FINAL REPORT

Tobacco Reforms Literature Review

Prepared by Deakin Health Economics for the Minderoo Foundation

Authors
Professor Rob Carter
Gail Younie (Tobacco 21)
Sophy Shih (Product Flavouring)
Solveig Petersen (Product Flavouring)
Anita Lal (E-Cigarettes)

Deakin Health Economics

Table of Contents

List of Tables

List of Figures

Executive Summary

Background: Deakin Health Economics (DHE) was commissioned by the Minderoo Foundation in early March 2018 to conduct systematic reviews on existing and potential impact of raising the legal age for smoking from 18 to 21 (Tobacco 21), product flavouring, and e-cigarettes on youth smoking rates. This document provides a summary of the full report together with appendices.

Methods: An overview of the literature review methods is at Appendix Two. Data extraction tables are available on request.

Results:

Tobacco 21: The differentiation between the legal age at which a person can purchase tobacco and the legal age that a person can smoke is made in some countries or local areas, but not in others. Though the age of smoking in many jurisdictions is 18 years, nearly half of current smokers become regular daily smokers before age 18 and approximately 95 percent of adult smokers began smoking before they were 21. As legal access to and use of cigarettes becomes more difficult, sources from peers, family, and carers become more important. In an attempt to reduce peer and family sources, there is a strong policy push in the US to raise the minimum legal age (MLA) for purchasing tobacco products to 21. The first Tobacco 21 law was adopted in the local town of Needham, near Boston, Massachusetts in 2005. By 2013, seven other localities had joined Needham, as well as the state of Hawaii (2013). Three years later, another 125 localities had followed suit. New York City (2014) and California (2016) followed more recently. Singapore has implemented a graduated approach to Tobacco 21, with the age for purchasing cigarettes rising to 19 in 2019, 20 in 2020 and 21 years in 2021.

The majority of evaluation studies identified for Tobacco 21 use very similar designs based on surveys with self-report or recall data. To date, Needham has the only formal evaluation of the change in smoking prevalence as a result of Tobacco 21, but evaluations are planned in Hawaii, New York, and California. There is, however, useful case study evidence for the potential of Tobacco 21, both from the earlier MLA increase from 16 to 18 and for Tobacco 21 itself. It is likely that the 16 to 18 MLA change in Australia during the 1990s did reduce youth smoking, but it is difficult to measure that using conventional experimental methods because the effect is gradual and part of a suite of measures. MLA changes affect the youngest ages first and then may have a peer example effect down the age groups. The New South Wales experience demonstrated that effective enforcement of an age-restricted tobacco sales law can achieve substantial reductions in attempted purchases of tobacco and of smoking by youth. Overseas experience with this age increase also demonstrated positive outcomes.

Needham is raised as an example of the impact of raising the legal age to 21, with one study finding smoking among high school students dropped by more than half in comparison to similar neighbouring towns. Significant progress has also been made in reducing tobacco prevalence in Hawaii, with "current smoking" (within the past 30 days) among high school students decreasing by more than two-thirds – from 24.5 percent in 2000 to 7.4 percent in

2015. The introduction of Tobacco 21 in November 2013 would have contributed to these ongoing improvements, particularly in middle school.

The National Academies Health and Medicine Division (HMD) used two different simulation models to predict that 12 percent reductions in the prevalence of tobacco use would occur if the age was raised to 21. Further, the HMD estimated a reduction of 20.8 percent to 30.0 percent in smoking initiation among teens 15 to 17 years, with reductions in the 12.5 to 18.0 percent range for other adolescents. The magnitude of the health impacts in the US are in the order of 249,000 fewer premature deaths, 45,000 fewer deaths from lung cancer, and 4.2 million fewer lost life-years.

Product Flavouring: Our review focused on three topics: (1) the impact of tobacco flavouring products on public health, (2) the public response to potential future bans on flavourings in tobacco products, and (3) the impact of banning flavouring tobacco products on smoking behaviours and smoking rates.

In terms of the literature on impacts, US evidence suggests that a ban on non-menthol flavourings in cigarettes may have the potential to reduce or postpone the start of flavoured tobacco use and therefore to reduce the overall tobacco consumption among children and adolescents. The studies also reveal an apparent risk that a ban restricted to only some types of flavours or to single types of tobacco products may result in a shift in nicotine products rather than in the actual reduction of nicotine use in child and adolescent years.

Menthol, the oldest and most commonly used flavouring, impacts on a variety of aspects of smoking. These include its physiological effects, the pattern of use in certain populations, increased addictiveness to smoking, smoking initiation, and progression to smoking. Menthol cigarettes have been around for nearly a century and the scientific evidence clearly shows that they pose a significant public health risk above that which has already been seen with non-menthol smoking. Unfortunately, smokers believe that menthol makes smoking less harmful, easier, and more pleasant. More worrying, the prevalence of flavouring tobacco product use is higher in young smokers, female smokers, and lower socio-economic populations. The attractiveness of novel designs like capsule technology initiates smoking in youth, who are generally more open to innovation and prefer to be able to make their own decisions on changing the taste of smoking.

Several studies (all in the US) were identified that investigated public responses to a future ban on menthol in cigarettes, as well as bans for flavoured e-cigarettes and little cigars/ cigarillos. Overall, the studies revealed higher support for a ban on menthol cigarettes among women than men, and among black and Hispanic respondents, individuals with less than high school education, and non-smokers. One study specifically investigated attitudes to a ban on menthol cigarettes among 18 to 24-year-old smokers (mean age 21). All participants started smoking before the age of 21 and one-third of them stated that their first cigarette was menthol. These young respondents were generally opposed to a ban on menthol cigarettes, which they saw as unfair and violating a person's integrity. They also expressed scepticism as to the effect such a ban would have and suggested that people would either find a way to get the product or switch to non-menthol cigarettes or to marijuana. Many acknowledged, however, that a ban might help them quit smoking.

Effect of E-cigarettes: E-cigarettes have evolved with three generations of e-cigarette devices. The first generation was designed to look like a tobacco cigarette. Second-generation devices, which are larger and more cylindrical and are typically shaped like pens, contain a transparent cartridge that holds e-liquid and an atomizer. Third generation devices, often referred to as "vaping products," bear little resemblance to cigarettes and are often rectangular in shape. Juul is one of the newest devices with a shape and size similar to a USB drive. The device can be recharged using a USB charging dock. Juul is the most popular e-cigarette in the US, especially amongst teenagers, with flavours such as mango, crème brûlée, fruit medley, and mint. Manufacturers of E-cigarettes often promote them as effective in helping people to quit smoking.

In a recent statement, the CEO of the National Health and Medical Research Council (NHMRC) concluded that there is insufficient evidence to support claims that e-cigarettes are safe and that further research is needed to enable the long-term safety, quality, and efficacy of e-cigarettes to be assessed. Similarly, the Therapeutic Goods Association (TGA), in its role as Australia's regulator of therapeutic devices, recently considered a proposal to relax current regulations on e-cigarettes and the poison status of nicotine, but opted to maintain the current regulations. The Delegate noted concern about adverse effects and a lack of evidence to sustain the smoking cessation argument presented by manufacturers. The comprehensive review conducted by the National Academies Health and Medicine Division (HMD) in the US showed consistent evidence of e-cigarette smokers transitioning to combustible cigarettes. These results were consistent amongst various methodologies, locations, and ages.

Discussion:

Tobacco 21: Controlling access to potentially harmful products is a core strategy in many countries with regard to people of all ages, but in particular for children and young people. As documented by the recent NASEM review, numerous studies have indicated the harm to young people from smoking and that the younger a person commences smoking, the stronger the addiction, the harder to stop, and the greater the health impacts. One of the key issues for young people's health is that their brains continue to develop up to the age of 25 years. Young brains are uniquely vulnerable to the effects of nicotine and nicotine addiction and appear to show signs of nicotine addiction at lower levels of exposure compared to adults.

The results of our literature review suggests a number of pre-conditions for effective policy action on Tobacco 21. These include a strong need for action, community support, and respected advocates, a scientific case for action, and a clear policy design. A strong case for action can be made based on: (1) the threat posed by tobacco company targeting of adolescents and young adults, (2) the danger that hard won gains in reducing smoking prevalence will be lost, (3) the vulnerability of young brains to the effects of nicotine and nicotine addiction, and (4) the accepted role of government in controlling access to harmful substances. Quantitative social research conducted in some Australian states in 2017 suggests strong community support for policy action to raise the minimum age for smoking. Respected non-government organisations have also indicated their support, including the Cancer Council, the Australian Medical Association, the Medical Oncology Group of

Australia, and the Private Cancer Physicians of Australia. Careful thought would need to be given as to how all community groups in Australia, particularly minority groups, would be engaged to support policy action.

The adverse health and cost impacts of smoking are firmly established. The unique vulnerability of young brains is also clear. Effectiveness data for Tobacco 21 are emerging and depend on enforcement and placement within a co-ordinated and comprehensive Tobacco Control program. Key design issues flagged in the case studies include: (1) whether focus is on the legal age of smoking and/or the legal age of purchase, (2) progressive implementation versus immediate implementation, (3) complementary activities such as media campaigns, support for retailers, posters, information sheets, etc., (4) any exemptions, (5) coordination with the education authorities, and (6) the key importance of effective enforcement and monitoring.

Finally, while a minimum age requirement of 21 is not common in Australia there are precedents for matters deemed to be important. Youth in full-time study, for example, are not regarded as independent for purposes of receiving Centrelink until they are 22. Youth who drive do not get a full license until they are 21 or have been driving for 3 years.

Product flavouring: In Australia, public support for more comprehensive regulation of flavouring additives in tobacco products seems likely. Tobacco control experts have a consensus view on the regulation of the content of tobacco products. In particular, elimination of menthol and other ingredients that mask the taste and nature of tobacco would create additional motivations for smokers to consider quitting. The risk of adverse outcomes suggests that regulation should be sufficiently broad to cover all types of flavouring technologies, include all types of possible flavouring additives, apply to all parts of tobacco products such as the tobacco, wrapping paper, filter, and package, and take into account of all types of nicotine related products, including combustible, non-combustible and all kinds of delivering devices such as e-cigarettes. Further, use of flavoured tobacco products of all types should continue to be monitored over time in the Australian Secondary School Survey of Smoking, Alcohol and Drugs (ASSAD).

E-cigarettes: The literature confirms that there is currently insufficient evidence to support claims that e-cigarettes are safe. The efficacy of e-cigarettes to reduce harm also remains unclear. Accordingly, governments would be cautious about promoting continued use of a substance with its own potential health risks, including uncertainty about long-term health risks, the possibility of increasing use of conventional tobacco products through both initiation and relapse, and concerns about questionable terms of engagement with the tobacco industry.

Conclusions:

Tobacco 21: Continuing progress on reducing smoking rates requires a comprehensive, integrated and multifactorial approach to maintain momentum and ensure that government efforts and hard won gains are not undermined by tobacco companies introducing new innovative products that appeal to young people. The documented success of Needham with Tobacco 21 in reducing smoking rates has helped drive similar policies in other states and localities in the US. Australia can also be a leader in achieving this reform. While it might be a bigger leap for Australia to increase the MLA to 21 while the age of adulthood is

considered to be 18 years, the potential effects far outweigh convention. The need and policy logic for Tobacco 21 are strong. The Tobacco 21 initiative has ability to address informal access to cigarettes by children and to impact social norms. The pre-conditions for this initiative to be successful can be achieved in Australia. Australia should take up the opportunity to be a world leader in contributing to the evidence base for success on Tobacco 21. It will require coordinated action across all levels of government and effective monitoring and enforcement.

Product Flavouring:

Tobacco companies are regaining their foothold in the adolescent and young adult market through innovative products and modes of delivery focused around product flavouring and e-cigarettes. Menthol capsule cigarette use in Australian secondary school students is a particular concern. Tobacco control experts and stakeholders have a consensus view on the regulation of the content of tobacco products. In particular, elimination of menthol from tobacco and other ingredients that mask the nature of tobacco would create additional motivation for smokers to consider quitting. There is public support for more comprehensive regulation of flavouring additives in tobacco products in Australia.

E-cigarettes:

The forthcoming release of the Intergovernmental Committee on Drugs (IGCD) will contain important advice to inform government policy. On the basis of the material compiled in this report a cautious approach in laws and regulations is warranted.

1. Background

Deakin Health Economics (DHE) was commissioned by the Minderoo Foundation in early March 2018 to conduct three systematic reviews on smoking prevention in youth, including a consultation process with nominated experts in the field (Appendix 1). The reviews covered raising the legal age for smoking from 18 to 21 (*Tobacco 21*), product flavouring, and the effects of e-cigarettes. The reviews were conducted to inform the federal and state policy debate on tobacco reform.

The adverse health impacts of smoking through increased morbidity and mortality are firmly established, with two out of three Australian smokers dying as a direct result of smoking. Smoking kills around 15,000 Australians per year[1] and has significant health and economic costs - estimated at $31.5 billion in 2004–05.[2] In 2011, tobacco use was the risk factor contributing the highest burden of disease in Australia (9.0 percent).[3] While smoking rates are generally falling in developed countries, tobacco companies are pushing back hard, developing new ways to target youth to reverse this trend and undermine price-control interventions in Australia. Product flavouring and e-cigarette technology are central to this threat. Studies[4, 9] have clearly demonstrated that the majority of smokers commence smoking as adolescents, a time of strong experimentation, with the highly addictive nature of nicotine a strong reinforcer to continue smoking.

Young brains are uniquely vulnerable to the effects of nicotine and nicotine addiction and appear to show signs of nicotine addiction at lower levels of exposure compared to adults. Nicotine exposure during adolescence may have long-lasting adverse consequences on brain development, together with increased likelihood of developing smoking related cancers.[5] Therefore, those users that start at younger ages and continue to smoke are at higher risk for tobacco-related disease and death. There is also a dose-response gradient. The younger a person is when he or she initiates smoking, the stronger the addiction to nicotine.[6] One of the key issues for young people's health is that their brains continue to develop up to the age of 25 years, particularly those areas responsible for "decision making, impulse control, sensation seeking, future perspective taking, and peer susceptibility and conformity continue to develop and change through young adulthood."[7] This means that in comparison

---

[1] Australian Institute of Health and Welfare 2016, *Australia's Health 2016*, AIHW.

