The Smoke Ring—are your friends a drag? Social network analysis and tobacco use

Raglan Maddox

BSc (Health Promotion), MPH

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Abstract

Background

Smoking is the single most preventable cause of morbidity and mortality within Australia. While there have been reductions in smoking in Australia, Aboriginal and Torres Strait Islander people are twice as likely as non-Indigenous people to smoke.

This study (the Smoke Ring Study) comprises two components: a systematic review to examine the influence of social networks on tobacco use; and a prospective mixed-method study. The prospective study explored and assessed the evidence on Aboriginal and Torres Strait Islander social networks and tobacco use and also Action Area 1 of the Australian Capital Territory (ACT) Aboriginal and Torres Strait Islander Tobacco Control Strategy 2010/11–2013/14 (the ACT Strategy). Development and implementation of components of the ACT Strategy commenced in 2010, with engagement of local Aboriginal and Torres Strait Islander community organisations and development of community communications commencing in 2012.

Methods

Systematic review

The systematic review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. The review searched the following databases: CINAHL (Cumulative Index to Nursing and Allied Health Literature); Informit Health Collection; PsycINFO; PubMed/MEDLINE; Scopus / Embase; Web of Science; and Wiley Online Library.

A narrative approach was used to summarise the 279 papers that were included in the systematic review. This systematic review helped to inform and focus the primary data collection that formed part of the Smoke Ring Study.

Prospective mixed-method study

The prospective study used a mixed-method pre- and post-test design, pre- and post-implementation of the ACT Aboriginal and Torres Strait Islander Tobacco Control Strategy. The study used a panel survey (n=204 baseline; n=103 follow-up), individual interviews (n=10 baseline; n=9 follow-up) and focus groups (baseline: 3 focus groups, 40 participants; follow-up: 3 focus groups, 30 participants). Logistic regression and social network analyses were used for the survey. Grounded theory was used to analyse the interviews and focus groups.

Results

Systematic review

Synthesis of the findings of the systematic review indicated that social network structures, positions and relationships influence tobacco use (that is, initiating, maintaining and ceasing tobacco use). Social network analysis is relevant to tobacco use given that social relations and social contexts impact on the decision to smoke or not to smoke.

Prospective mixed-method study

Baseline data from the prospective study identified a prevalence of smoking of 36.4% (95% CI, 27.8–44.9) among the Aboriginal and Torres Strait Islander community in the ACT region—a figure that is significantly higher than that for the general Australian population (which is approximately 15%).

While participants were not representative of the ACT Aboriginal and Torres Strait Islander population, a broad cross-section of the Aboriginal and Torres Strait Islander community in the region, covering a wide range of smoking behaviours, participated in the prospective study. The mean age in the study was 35 years (12 to 75 years of age). The sample was 65% female and 35% male and reported a median household income category of $67,600–$83,199 per annum. Household size ranged from one to seven people and 47% of participants had completed education to year 12 or above at baseline.

At baseline, logistic regression models were used to determine factors significantly associated with smoking. Two independent variables made a unique, statistically significant contribution to whether respondents smoked:

- completing education to at least year 12 or equivalent (p=0.003) (OR=21.5; 95% CI, 2.9-158.7); and
- the number of housemates who smoke (p=0.046) (OR=11.8; 95% CI, 1.1-132.2).

Social network analysis at baseline revealed that the total participant-nominated network (that is, the social network that participants in the survey claimed to belong to) included sub-groups that were mostly inaccessible through recognised relationships—i.e. connected via a small number of relationships—and there was significant difference between smokers' and non-smokers' networks. When smoking and non-smoking networks were examined separately, it was found that the average distance between connected smokers and non-smokers was 2.8 and 2.7 steps or relationships respectively. This indicated that, when considered independently, smoking and non-smoking

networks were more cohesive than the total network. Members of the total network were a mean distance of 11.0 steps away from each other.

At follow-up, there was a statistically significant difference (p=0.007) in the number of smokers (42.9% and 44.4% of the network at baseline and follow up) and non-smokers (21.1% and 22.7% of the network at baseline and follow up) who reported that their best friend was a smoker. This also suggested some polarisation, or independence among smoking and non-smoking groups respectively.

Themes from the study, but specifically the qualitative analysis at baseline and follow up included:

- social normalisation of smoking;
- tobacco being convenient and easy to obtain;
- role modelling; and
- smoking being seen as a way to facilitate social interactions.

The results that were obtained from the study indicated that the ACT Strategy may have had an impact on smoking behaviour, noting that other local and national tobacco control measures have also been implemented. Therefore it is not possible to attribute changes specifically to the Strategy. Among Aboriginal and Torres Strait Islander people in the ACT, there was a reduction in smoking, an increase in the number of people who had never smoked and a decrease in the number of participants who reported incorrect perceptions that 'some cigarette brands were more harmful than others'.

Limitations

This thesis has a number of limitations. The systematic review may have incurred publication bias, and included studies with different methods, different settings and at various points in time. In relation to the primary data collection, the use of a survey name generator question may not have provided a complete list of participants' networks. The prospective study also used self-reported measures of smoking and network characteristic behaviours and the study's attrition at follow-up was also a limitation.

Conclusions

The Smoke Ring Study was the first mixed-method longitudinal study to utilise social network analysis to examine Aboriginal and Torres Strait Islander social connections and how they impact on smoking. This study demonstrated that achieving at least a year 12 level of education was protective against smoking. It also supported the hypothesis that exposure to smokers in one's social network

strongly influenced smoking behaviours. It would appear that having a best friend who smoked was strongly associated with whether a person was a smoker.

These findings imply that social networks can facilitate smoking behaviours, providing insight into the nuanced nature of social networks. They also suggest that good work has been undertaken as part of the ACT Strategy to reduce smoking prevalence. However, more work is required. The findings demonstrate that there is a need to focus policy, program and service delivery on smoking networks in order to reduce smoking rates and on non-smoking networks to minimise smoking uptake.

Supervisors' statement

As co-authors of the papers listed below, as part of **The Smoke Ring—are your friends a drag? Social network analysis and tobacco use**, we confirm that Raglan Maddox has made the following significant contributions:

- conception and design of the research proposal;
- gaining of ethical approval to conduct the research;
- conducting the research and data collection;
- analysis and interpretation of data;
- writing the papers and critical appraisal of content;
- drafting, submitting and finalising the manuscripts for publication; and
- acting as corresponding author for journal communication and the publication peer-review process.

i. A Systematic Review Protocol: Social Network Analysis of Tobacco Use. *Systematic Reviews*. 2014. http://www.systematicreviewsjournal.com/content/3/1/85

ii. Social Network Analysis of Tobacco Use: Systematic Review. [Under review, *Tobacco Control*]

iii. Study protocol—Indigenous Australian social networks and the impact on smoking policy and programs in Australia: protocol for a mixed-method prospective study. *BMC Public Health*. 2013. http://www.biomedcentral.com/1471-2458/13/879

iv. Factors Influencing Smoking Among Aboriginal and Torres Strait Islander People in the Australian Capital Territory: A Mixed Method Study. *International Journal of Health, Wellness and Society*. [In press]

v. The Smoke Ring: Social network analysis of the ACT Aboriginal and Torres Strait Islander community and the impact on smoking—a longitudinal mixed method study. *BMC Public Health*. [Under review, *Journal of Public Health Research & Practice*].

