rate by 2000, requiring further government intervention to achieve target Youth media campaign – Why start?
	Alcohol
2000	National alcohol strategy (2000–2003), including targets for consumption levels
2004	ALAC launched a large-scale social marketing campaign with aim to change drinking culture
2004	Social marketing targeting binge drinking
2005	'It's not the drinking. It's how we're drinking' social marketing campaign from ALAC
	Drugs/Marijuana
2002	Effective drug education project – Produced booklets in 2004 containing principles of best practice for school-based drug education
2004	15 new community action on youth and drugs programmes started, with aim to address harm from drugs experienced by young people
Year	School-based health services and curricula
1999	School-based health and physical education curriculum was introduced
2002	New Zealand Standards for the Wellbeing of Children and Adolescents Receiving Healthcare
2006	Draft Standards for Youth Health Services, Kidz First Centre for Youth Health, Youth Health Expert Working Group
2007	School-based health and physical education curriculum was substantially revised

ALAC, Alcohol Advisory Council; FCTC, Framework Convention on Tobacco Control; WHO, World Health Organization.

reversed during the early years of the global financial crisis⁴⁵; thus, although inequality may be an important determinant of health and risk behaviours, it is unlikely to be a driving force for the observed changes over time.

Family, school and neighbourhood environments and social norms

Family environment and parental behaviour play an important role in influencing youth behaviour, as do school and neighbourhood environment, peer influence and social norms.⁴⁶ Findings from ours and other international studies present a picture of small but significant overall improvements in family connectedness, parental involvement and monitoring, perhaps reflecting cultural changes in parenting practices, particularly with more positive engagement of fathers.^{2,47} Adult drinking, smoking and alcohol-related harm has also decreased over recent decades,⁴⁸ alongside cultural shifts in media coverage and levels of approval around alcohol and smoking,^{49,50} providing increasingly positive social norms for young people.

Risk-taking behaviours are strongly influenced by underlying sensation seeking, which increases during adolescence, but secular changes in this 'underlying preference for risk-taking' suggest that wider societal and cultural factors can influence this preference.⁵¹ A study of US adolescents identified an underlying preference for risk that was significantly associated with risk-taking behaviours such as substance use. However, decreases in substance use in recent years were not accompanied by a decrease in preference for risk, and it may be that there have been secular shifts in the perceptions and types of risks young people take.⁵¹ With increased parental monitoring, supervision and societal restrictions on access to substances, adolescents may be taking more risks with things like online gaming, social media and extreme sports.

Social media and internet

Over the last two decades, use of computer and internet technology has increased rapidly. Access to social media and the internet have enabled increased communication without the need to leave home. Today's teenagers socialise, express their identity, have fun and take risks in different ways. Online gaming and social media may have displaced some risky behaviour and sensation seeking that previous generations engaged in physically but also opened a new avenue of online risk-taking in relation to things like pornography and contact with strangers.⁵² Adolescent electronic media use has increased in NZ over the same time period,⁵³ and reductions in many risk behaviours across multiple countries may be related to global trends in the rapid uptake of new communication and information technologies over this period.

Physical environment

The quality of physical environments can contribute significantly to participation in risky health behaviours. Deteriorated physical conditions in neighbourhoods have an association with risky behaviours, independent of poverty or ethnicity measures.^{54,55} In contrast, improvements to the built physical environments can have positive effects on reducing morbidity and mortality associated with risky behaviour through improved road design,⁵⁶ minimising access to alcohol outlets⁵⁷ and well-designed cities that improve safe walking.⁵⁸

The stress reduction perspective suggests that 'stressful neighbourhoods' with high levels of violence and substance use result in a 'stress response' as a means of coping.⁵⁹ There have been increases in national investment in some aspects of infrastructure in NZ during the last 15 years,⁶⁰ including schools, health facilities, roads and transport that may have contributed to improved physical environments and consequently reduced risk behaviours.

Discussion

There is accumulating evidence suggesting reductions in common risk-taking behaviours among adolescents in NZ and internationally over recent years. We identified several likely driving forces for change.