[2] Collins D, Lapsley H 2008, *The costs of tobacco, alcohol and illicit drug abuse to Australian society in 2004/05*, Department of Health and Ageing, Government of Australia.

[3] Australian Institute of Health and Welfare, *Australian Burden of Disease Study: Impact and causes of illness and death in Australia 2011*, AIHW.

[4] Scollo, MM & Winstanley, MH 2008, *Tobacco in Australia: Facts and Figures,* 3rd edition, Cancer Council Australia.

[5] Callaghan, RC, Sanches, M, Gatley, J, et al. 2018, "Impacts of Canada's minimum age for tobacco sales (MATS) laws on youth smoking behaviour, 2000–2014," Tobacco Control.

[6] Morain, SR, Winickoff, JP & Mello, MM 2016, "Have Tobacco 21 Laws Come of Age?," *New England Journal of Medicine*, vol. 374, no. 17, pp. 1601-1604.

[7] Bonnie, RJ, Stratton, K & Kwan LY (editors) 2015, *Public Health Implications of Raising the Minimum Age of Legal Access to Tobacco Products*, Committee on the Public Health Implications of Raising the Minimum Age for Purchasing Tobacco Products, Board on Population Health and Public Health Practice, Institute of Medicine, National Academies Press (US), Chapter 3.

to adults, adolescents are more susceptible to peer influence, have reduced impulse control, and display greater sensation and reward seeking behaviours.[8, 9]

Tobacco 21:

Though the age of smoking and/or purchase in many jurisdictions is 18 years, approximately 95 percent of adult smokers begin smoking before they reach 21 and nearly half become regular, daily smokers before age 18. Studies[10] have shown that as legal access to cigarettes becomes more difficult, sources from peers, family, and carers become more important. In the US the majority of buyers of cigarettes for minors are under 21. In an attempt to reduce peer and family sources there is a policy push in the US to raise the minimum legal age (MLA) to purchase tobacco products to 21. Singapore has just introduced a graduated approach to Tobacco 21.

Product flavouring:

There is a wide range of flavouring additives in tobacco products, including natural or synthetic agents, pigments with colouring effects, processing with fruit or vegetables, spices or herbs, seasoning, and sweetening or stimulating agents. Menthol is the most commonly used flavour-characterising additive in tobacco products. Menthol has a typical peppermint odour and taste with a cooling effect. Flavouring additives can be manufactured by adding flavouring agents into tobacco (e.g. menthol cigarettes) or other parts of the cigarette, such as wrapping paper, packages, or filters. A new technology for flavouring is available with embedded flavour "capsules" in cigarette filters (e.g. the "crush ball"), designed to give a "kick of freshness" by releasing the menthol more quickly and directly at any time during the course of smoking. The capsule technology is designed to make cigarettes more attractive to smokers as it incorporates distinctive flavours that provide a pleasurable sensory experience.

In Australia, there are only limited restrictions on additives to tobacco products, apart from current legislation banning the use of fruit and confectionary flavours in tobacco products in most states and territories since 2008. The existing bans are not sufficiently broad to cover all of the flavoured tobacco products (e.g. menthol cigarettes), which are not considered "fruity, sweet or confectionary-like," and it is also problematic to have inconsistency in the regulation across states and territories.

Effects of E-Cigarettes

E-cigarettes are devices that when heated produce an aerosol (commonly termed vapour), usually containing nicotine, which is inhaled by the users via a mouthpiece. E-liquids usually contain nicotine, flavourings, and humectant such as propylene glycol and glycerol. Popular

---

[8] Morain, SR 2016, "Tobacco 21 laws: withdrawing short-term freedom to enable long-term autonomy," *American Journal of Bioethics*, vol. 16, no. 7, pp. 26–28.

[9] Bonnie, RJ, Stratton, K & Kwan, LY (editors) 2015, *Public Health Implications of Raising the Minimum Age of Legal Access to Tobacco Products*, Committee on the Public Health Implications of Raising the Minimum Age for Purchasing Tobacco Products, Board on Population Health and Public Health Practice, Institute of Medicine, National Academies Press (US), Chapter 3.

[10] Morain, SR, Winickoff, JP & Mello, MM 2016, "Have Tobacco 21 Laws Come of Age?," *New England Journal of Medicine*, vol. 374, no. 17, pp. 1601-1604.

flavours include various fruits, mint, and tobacco. A popular e-cigarette device amongst youth in the US is the Juul.[11] It resembles a USB stick and is easy to conceal.

The net public health effect of e-cigarettes is expected to depend on four factors: (1) the effect on youth initiation of combustible tobacco products (referred to subsequently as "cigarettes"), (2) the effect on adult cessation of cigarettes, (3) their direct harms irrespective of their role in cessation, and (4) their impact as a distraction undermining advocacy for evidence-based interventions. E-cigarette use could cause substantial harm to public health in the short and long terms due to the direct harms of exposure to e-cigarettes, the harms related to cigarette use by youths who initiate smoking via e-cigarettes, and the negative impact of e-cigarettes as a diversion from evidence-based tobacco control interventions.

2. Methods

An overview of the literature review methods is at Appendix Two. Data extraction tables are available on request.

3. Results

Core issues to be covered in the review were: (1) clear description of the intervention, (2) details on intervention application, (3) case studies, and (4) extent of the evidence base, with smoking rates as the primary outcome measure.

Results for Tobacco 21

There is a clear difference between the legal age at which a person can purchase tobacco and the legal age that a person can smoke. This differentiation is made in some countries or local areas but not in others and allows cigarettes to be confiscated or the smoker to be fined or charged. Some countries have a national approach, while others have differing interpretations of legal age within their states or provinces.

An indicative list of the legal age for purchasing or smoking tobacco in Australia, a range of OECD countries, and our near neighbours is at Appendix Three. The interpretation of "smoking age" is for smoking in public. There is an exemption in Germany for people who are married.

Intervention description

As legal access to and use of cigarettes becomes more difficult, sources from peers, family and carers become more important. In an attempt to reduce peer and family sources there is a strong policy push in the US to raise the minimum legal age (MLA) to purchase tobacco products to 21. The Tobacco 21 objectives are to reduce access to tobacco products and change social norms around smoking from a "normative" (acceptable) to "de-normative" (unacceptable) activity. Key design issues flagged in the literature include: (1) progressive versus immediate implementation, (2) whether intervention includes MLA of smoking and/or MLA of purchase, (3) range and type of complementary action, including monitoring

---

[11] Teitell, B 2017, "'Juuling': The most widespread phenomenon you've never heard of," The Boston Globe, 16 November. Available from: https://www.bostonglobe.com/metro/2017/11/15/where-teenagers-are-high-school-bathrooms-vaping/IJ6xYWWlOTKqsUGTTlw4UO/story.html. [13 March 2018].

and enforcement, and (4) pre-requisites for action, such as community acceptance and engagement. These issues are discussed in the Discussion Section below.

Intervention application

The first Tobacco 21 law was adopted in the local town of Needham, near Boston, Massachusetts in 2005.[12] By 2013, seven other localities had joined Needham. Three years later, more than 125 localities and the state of Hawaii had followed suit. That number has now more than doubled with Maine, Oregon, California, and New Jersey picking up the initiative.[13] Tobacco 21 laws have now been passed in five states and more than 250 localities.[14]

A number of studies have looked at support for Tobacco 21 in the US. Studies were at the national level, state level, and with both adults and youth. At the national level, 75 percent of adults surveyed favoured raising the MLA to 21 years, including seven in 10 smokers.[15] As most laws have been initiated at the local or state level, Morain et al. looked at support in five US states, finding majority support in all five states and across all sociodemographic subgroups assessed, including 18 to 20-year-olds who are most directly impacted by Tobacco 21 laws.[16] Majority youth support at the national level was also found by Dai using data from the 2015 National Youth Survey.[17] Seven months after the effective date of implementation of Tobacco 21 laws in California, there was strong support from retailers and a high awareness of the laws and their intent amongst the population.[18]

Singapore has implemented a graduated approach to Tobacco 21, with the age for purchasing cigarettes (and the use and possession of tobacco products) rising to 19 in 2019, 20 in 2020, and 21 years of age in 2021.

Level and quality of the evidence base

The majority of evaluation studies identified for Tobacco 21 use very similar designs based on surveys with self-report or recall data. Compliance data collected from retailers all took the form of underage or young people who looked underage as decoys to purchase tobacco products. To date Needham has the only formal evaluation of the change in smoking prevalence as a result of Tobacco 21, but evaluations are planned in Hawaii, New York, and California. There is, however, very useful case study evidence for the potential of Tobacco 21, both from the earlier MLA increase for 16 to 18 years of age and for Tobacco 21 itself.

---

[12] Kessel Schneider S., et al 2015. Community reductions in youth smoking after raising the minimum tobacco sales age to 21. Kessel Schneider, S, Buka, SL & Dash K, et al 2015, *Community reductions in youth smoking after raising the minimum tobacco sales age to 21*, Tobacco Control, 12 June.

[13] Tobacco 21. Available from: https://tobacco21.org/.

[14] Morain, SR, Winickoff, JP & Mello, MM 2016, "Have Tobacco 21 Laws Come of Age?," *New England Journal of Medicine*, vol. 374, no. 17, pp. 1601-1604.

[15] King, BA, Jama, AO, Marynak, KL & Promoff, GR 2015, "Attitudes toward raising the minimum age of sale for tobacco among US adults," *American Journal of Preventive Medicine*, vol. 49, pp. 583-8.

[16] Morain SR, et al. 2017, "State-Level Support for Tobacco Laws: Results of a Five-State Survey," *Nicotine & Tobacco Research,* 15 September.

[17] Dai, H 2017, "Attitudes Toward Tobacco 21 Among US Youth," *Pediatrics*, July, vol. 140, no. 1.

[18] Zhang X, Vuong, TD, Andersen-Rodgers, E et al. 2018, "Evaluation of California's 'Tobacco 21' law," *Tobacco Control*, 13 February.

Case studies for Tobacco 21

Lessons from MLA change in smoking age from 16 to 18

Australia: Over the past 25 years, Australia has seen the introduction and strengthening of comprehensive tobacco control programs in all its states and territories.[19] The policy areas included youth access (including the increase in MLA from 16 to 18), clean indoor air, point-of-sale and outdoor tobacco advertising, increased cigarette prices, and funding for tobacco control programs. White et al.[20] applied logistic regression to multiple cross-sectional data over the 1990-2005 period to analyse the impact of these policies. Stricter controls on youth access to cigarettes were associated with lower adolescent smoking prevalence in the unadjusted analyses, but not after adjusting for other policies, demographics, and survey year. The authors concluded that adult-directed, population-based tobacco control programs and the increased price of cigarettes as part of well-funded comprehensive tobacco control programs were associated with lower adolescent smoking. The authors noted that several states phased in legislation related to youth access and point-of-sale advertising, with an initial period of education and inspections rather than full enforcement and prosecutions. Teasing out the independent impact of the MLA change was therefore difficult in this context.

Another study[21] that covered the 1984-2008 period in Victoria included the MLA change in 1993 as well as major advertising and other policy initiatives. They attributed the continuing decline in initiation among adolescents to the ongoing price increases, ongoing media campaigns, bans on traditional forms of advertising, strengthening of laws banning sales to minors, and increasing smokefree public places. As with the White study, the MLA initiative was part of a comprehensive policy approach in Victoria that made it hard to separate out individual elements. It is likely that MLA did reduce youth smoking, but it is very difficult to measure that using conventional experimental methods because the effect is gradual, not abrupt, and only one part of multiple policy initiatives. It is likely that MLA changes affect the youngest ages first and then have a peer example effect down the age groups.[22]

The only evaluation focused on the independent impact of the MLA increase in Australia involves the New South Wales increase in 1991.[23] In 1994, teenage volunteers tested retailer compliance in a 25 percent sample of retailers in the Central Coast region of NSW. Compliance was less than 70 percent, with more than 30 percent of retailers making illegal sales when tested. These results after 18 months of extensive education about the law,

---

[19] Scollo, MM & Winstanley, MH 2008, *Tobacco in Australia: Facts and Figures,* Cancer Council Australia, 3rd edition.

[20] White, VM, Warne, CD, Spittal, MJ, Durkin, S, Purcell, K & Wakefield M 2011, "What impact have tobacco control policies, cigarette price and tobacco control program funding had on Australian adolescents smoking? Findings over a 15-year period," *Addiction*, vol. 106, pp. 1493-1502.

[21] Germain, D, Durkin, S, Scollo, M & Wakefield, M 2012, "The long-term decline of adult tobacco use in Victoria: changes in smoking initiation and quitting over a quarter of a century of tobacco control," *ANZJPH,* vol. 36 no. 1, p. 17-23.

[22] Scollo, M, personal communication, adviser on consultation list, Appendix 1.

[23] Tutt, D, Bauer, L & DiFranza, J 2009, "Restricting the retail supply of tobacco to minors," Journal of Public Health Policy, vol. 30, no. 68. This evaluation was more about retailer compliance evaluating the impact of the increase in legal age access in a population.

.

prompted the design of a three-part strategy of retailer education, active enforcement through the use of under-age decoys, and publicity about prosecutions. This included the use of media to publicise random compliance checks and TV crews using hidden cameras to highlight the perception of being caught. Between 1993 and 1996, the prevalence of smoking declined in the NSW Central Coast intervention area, while remaining unchanged in the two control areas. Between 1993 and 2002, the prevalence of current smoking in the intervention area was reduced by 50 percent. The NSW experience demonstrates that effective enforcement of an age-restricted tobacco sales law can achieve substantial reductions in attempted purchases of tobacco and of smoking by youth.