Rachel Davey
Signed: Rachel Davey Date: 10 February 2015

Tom Cochrane
Signed: Date: 10 February 2015

Joan Corbett
Signed: Date: 10 February 2015

Ray Lovett
Signed: Date: 10 February 2015

Anke van der Sterren
Signed: Date: 10 February 2015

Table of Contents

Contents

Abstract i

Certificate of authorship of thesis v

Supervisors' statement vii

Table of Contents ix

List of figures xi

List of acronyms xiii

Definitions xv

Social network definitions xxi

List of publications and conference presentations xxiii

Acknowledgements xxvii

Introduction 1

Chapter 1 Literature review 7

1.0 Systematic review overview 7

1.1 Published work—A Systematic Review Protocol: Social Network Analysis of Tobacco Use, *Systematic Reviews* 9

1.2 Co-authors' declaration 17

1.3 Systematic literature review 19

1.4 Publication—Social Networks and Tobacco Use: A Systematic Review 21

1.5 Co-authors' declaration 67

Chapter 2 Research design and methods 69

2.0 Protocol overview 69

2.1 Ethical considerations 69

2.2 Published work—Study Protocol—Indigenous Australian Social Networks and the Impact on Smoking Policy and Programs in Australia: Protocol for a Mixed-method Prospective Study, *BMC Public Health* 71

2.3 Co-authors' declaration 87

Chapter 3: Results 89

3.0 Baseline results overview 89

3.1 Published work—The Smoke Ring—Factors Influencing Smoking among Aboriginal and Torres Strait Islander People in the Australian Capital Territory: A Mixed Method Study, *International Journal of Health, Wellbeing and Society* 91

3.2 Co-authors' declaration 109

3.3 Follow-up results 111

3.4 Publication—The Smoke Ring—Social Network Analysis of the ACT Aboriginal and Torres Strait Islander Community and the Impact on Smoking: A Longitudinal Mixed Method Study, *Public Health Research & Practice* 115

3.5 Co-authors' declaration 145

Chapter 4: Discussion 147

4.0 Discussion 147

4.1 Limitations 151

4.2 Strengths 153

4.3 Contribution to knowledge 155

4.4 Recommendations 157

4.4.1 Implications for practice 157

4.4.2 Recommendations for future research 159

References 161

Appendices 169

i: ACT Aboriginal and Torres Strait Islander Tobacco Control Strategy 2010/11–2013/14 ... 169

ii: Aunty Lorraine Webb's artwork: The Smoke Ring 185

iii: Social Networks and Tobacco Use: A Systematic Review — Supplementary Table 1 187

iv: Social Networks and Tobacco Use: A Systematic Review — Supplementary Table 2 545

v: Ethics approval documentation 567

vi: The Smoke Ring: preliminary survey results 569

vii: Interview and focus group guide 653

viii: Survey for smokers 655

ix: Survey for non-smokers 671

x: Information and consent form 683

xi: Winnunga Letter of Support and Project Agreement 691

xii: Dangerous consumption: tobacco and alcohol use seminar outline 695

xiii: Publication—Plain Packaging Implementation: Perceptions of Risk and Prestige of Cigarette Brands among Aboriginal and Torres Strait Islander People 703

List of figures

Figure 1: Action Area 1—Development and implementation of a multi-component cessation and reduction program 3
Figure 2: Groupings of research – social network analysis of tobacco use 20
Figure 3: Aboriginal and Torres Strait Islander people aged 15 years and over—smoking status in the ACT by sex, 2008 to 2012 113
Figure 4: Activities undertaken by participants to assist in making a quit attempt during the previous 12 months, 2012 and 2013 114
Figure 5: Interview and focus group themes regarding social networks and tobacco use 149

List of acronyms

ACT	Australian Capital Territory
Add Health	National Longitudinal Study of Adolescent Health
AGD	Average Geodesic Distance
AMS	Aboriginal Medical Service
APL	Average Path Length
AQF	Australian Qualifications Framework
ATODA	ACT Alcohol, Tobacco and Other Drug Association
CI	Confidence Interval
HREC	Human Research Ethics Committee
NRT	Nicotine Replacement Therapy
IHIG	Indigenous Health Interest Group
IPAA	Institute of Public Administration Australia
OR	Odds Ratio
P/A	Per Annum
PBS	Pharmaceutical Benefit Scheme
UC	University of Canberra
RE-AIM	Reach, Effectiveness, Adoption, Implementation, Maintenance

Definitions

Australian Capital Territory

The Australian Capital Territory (ACT) is an autonomous region in the south-east of Australia, enclaved within New South Wales. Canberra is the only city in the ACT and is the capital of Australia, with a resident population of approximately 386,000 people [1].

The ACT Aboriginal and Torres Strait Islander Tobacco Control Strategy 2010/11–2013/14

In 2010, the ACT Government made a commitment to reduce the relatively high smoking rates among Aboriginal and Torres Strait Islander people living in the ACT [2]. The commitment involved the development of an Aboriginal and Torres Strait Islander Tobacco Control Strategy 2010/11 2013/14 (the ACT Strategy). The ACT Strategy is included in this paper at Appendix i: ACT Aboriginal and Torres Strait Islander Tobacco Control Strategy 2010/11–2013/14.

The ACT Strategy outlined four areas for action:

- Action Area 1—Development and implementation of a multi-component cessation and reduction program based on family, social and workplace networks;
- Action Area 2—Social marketing;
- Action Area 3—Research and evaluation; and
- Action Area 4—Building on existing legislation, bans and policy initiatives.

The research and evaluation in this paper was included as part of the ACT Strategy.

The ACT Aboriginal and Torres Strait Islander Tobacco Control Advisory Group

The ACT Aboriginal and Torres Strait Islander Tobacco Control Advisory Group (the Advisory Group) was established to provide the driving force behind the work set out in the ACT Strategy and to advise the ACT Government to ensure implementation, monitoring and evaluation of the ACT Strategy. The Advisory Group is made up of key stakeholders including representatives from:

- the ACT Asthma Foundation;
- the Australian Institute of Aboriginal and Torres Strait Islander Studies;
- the Australian National University;
- the ACT Alcohol, Tobacco and Other Drug Association (ATODA);
- the Cancer Council;
- Gugan Gulwan Youth Aboriginal Corporation;
- the University of Melbourne; and
- Winnunga Nimmityjah Aboriginal Health Service.

The ACT Strategy

See the ACT Aboriginal and Torres Strait Islander Tobacco Control Strategy 2010/11–2013/14.

Centrality

'Centrality' refers to indicators that identify the most important or central node within a graph [3]. The degree of centrality can be interpreted in terms of the potential risk of a node for catching whatever is flowing through the network (for example, smoking, smoking knowledge or another contagion). In the case of a directed network, as identified within this thesis, there are two separate measures regarding degree of centrality: in-degree and out-degree. In-degree is a count of the number of ties directed to the node (i.e. popularity, influence) and out-degree is the number of ties that the node directs to other nodes (i.e. selection) [3].

Contagion

'Contagion' refers to exchange among interacting units that can influence people, groups and/or organisations [4-9]. This influence is also known or referred to as 'peer effects' or 'induction' [4-9].

Dyads

'Dyads' are two individuals or units regarded as a pair—for example, a husband and wife and partners [10].