Undoubtedly, much has been achieved through concerted efforts to regulate access, legislation to reduce harmful behaviours and public health campaigns and social marketing to change societal attitudes.⁶¹ School-based health policies and curricula may also have contributed to reductions in sexual risk taking, risky driving and interpersonal violence in NZ. Secular changes in youth smoking and drinking have accompanied broader population changes, with fewer adults smoking or drinking alcohol or exposed to alcohol-related harm.⁴⁸ These trends largely predate the recent global recession, although macroeconomic effects may have accentuated downwards trends in risk behaviours. Likewise, income inequality is high in NZ but remained stable during the study period and is unlikely to explain overall population trends. Improved physical and social environments may also have contributed to reductions in risk-taking behaviours. Increased parental involvement, monitoring and access restrictions may have resulted in substance use and risky driving being displaced by other forms of sensation seeking, like social media.

Changes may not have occurred equally for all population subgroups. There is some evidence for convergence of risk behaviours in high-income countries, with steeper declines in traditionally higher risk groups.^{62,63} For example, alcohol risk behaviours among boys have declined more than girls in Western countries,⁶³ and our study found steeper declines in risk behaviours among Māori students, also a traditionally higher-risk group (Clark T *et al.*, unpublished, 2018). However, some convergence has occurred due to increased risk taking in formerly low-risk groups.⁶⁴ There may be other inequalities in rates of change between population subgroups, such as by gender, age, ethnicity and socio-economic position, with subgroups affected differently by macroeconomic conditions, public health campaigns or social marketing. Population health behaviour is complex, and positive changes in the prevalence of some indicators could mask negative changes in others. For example, European studies report that higher prices and stronger controls are associated with reducing adolescent alcohol consumption, but there is a trend for starting drinking at younger ages and increased drunkenness and alcohol-related harm.^{65,66} As such, we encourage further investigation of population survey data, using larger pooled datasets, and as this change has occurred over a relatively short time period, longer time series would be needed to explore continuing trends, alongside trends in potential driving forces.

Although statistically significant, some of the changes observed are not large, and levels of exposure to risk are still unacceptably high. In 2012, almost one in four students in our study still engaged in binge-drinking behaviour, almost half did not use condoms the last time

they had sex and over a quarter did not always wear seatbelts while driving or being driven in a car. Behaviours and indicators other than risk-taking behaviours either did not improve or became worse. One-third of children were overweight or obese, less than one in five met the recommendations for fruit and vegetable intake or physical activity, and some mental health indicators have worsened.^{2,3} Furthermore, support systems are still suboptimal, with around half of students not feeling safe in their own neighbourhood or having an adult they could talk to outside the family, and 1 in 10 children experiencing sexual abuse.

The limitations of this research are that the surveys were cross-sectional, making it difficult to draw conclusions about causality in observed associations. All behaviours were self-reported, meaning that trends could reflect changes in the social acceptability of behaviours or changes in participant trust in the privacy of surveys and willingness to disclose risk behaviours, both of which would potentially overestimate changes. Changes over time could also reflect changes in sample composition between surveys, with more students living in areas of higher deprivation in 2012 compared to 2001. However, national administrative, non-self-reported data on motor vehicle risk behaviours and teen pregnancy supports the direction of the observed changes.^{5–8}

Conclusions

There has been considerable progress in reducing many adolescent risk behaviours in NZ and internationally over recent years. We have explored potential driving forces for these trends. The timing and patterns of changes in risk behaviours suggest that policies, legislation and public health programmes are likely to have been influential, and school-based health services and curricula may have contributed to reductions in some risk behaviours. The roles of social, physical and online environments are possible and need more exploration. Although we cannot draw firm conclusions about which, if any, are causal, these findings highlight that adolescent risk behaviours can and do change and that a range of processes are likely to be involved. The cumulative effect of social, economic, environmental and policy factors can be influential and require further investigation to understand effective components that can be replicated in population groups and health areas that have seen less change, like mental health, obesity, physical activity, safe sex and injury. Issues that require further investigation include: whether these changes are temporary or part of a longer-term trend; whether reductions represent drops in some targeted behaviours or an overall reduction in risk-taking behaviours; and how equally distributed these changes are across population subgroups. Exploring driving forces in reducing risk behaviours among adolescents is important to inform future efforts to reduce preventable morbidity and mortality. Future efforts should consider how science and policy communities can harmonise efforts to improve adolescent health and well-being.

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