Overseas experience: Two studies[24] of the England, Scotland, and Wales experience in raising their MLA to 18 reported reduced smoking prevalence in younger age groups. In just over three years from 2007, smoking among youth aged 16 to 17 years dropped from 23.7 percent to 16.6 percent, a proportional decrease of 32.5 percent. Three studies[25] of the Swedish experience over the 1996-2005 period also confirmed the potential for significant declines in smoking rates with MLA changes, but noted the lack of impact in Malmö attributed to high parent smoking rates and ease of access to many small retailers. Finally, a study[26] of 19 European Union countries compared intervention countries that had raised tobacco sales restrictions to 18 years in 2007, 2008 or 2009, with control countries that had sales restrictions in place since 2004. The study used data from the 2007 and 2009 European School Survey Project on Alcohol and Other Drugs (ESPAD). There were seven intervention countries and 12 control countries. The study found a significant decrease in obtainability in control countries between 2007 and 2011, but the decrease was significantly larger in the intervention countries (OR =0.75, 95% CI = 0.70-0.80). The study also found that smoking prevalence did not differ between intervention and control groups in 2007, but this study was unable to measure compliance with MLA laws. Further, assuming these laws affect the youngest teenagers most, then it would take longer than 1-2 years for differences in the rates of smoking among all or older teenagers to become apparent.

Lessons from MLA change in smoking age from 18 to 21

Needham, Massachusetts, US: Needham is raised as an example of the impact of raising the legal age to 21 in reducing smoking rates, with one study[27] finding smoking among high schools students had dropped by more than half in comparison to similar neighbouring towns. Strong enforcement may partially explain this success, with zero illegal sales picked up in compliance checks in 2008, in comparison to 8.3 percent in the rest of the state of Massachusetts. This MLA initiative reflected concerted efforts of a local paediatrician to

---

[24] Fidler, JA & West, R 2010, "Changes in smoking prevalence in 16-17 year old versus older adults following a rise in legal age of sale: findings from an English population study," *Addiction*, vol. 105, pp. 1984-1988. DiFranza, JR 2010, "Commentary on Fidler and West: Curtailing tobacco sales to minors," *Addiction*, vol. 105, pp. 1989-90.

[25] Hagquist, C et al. 2007, "Smoking habits before and after the introduction of a minimum-age law for tobacco purchase: Analysis of data on adolescents from three regions of Sweden," *Scandinavian Journal of Public Health,* vol. 35, no. 4, pp. 373 - 379.

[26] Kuipers, MA, Brandhof, SD, Monshouwer, K, Stronks, K & Kunst AE 2016, "Impact of laws restricting the sale of tobacco to minors on adolescent smoking and perceived obtainability of cigarettes: an intervention-control pre-post study of 19 European Union countries," *Addiction*, vol. 112, no. 2, pp. 320–329.

[27] Kessel Schneider, S et al. 2015, "Community reductions in youth smoking after raising the minimum tobacco sales age to 21," *Tobacco Control*, vol. 25, no. 3.

limit access to cigarettes to reduce smoking rates in young people, which generated significant community support. Needham is also an example of using an incremental approach to a public health issue to achieve action when trying to effect change at a whole state level is difficult because of either cost, time, difficulty, or political realities.[28] Needham also demonstrated effectiveness even though it was the only suburb where Tobacco 21 was implemented and there was the potential for young people to purchase in any of a dozen other neighbouring towns/suburbs. With the significant drop in smoking rates Needham had made itself an "island of addiction avoidance."

Hawaii, US: Tobacco 21 was introduced as part of an ongoing fight against tobacco in Hawaii and was introduced before the formal evaluation of Needham and the release of the IOM 2015 report into the public health implications of raising the MLA. This is the first and one of the few examples where Tobacco 21 was achieved at a state level. Tobacco 21 was facilitated by a broad grassroots movement driving the process, including children. A consultative approach was taken to other islands in Hawaii, allowing them to set their own laws, which helped ensure broad support. Introduction was accompanied by a commitment to strong enforcement and monitoring, including the use of penalties, felony charges, the labelling of tobacco products or e-cigarettes as contraband and a preparedness of the Department of Education to suspend or expel students. On the flip side of strong enforcement, a nuanced approach was taken with the military bases that enabled them to come on board within their own timelines.

Significant progress has been made over the past decade in reducing tobacco prevalence among Hawaii youth.[29] "Current smoking" (in the past 30 days) among high school students decreased by more than two-thirds, from 24.5 percent in 2000 to 7.4 percent in 2015. "Frequent smoking" (on 20 or more of the past 30 days) was reduced over 80 percent from 10.3 percent in 2000 to 2.0 percent in 2015. Among middle school students, current smoking declined from 5.3 percent in 2003 to 3.0 percent in 2015. Informal access remains an issue, however, with 78.8 percent of middle school and 86.7 percent of high school tobacco users under the age of 18 still responding that it would be easy to get tobacco products if they were so inclined.[30]

New York City: To reduce accessibility of cheap tobacco particularly for youth, New York City implemented two point-of-sale laws in 2014. In addition to Tobacco 21, the Sensible Tobacco Enforcement (STE) included a comprehensive set of price-related policies that restricted price discounts, established minimum price and packaging requirements, and increased penalties for tax evasion. Strong local and community buy-in was critical to getting the T21 laws considered. Alliances were not only with non-governmental partners

---

[28] Quinn, C 2013, "Mass. cities, towns raising tobacco sales age," The Salem News, Statehouse News Service, 30 December. Available from: http://www.salemnews.com/news/local_news/mass-cities-towns-raising-tobacco-sales-age/article_3cb7601c-c0be-5612-83ef-9df16de4773f.html. [16 June 2018].

[28] Chen, V & Forster, JL 2006, "The long-term effect of local policies to restrict retail sale of tobacco to youth," *Nicotine & Tobacco Research*, vol. 8, no. 3, pp. 371–377.

[29] Based on youth tobacco surveys administered by the CDC – Youth Tobacco Survey (YTS). Available from: http://hhdw.org/wp-content/uploads/2016/06/2015-HYTS_Data-Higlights-Report_FINAL_June2016.pdf.

[30] 22.8 percent of middle School students obtained cigarettes by borrowing or "bumming" them from friends, while 30.7 percent of underage high school smokers gave their friends money to buy cigarettes for them.

such as the American Cancer Society or the Tobacco-Free Kids associations, but also with the LGBTI Community and Asian Americans for Equality, with these groups engaging community partners and policy makers.[31] Being able to build on the successes of other local areas, such as Needham, as well as evidence on smoking prevalence[32] and the huge burden of disease and cost impacts of smoking, helped to convince local politicians despite strong opposition (including a lawsuit) from tobacco companies and retailer groups. With expected impacts in smoking rates not yet being realised, two evaluations of the NYC intervention have raised issues around monitoring and compliance.[33, 34] Young smokers in New York have demonstrated well developed strategies to obtain cigarettes and their sources are often passed around.

Without strong compliance it is difficult to evaluate the effectiveness of these interventions and will potentially enable tobacco companies to political interfere and call for laws to be wound back if there are no reliable evaluations of the impact.[35] Implementation of new laws requires a strategy for the ongoing compliance and surveillance of these laws to ensure they are working as intended.

California, US: In 2016, California increased the minimum age of sale for tobacco products, including electronic cigarettes, from 18 to 21 years of age, making California the second state in the nation to take this action to prevent tobacco initiation by young people. In California, community-focused tobacco control efforts are carried out by 61 local lead agencies, primarily local health departments, and 35 competitive grant projects, primarily non-profit agencies. The local lead agencies manage local coalitions and conduct education and policy activities within their health jurisdiction. The 35 competitive grant projects focus tobacco control efforts within priority population communities that experience higher rates of tobacco use or exposure to second hand smoke. The lead agencies recognised that public health efforts are more likely to be successful if scientific evidence[36] is incorporated into making management decisions, developing policies, and implementing programs and that successful implementation of a social-norm change intervention relies on strong community competencies in the areas of: (1) community organising, (2) building strategic and diverse partnerships, (3) policy implementation, and (4) subject matter expertise across a range of

---

[31] Moreland-Russell, S et al. 2016, "Success in the city: the road to implementation of Tobacco 21 and Sensible Tobacco Enforcement in New York City," *Tobacco Control,* vol. 25, pp. i6-i9.

[32] Beginning in 2011, the Department of Health & Mental Hygiene researched and conducted surveys to assess the prevalence of cheap and discounted tobacco in the city. This information was used to develop displays to educate stakeholders and decision makers on the low prices and extent of discounting practices.

[33] Silver, D, Macinko, J, Giorgio, M, Bae, JY & Jimenez, G 2016, "Retailer Compliance with tobacco control laws in New York City before and after raising the minimum legal purchase age to 21," *Tobacco Control,* vol. 25, no. 6, pp. 624-627.

[34] Macinko, J & Silver, D 2018, "Impact of New York City's 2014 Increased Minimum Legal Purchase Age on Youth Tobacco Use," *American Journal of Public Health,* vol. 108, no. 5, pp. 669-675.

[35] A pre/post evaluation is planned. Moreland-Russell, S et al. 2016, "Success in the city: the road to implementation of Tobacco 21 and Sensible tobacco Enforcement in New York City," *Tobacco Control*, vol. 25, pp. i6-i9.

[36] California was influenced by the seminal National Academies report, *Public Health Implications of Raising the Minimum Age of Legal Access to Tobacco Products.* as well as the strong science around the adverse impacts of smoking. Also see Zhang X., et al. 2018.

health, cultural, legal, and technical areas such as program planning, marketing, and evaluation.

California looked at exemptions for military personnel and American Indian tribal lands to increase support for its proposals. Within Hawaii there were no exemptions for military personnel, though the military voluntarily moved to restrict the sale of tobacco products to personnel 21 and over. The reasons for why this was not considered for California are not clear. Autonomy over tribal lands is an important recognition and the California evaluation plan includes strategies to engage with tribal leaders. A clear risk, however, is that this group, having been placed outside the strategy, may be left behind, even though the rates of smoking are higher than for non-indigenous population.

To date there has only been one published qualitative evaluation[37] of the California's Tobacco 21 law using a number of surveys. The evaluation found 98.6 percent of retailers were aware of the law and 60.6 percent supported the law. Two-thirds of young adults 18 to 24 years were aware of the law, with an even spread through different ethnic groups, and 60 percent agreed that raising the age of tobacco sales to 21 would reduce youth tobacco use.

Modelled changes in smoking prevalence for Tobacco 21

The HMD used two different simulation models to predict that 12 percent reductions in the prevalence of tobacco use would occur if the age was raised to 21. Further, the HMD estimated a reduction of 20.8 percent to 30.0 percent in smoking initiation among teens 15 to 17 years, with effects in the 12.5 to 18.0 percent range for other adolescents.[38] The magnitude of the health impacts in the US are in the order of 249,000 fewer premature deaths, 45,000 fewer deaths from lung cancer and 4.2 million fewer lost life-years.

Results for Product Flavouring

For tobacco flavouring products, we concentrated on three topics: (1) the impact of tobacco flavouring products on public health, (2) the public response to potential future bans on flavourings in tobacco products, and (3) the impact of banning flavouring tobacco products on smoking behaviours and smoking rates.

Impact of tobacco flavouring products on public health

Menthol, the most commonly used flavouring, impacts on a variety of aspects of smoking. These include its physiological effects, the pattern of use in certain populations, increased addictiveness to smoking, smoking initiation, and progression to smoking. Based on the available strength of evidence concerning menthol cigarettes, the US Food and Drug Administration (FDA) review concluded that:

1. Adequate data suggests that menthol use is likely associated with increased smoking initiation by youth and young adults;
2. Menthol smokers show greater signs of nicotine dependence and are less likely to successfully quit smoking; and

---

[37] Zhang, X, Vuong, TD, Andersen-Rodgers, E & Roeseler A 2018, "Evaluation of California's 'Tobacco 21' law," *Tobacco Control,* 13 February.

[38] IOM (Institute of Medicine) 2015, *Public health implications of raising the minimum age of legal access to tobacco products*, The National Academies Press.

3. Menthol's cooling and anesthetic properties can reduce the harshness of cigarette smoke and menthols are marketed as a smoother alternative to non-menthol cigarettes.

The scientific evidence determines that menthol cigarettes pose a significant public health risk above that which has already been seen with non-menthol smoking. Unfortunately, smokers believe that menthol makes smoking less harmful, easier, and more pleasant. More worrying, the prevalence of flavouring tobacco product use is higher in young smokers, female smokers, and lower socio-economic populations. The uptake of menthol flavour capsules as a preferred product in Australia indicates a similar pattern of use in young and high school aged smokers here. The attractiveness of novel design such as capsule technology initiates smoking in youth who are open to innovation and pleased to be able to make their own decisions on changing the taste of smoking.

Although the smoking of menthol cigarettes has declined in Australia, a significant increase in menthol capsule cigarettes has been observed since its introduction to the Australian market in 2012. Survey findings in 2014 showed that more than half (52 percent) of high school aged smokers experimented or used the menthol capsule cigarettes. The Australia experience mirrors similar patterns of use in teenage smokers as in the US and Latin America.

Public response to potential future bans on flavourings in tobacco products

Several studies were identified that investigated public responses to a future ban on menthol in cigarettes, as well as bans for flavored e-cigarettes and little cigars/cigarillos. These studies were all performed in the US following the FDA ban in 2009 on tobacco flavoring in the US, which did not include menthol flavoring and only included flavoring in cigarettes, not in other tobacco products. Four studies investigated public support for a potential future ban on menthol cigarettes and two studies addressed attitudes and responses to such a ban amongst young people. Two studies, one national[39] and one local,[40] reported 60-70 percent public support for a future ban on menthol cigarettes, while 30-40 percent were opposed. Two additional national studies,[41] which provided opportunities for more nuanced answers, found a 20-34 percent clear support for a ban on menthol cigarettes, while 52 percent and 17 percent were undecided and 28-49 percent were opposed to a ban. Overall, the studies revealed higher support for a ban on menthol cigarettes among women than men and in blacks and Hispanics, individuals with less than high school education, and among non-smokers. As expected, the support for such a ban was particularly low among menthol smokers, but the particularly low support for a ban among smokers (including menthol smokers) did not apply to African Americans. There was also lower support for a ban in 18-24 year olds than in those older than 24 years.