Ego

'Ego' is a single actor or participant [10].

Egocentric

'Egocentric' is centered on individual node/s or participant/s. For example, an egocentric social network is a social network based around a participant or sample of participants [10].

Former smoker

'Former Smoker' are participants who reported smoking at least 100 cigarettes in their lifetime, but at the time of the data collection did not smoke at all.

Funding Body

The 'Funding Body' refers to the Australian Capital Territory (ACT) Health Directorate.

Indigenous Australians

The term 'Indigenous Australians' is sometimes used within this thesis to refer to the First Nations' people of Australia—Aboriginal and Torres Strait Islander peoples. No offence is intended. I acknowledge and respect that Aboriginal and Torres Strait Islander people constitute many nations, language groups and cultures.

Isolate

An ‘isolate’ is a node or person that has no connections to other actors, nodes or people [10].

Liaison

A ‘liaison’ is a node or person that brokers a relation between two groups but is not part of either group [10].

Never Smoker

‘Never Smoker’ is defined as participants who reported never having smoked 100 in their lifetime.

Node

A ‘node’ represents an individual actor or person within the social network [10].

No More Boondah

‘No More Boondah’ is a quit smoking program developed by Winnunga Nimmityjah Aboriginal Health Service that aims to: support, encourage and facilitate quit attempts; educate on the harms of tobacco and addiction; and promote smoke free spaces and workplaces.

Nominated network

‘Nominated network’ is a network that is identified, reported or nominated by a participant or sample of participants [10]. This is different from a complete network, such as a school class or workplace, where all potential nodes have been identified.

Non-smoker

‘Non-smoker’ is defined as anyone who reported not smoking, either never smokers or former smokers.

Smoker

‘Smoker’ is defined as anyone who reported smoking, either every day or some days.

The Smoke Ring

A central component of the Smoke Ring Study has been community engagement. The Aboriginal and Torres Strait Islander community has provided input and participation at all stages of the research process. The study involved a partnership with Winnunga Nimmityjah Aboriginal Health Service and regular reporting to the ACT Aboriginal and Torres Strait Islander Tobacco Control Advisory Group.

Members of the Advisory Group include representatives of various community organisations that have provided input, support and engagement throughout this research project.

The title ‘The Smoke Ring’ was proposed for the research by a survey participant. It reflects the idea of community relationships, or ‘rings’, and tobacco use. The Advisory Group supported and endorsed this title because it resonated with the aim of the research and subsequent findings. As a result, the research has become known as ‘the Smoke Ring Study’.

The title ‘The Smoke Ring’ was reinforced by Aunty Lorraine Webb, a Wiradjuri and Ngunnawal woman from Cowra, New South Wales. Aunty Lorraine produced the artwork *The Smoke Ring* (see *Appendix ii: Aunty Lorraine Webb’s artwork*). *The Smoke Ring* represents the community striving for good health and wellbeing. The footprints that can be seen in the artwork pose the question: ‘Which way – which path will you take?’ The artwork questions attitudes, beliefs and behaviours about smoking and being smoke free and therefore it captures the essence of the research.

Social network analysis

Social network analysis provides theories, methods, and techniques to characterise and understand social relationships and how they may influence behaviours and vice versa [11]. This set of tools assists when undertaking methodical analysis of social networks—for example, mapping, measuring and analysing relationships and exchange among interacting units that can influence people, groups and/or organisations [4-9]. This influence is often known or referred to as ‘contagion’ (see above), ‘peer effects’ or ‘induction’ [4-9].

Talking About the Smokes

Talking About the Smokes is a national research project incorporating:

- a longitudinal study of Aboriginal and Torres Strait Islander smokers and recent ex-smokers;
- a cross-sectional survey of non-smokers;
- two cross-sectional surveys of Aboriginal community controlled health organisation staff; and
- descriptive analysis of the tobacco policies and practices at the Aboriginal community controlled health organisations [12].

Ties

‘Ties’ or ‘edges’ represent relationships between ‘nodes’, also referred to as individuals. Relationships include friendship, kinship or shared living arrangements [10, 13].

Total network

The ‘total network’, ‘total nominated network’ or ‘total participant-nominated network’ includes all participants, the smoking and non-smoking social networks combined.

Winnunga Nimmityjah Aboriginal Health Service

Winnunga Nimmityjah Aboriginal Health Service (Winnunga) is an Aboriginal community controlled primary health care service, established in 1988. Winnunga is operated by the Aboriginal community of the Australian Capital Territory (ACT). The Winnunga Board consists of six Aboriginal people elected by the community.

Winnunga is funded by both the Australian Government and the ACT Government. It sees over 3,000 clients per year and this figure continues to grow, with approximately 80 new clients per month. Winnunga's primary purpose is to provide culturally safe and holistic health services to Aboriginal and Torres Strait Islander people in the ACT region. It provides a range of clinical services as well as health promotion and tobacco control programs such as the No More Boondah program.

Year 12 or equivalent

'Year 12' refers to completion of Australian year 12 or equivalent education—i.e. Australian Qualifications Framework (AQF) Certificate Level II or above.

Social network definitions

Centrality

'Centrality' refers to indicators that identify the most important or central node within a graph [3]. The degree of centrality can be interpreted in terms of the potential risk of a node for catching whatever is flowing through the network (for example, smoking, smoking knowledge or another contagion). In the case of a directed network, as identified within this thesis, there are two separate measures regarding degree of centrality: in-degree and out-degree. In-degree is a count of the number of ties directed to the node (i.e. popularity, influence) and out-degree is the number of ties that the node directs to other nodes (i.e. selection) [3].

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List of publications and conference presentations

Papers published / in press

Raglan Maddox, Rachel Davey, Ray Lovett, Tom Cochrane, Anke van der Sterren and Joan Corbett. *[in press].* The Smoke Ring: Factors Influencing Smoking among Aboriginal and Torres Strait Islander People in the Australian Capital Territory: A Mixed Method Study. *International Journal of Health, Wellness and Society.*

Raglan Maddox, Rachel Davey, Ray Lovett, Anke van der Sterren, Joan Corbett and Tom Cochrane. 2014. A Systematic Review Protocol: Social Network Analysis of Tobacco Use. *Systematic Reviews*. http://www.systematicreviewsjournal.com/content/3/1/85

Raglan Maddox, Rachel Davey, Ray Lovett, Tom Cochrane and Anke van der Sterren. 2013. Study protocol—Indigenous Australian social networks and the impact on smoking policy and programs in Australia: protocol for a mixed-method prospective study. *BMC Public Health*. http://www.biomedcentral.com/1471-2458/13/879

Papers submitted and accepted for review

Raglan Maddox, Rachel Davey, Tom Cochrane, Ray Lovett and Anke van der Sterren. The Smoke Ring: Social network analysis of the ACT Aboriginal and Torres Strait Islander community and the impact on smoking—a longitudinal mixed method study. *Public Health Research & Practice. [Under review]*

Raglan Maddox, Rachel Davey, Tom Cochrane, Ray Lovett, Joan Corbett and Anke van der Sterren. Social Network Analysis of Tobacco Use: Systematic Review. *Tobacco Control. [Under review]*

Raglan Maddox, Sarah Durkin and Ray Lovett. Plain packaging implementation: perceptions of risk and prestige of cigarette brands among Aboriginal and Torres Strait Islander people. *Australian and New Zealand Journal of Public Health. [Under review]*