---

[39] Winickoff, JP et al. 2011, "US attitudes about banning menthol in cigarettes: results from a nationally representative survey*," American Journal of Public Health*, vol. 101**,** no. 7, pp. 1234-1236.

[40] Bolcic-Jankovic, D & Biener, L 2015, "Public opinion about FDA regulation of menthol and nicotine," *Tobacco Control*, vol. 24, no. e4, pp. e241-e245.

[41] Pearson, JL et al. 2012, "A ban on menthol cigarettes: impact on public opinion and smokers' intention to quit," *American Journal of Public Health*, vol. 102, no. 11, pp. e107-e114. Schmidt, AM et al. 2018, "Attitudes towards Potential New Tobacco Control Regulations among U.S. Adults," *International Journal of Environmental Research and Public Health*, vol. 15, no. 1.

One study[42] found that smokers and non-smokers were equally keen to reject a ban on menthol cigarettes, but among the ones in favour of regulations, smokers preferred to phase out the amount of menthol over time. There was no such specific preferences among non-smokers.

A qualitative interview study specifically investigated attitudes to a ban on menthol cigarettes among 18-24 years old smokers (mean age 21 years).[43] All participants started smoking before the age of 21 years and one-third stated that their first cigarette was menthol. These young respondents were generally opposed to a ban on menthol cigarettes, which they saw as unfair and violating a person's integrity. They also expressed scepticism as to the effect such a ban would have and suggested that people would either find a way to get the product or switch to non-menthol cigarettes or to marijuana. Many acknowledged, however, that a ban might help them quit smoking. In addition, O'Connor[44] also reported on adolescent behaviour in the case of a ban on menthol cigarettes. In this national study of smokers, 41 percent of the 14-17-year-old participants reported that they would try to quit smoking if menthol cigarettes were banned, while 24 percent said that they would find a way to otherwise purchase the product.

Four studies, three national and one local study from California, investigated the public support for a ban on flavoured e-cigarettes. Two of these studies targeted banning of e-cigarettes with candy and fruit flavours, and two addressed banning of flavoured e-cigarettes in general. The role of exposure to information about tobacco was also investigated in these studies. Most studies, such as Schmidt et al., found that a tight majority of the participants (54-57 percent) supported a ban on flavoured e-cigarettes.[45] One study, however, by Tan et al., reported only a 34 percent support for such a ban.[46] This was also the only study to investigate the degree of public indifference and thereby reveal that 38 percent did not have an opinion on the issue. There was no clear evidence for differences in support depending on socio-economy and race/ethnicity. The Schmidt study also reported that exposure to a national tobacco control campaign increased the odds of support for a ban on flavoured e-cigarettes. The study by Tan et al. reported that the exposure to information on e-cigarettes overall was limited and mostly conflicting. The latter study found no evidence that information in general influenced whether people were supportive or not of such a ban, but that general information decreased the risk of having

[42] Doran, N, Brikmanis, K, Petersen, A, Delucchi, K, Al-Delaimy, WK, Luczak, S, et al. 2017, "Does e-cigarette use predict cigarette escalation? A longitudinal study of young adult non-daily smokers," *Preventive Medicine*, vol. 100, pp. 279-284.

[43] Wackowski, OA et al. 2017, "In Their Own Words: Young Adults' Menthol Cigarette Initiation, Perceptions, Experiences and Regulation Perspectives," *Nicotine Tobacco Research.*

[44] O'Connor, RJ et al. 2012, "What would menthol smokers do if menthol in cigarettes were banned? Behavioural intentions and simulated demand," *Addiction*, vol. 107, no 7, pp. 1330-8.

[45] Schmidt, AM et al. 2018, "Attitudes towards Potential New Tobacco Control Regulations among U.S. Adults," *International Journal of Environmental Research and Public Health*, vol. 15, no. 1. Unger, JB et al. 2017, "Support for electronic cigarette regulations among California voters," *Tobacco Control*, vol. 26, no. 3, pp. 334-337. Wackowski, OA & Delnevo, CD 2015, "Smokers' attitudes and support for e-cigarette policies and regulation in the USA," *Tobacco Control*, vol. 24, no. 6, pp. 543-546.

[46] Tan, ASL, Lee, C & Bigman, CA 2015, "Public support for selected e-cigarette regulations and associations with overall information exposure and contradictory information exposure about e-cigarettes: findings from a national survey of U.S. adults," *Preventive Medicine*, vol. 81, pp. 268-274.

no opinion on this issue. The Tan study also investigated the level of support for a ban on candy and sweet flavoured cigarillos/little cigars. Support was stronger at just over half of those surveyed (56 percent), with greater support among females, older age groups, non-whites, people at the lower end of the socio-economic scale, non-smokers, and those exposed to a national tobacco control campaign.

Impact of banning flavouring tobacco products on smoking behaviours and rates

The US evidence suggests that a ban on non-menthol flavourings in cigarettes may have the potential to reduce or postpone the start of flavoured tobacco use and therefore to reduce the overall tobacco consumption among children and adolescents. The US studies also reveal an apparent risk that a ban restricted to only some types of flavours or to single types of tobacco products may result in a shift in nicotine products rather than in the actual reduction of nicotine use in child and adolescent years. For example, a shift to menthol flavoured tobacco products after the ban of fruit or confectionery flavoured tobacco was implemented.

Available studies in the literature also suggest that restrictions on the packaging and pricing of tobacco products may help reduce tobacco exposure and availability in the early years and across socio-economic and racial or ethnic groups. This type of regulation may have specific impact among children and adolescents, given that younger individuals have been shown to be particularly sensitive to pricing. Thus, effectively preventing children and adolescents from being led into early nicotine use may demand a comprehensive approach where all types of non-nicotine flavours are banned in all types of nicotine products. Restrictions in packaging and pricing may further support the prevention of child and adolescent tobacco initiation and use.

Results for effect of E-cigarettes

E-cigarettes have evolved over three generations of e-cigarette devices. The first generation mimicked a tobacco cigarette and were designed to look like one. Second-generation devices, which are larger and more cylindrical and are often shaped like pens, contain a transparent cartridge that holds e-liquid and an atomizer. Third generation devices, often referred to as "vaping products," bear little resemblance to cigarettes and are often rectangular in shape. Juul is one of the newest devices with a shape and size similar to a USB drive. The device can be recharged using a USB charging dock. Juuls are currently the most popular e-cigarette in the US, especially amongst teenagers, with flavours such as mango, crème brulee, fruit medley, and mint. It has been reported that some youths are going through one pod per day. Widely available flavour categories include tobacco, beverages, fruits, cool blends, desserts and sweets, fruit, and mentholated. In the UK, fruit flavours are most popular last smoked amongst youth.

In April 2015, the Commonwealth Department of Health engaged the University of Sydney (in partnership with the Cancer Council New South Wales) to explore options to minimise the risks associated with the marketing and use of for electronic nicotine delivery systems (ENDS) in Australia. The project was initiated under the auspices of the Intergovernmental Committee on Drugs (IGCD), which reports to the Australian Health Ministers' Advisory Council Mental Health, Drug and Alcohol Principal Committee. The IGCD nominated that the

Department of Health act as the lead agency to oversee the project. The outcomes of the project are to inform policy options for ENDS (with or without nicotine) that may be considered separately or in coordination by the commonwealth, state and territory governments. Broader dissemination of the report, when finalised, will be a matter for the IGCD. At this time it is unknown when the IGCD will be meeting to discuss this report.

In the 2017 NHMRC CEO Statement, one of the key messages was that:

> *Health authorities and policy-makers should act to minimise harm to users and bystanders, and to protect vulnerable groups such as young people, until evidence of safety, quality and efficacy can be produced.*

The NHMRC also concluded that there is currently insufficient evidence to support claims that e-cigarettes are safe and that further research is needed to enable the long-term safety, quality, and efficacy of e-cigarettes to be assessed. Accordingly, the NHMRC is currently funding a number of studies into the safety and efficacy of e-cigarettes. A recent Parliamentary Committee also confirmed the need for more research.[47]

The TGA, in its role as Australia's regulator of therapeutic devices, considered a proposal to relax current regulations on e-cigarettes and the poison classification of nicotine and opted to maintain the current regulations. The Delegate similarly noted concern about adverse effects and a lack of evidence to sustain the smoking cessation argument.

The US NASEM review[48] showed consistent evidence of a positive association between e-cigarette use and take-up of cigarette smoking. These results were consistent amongst various methodologies, locations, and ages. The primary evidence comprised longitudinal cohort studies that assessed e-cigarettes use at baseline and future cigarette use amongst "never smokers." The consistency of results across studies from varying locations and methodologies such as paper versus internet surveys, with and without biochemical verification of smoking, length of follow up strengthened the confidence of the committee in the causality of the association of e-cigarette use with transition from "never" to "ever smoker."

In the supplemental review there was strong evidence from longitudinal cohort studies of high plausibility that e-cigarette use may be a catalyst for smoking initiation, strengthening the confidence of a causal link from e-cigarette use to tobacco cigarette ever use. The supplemental review also found that young non-smokers who vape higher concentrations of nicotine were more likely to subsequently smoke at higher frequency and intensity rates, which added weight to the plausibility that e-cigarette use affects progression of smoking.

In summary, because the supplemental review provided strong evidence of plausibility and specificity of a possible causal effect of e-cigarette use on smoking and did not find

---

[47] Commonwealth of Australia 2018, *Report on the Inquiry into the Use and Marketing of Electronic Cigarettes and Personal Vaporisers in Australia*. Available from: https://www.aph.gov.au/Parliamentary_Business/Committees/House/Health_Aged_Care_and_Sport/ElectronicCigarettes/Report. [16 June 2016].
[48] National Academies of Sciences, Engineering and Medicine 2018, *Public Health Consequences of E-Cigarettes*, The National Academies Press. Available from https://doi.org/10.17226/24952. [16 June 2018].

conclusive evidence to refute the catalyst explanation, the committee considered the overall body of evidence of a causal effect of e-cigarette use on risk of transition from never to ever smoking to be substantial.

Finally, in view of the World Health Organization's advice[49] on variations between countries, it should be noted that the greater number of evidence cited for the US NASEM review was derived from the US, where tobacco control is in many jurisdictions weaker than controls in Australia. Therefore, while the NASEM report concluded with precautionary advice, particularly in relation to e-cigarette use as a catalyst for smoking in young people, the vast majority of independent health authorities in Australia would recommend even greater caution here, given the success of tobacco control in Australia and the currently[50] low rates of smoking prevalence in teenagers and young adults.

4 Discussion

Tobacco 21
Compliance remains a key issue:
In Australia, monitoring and surveillance of retailers and enforcement of MLA is not standardised and falls to different bodies, with no national centralised reporting on infringements and prosecutions. In Victoria, for example, this role is completely contracted out to Local Councils. In its 2011/2012 Annual Report,[51] the Municipal Association of Victoria described the Victorian State Tobacco Act as enabling

> "…in that they provide powers to councils to act. Whether or not councils decide to be involved in tobacco enforcement or education is a matter for them to consider in the context of local priorities."

The same report noted that 39 (of 79) councils participated in the sales to minors enforcement activity component with a 13 percent rate of sales to minors. In the MAV's 2014/15 report,[52] 54 councils were reported as participating with a rate of 7.2 percent test purchases resulting in sales to minors, 192 warning letters, 90 infringement notices and three prosecutions. Rural councils comment that tobacco retailers will question strangers, which can result in low sales from the test purchasing program due to questions not being asked of locals. Given the higher rates of smoking in rural and remote areas, this comment is pertinent to the effectiveness of using underage buyers in monitoring underage sales.

In WA the responsibility for enforcement of the State's Tobacco Control Laws is centralised and remains with the Department of Health. In its 2016 media release of the results of their latest Tobacco Retailer Compliance Survey, a 16 percent success rate for minors purchasing cigarettes was reported for 2015 - a significant reduction from the 29 percent success rate reported in 2013. The WA Tobacco Act allows for fines ranging from $10,000 for a first offense to $20,000 for a subsequent offense and $40,000 to $80,000 respectively for a body

---

[49] World Health Organization 2014, *Electronic nicotine delivery systems*.
[50] For current rates and trends in Australia for young adults see:
http://www.tobaccoinaustralia.org.au/chapter-1-prevalence/1-4-prevalence-of-smoking-young-adults.
[51] Municipal Association of Victoria, *Annual Report*, 2011/2012.
[52] Municipal Association of Victoria, *Annual Report*, 2014/2015.

corporate. The legislation does not permit prosecutions of retailers. In Tasmania, NSW, and Queensland, the respective health departments are responsible for the issuing of licenses and the monitoring of compliance, in particular underage sales laws.

Socio-economic factors also play an important role in the availability of cigarettes and a number of studies both in the US and Australia have shown a higher density of tobacco retailers in areas of socio-economic disadvantage. In Tasmania, for example, suburbs or towns with the greatest socio-economic disadvantage have more than twice the number of tobacco outlets per 1,000 people as areas of least disadvantage.[53] An ABC news report[54] on the same issue said that no Australian State or Territory currently restricts the number or location of tobacco retailers. In response to this issue, California introduced zoning ordinances and conditional use permits and, in 2014, San Francisco introduced a cap of 45 tobacco retailers per legislative district and banned outlets within 150 metres of schools.[55]

Place of Tobacco 21 in an overall policy setting

It is important to view the Tobacco 21 initiative in a policy context. There have been many interventions around the world and in Australia to reduce the burden of tobacco on health (see Figure 1). These include the introduction of taxes, bans on advertising, increased education and knowledge of the harms of smoking, bans on smoking in work places, public transport and public spaces, together with changes in the legal age that cigarettes can be purchased.

The many factors outlined in Figure 1 have played a role, some directly and some indirectly, in reducing smoking rates, with both short-term and long-term effects. Smoking trends in the developed world have been trending down, with significant reductions in young people taking up smoking. Indeed, much of the decline in smoking in Australia since the late 1990s appears to be attributable not to more people quitting, but to fewer young people taking up smoking in the first place.[56] Australian National Tobacco Control Strategies have been in place for many years and are strongly supported at the state/territory level and by the Cancer Council and the National Heart Foundation.

Controlling access to a harmful product is a core strategy in many countries for both adults and children, but in particular for children and young people. As documented by the recent NASEM review, numerous studies have indicated the harm to young people from smoking and that the younger a person commences smoking, the stronger the addiction, the harder to cease, and the greater the health impacts.

---

[53] Melody, S 2018, MJA Podcasts 2018 Episode 16: Tobacco retail accessibility, 2 April, vol. 208, no. 4.
[54] Shrine, R 2018, "Tobacco study suggests fewer Tasmanian sales licences in poorer areas could reduce smoking," ABC News, 4 March. Available from: http://www.abc.net.au/news/2018-03-05/tobacco-study-calls-for-fewer-tasmanian-retail-sales-licences/9508360. [16 June 2018].
[55] Zhang X, Vuong, TD, Andersen-Rodgers, E et al. 2018, "Evaluation of California's 'Tobacco 21' law," *Tobacco Control*, 13 February.
[56] Scollo, MM & Winstanley, MH 2008, *Tobacco in Australia: Facts and Figures,* Cancer Council Australia, 3rd edition.

Figure 1 - Daily Smokers aged 18 or older and key tobacco control measures in Australia

Sources: ABS 1997, 2002, 2006, 2009; ABS Australian Health Survey 2011-12 (National Health Survey component; customised request) and ABS National Health Survey 2014-15; Department of Health 2015.

Figure 1.1: Daily smokers aged 18 or older and key tobacco control measures in Australia, 1989–90 to 2016
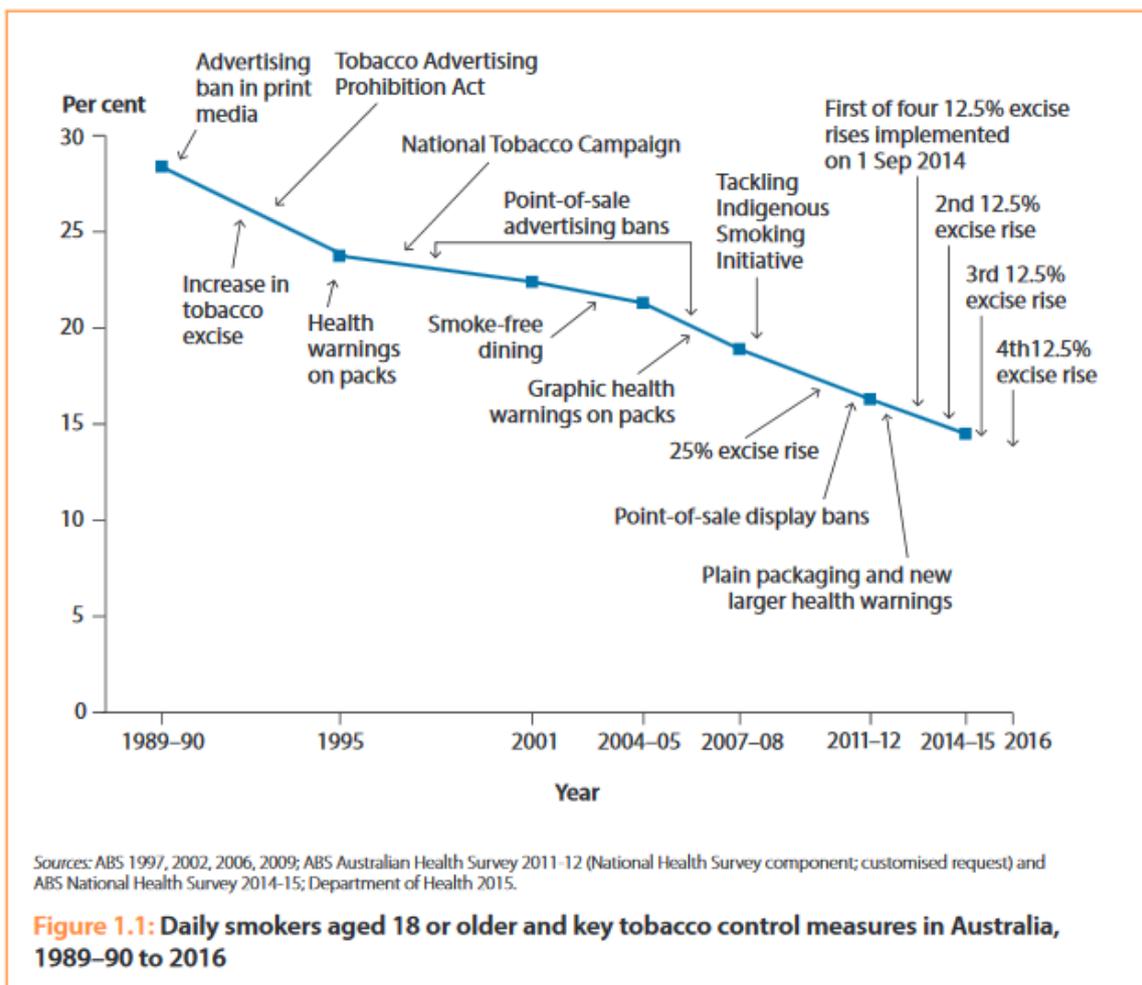
Source National Tobacco Strategy 2012-2018 p. 3

One of the key issues for young people's health, is that their brains continue to develop up to the age of 25 years, in particular those areas responsible for "*decision making, impulse control, sensation seeking, future perspective taking, and peer susceptibility and conformity continue to develop and change through young adulthood.*"[57] This means that in comparison with adults, adolescents are more susceptible to peer influence, have reduced impulse control, and display greater sensation and reward seeking behaviours.[58]

Young brains are uniquely vulnerable to the effects of nicotine and nicotine addiction and appear to show signs of nicotine addiction at lower levels of exposure compared to adults. Nicotine exposure during adolescence may have long lasting adverse consequences on brain development, together with increased likelihood of developing smoking related cancers. A

---

[57] Bonnie, RJ, Stratton, K & Kwan LY (editors) 2015, *Public Health Implications of Raising the Minimum Age of Legal Access to Tobacco Products*, Committee on the Public Health Implications of Raising the Minimum Age for Purchasing Tobacco Products, Board on Population Health and Public Health Practice, Institute of Medicine, National Academies Press (US), Chapter 3.

[58] Morain, SR 2016, "Tobacco 21 laws: withdrawing short-term freedom to enable long-term autonomy," *American Journal of Bioethics*, vol. 16, no. 7, pp. 26–28.

study by Callaghan estimated[59] that children who start smoking at age 15 are three times more likely to die of cancer due to smoking than the already high rate for a young person who takes up the habit in their mid-twenties. Therefore, those users that start at younger ages and continue to smoke are at higher risk for tobacco-related disease and death. There is also a dose-response gradient. The younger a person is when they initiate smoking, the stronger the addiction to nicotine.[60] As Callaghan concludes *"The adolescent brain is uniquely vulnerable to the rewarding effects of nicotine-a sensitivity that diminishes with age."*

The current National Tobacco Strategy (2012-2018) prioritises action to protect public health policies from tobacco industry interference, eliminate the remaining advertising, promotion, and sponsorship of tobacco products, and reduce the affordability of tobacco products. Other priorities focus on increasing smoke-free areas, strengthening mass media and public education campaigns, improving access to evidence based cessation services, and considering further regulation of tobacco product contents, disclosure, and supply. Particular emphasis is often placed on preventing early uptake of smoking. In recognition of this since the 1990s one of the strategies to reduce access to tobacco products for young people has been to raise the age that a young person can legally access a product. Tobacco 21 would revisit this policy strategy last actioned in the 1990s in Australia.

It should be noted, however, that the NTS - now into its third rendition - is an in-principle agreement between Australia's nine sovereign governments and has no targeted funding nor formal reporting linked to program and policy implementation, other than basic tracking against the principles. Significant achievements in tobacco control policy, such as plain packaging, increases in tobacco excise, funding for cessation services, and investment in mass media antismoking campaigns, have nonetheless occurred.

Pre-conditions for action

The results of the literature search summarised above suggests a number of pre-conditions for effective policy action on the MLA for smoking and/or purchase. These are briefly discussed below.

A clear need for action: A strong case for action can be made based on: (1) the threat posed by Tobacco Company targeting of adolescents and young adults, (2) the danger that hard won gains in reducing smoking prevalence will be lost, (3) the vulnerability of young brains to the effects of nicotine and nicotine addiction, and (4) the obligation of government to control access to harmful substances.

Strong community support and respected advocates: Internal polling and tracking data provided by the Minderoo Foundation suggests strong community support for policy action to raise the minimum age for smoking.[61] Minderoo has also advised that respected non-government organisations have indicated their support, including the Cancer Council

---

[59] Callaghan R.C., et al. 2018, "Impact of Canada's minimum age for tobacco sales (MATS) laws on youth smoking behaviour, 2000-2014," *Tobacco Control*.

[60] Morain, SR, Winickoff, JP & Mello MM 2016, "Have Tobacco 21 Laws Come of Age?," *New England Journal of Medicine*, vol. 374, no. 17, pp. 1601-1604.

[61] YouGov Galaxy T21 – Benchmark Polling – Three key marginal seats, January 22, 2018.
Galaxy research T21 – Queensland Marginal Seat Polls, November, 2017.
Galaxy research T21 – Queensland Campaign Tracking, 12 December, 2017.

(Cancer Council national board supportive of T21 alongside other policy measures and nationally funded advertising campaign); the Australian Medical Association (the AMA national board endorsed T21 as a policy position in February 2018 at the request of the AMA South Australian President); the Medical Oncology Group of Australia (MOGA announced their support for T21 during the recent SA election); and the Private Cancer Physicians of Australia (PCPA also announced their support for T21 during the SA election). It is important to consider the impact of Australia's diverse culture and vast collections of communities. Careful thought would need to be given as to how all community groups in Australia would be engaged to support policy action.

A scientific case for action: The adverse health and cost impacts of smoking are firmly established. The unique vulnerability of young brains is also clear. Effectiveness data for Tobacco 21 is emerging, but much depends on enforcement, placement within a comprehensive Tobacco Control program and a strong co-ordinated intervention design.

Policy design: Key design issues flagged in the case studies include: (1) whether focus is on the legal age of smoking and/or the legal age of purchase, (2) progressive implementation versus immediate implementation and/or grandfathering of 18-20-year-olds, (3) complementary activity (media campaign; support for retailers; posters and information sheets, etc.), (4) any exemptions, (5) coordination with the education authorities, and (6) the key importance of effective enforcement and monitoring.

Precedent for regulation based on age of 21: While a minimum age requirement of 21 is not common in Australia there are precedents for matters deemed to be important. Youth in full-time study, for example, are not regarded as independent for purposes of receiving Centrelink until they are 22. Youth who drive do not get a full license until they are 21 or have been driving for three years.

Product Flavouring

The prevalence of flavoured tobacco products is clearly higher in young smokers, female smokers, and lower social-economic populations. The evidence from both overseas and Australia identifies that menthol flavoured tobacco products are popular among youth and adolescents. These findings are alarming as the appeal of such products to the younger population is suggested by several authors as a gateway to regular smoking. The growth in menthol capsule cigarette use among Australian secondary school students is particularly concerning. Health professionals link market innovations such as the novel design of capsule technology, as an allurement tool for initiating smoking, particularly in younger demographics. Start-up smokers are enticed by the individuality of menthol cigarettes verse generic cigarettes, the modest taste of tobacco masked by the flavouring and the perceived 'healthier' status that also derives from the fresher aftertaste.[62]

---

[62] Philip Morris 2010, "Marlboro Menthol Marketing Plan," August 2001. Available from: http://www.pmdocs.com/core/downloadSearchBlob?IDX=1&FROM=SEARCH&CVSID=18a4e639f507b7684ce1aba29c7aecbb

Broad public support is central for successful implementation and enforcement of tobacco regulations.[63] From the current literature review it is still debated how the Australian public would react to a comprehensive ban on flavoured tobacco products. There was support reported in the National Drug Strategy Household Survey (NDAHS) of 2016. The evidence available from the US also suggests broad public support for a ban on menthol cigarettes, while support for a ban on flavouring in e-cigarette and small cigars may be less widespread. The information provided by the Minderoo Foundation from its polling is also suggestive of public support for tobacco control policy focused around on adolescents and young adults. Interestingly, the support for a ban on menthol cigarettes seems to be particularly strong in populations which have been heavily targeted by the tobacco industry and for whom rates of menthol cigarette smoking are high (e.g. African Americans and low socio-economic groups). This is promising, but other groups that have been successfully targeted by the tobacco industry seem less in favour of a ban in the US. It is concerning that younger populations appear to be more resistant to regulations and adept at finding informal access. This would reinforce the link for comprehensive action involving both Tobacco 21 and regulation of product flavouring.

It is also evident from the US literature that a large share of individuals supporting a ban on flavouring may not be strongly convinced about their position. Targeted media campaigns would seem an essential element to solidify support for stronger regulation of flavoured tobacco products. The literature also suggests that generally there may be little and conflicting information available to guide opinions on this issue.