Presentations

Raglan Maddox. Aboriginal and Torres Strait Islander people, smoking and social networking. November 2014. *Alcohol, Tobacco and Other Drug Research Symposium*. Canberra, Australia. (oral)

Raglan Maddox. The importance of research, evaluation and continuous quality improvement. October 2014. *Cancer Australia Lung Cancer Forum*. Canberra, Australia. (oral)

Raglan Maddox. An innovative graduate and resident academic programme. October 2014. *The Institute of Public Administration Australia (IPAA) International Conference: The Shape of Things to Come.* Peoples' Choice Award. Perth, Australia. (oral)

Raglan Maddox. Smoking & addiction. August 2014. Centre for Applied Psychology. University of Canberra. (oral)

Raglan Maddox, Perri Chapman and Chanel Webb. Aboriginal and Torres Strait Islander tobacco use. July 2014. *National Aboriginal Community Controlled Health Organisation Summit*. Melbourne, Australia. (oral)

Raglan Maddox. Social network analysis and tobacco use among the Aboriginal and Torres Strait Islander population in Canberra and surrounds. June 2014. Australian National University Indigenous Health Interest Group (IHIG). (oral)

Raglan Maddox. The Smoke Ring—smoking among Aboriginal and Torres Strait Islander people in the ACT region. March 2014. *The Australian Institute of Aboriginal and Torres Strait Islander Studies' National Indigenous Studies Conference*. Canberra, Australia. (oral)

Raglan Maddox. Smoking among Aboriginal & Torres Strait Islander people in the ACT. March 2014. *International Conference on Health, Wellness and Society*. Vancouver, Canada. (oral)

Raglan Maddox and Ray Lovett. Dangerous consumption: tobacco and alcohol use—leading risk factors for chronic disease among Aboriginal and Torres Strait Islander people in Australia. 2014.

- *Richard Doll Seminar Series.* University of Oxford. Oxford, England. March 2014. (oral)
- Harvard School of Public Health. Boston, USA. March 2014. (oral)
- University of North Carolina, Gillings School of Global Public Health. Chapel Hill, USA. February 2014. (oral)
- Johns Hopkins Bloomberg School of Public Health. Baltimore, USA. February 2014. (oral)
- University of California Berkley School of Public Health. Berkley, USA. February 2014. (oral)

Raglan Maddox and Ray Lovett. Indigenous Australian communities: biracial identity, domestic violence & health. February 2014. *Harvard 2nd annual 'Rise Up'– A celebration of life*. Boston, USA. (oral)

Raglan Maddox. Smoking among Aboriginal and Torres Strait Islander people. February 2014. Maryland Department of Health & Mental Hygiene. Baltimore, USA. (oral)

Raglan Maddox, Perri Chapman and Chanel Webb. Smoking behaviours among Indigenous Australians in the ACT: The importance for 'No More Boondah'. October 2013. *Smokefree Oceania Conference*. Auckland, New Zealand. (oral)

Raglan Maddox. Smoking among Aboriginal and Torres Strait Islander people. October 2013. *The Alcohol Tobacco and Other Drug Association Research Symposium*. Canberra, Australia. (oral)

Raglan Maddox. Smoking behaviours among Indigenous Australians in the ACT: The importance for 'No More Boondah'. September 2013. *International Conference on Public Health Priorities in the 21st Century: The Endgame for Tobacco.* Dehli, India. (poster)

Raglan Maddox. Smoking behaviours among Indigenous Australians. December 2012. ACT Alcohol, Tobacco and Other Drug Expert Advisory Group. Canberra, Australia. (oral)

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Raglan Maddox. Tackling Indigenous Smoking and Promoting Healthy Lifestyles. May 2012. Cancer Council Western Australia. World No Tobacco Day. Perth, Australia. (oral)

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I also thank Dr Sarah Durkin and my supervisory team: Professors Rachel Davey and Tom Cochrane, Dr Ray Lovett, Ms Anke van der Sterren and Associate Professor Joan Corbett. They have provided guidance in this research from start to finish, providing invaluable feedback on reasoning, analysis, writing and completion.

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Introduction

Background

In Australia, life expectancy at birth is among the highest in the world. This trend is increasing and expected to continue [14]. However, some population groups in Australia experience marked health inequalities. The life expectancy for Aboriginal and Torres Strait Islander people at birth is estimated to be 67 years for males and 73 years for females [14, 15]. This is approximately 12 years fewer for males and 11 years fewer for females than other Australians [14]. Aboriginal and Torres Strait Islander people suffer the worst health of any population group in Australia—the burden of disease is estimated to be two and a half times that of the Australian population [16].

Many factors contribute to the difference in life expectancy and health between Aboriginal and Torres Strait Islander people and non-Indigenous Australians [17]. Aboriginal and Torres Strait Islander people are much more likely than non-Indigenous Australians to die prematurely from preventable 'lifestyle diseases' such as smoking [18; 66]. These diseases can often be prevented, delayed and/or better managed through interventions, effective management and lifestyle changes.

Tobacco use is the most preventable cause of morbidity and mortality within Australia [14] and it has been identified as the single biggest cause of preventable death among Aboriginal and Torres Strait Islander people. Smoking is responsible for 20% of Aboriginal and Torres Strait Islander deaths [19, 20]. Approximately 42% of Aboriginal and Torres Strait Islander people aged 15 years and over report as being daily smokers [21]. In contrast, approximately 15% of the general population smoke daily [22]. The reasons for the high rate of tobacco use are complex and multifactorial [23]. For example, up to the 1960s Aboriginal and Torres Strait Islander people received rations of tobacco as a payment for labour before they were fully engaged with the cash economy [24-26].

Tobacco use can be entrenched in many settings. However, the health inequalities do not exist due to traditional tobacco use but, rather, through patterns of post-colonial tobacco use [27]. The current empirical evidence [28-30] shows that literature on tobacco control and the Aboriginal and Torres Strait Islander population is very limited. For example, Carson's review [28] identified only four Indigenous cessation intervention studies and highlighted the paucity of evidence available to evaluate the effectiveness of interventions, despite the known success of interventions in non-Indigenous populations. Findings from a systematic review on smoking cessation and tobacco prevention studies for indigenous peoples indicated that more robust research is required to determine the efficacy of interventions, programs and policies, including the use of social media—

social network platforms such as Facebook®, Twitter® and YouTube®—in tackling smoking [30]. Furthermore, the high prevalence and normalisation of tobacco use within Aboriginal and Torres Strait Islander communities may play a role in ensuring social cohesion among Aboriginal and Torres Strait Islander people [19]. Tobacco use reinforces family relationships and friendships [19], highlighting the potential importance of social networks. So, while reducing Aboriginal and Torres Strait Islander smoking rates will assist to close the gap in life expectancy and health outcomes between Aboriginal and Torres Strait Islander people and their non-Indigenous counterparts, more work is required [28-30].

The National Healthcare Agreement has set the target of closing the life expectancy gap within a generation (2030) and halving the 2009 Aboriginal and Torres Strait Islander smoking rate by 2018 [31]. In addition, the ACT Government has committed to reducing smoking rates among Aboriginal and Torres Strait Islander people by developing the ACT Aboriginal and Torres Strait Islander Tobacco Control Strategy 2010/11–2013/14 [2] (the ACT Strategy).

ACT Aboriginal and Torres Strait Islander Tobacco Control Strategy 2010/11–2013/14

In 2010, the ACT Government made a commitment to reduce the relatively high smoking rates among Aboriginal and Torres Strait Islander people living in the ACT [2]. As part of this commitment, it developed the ACT Strategy (see Appendix i: ACT Aboriginal and Torres Strait Islander Tobacco Control Strategy 2010/11–2013/14), which incorporates the aims and areas for action outlined above under 'Definitions'.

The ACT Strategy recognised that, while there is evidence on the prevalence of smoking in the Aboriginal and Torres Strait Islander community, reports on the effectiveness of tobacco control initiatives for Aboriginal and Torres Strait Islander people are scant [32]. Much of the work in Aboriginal and Torres Strait Islander tobacco control has been drawn from two central tenets:

1. tobacco control is best delivered in the community setting; and
2. effective programs must be based in the social, work or family environment [2].

Therefore, the central aim of this research was to gain a better understanding of the relationship between Aboriginal and Torres Strait Islander social networks and tobacco use in the ACT region [33]. The ACT Strategy provided the context for undertaking the Smoke Ring Study, which examined Action Area 1 of the Strategy, outlined in Figure 1.

Figure 1: Action Area 1—Development and implementation of a multi-component cessation and reduction program

In addition, the ACT Aboriginal and Torres Strait Islander Tobacco Control Advisory Group (the Advisory Group) (see Definitions above) was established to provide the driving force behind the work set out in the ACT Strategy. The role of the Advisory Group was to advise the ACT Government on implementing, monitoring and evaluating the ACT Strategy. As a result, the Advisory Group provided input into the design of the prospective Smoke Ring Study, which examined Action Area 1 of the ACT Strategy, as well as the systematic review protocol.

Underpinning theories and principles

The research was also informed by the following underpinning theories and principles:

- homophily;
- the theory of triadic influence;
- diffusion of innovations theory; and
- Bandura's social learning theory [34-38].

These theories and principles suggest that social networks and social network structures can influence health behaviour and that normative and other peer influences can be transmitted through network ties or relationships [33, 39]. As a result, social network analysis will be used which

provides methods and techniques to characterise and understand social relationships and how they may influence behaviours and how behaviours influence relationships [11]. This set of tools assists when undertaking methodical analysis of social networks—for example, mapping, measuring and analysing relationships and exchange among interacting people that can influence people, groups and/or organisations [4-9]. This research explored factors that influence smoking behaviour among Aboriginal and Torres Strait Islander people, including social network associations [13].

The Smoke Ring Study involved collecting data in two waves approximately 12 months apart (pre- and post-implementation of the ACT Strategy). The primary data were collected via surveys, interviews and focus groups. By collecting data both before and after the ACT Strategy was implemented, changes could be identified over time, the program could be examined and the socio-environmental mechanisms that influence tobacco use, attitudes and knowledge could be explored.

Aim and objectives

The aim of the Smoke Ring Study was to examine the social network structure of the Aboriginal and Torres Strait Islander community and tobacco use [33]. Research questions included:

1 Do individuals' social networks influence smoking behaviour?
2 Is there an association between various social factors (e.g. age, education, income, gender etc.) and being a smoker or non-smoker?
3 Has the ACT Aboriginal and Torres Strait Islander Tobacco Control Strategy 2010/11–2013/14 impacted on smoking behaviour?

To address these research questions, the study explored and took into consideration the social determinants of health in examining what predicts smoking outcomes. The study design used a mixed-method (qualitative and quantitative) approach to explore the social context that underlies Aboriginal and Torres Strait Islander tobacco use at baseline and follow-up. Primary data were collected via surveys, interviews and focus groups in 2012 (baseline) and with a 12-month follow-up. Quantitative data were analysed using social network analysis and statistical analysis. The interviews and focus groups used grounded theory to extract a more detailed understanding of the context of the social influence on tobacco use, and the influence of tobacco use on social networks [37].

The research hypotheses were:

1. A member of a social network was more likely to be a smoker if they had friends who smoked; and

2. A member of a social network was more likely to be a smoker if they had household members who smoked.

The research also contributed to the evidence base on tobacco control. The research synthesised the evidence base of social network analysis and tobacco use and allowed for a deeper understanding of the factors associated with smoking behaviours among Aboriginal and Torres Strait Islander people.

Thesis outline

Chapter 1 presents a systematic review of the literature on social network analysis of tobacco use. It is based on two papers:

a) 'A Systematic Review Protocol: Social Network Analysis of Tobacco Use' [40], which detailed the systematic review methodology (published)

b) 'Social Network Analysis of Tobacco Use: A Systematic Review', which details the findings of systematic review (submitted for publication in the *Journal of Tobacco Control*)

The review examined social network structure, social network positions, relationships and tobacco use across all cultures, age groups and demographics to ascertain whether social network structures/positions influence tobacco use [40]. The review highlighted the importance of peer selection, peer influence and social network dynamics in relation to tobacco use [41-90]. The findings from the review provided important context for this thesis [13, 40].

Chapter 2 describes the study protocol for the prospective study, which was published in the following paper:

c) 'Study Protocol—Indigenous Australian Social networks and the Impact on Smoking Policy and Programs in Australia: Protocol for a Mixed-method Prospective Study' [13], which detailed the study methodology (published).

Chapter 3 describes the results of the baseline and follow-up. This chapter is based on two papers:

d) 'The Smoke Ring—Factors Influencing Smoking Among Aboriginal and Torres Strait Islander People in the Australian Capital Territory: A Mixed Method Study' [91] (in press).

Chapter 3 also examines changes over time and the association of social networks with smoking behaviours among the Aboriginal and Torres Strait Islander community in the ACT region.

e) 'The Smoke Ring: Social Network Analysis of the ACT Aboriginal and Torres Strait Islander Community and the Impact on Smoking—A Longitudinal Mixed Method Study' (submitted for

publication in the journal *Public Health Research & Practice*), which identifies and discusses shifts in social networks and tobacco use over time.

To the author's knowledge, no studies have used social network analysis tools to determine tobacco use among Aboriginal and Torres Strait Islander people. Furthermore, few mixed-method studies have analysed Aboriginal and Torres Strait Islander tobacco use over time.

Chapter 4 discusses the findings of the Smoke Ring Study and its limitations. The complexity and holistic nature of why people smoke is highlighted, as is the cohesive nature of both the smoking and non-smoking social networks. The evidence from the study indicated some polarisation or independence of smoking and non-smoking groups within the Aboriginal and Torres Strait Islander community.

The Smoke Ring Study also provided insight into the nuanced nature of smoking and non-smoking social networks respectively, highlighting the need to focus tobacco control efforts on preventing uptake as well as encouraging and supporting attempts to quit smoking, and remain smoke free.

Finally, practical implications and future directions for research and policy are discussed.

Chapter 1 Literature review

1.0 Systematic review overview

Tobacco control measures that target Aboriginal and Torres Strait Islander people should take into account the social, work and family environment [2]. Furthermore, theories, principles [36-38] and robust empirical evidence suggest that social networks and social network structures can influence health behaviour—that is, normative and other peer influences, such as tobacco use, can be transmitted through network ties or relationships [33, 39]. However, social network analysis of tobacco use, which includes mapping, measuring and analysing relationships and exchange among interacting people, within the Aboriginal and Torres Strait Islander community is an area that is currently under-researched [30].