In Australia, public support for more comprehensive regulation of flavouring additives in tobacco products seems highly likely. Tobacco control experts have a consensus view on the regulation of the content of tobacco products. In particular, elimination of menthol from tobacco and other ingredients which mask the nature of tobacco would create additional motivations for smokers to consider quitting.

Putting this all together, commonwealth and state governments should take a consensus approach to regulate flavouring tobacco products. The regulation should be sufficiently broad to cover all types of flavouring technologies, include all types of possible flavouring additives, apply to all parts of tobacco products, such as tobacco, wrapping paper, filter, package and take into account of all types of nicotine related products, including combustible, non-combustible, and all kinds of delivering devices such as e-cigarettes. Further, use of flavoured tobacco products of all types should continue to be monitored over time in the Australian Secondary School Survey of Smoking, Alcohol and Drugs (ASSAD). Quit Victoria is currently monitoring use of tobacco products including variants, however no national data are available about use of menthol and other flavoured tobacco products among young adults or adults generally.

---

[63] Burstein, P 2003, "The impact of public opinion on public policy: a review and an agenda," *Political Research Quarterly, vol. 56, no. 1, pp. 29–40.*

E-Cigarettes

The conclusion of the 2017 NHMRC CEO Statement, is that there is currently insufficient evidence to support claims that e-cigarettes are safe and that further research is needed to enable the long-term safety, quality, and efficacy of e-cigarettes to be assessed. The TGA in its role as Australia's regulator of therapeutic devices considered a proposal to relax current regulations on e-cigarettes and poison classification of nicotine and opted to maintain the current regulations. The Delegate noted concern about adverse effects and a lack of evidence to sustain the smoking cessation argument.

The efficacy of e-cigarettes to reduce harm remains unclear. All governments in Australia remain engaged in monitoring the potential risks and benefits of e-cigarettes to Australia's population. In view of the available evidence, on 27 November 2017 they released the following joint statement through the intergovernmental Drug and Alcohol Forum:

> *"Members noted that the current evidence base in relation to e-cigarettes supports maintaining and, where appropriate, strengthening the current controls that apply to the marketing and use of these products in Australia.*
>
> *Members agreed to national guiding principles which reflect a precautionary approach to e-cigarettes and affirmed the current national regulatory framework remains appropriate."[64]*

Governments would thus share concerns raised in the literature about using e-cigarettes for tobacco harm reduction. These include promoting continued use of a substance with its own potential health risks, including uncertainty about long-term health risks, the possibility of increasing use of conventional tobacco products through both initiation and relapse, and concerns about questionable terms of engagement with the tobacco industry.

Experienced tobacco control advocates and independent policy makers, based both in academia and in public policy settings, identify the tobacco industry's stake as the largest commercial investor in the e-cigarette market as another reason for concern. Tobacco industry activity has over many years been shown to be an important guide to tobacco control policy. For example, plain packaging, which in a comprehensive post-implementation review in Australia exceeded expectations in reducing prevalence, was partly informed 25 years ago by tobacco industry research showing the importance of pack design to take-up and consumption. Militant opposition to multiple other reforms, such as broadcast advertising bans and price controls, pre-dated longitudinal data showing their benefits in reduce smoking prevalence. These realpolitik observations are considered critical by experienced public health advocates. In the view of most tobacco control advocates in Australia with direct experience of industry activity, the aggressive promotion of e-cigarettes by industry interests should add further caution to unfounded claims of the net benefits of e-cigarettes in reduced smoking prevalence.

---

[64] Ministerial Drug and Alcohol Forum 2017, *Ministerial Drug and Alcohol Forum Communiqué*, Department of Health.

5 Conclusions

General

The lessons over many decades point to integrated, multifactorial approaches to the issue of tobacco control, especially for young people. Continuing progress requires a comprehensive approach to maintain momentum and ensure that government efforts and hard-won gains are not undermined by tobacco companies introducing new innovative products that appeal to young people.

Tobacco 21

The introduction of Tobacco 21 in the small town of Needham, Massachusetts, occurred in 2005. Its documented success in reducing smoking rates has helped drive similar policies in other areas. Australia can also be a leader in achieving this reform. While it might be a bigger leap for Australia to increase the MLA to 21 while the age of adulthood is considered to be 18 years, the potential effect far outweighs convention. While the policy and program logic for Tobacco 21 is strong, formal evaluation of effectiveness over a sustained period is still emerging. The Tobacco 21 initiative has attractive elements, particularly its ability to address informal access to cigarettes by children. The pre-conditions for this initiative to be successful in Australia – clear need for action, strong policy design with uniform application across states/territories, suite of support measures, broad community support, strong enforcement, and an engaged education sector - can be achieved if Australia takes up the opportunity to be a leader in contributing to the evidence base for success on Tobacco 21.

Product Flavouring

Tobacco companies are regaining their foothold in the adolescent and young adult market through innovative products and modes of delivery focused around product flavouring and e-cigarettes. Menthol capsule cigarette use among Australian secondary school students is a particular concern. Tobacco control experts and stakeholders have a consensus view on the regulation of the content of tobacco products. In particular, elimination of menthol from tobacco and other ingredients which mask the nature of tobacco would create additional motivation for smokers to consider quitting. There is public support for more comprehensive regulation of flavouring additives in tobacco products in Australia.

E-Cigarettes

The forthcoming release of the Intergovernmental Committee on Drugs (IGCD) will contain important advice to inform government policy. On the basis of the material compiled in this report a cautious approach in law and regulation is warranted in our view. This is consistent with the position taken by all government and statutory health agencies in Australia and almost all medical colleges and other non-government health organisations.[65]

---

[65] *Statement on e-cigarettes in Australia.* Available from: https://canceraustralia.gov.au/sites/default/files/statement_on_e-cigarettes_february_2018_0.pdf [16 June 2018].

6. References

References for Tobacco 21

- Apollonio, DE, Glantz, SA 2016, "Minimum Ages of Legal Access for Tobacco in the United States From 1863 to 2015," *American Journal of Public Health, vol.* 106, no. 7, pp. 1200-1207.

- Callaghan RC, Sanches M, Gatley J, Cunningham JK, Chaiton MO, Schwartz R, et al. 2018, "Impacts of Canada's minimum age for tobacco sales (MATS) laws on youth smoking behaviour, 2000–2014," *Tobacco Control*.

- Chen, V & Forster, JL 2006, "The long-term effect of local policies to restrict retail sale of tobacco to youth," *Nicotine & Tobacco Research*, vol. 8, no. 3, pp. 371–377.

- Dai, H & Hao, J 2017, "The effects of tobacco control policies on retailer sales to minors in the USA, 2015, *Tobacco Control*.

- DiFranza, JR 2010, "Commentary on Fidler and West: Curtailing tobacco sales to minors," *Addiction*, vol. 105, pp. 1989-90.

- DiFranza, JR, Celebucki, CC & Mowery, PD 2001, "Measuring statewide merchant compliance with tobacco minimum age laws: the Massachusetts experience," *American Journal of Public Health,* vol. 91, no. 7, pp. 1124-1125.

- DiFranza, JR & Coleman, M 2001, "Sources of tobacco for youths in communities with strong enforcement of youth access laws," *Tobacco Control, vol. 10, no. 4 pp.* 323-328.

- DiFranza, JR, Savageau, J & Fletcher K 2009, "Enforcement of underage sales laws as a predictor of daily smoking among adolescents – a national study," *BMC Public Health,* vol. 9, no. 1, p. 107.

- Doubeni, C, Li, W, Fouayzi, H & DiFranza, J 2008, "Perceived accessibility as a predictor of youth smoking," *Annals of Family Medicine,* vol. 6, pp. 323–330.

- Fidler, JA & West, R 2010, "Changes in smoking prevalence in 16-17-year-olds versus older adults following a rise in legal age of sale: findings from an English population study," *Addiction,* vol. 105, no. 11, pp. 1984-1988.

- Filippidis, FT, Agaku, IT, Connolly, GN & Vardavas, CI 2014, "Trends in age verification among U.S. adolescents attempting to buy cigarettes at retail stores, 2000-2009," *Preventive Medicine,* vol. 61, pp. 61-65.

- Galaxy research T21 – Queensland Campaign Tracking, 12 December, 2017. Provided by the Minderoo Foundation.

- Galaxy research T21 – Queensland Marginal Seat Polls, November, 2017. Provided by the Minderoo Foundation.

- Galaxy research YouGov Galaxy T21 – Benchmark Polling – Three key marginal seats, January 22, 2018. Provided by the Minderoo Foundation.

- Gendall, P, Hoek, J, Marsh, L, Edwards, R & Healey B 2014, "Youth tobacco access: trends and policy implications," *BMJ Open*, vol. 4, no. 4, p. e004631.

- Germain, D, Durkin, S, Scollo, M & Wakefield, M 2012, "The long-term decline of adult tobacco use in Victoria: changes in smoking initiation and quitting over a quarter of a century of tobacco control," *Australian and New Zealand Journal of Public Health*, vol. 36, no. 1, pp. 17-23.

- Hagquist, C, Sundh, M & Eriksson C 2007, "Smoking habits before and after the introduction of a minimum-age law for tobacco purchase: analysis of data on adolescents from three regions of Swedenm" *Scandinavian Journal of Public Health*, vol. 35, no. 4, pp. 373-379.

- IOM (Institute of Medicine) 2015, Public health implications of raising the minimum age of legal access to tobacco products, The National Academies Press.

- Kessel Schneider, S, Buka, SL, Dash, K, Winickoff, JP & O'Donnell L 2016, "Community reductions in youth smoking after raising the minimum tobacco sales age to 21," *Tobacco Control,* vol. 25, no. 3, pp. 355-359.

- Kuipers, MA, Brandhof, SD, Monshouwer, K, Stronks, K & Kunst AE 2016, "Impact of laws restricting the sale of tobacco to minors on adolescent smoking and perceived obtainability of cigarettes: an intervention-control pre-post study of 19 European Union countries," *Addiction,* vol. 112, no. 2, pp. 320–329.

- Lee, JG, Boynton, MH, Richardson, A, Jarman, K, Ranney, LM & Goldstein, AO 2016, "Raising the Legal Age of Tobacco Sales: Policy Support and Trust in Government, 2014-2015," *American Journal of Preventive Medicine*, vol. 51, no. 6, pp. 910-915.

- Lee, JG, Landrine, H, Torres, E & Gregory, KR 2016, "Inequities in tobacco retailer sales to minors by neighbourhood racial/ethnic composition, poverty and segregation, USA, 2015," *Tobacco Control,* vol. 25, no. e2, pp. e142-e145.

- Lipperman-Kreda, S, Grube, JW & Friend, KB 2014, "Contextual and community factors associated with youth access to cigarettes through commercial sources," *Tobacco Control,* vol. 23, no. 1, pp. 39-44.

- Lipperman-Kreda, S, Grube, JW, Friend, KB & Mair, C 2016, "Tobacco outlet density, retailer cigarette sales without ID checks, and enforcement of underage tobacco laws: associations with Youths' cigarette smoking and beliefs," *Addiction, vol. 111, no. 3, pp. 525-532.*

- Macinko, J & Silver, D 2018, "Impact of New York City's 2014 Increased Minimum Legal Purchase Age on Youth Tobacco Use," *American Journal of Public Health*, vol. 108, no. 5, pp. 669-675.

- Millett, C, Lee, JT, Gibbons, DC & Glantz, SA 2011, "Increasing the age for the legal purchase of tobacco in England: Impacts on socio-economic disparities in youth smoking," *Thorax,* vol. 66, no. 10, pp. 862-865.

- Minaker, LM, Soni, S, Ngyuyen, N & Manske, S 2015, "Youth retail access in Canada: regional variation, perceptions, and predictors from YSS 2010/20111," *Addictive Behaviors,* vol. 51, pp. 1-6.

- Morain, SR, et al. 2016, "Have Tobacco 21 Laws Come of Age," *New England Journal of Medicine*, vol. 374, no. 17, pp. 1601-1604.

- Morain, SR 2016, "Tobacco 21 Laws: Withdrawing Short-Term Freedom to Enable Long-Term Autonomy," *American Journal of Bioethics,* vol. 16, no. 7, pp. 26–28.

- Moreland-Russell, S, Combs, T, Schroth, K & Luke, D 2016, "Success in the city: the road to implementation of Tobacco 21 and Sensible Tobacco Enforcement in New York City," *Tobacco Control,*. vol. 25, (suppl 1), pp. i6-i9.

- Richardson, L, Hemsing, N, Greaves, L, Assanand, S, Allen, P, McCullough, L et al. 2009, "Preventing smoking in young people: a systematic review of the impact of access

interventions," *International Journal of Environmental Research and Public Health*, vol. 6, no. 4, pp. 1485–1514.

- Savage, M 2017, "Do youth access control policies stop young people smoking? Evidence from Ireland," *Economic and Social Research Institute (ESRI),* Working Paper No. 572.

- Silver, D, Bae, JY, Jimenez, G & Macinko, J 2016, "Compliance with minimum price and legal age for cigarette purchase laws: evidence from NYC in advance of raising purchase age to 21," *Tobacco Control,* vol. 25, no. 3, pp. 289-294.

- Silver, D, Macinko, J, Giorgio, M, Bae, JY & Jimenez, G 2016, "Retailer compliance with tobacco control laws in New York City before and after raising the minimum legal purchase age to 21," *Tobacco Control,* vol. 25, no. 6, pp. 624-627.

- Sundh, M & Hagquist, C 2004, "The importance of a minimum age law for the possibility of purchase of tobacco by adolescents: a study based on Swedish experiences," *Scandinavian Journal of Public Health,* vol. 32, no. 1, pp. 68-74.

- Sundh, M & Hagquist, C 2005, "Effects of a minimum-age tobacco law--Swedish experience," *Drugs: Education, Prevention & Policy,* vol.12, no. 6, pp. 501-510.