When investigating and addressing tobacco use and social networks, it is important to have a comprehensive view of social networks, and the members of the social networks' relationship with tobacco use. An important role for the systematic review was to build this understanding. It is also acknowledged that the systematic review identified a dearth of literature around social networks and tobacco use among the Aboriginal and Torres Strait Islander population, only identifying two articles that met the inclusion criteria. The peer-reviewed protocol paper 'A Systematic Review Protocol: Social Network Analysis of Tobacco Use' [40] provides a detailed description of the systematic review methodology.

1.1 Published work—A Systematic Review Protocol: Social Network Analysis of Tobacco Use, *Systematic Reviews*

Raglan Maddox, Rachel Davey, Ray Lovett, Anke van der Sterren, Joan Corbett and Tom Cochrane. 2014. A Systematic Review Protocol: Social Network Analysis of Tobacco Use. *Systematic Reviews*. http://www.systematicreviewsjournal.com/content/3/1/85

SYSTEMATIC REVIEWS

PROTOCOL Open Access

A systematic review protocol: social network analysis of tobacco use

Raglan Maddox[1*], Rachel Davey[1], Ray Lovett[2], Anke van der Sterren[3], Joan Corbett[4] and Tom Cochrane[1]

Abstract

Background: Tobacco use is the single most preventable cause of death in the world. Evidence indicates that behaviours such as tobacco use can influence social networks, and that social network structures can influence behaviours. Social network analysis provides a set of analytic tools to undertake methodical analysis of social networks. We will undertake a systematic review to provide a comprehensive synthesis of the literature regarding social network analysis and tobacco use. The review will answer the following research questions: among participants who use tobacco, does social network structure/position influence tobacco use? Does tobacco use influence peer selection? Does peer selection influence tobacco use?

Methods: We will follow the Preferred Reporting Items for Systemic Reviews and Meta-Analyses (PRISMA) guidelines and search the following databases for relevant articles: CINAHL (Cumulative Index to Nursing and Allied Health Literature); Informit Health Collection; PsycINFO; PubMed/MEDLINE; Scopus/Embase; Web of Science; and the Wiley Online Library. Keywords include tobacco; smoking; smokeless; cigarettes; cigar and 'social network' and reference lists of included articles will be hand searched. Studies will be included that provide descriptions of social network analysis of tobacco use.
Qualitative, quantitative and mixed method data that meets the inclusion criteria for the review, including methodological rigour, credibility and quality standards, will be synthesized using narrative synthesis. Results will be presented using outcome statistics that address each of the research questions.

Discussion: This systematic review will provide a timely evidence base on the role of social network analysis of tobacco use, forming a basis for future research, policy and practice in this area. This systematic review will synthesise the evidence, supporting the hypothesis that social network structures can influence tobacco use. This will also include exploring the relationship between social network structure, social network position, peer selection, peer influence and tobacco use across all age groups, and across different demographics. The research will increase our understanding of social networks and their impact on tobacco use, informing policy and practice while highlighting gaps in the literature and areas for further research.

Keywords: Protocol, systematic review, tobacco use, smoking, social networks

Background

Tobacco use is a major public health concern due to significant associated health risks, such as cardiovascular disease, respiratory diseases and cancers [1-6]. As a result, tobacco use is the single most preventable cause of death in the world and is the most preventable cause of morbidity and mortality within Australia [7,8]. Tobacco use has spread globally throughout the developed and developing world [9]. It is well-documented that many cultural and socio-environmental factors influence tobacco use, with increased interest in the context of tobacco use within social networks [10-18]. Social network analysis provides a set of analytic tools to undertake methodical analysis of social networks; mapping, measuring and analysing relationships and exchange among interacting units, such as relationships between people, groups and organizations [19,20].

Evidence indicates that social network structures can influence behaviour and that behaviour can influence social networks, with normative and peer influences

* Correspondence: Raglan.Maddox@canberra.edu.au
[1]Centre for Research and Action in Public Health, University of Canberra, University Drive, Canberra ACT 2606, Australia
Full list of author information is available at the end of the article

transmitted through network ties or relationships [11,21]. Peer associations can impact on behaviour, including smoking initiation and cessation [22-24]. In addition, tobacco use can assist to maintain and reinforce social relationships and kinship bonds [25-27]. Social network analysis is used in many disciplines to map, measure, characterise and investigate relationships and influences between people, groups, and organisations [18,28-31]. For example, economics, sociology, health and political science have all studied how real-life social networks can influence the spread of complex behaviour, such as tobacco and alcohol use, obesity, suicide prevention, organ donation registration and even political expression and voting behaviour [32-44]. A better understanding of these connections, relationships and influences through social networks analysis of tobacco use is required [11,18].

Undertaking the systematic review on social network analysis of tobacco use will improve our understanding of the interaction between social networks and smoking behaviour and attitudes across population groups. A systematic review by Seo and Huang [45] explored social network analysis in smoking behaviour, but only focused on adolescent cigarette smoking. This systematic review will build on the research by Seo and Huang [45], systematically consolidating and investigating social network analysis of tobacco use among all population groups. This review will contribute to the evidence base by highlighting and synthesising key learning, inconsistencies and any evidence-gaps that remain from research of social network analysis of tobacco use. This review could be used to further inform research, programmes and policies utilising social networks to address tobacco use.

This systematic review has not been registered with the International Prospective Register of Systematic Reviews (PROSPERO) as it does not meet the inclusion criterion. For example, PROSPERO requires a minimum of one outcome to be of direct patient or clinical relevance, which is outside the scope of this review.

Research question/s

The systematic review will provide a comprehensive synthesis of the literature on social network analysis of tobacco use and summarise key findings and the nature of social network influences on tobacco use. The research questions include the following. 1) Does social network structure/position influence tobacco use? For example, are clique members, liaisons, and isolates more likely to use tobacco? 2) Does tobacco use influence peer selection? 3) Does peer selection influence tobacco use?

Methods

This systematic review will follow the Preferred Reporting Items for Systemic Reviews and Meta-Analyses (PRISMA) guidelines [46].

Criteria for considering studies

Study inclusion criteria

This review will include peer reviewed literature that is published in electronic databases. Studies must describe social network analysis, examining relationships between participants in regards to tobacco use [19,20].

Study design Studies using quantitative, qualitative and mixed-methods approaches will be eligible for inclusion in order to obtain a comprehensive overview of the existing evidence base. This may include: case control; cohort; cross-sectional; experimental; and intervention designs with no restrictions. All relevant publications will be obtained in order to gain an overview of observational evidence and the influence of social structures on tobacco use.

Population The sample must include tobacco users, but all genders, age groups and participants from any racial, ethnic, cultural or religious groups will be eligible for inclusion, regardless of location.

Intervention/exposure Studies to be included must include a description of social network analysis of tobacco use, and may include observational data if the inclusion criterion is met. This will assist to provide an overview of existing evidence of the influence of social structures on tobacco use.

Outcomes Studies will be included if they contain any outcomes related to tobacco use and social network structure or social network characteristics, such as social network positions. Based primarily on the need to address the research questions, we consider the main outcomes for the systematic review to be: tobacco use and social network position/s; peer selection in tobacco use; and peer influence in tobacco use.

Study exclusion criteria

We will exclude any studies that are: not available in English; conference abstracts; books or grey literature. Furthermore, studies with inappropriate and/or insufficient quality will also be excluded from the analysis.

Search strategy

In following the PRISMA guidelines [46] we will search the following databases for relevant articles: Cumulative Index to Nursing and Allied Health Literature (CINAHL); Informit Health Collection; PsycINFO; PubMed/MEDLINE; Scopus/Embase; Web of Science; and Wiley Online Library. Reference lists of included articles will also be hand-searched. The search will be undertaken by 31 May 2014 and include papers published between 1 January 2004 and 31 May 2014. Important keywords

include: tobacco; smoking; smokeless; cigarettes; cigar and social network.

Selection of studies

We will upload search results into EndNote and any duplicates will be removed. Prior to any screening, reviewers will undergo training to ensure a comprehensive understanding of the review question, the inclusion and exclusion criteria and a basic understanding of social network analysis of tobacco use. In the first round of screening, titles and abstracts will be screened for inclusion. Following preliminary screening, eligibility will be assessed through full-text screening. Eligibility for inclusion of papers will be assessed independently and in duplicate. At the title and abstract screening level, consensus must be reached with both reviewers in order to exclude an article; conflicts will be included. During full-text screening, disagreements will require resolution through consensus. If consensus cannot be achieved, a third reviewer will be called to make a decision. Quality monitoring of the screening process will be done by the first author (RM), who will randomly select 10% of the total articles for revision. Assistance from an independent reviewer will be used if necessary.

Data extraction

A data extraction form will be developed and pilot-tested on a randomly selected subsection of studies. We will then amend the extraction form based on outcomes and feedback from the pilot testing phase. This will ensure a comprehensive data extraction process and optimise the usability of the extraction form. The data extraction form will ensure that the review extracts pertinent data to provide a comprehensive synthesis of the literature regarding social network analysis of tobacco use. The form will provide a mechanism to elicit data to describe key findings and the nature of social network influences on tobacco use. As per the PRISMA guidelines, data will be extracted from each study that meets the inclusion criteria, including: participants; interventions; comparisons; outcomes; study design (PICOS); social network analysis methodology, follow-up period; and funding source [45,46]. The extraction process will be completed independently. Quality monitoring of the extraction process will be done by the first author (RM), who will randomly select 10% of the included articles for revision. If there is a disagreement, this will be resolved through consensus. If a consensus cannot be reached, a third reviewer will make a decision.

If data are unclear, missing, or presented in a form that is unable to be reliably extracted, authors will be contacted to assist in the process. The corresponding author will be initially contacted by email, with the first author (if not the corresponding author) copied into all correspondence. If email addresses are not available, authors will be contacted by phone. Authors will be given seven days to respond to emails, after which they will be followed up with a phone call and an additional email. If no responses are received after an additional seven days, another phone call will be made to contact the author. Attempts to reach authors will occur for an additional seven days and if authors are unable to be contacted, the authors will be classified as uncontactable.

Quality assessment and risk of bias

The quality of qualitative studies will be measured using the McMaster Quality Assessment Guidelines - Qualitative Form (Version 2.0) [47]. We will assess all studies for threats to internal and external validity, and develop an index of threats to validity.

Analysis

Qualitative, quantitative and mixed-method data that meets the inclusion criteria for the review, including methodological rigour, credibility and quality standards as outlined, will be described and synthesized using narrative synthesis [48]. This approach is used to synthesise the evidence relevant to the research questions, summarising and explaining the findings of included studies. Results will be presented using a number of outcome statistics where possible to address each research question [48]. For example, in addressing the influence of social network structure/position on tobacco use, mean difference, relative risk, odds ratio, etcetera, could be used, if available, to identify differences in tobacco use among clique members, liaisons or isolates. This is expected to be similar in assessing if peer selection processes (nominating smokers within the social network) predict future tobacco use, or vice versa.

A standardised template for data extraction will be used by one reviewer, and will be checked by a second reviewer. Preliminary synthesis will develop an initial description of the included study results, incorporating outcome statistics against research questions where possible [48]. As patterns across study results emerge from the preliminary synthesis, reviewers will interrogate the data to identify and gain an understanding about any factors that may explain differences in direction and/or effect [48]. The narrative synthesis of evidence is expected to be reported in a table format, highlighting the key outcomes and addressing the research questions. In order to avoid potential biases, key points of difference between studies will be identified.

Meta-analysis and pooling of statistical results will not be undertaken in this instance.

Discussion

A more detailed understanding of the influence of social networks and the importance of people's social context

in relation to tobacco use and the behavior-change process is required. We anticipate that the systematic review will synthesise evidence, including network characteristics, that social network structures can influence behaviour such as tobacco use. An expected strength of the review will be its ability to examine the relationship between social network structure, social network position and tobacco use across all age groups, and potentially different cultures and demographics. For example, do clique members, liaisons, and isolates influence tobacco use and does this vary by age or population group? The review will also examine peer selection and peer influence preceding tobacco use. The research will increase our understanding of social networks and the impact on tobacco use, informing policy and practice while highlighting gaps in the literature and areas for further research. This will assist researchers in exploring the influence of social networks on tobacco use and to examine if there is an association between social factors and being a smoker or a non-smoker.

Review findings will be disseminated in peer-reviewed publications and presentations, and made publicly available through appropriate mechanisms.

This protocol received input from the Australian Capital Territory (ACT) Aboriginal and Torres Strait Islander Tobacco Control Advisory Group.

Limitations

This systematic review may not be generalizable across all population groups, such as minority groups and different age groups. In addition, the literature may not capture the holistic and dynamic nature of social networks, but their influence in relation to tobacco use, peer influence and peer selection at a point in time.

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

RM, conceived the protocol and drafted and finalised the manuscript. RD commented on the study protocol, revised the manuscript critically for important intellectual content and will be involved in the analysis and interpretation of data. RL has been involved in the preliminary discussion around the systematic review, contributing to the design of the review and will be involved in the analysis and interpretation of the systematic review data. RL was also involved in drafting the manuscript and revising it critically for important intellectual content. AVDS contributed in the design of the study and was involved in drafting the manuscript and revising it critically for important intellectual content. JC contributed to the design of the protocol, was involved in drafting the manuscript, and will be involved in the analysis and interpretation of the systematic review data. TC contributed to the study protocol, with particular input on analysis and interpretation of data. All authors read and approved the final manuscript.

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Author details

[1]Centre for Research and Action in Public Health, University of Canberra, University Drive, Canberra ACT 2606, Australia. [2]Australian Institute of Aboriginal and Torres Strait Islander Studies, Australian National University, GPO Box 553, Canberra ACT 2601, Australia. [3]Centre for Excellence in Indigenous Tobacco Control, University of Melbourne, 207 Bouverie Street, Melbourne VIC 3010, Australia. [4]Faculty of Health, University of Canberra, University Drive, Canberra ACT 2606, Australia.

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1.2 Co-authors' declaration

As co-authors of the paper **A Systematic Review Protocol: Social Network Analysis of Tobacco Use**, we confirm that the lead author, Raglan Maddox, made the following significant contributions as the lead author:

- conception and design of the research proposal;
- gaining of ethical approval to conduct the research;
- conducting the research and data collection;
- analysis and interpretation of data;
- writing the papers and critical appraisal of content;
- drafting, submitting and finalising the manuscript for publication; and
- acting as corresponding author for journal communication and the publication peer-review process.