- Sundh, M & Hagquist, C 2006, "Compliance with a minimum-age law of 18 for the purchase of tobacco - The case of Sweden," *Health Education Research,* vol.21, no. 3, pp. 378-385.

- Sundh, M & Hagquist, C 2007, "Does a minimum-age law for purchasing tobacco make any difference? Swedish experiences over eight years," *European Journal of Public Health,* vol.17, no. 2171-2177.

- Tutt, D, Bauer, L & DiFranza J 2009, "Restricting the retail supply of tobacco to minors," *Journal of Public Health Policy,* vol. 30, no. 1, pp. 68–82.

- Warpenius, K, Holmila, M & Raitasalo, K 2016, "Compliance with the legal age limits for alcohol, tobacco and gambling – A comparative study on test purchasing in retail outlets," *Drugs: Education, Prevention & Policy,* vol.23, no. 5, pp. 435-441.

- White, MM, Gilpin, EA, Emery, SL & Pierce, JP 2005, "Facilitating adolescent smoking: who provides the cigarettes?," *American Journal of Health* Promotion, vol.19, no. 5, pp. 355-360.

- White, VM, Warne, CD, Spittal, MJ, Durkin, S, Purcell, K & Wakefield, MA 2011, "What impact have tobacco control policies, cigarette price and tobacco control program funding had on Australian adolescents' smoking? Findings over a 15-year period," *Addiction,* vol.106, no. 8, pp. 1493-1502.

- Zhang, X, Vuong, TD, Andersen-Rodgers, E & Roeseler, A 2018, "Evaluation of California's 'Tobacco 21' law,"*Tobacco Control,* 13 February.

References for Product Flavouring

- Alexander, LA, Crawford, T & Mendiondo, MS 2010, "Occupational status, work-site cessation programs and policies and menthol smoking on quitting behaviors of US smokers," *Addiction*, vol. 105, suppl. 1, pp. 95-104.

- Bolcic-Jankovic, D & L Biener L 2015, "Public opinion about FDA regulation of menthol and nicotine," *Tobacco Control*, vol. 24, no. e4, pp. e241-e245.

- Cancer Council Australia 2018, Position statement - Reducing the palatability of tobacco products: banning the use of filter design features and flavourings, *National Cancer Control Policy*.

- Commonwealth Department of Health (Ed.) 2016, *Health Policy Analysis Mid-point review of the National Tobacco Strategy 2012-2018: Final report.*

- Courtemanche, CJ, Palmer, MK & Pesko, MF 2017, "Influence of the Flavored Cigarette Ban on Adolescent Tobacco Use," *American Journal of Preventive Medicine*, vol. 52, no. 5, pp. e139-e146.

- Delnevo, CD & Hrywna M 2015, "Clove cigar sales following the US flavoured cigarette ban," *Tobacco Control*, vol. 24, no. e4, pp. e246-50.

- Fagan, P et al. 2010, "Nicotine dependence and quitting behaviors among menthol and non-menthol smokers with similar consumptive patterns," *Addiction*, vol. 105, suppl. 1, pp. 55-74.

- Farley, SM & Johns, M 2016, New York City flavoured tobacco product sales ban evaluation, *Tobacco Control*, vol. 26, no. 1, pp. 78-84.

- German Cancer Research Center (Ed.) 2012, *Menthol capsules in cigarette filters - increasing the attractivenss of a harmful product*, GCRC.

- Hersey, JC, Nonnemaker, JM & Homsi, G 2010, "Menthol cigarettes contribute to the appeal and addiction potential of smoking for youth,"*Nicotine & Tobacco Research*, vol. 12, suppl. 2, pp. S136-S146.

- King, B et al. 2012, "The decline of menthol cigarette smoking in Australia, 1980-2008," *Nicotine & Tobacco Research*, vol. 14 no. 10, pp. 1213-1220.

- Lawrence, D et al. 2010, "National patterns and correlates of mentholated cigarette use in the United States," *Addiction*, vol. 105, suppl. 1, pp. 13-31.

- Li, W et al. 2017, "Has Boston's 2011 cigar packaging and pricing regulation reduced availability of single-flavoured cigars popular with youth?," *Tobacco Control*, vol. 26, no. 2, pp. 135-140.

- Macpherson, LJ et al. 2006, "More than cool: promiscuous relationships of menthol and other sensory compounds," *Molecular and Cellular Neuroscience*, vol. 32, no. 4, pp. 335-343.

- O'Connor, RJ, et al. 2012, "What would menthol smokers do if menthol in cigarettes were banned? Behavioral intentions and simulated demand," *Addiction*, vol. 107, no. 7, pp. 1330-8.

- Pearson, JL et al. 2012, "A ban on menthol cigarettes: impact on public opinion and smokers' intention to quit," *American Journal of Public Health*, vol. 102, no. 11, pp. e107-14.

- Philip Morris 2010, "Marlboro Menthol Marketing Plan," August 2001. Available from: http://www.pmdocs.com/core/downloadSearchBlob?IDX=1&FROM=SEARCH&CVSID=18a4e639f507b7684ce1aba29c7aecbb

- Richardson, A et al. 2015, "How the industry is marketing menthol cigarettes: the audience, the message and the medium," *Tobacco Control*, vol. 24, no. 6, pp. 594-600.

- Schmidt, AM et al. 2018, "Attitudes towards Potential New Tobacco Control Regulations among U.S. Adults," *International Journal of Environmental Research and Public Health,* vol. 15, no. 1.

- Smith, DM et al. 2016, "Association between use of flavoured tobacco products and quit behaviours: findings from a cross-sectional survey of US adult tobacco users," *Tobacco Control*, volume 25, suppl. 2.

- Stahre, M et al. 2010, "Racial/ethnic differences in menthol cigarette smoking, population quit ratios and utilization of evidence-based tobacco cessation treatments," *Addiction,* vol. 105, suppl. 1, pp. 75-83.

- Tan, ASL, Lee, C & Bigman, CA 2015, "Public support for selected e-cigarette regulations and associations with overall information exposure and contradictory information exposure about e-cigarettes: findings from a national survey of U.S. adults," *Preventive Medicine*, vol. 81, pp. 268-274.

- Thrasher, JF, et al. 2016, "Cigarette brands with flavour capsules in the filter: trends in use and brand perceptions among smokers in the USA, Mexico and Australia, 2012-2014," *Tobacco Control*, vol. 25, no. 3, pp. 275-283.

- Thrasher, JF, et al. 2017, "Market share for flavour capsule cigarettes is quickly growing, especially in Latin America," *Tobacco Control*, vol. 26, no. 4, pp. 468-470.

- Tobacco Products Scientific Advisory Committee 2011, *Menthol cigarettes and public health: review of the scientific evidence and recommendations,* Tobacco Products Scientific Advisory Committee, Washington, DC.

- Trinidad, DR, et al. 2010, Menthol cigarettes and smoking cessation among racial/ethnic groups in the United States, *Addiction*, vol. 105, suppl. 1, pp. 84-94.

- Unger, JB, et al. 2017, "Support for electronic cigarette regulations among California voters, *Tobacco Control*, vol. 26, no. 3, pp. 334-337.

- U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health 2012, *Preventing Tobacco Use Among Youth and Young Adults: A Report of the Surgeon General,* U.S. Department of Health and Human Services.

- US Food and Drug Administration 2011, *Preliminary scientific evaluation of the possible public health effects of menthol versus nonmenthol cigarettes,* FDA.

- US Food and Drug Administration 2013, *Peer Review Summary Report: External Peer Review of the FDA Scientific Evaluation of the Possible Health Effects of Menthol versus Nonmenthol Cigarettes*, in *Assessment of the Impact of Mentholated Cigarettes on Smoking Initiation, Dependence, and Cessation*.

- Wackowski, OA & Delnevo, CD 2015, "Smokers' attitudes and support for e-cigarette policies and regulation in the USA," *Tobacco Control*, vol. 24, no. 6, pp. 543-546.

- Wackowski, OA & Delnevo, 2007, "Menthol cigarettes and indicators of tobacco dependence among adolescents," *Addictive Behaviors*, vol. 32, no. 9, pp. 1964-1969.

- Wackowski, OA et al. 2017, "In Their Own Words: Young Adults' Menthol Cigarette Initiation, Perceptions, Experiences and Regulation Perspectives," *Nicotine Tobacco Research*.

- White, V & Williams, T 2014, *Australian secondary school students' use of tobacco in 2014*, Centre for Behavioural Research in Cancer, Cancer Council Victoria.

- WHO Study Group on Tobacco Product Regulation (TobReg) 2016, *Advisory note: banning menthol in tobacco products*, World Health Organization.

- Winickoff, JP, et al. 2011, "US attitudes about banning menthol in cigarettes: results from a nationally representative survey," *American Journal of Public Health*, vol. 101, no. 7, pp. 1234-1236.

References for E-Cigarettes

- Action on Smoking and Health 2015, *Smokefree GB adult survey*, ASH.

- Adriaens, K, Van Gucht, D, Declerck, P &, Baeyens F 2014, "Effectiveness of the electronic cigarette: An eight-week Flemish study with six-month follow-up on smoking reduction, craving and experienced benefits and complaints," *International Journal of Environmental Research and Public Health,* vol.11, no. 11, pp. 11220-11248. Available from: https://doi.org/10.3390/ijerph111111220.

- Akre, C, Barrense-Dias, Y, Berchtold, A & Suris, JC 2018, "From tobacco-related products to smoking: Results from a longitudinal study," *Journal of Adolescent Health*, vol. 62, no. 2, pp. S7-S8.

- Ambrose, BK, Rostron, BL, Johnson, SE, Portnoy, DB, Apelberg, BJ, Kaufman AR et al. 2014, "Perceptions of the relative harm of cigarettes and e-cigarettes among U.S. youth," *American Journal of Preventive Medicine,* vol.47, no. 2, suppl. 1, pp. S53-S60.

- Australian Institute of Health and Welfare 2016, *National Drug Strategy Household Survey 2016 detailed findings*, Drug Statistics series no. 31, AIHW.

- Bauld, L, MacKintosh, AM, Eastwood, B, Ford, A, Moore, G, Dockrell, M, et al. 2017, "Young People's Use of E-Cigarettes across the United Kingdom: Findings from Five Surveys 2015-2017," *International Journal of Environmental Research and Public Health,* vol. 14, no. 9, p. 973. Available from https://doi.org/10.3390/ijerph14090973.

- Barrington-Trimis, JL, Urman, R, Berhane, K, Unger, JB, Cruz, TB, Pentz, MA, et al. 2016, "E-Cigarettes and Future Cigarette Use," *Pediatrics,* vol. 138, no. 1, pp. 1-8.

- Best, C, Haseen, F, Currie, D, Ozakinci, G, MacKintosh, AM, Stead, M, et al. 2017, "Relationship between trying an electronic cigarette and subsequent cigarette experimentation in Scottish adolescents: a cohort study," *Tobacco Control,* vol. 22, (053691):2017-053691.

- Bold, KW, Kong, G, Cavallo, DA, Camenga, DR & Krishnan-Sarin, S 2017, "E-Cigarette Susceptibility as a Predictor of Youth Initiation of E-Cigarettes," *Nicotine & Tobacco Research,* vol. 20, no. 1, pp. 140-4. Available from: https://doi.org/10.1093/ntr/ntw393.

- Bold, KW, Morean, ME, Kong, G, Simon, P, Camenga, DR, Cavallo, DA et al. 2017, "Early age of e-cigarette use onset mediates the association between impulsivity and e-cigarette use frequency in youth," *Drug Alcohol Dependence,* vol.181, pp. 146-151. Available from: https://doi.org/10.1016/j.drugalcdep.2017.09.025.

- Bullen, C, Howe, C, Laugesen, M, McRobbie, H, Parag, V, Williman, J, et al. 2013, "Electronic cigarettes for smoking cessation: a randomised controlled trial," *Lancet*, vol.

382, no. 9905, pp. 1629-37. Available from: https://doi.org/10.1016/S0140-6736(13)61842-5.

- Caponnetto, P, Campagna, D, Cibella, F, Morjaria, JB, Caruso, M, Russo, C et al. 2013, "EffiCiency and Safety of an eLectronic cigAreTte (ECLAT) as tobacco cigarettes substitute: a prospective 12-month randomized control design study," *PLoS One,* vol. 8, no. 6, p. e66317. Available from: https://doi.org/10.1371/journal.pone.0066317.

- Chaffee, BW, Gansky, SA, Halpern-Felsher, B, Couch, ET, Essex, G & Walsh, MM 2015, "Conditional Risk Assessment of Adolescents' Electronic Cigarette Perceptions," *American Journal of Health Behavior,* vol. 39, no. 3, pp. 421-32.

- Chaffee, BW, Watkins, SL & Glantz SA, "Electronic Cigarette Use and Progression From Experimentation to Established Smoking," *Pediatrics,* vol. 5, no. 10, pp. 2017-3594.

- Conner, M, Grogan, S, Simms-Ellis, R, Flett, K, Sykes-Muskett, B, Cowap, L et al. 2017, "Do electronic cigarettes increase cigarette smoking in UK adolescents? Evidence from a 12-month prospective study," *Tobacco Control*, vol. 17, (053539):2016-053539.

- Doran, N, Brikmanis, K, Petersen, A, Delucchi, K, Al-Delaimy, WK, Luczak, S, et al. 2017, "Does e-cigarette use predict cigarette escalation? A longitudinal study of young adult non-daily smokers," *Preventive Medicine,* vol. 100, pp. 279-284. Available from: https://doi.org/10.1016/j.ypmed.2017.03.023.

- Etter, JF 2017, "Gateway effects and electronic cigarettes," *Addiction,* vol.7, no. 10, p. 13924.

- Global Tobacco Control 2018, *Country laws regulating e-cigarettes Baltimore*, John Hopkins Bloomberg School of Public Health. Available from: http://globaltobaccocontrol.org/e-cigarette/policy-domains. [27 March 2018].

- Goldenson, NI, Leventhal, AM, Stone, MD, McConnell, RS & Barrington-Trimis, JL 2017, "Associations of Electronic Cigarette Nicotine Concentration With Subsequent Cigarette Smoking and Vaping Levels in Adolescents," *JAMA Pediatrics,* vol. 171, no. 12, pp. 1192-1199.

- Hammond, D, Reid, JL, Cole, AG & Leatherdale, ST 2017, "Electronic cigarette use and smoking initiation among youth: a longitudinal cohort study," *CMAJ,* vol. 189, no. 43, pp. E1328-E36. Available from: http://www.cmaj.ca/content/189/43/E1328.

- Jamal, A, Gentzke, A, Hu, SS, Cullen, KA, Apelberg, BJ, Homa, DM et al. 2017, "Tobacco Use Among Middle and High School Students - United States, 2011-2016," Morbidity and Mortality Weekly Report (MMWR), vol. 66, no. 23, pp. 597-603. Available from: https://doi.org/10.15585/mmwr.mm6623a1.

- Kozlowski, LT & Warner, KE 2017, "Adolescents and e-cigarettes: Objects of concern may appear larger than they are," *Drug and Alcohol Dependence,* vol. 174, pp. 209-214.

- Leventhal, AM, Stone, MD, Andrabi, N, Barrington-Trimis, J, Strong, DR, Sussman, S, et al. 2016, "Association of e-cigarette vaping and progression to heavier patterns of cigarette smoking," *JAMA: Journal of the American Medical Association,* vol. 316, no. 18, pp. 1918-1920.

- Leventhal, AM, Strong, DR, Kirkpatrick, MG, Unger, JB, Sussman, S, Riggs, NR, et al. 2015, "Association of electronic cigarette use with initiation of combustible tobacco product smoking in early adolescence," *JAMA - Journal of the American Medical Association,* vol. 314, no. 7, pp. 700-7.

- Liederman, E. 2018, "Juuls prevalent among non-cigarette smokers," *The Signal*.

- Loukas, A, Marti, CN, Cooper, M, Pasch, KE & Perry, CL 2018, "Exclusive e-cigarette use predicts cigarette initiation among college students," *Addictive Behaviors,* vol.76, pp. 343-347.

- Lydon, DM, Wilson, SJ, Child, A & Geier, CF 2014, "Adolescent brain maturation and smoking: what we know and where we're headed," *Neuroscience & Biobehavioral Reviews*, vol.45, pp. 323-342. Available from: https://doi.org/10.1016/j.neubiorev.2014.07.003.

- Malas, M, van der Tempel, J, Schwartz, R, Minichiello, A, Lightfoot, C, Noormohamed, A et al. 2016, "Electronic Cigarettes for Smoking Cessation: A Systematic Review," *Nicotine Tobacco Research,* vol. 18, no. 10, pp. 1926-36. Available from: https://doi.org/10.1093/ntr/ntw119.

- McKee, M & Capewell S 2015, "Evidence about electronic cigarettes: a foundation built on rock or sand?," *BMJ,* vol.351, p. h4863.

- McNeill, A, Brose LS, Calder R & Hitchman SC 2015, "E-cigarettes: an evidence update," *Public Health England*.

- Miech, R, Patrick, ME, O'Malley, PM & Johnston, LD 2017, "E-cigarette use as a predictor of cigarette smoking: results from a 1-year follow-up of a national sample of 12th grade students," *Tobacco Control*, vol. 26, no. e2, pp. e106-e111. Available from: https://doi.org/10.1136/tobaccocontrol-2016-053291.

- National Academies of Sciences, Engineering and Medicine 2018, "Public Health Consequences of E-Cigarettes," The National Academies Press. Available from: https://doi.org/10.17226/24952.

- Phillips, CV 2015, "Gateway Effects: Why the Cited Evidence Does Not Support Their Existence for Low-Risk Tobacco Products (and What Evidence Would)," *Internatiional Journal of Environmental Research and Public Health,* vol. 12, no. 5, pp. 5439-5464. Available from: https://doi.org/10.3390/ijerph120505439.

- Primack, BA, Shensa, A, Sidani, JE, Hoffman, BL, Soneji, S, Sargent, JD et al. 2017, "Initiation of Traditional Cigarette Smoking after Electronic Cigarette Use Among Tobacco-Naive US Young Adults," T*he American Journal of Medicine,* vol. 11, no. 17, pp. 31185-31183.

- Quit, *E-cigarettes*. Available from: https://www.quit.org.au/resources/policy-advocacy/policy/e-cigarettes. [27 March 2018]

- Samir, S, Barrington-Trimis, JL, Wills, TA, Leventhal, AM, Unger, JB, Gibson, LA et al 2017, "Association between initial use of e-cigarettes and subsequent cigarette smoking among adolescents and young adults a systematic review and meta-analysis," *JAMA Pediatrics,* vol. 171, no. 8, pp. 788-797.

- Schneider, S & Diehl, K 2016, "Vaping as a Catalyst for Smoking? An Initial Model on the Initiation of Electronic Cigarette Use and the Transition to Tobacco Smoking Among Adolescents," *Nicotine & Tobacco Research,* vol. 18, no. 5, pp. 647-653.

- Selya, AS, Dierker, L, Rose, JS, Hedeker, D & Mermelstein RJ 2017, "The Role of Nicotine Dependence in E-Cigarettes' Potential for Smoking Reduction," *Nicotine & Tobacco Research,* vol. 7, (3931849).

- Soneji, S, Barrington-Trimis, JL, Wills, TA, Leventhal, AM, Unger, JB, Gibson, LA et al. 2017, "Association Between Initial Use of e-Cigarettes and Subsequent Cigarette Smoking Among Adolescents and Young Adults: A Systematic Review and Meta-analysis," *JAMA Pediatrics,* vol. 171, no. 8, pp. 788-97. Available from: https://doi.org/10.1001/jamapediatrics.2017.1488.

- Spindle, TR, Hiler, MM, Cooke, ME, Eissenberg, T, Kendler, KS & Dick, DM 2017, "Electronic cigarette use and uptake of cigarette smoking: A longitudinal examination of U.S. college students," *Addictive Behaviors*, vol. 67, pp. 66-72. Available from: https://doi.org/10.1016/j.addbeh.2016.12.009. Store, SV 2018, *E-liquids Banyo*, QLD2018. . Available from: https://supervapestore.com.au/e-liquid. [25 March, 2018].

- Unger, JB, Soto, DW & Leventhal, A 2016, "E-cigarette use and subsequent cigarette and marijuana use among Hispanic young adults," *Drug & Alcohol Dependence,* vol. 163, pp.261-264.

- United States Centers for Disease Control and Prevention 2015, *QuickStats: Cigarette Smoking Status Among Current Adult E-cigarette Users,(dagger) by Age Group - National Health Interview Survey, (section sign)*, Morbidity and Mortality Weekly Report (MMWR), vol. 65, no. 42, p. 1177. Available from: https://doi.org/10.15585/mmwr.mm6542a7.

- US Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health 2016, *E-Cigarette Use Among Youth and Young Adults. A Report of the Surgeon General,* US Department of Health and Human Services.

- Wills, TA, Knight, R, Sargent, JD, Gibbons, FX, Pagano, I & Williams RJ 2017, "Longitudinal study of e-cigarette use and onset of cigarette smoking among high school students in Hawaii," *Tobacco Control*, vol. 26, no. 1, pp. 34-39. Available from: https://doi.org/10.1136/tobaccocontrol-2015-052705.

7. List of Appendices

Appendix 1: Consultation List

Appendix 2: Literature Review Methods

Appendix 3: Table 1 - Age of purchasing cigarettes and age of smoking by country

Consultation Group:

1)	Karen Canfell	Director of Cancer Research	Cancer Council, NSW
2)	Terry Slevin	Director Education and Research	Cancer Council, WA
3)	Helen Zorbas	CEO	Cancer Australia
4)	Matthew L. Myers	President	Campaign for Tobacco-Free Kids (USA)
5)	Mike Daube	Health Policy	Curtin University
6)	Todd Harper	CEO	Cancer Council, VIC
7)	Melanie Wakefield	Director, Centre for Behavioural Research in Cancer	Cancer Council, VIC
8)	Michelle Scollo	Senior Policy Adviser, Tobacco	Cancer Council, VIC
9)	Paul Grogan	Director, Public Policy and Knowledge Management	Cancer Council Australia

Appendix Two: Literature Review Methods

Overview of Literature Review Methods

Data screening and assessment involved a single reader, with any uncertainties resolved by a second reader. A consultation process provided valuable insight and interpretation of the evidence from experts in the field (refer Appendix One). Targeting of the eligible literature to meet time constraints was based on prioritising: (1) literature reviews, (2) major reports, (3) recent publications, and (4) publications provided from or recommended through our consultation process. Only literature in English and from developed countries was included. The full report includes PRISM charts for each review. Formal data bases searched included PubMed, CINHAL, Embase, PsyInfo, Global Health and Cochrane. Search terms for the rapid reviews are set out below. **T21:** ((smoking or tobacco or cigarette) AND (legal age));

- **Flavour filter:** ((smoking or tobacco or cigarette) AND (flavor* or flavour* or filter));

  (Plus Flavour filter excluding e-cigarette): ((((smoking or tobacco or cigarette) AND (flavour* or flavour* or filter or crush balls)))) NOT e-cigarette]

- **E-cigarette:** (((smoke* OR tobacco OR cigarette*) AND (e-cigarette* OR ecigarette OR "electronic cigarette" OR "electronic nicotine delivery device*" OR "electronic device" OR vaping OR "alternative nicotine delivery device*" OR vaporiser* OR vaporizer* OR "vapor pen*" OR "vape pen*")) AND ((harm OR harms OR benefit* OR gateway OR initiate* OR onset OR transition) AND (youth OR children OR teen* OR adolescent* OR minor)))

- All literature reviews focused on youth by adding in the additional terms: 'AND (youth or children or teen* or adolescent*))'.

Core issues to be covered in the review were: (1) clear description of the intervention (including permutations thereof and associated initiatives), (2) smoking rates as the primary outcome measure, (3) intervention application (compliance, reach, intended and unintended outcomes, legislative implications, etc.), (4) extent and quality of the evidence base, and (5) case studies. The data extraction templates were designed around the core issues. Data extraction tables and PRISM charts are available on request.

For Tobacco 21:

A total of 489 publications were identified by our search terms. When data bases were combined and duplicates removed, there were 257 for screening and assessment. The scarcity of formal up-to-date literature dealing with T21 interventions and evaluations necessitated a search of local media, government department websites and less formal sources of information to compliment the formal literature. In order to provide as broad an overview as possible to this topic given the different cultural norms, articles from a range of countries was reviewed. Even though the search was international, the majority of articles are from the United States.

For Product Flavouring:

A total of 1,782 publications were identified by our search terms. When databases were combined and duplicates removed, there were 803 for screening and assessment. Our

assessment focused on articles with a rationale for banning product flavourings, together with the impacts of and reaction to banning.

For Effects of E-Cigarettes:

We focused on a recent and comprehensive report released by the National Academies of Sciences, Engineering and Medicine in the US. In addition to reviewing this report, we conducted database searches to capture relevant literature published after the report's literature searches were completed in August 2017, with 396 publications identified. When databases were combined and duplicates removed, there were 217 for screening and assessment. We also examined two important Australian documents recently released – one by the Therapeutic Goods Administration (TGA) and the other by National Health and Medical research Council (NHMRC). In addition, we reviewed the report on ENDS by the World Health Organization, submitted to the Conference of the Parties to the WHO Framework Convention on Tobacco Control.[66]

---

[66] World Health Organization 2014, *Electronic nicotine delivery systems*.

Appendix Three

Table 1 - Age of purchasing cigarettes and age of smoking by country

Country/State/County/City	Legal age of Smoking	Legal Age of Purchasing	Comments
Australia	Age of smoking is set at the State level.		
Victoria	None	18	
New South Wales	None	18	
Queensland	None	18	
Tasmania	18	18	Same restriction applies to e-cigs
South Australia	None	18	
Western Australia	None	18	
Northern Territory	None	18	
ACT	None	18	
Canada (sample)	Age is set at the province level; examples below		
Federal Government	None	18	
Alberta	18	18	
British Columbia	None	19	
Ontario	None	19	
Quebec	None	18	
Europe (sample)			
Austria	16	16	
Belgium	16	16	
Denmark	None	18	
France	None	18	
Germany	18	18	
Ireland	18	18	
Italy	None	18	
United Kingdom			
England	16	18	
Wales	16	18	
Scotland	18	18	
Northern Ireland	18	18	
Asia (sample)			
China	None	18	
Indonesia	None	18	Illegal to supply to pregnant women
Hong Kong	18	18	
Singapore	18	18	Smoking age is increasing from 18 to 19 years by 2019 and 21 by 2021
South Korea	19	20	

Country/State/County/City	Legal age of Smoking	Legal Age of Purchasing	Comments
New Zealand	**None**	**18**	
United States of America			
California	18	21	Includes e-cigarettes. Exemptions
Florida	None	18	
Guam	21	21	
Hawaii	21	21	Includes e-cigarettes
Boston, Massachusetts	None	21	Over 100 cities in Massachusetts have raised their sale age to 21.
Massachusetts	None	18	
New York City	None	21	14 cities in New York, have raised the sales age for tobacco products to 21 years. The state level is still 18
Texas	18	18	
San Antonio	18	21	Part of Texas by separate local by-law
Utah	19	19	Has a current T21 before the legislative. Has tried twice before.
Virginia	18	18	
Wyoming	18	18	
Washington DC	None	21	
Washington	None	18	

Sources: T21 website: https://tobacco21.org/; tobacco regulations States of Australia; Global Tobacco Control website: https://www.cdc.gov/tobacco/global/gtss/gtssdata/index.html (CDC). Media reports.

Note: Changes may have occurred since this table was published, especially in the United States.