Rachel Davey

Signed: Rachel Davey Date: 10 February 2015

Tom Cochrane

Signed: T Cochrane Date: 10 February 2015

Joan Corbett

Signed: Joan Corbett Date: 10 February 2015

Ray Lovett

Signed: Ray Lovett Date: 10 February 2015

Anke van der Sterren

Signed: Anke van der Sterren Date: 10 February 2015

1.3 Systematic literature review

The Smoke Ring Study systematic review provided a synthesis of the literature published between 1 January 2004 and 31 May 2014 on social network analysis and tobacco use[40]. As reported in the publication 'A Systematic Review Protocol: Social Network Analysis of Tobacco Use' [40], the two central inclusion criteria used to identify studies for the review were:

1. peer-reviewed literature published in electronic databases; and
2. literature that involved social network analysis, examining relationships between participants in regard to tobacco use [7, 8].

The review built upon the paper by Seo and Huang [92], 'Systematic Review of Social Network Analysis in Adolescent Cigarette Smoking Behavior'. The findings highlighted the importance of social context in understanding and addressing tobacco use [69, 73, 89, 93-100].

The manuscript 'Social Network Analysis of Tobacco Use: A Systematic Review' has been submitted to the journal *Tobacco Control* for consideration.

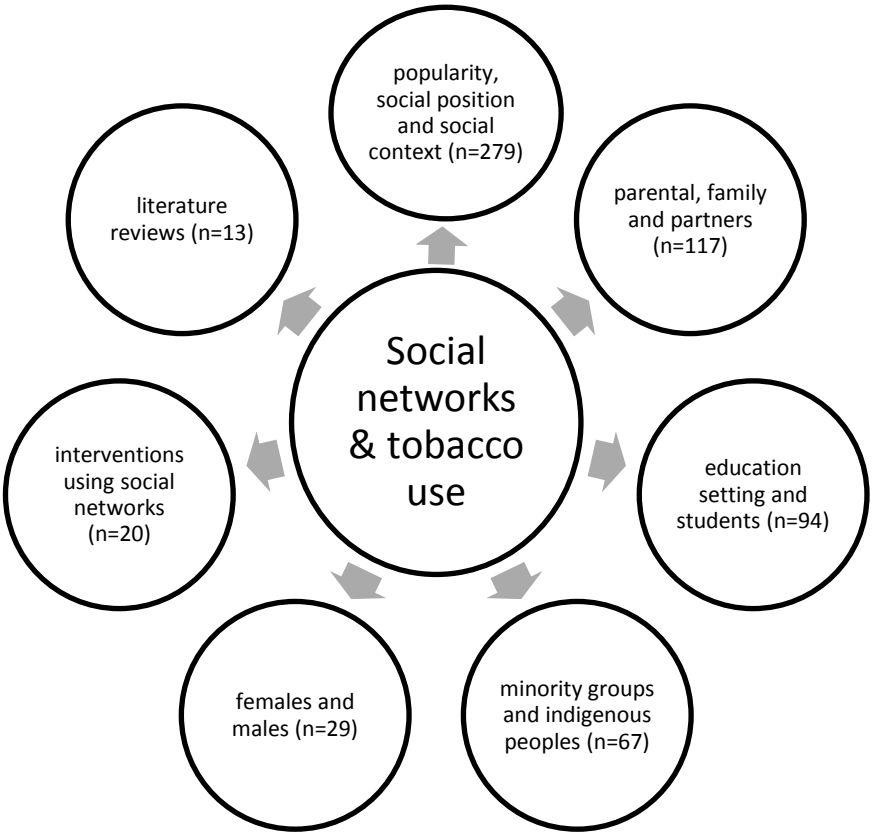
The systematic review identified many diverse studies that have led to an increased understanding of social networks and tobacco use [81, 92, 99, 101-111]. The review recognised that social network analysis is relevant to tobacco use because social relations and social contexts impact on the decision to smoke or not to smoke. As illustrated in Figure 2, the following aspects emerged through the narrative synthesis of the included evidence:

- popularity, social position and social context (n=279);
- parental, family and partners (n=117);
- education setting and students (n=94);
- minority groups and indigenous peoples (n=67);
- females and males (n=29);
- interventions using social networks (n=20); and
- literature reviews (n=13).

The review identified only two studies that explore the social context of Aboriginal and Torres Strait Islander tobacco use, but it was noted that they did not map smoking over time. The two papers that focused on the Aboriginal and Torres Strait Islander population explored the determinants of smoking among Aboriginal and Torres Strait Islander young people and reviewed the literature to understand smoking and cessation in Aboriginal and Torres Strait Islander women [95, 99]. The review also highlighted different techniques to analyse social networks, such as mapping, measuring

and analysing social network positions, roles, relationships and exchange among people and the relationship with tobacco use [7-9].

Figure 2: Groupings of research – social network analysis of tobacco use



Findings from this review indicated that both peer selection and peer influence operate in the initiation and maintenance of cigarette smoking among adolescents, although peer selection appears to contribute more to smoking homogeneity [92]. Findings were mixed with regard to whether social network structure or individual positions influence tobacco use. These differences may be due to varying confounding characteristics of the described structure or individuals' positions or to the fact that the paper only captured a point-in-time snapshot of a social network that may be in a dynamic state [110, 112-117].

While the review synthesised the evidence, reiterating the complex, dynamic and holistic nature of social networks and tobacco use, the review also recognised paucity in the literature regarding social networks and Aboriginal and Torres Strait Islander tobacco use.

1.4 Publication—Social Networks and Tobacco Use: A Systematic Review

Raglan Maddox, Rachel Davey, Tom Cochrane, Ray Lovett, Joan Corbett and Anke van der Sterren. Social Networks and Tobacco Use: A Systematic Review. *[Under review]*

SOCIAL NETWORKS AND TOBACCO USE: SYSTEMATIC REVIEW

Raglan Maddox[1§]

Rachel Davey[1], Tom Cochrane[1], Ray Lovett[2], Anke van der Sterren[3], Joan Corbett[4],

[1] Centre for Research and Action in Public Health, University of Canberra, University Drive, Canberra, ACT 2606 Australia

[2] Australian Institute of Aboriginal and Torres Strait Islander Studies, Australian National University, GPO Box 553, Canberra, ACT 2601 Australia

[3] Centre for Excellence in Indigenous Tobacco Control, University of Melbourne, 207 Bouverie Street, Melbourne, Victoria 3010 Australia

[4] Faculty of Health, University of Canberra, University Drive, Canberra, ACT 2606 Australia

[§]Corresponding author

Email: Raglan.Maddox@canberra.edu.au

Phone: +61 402 377 303

Email addresses:

RM: Raglan.Maddox@canberra.edu.au

RD: Rachel.Davey@canberra.edu.au

TC: Tom.Cochrane@canberra.edu.au

RL: Ray.Lovett@aiatsis.gov.au

AVDS: anke@atoda.org.au

JC: Joan.Corbett@canberra.edu.au

Keywords: Systematic review, Tobacco, Smoking, Social Networks

Word count: 5,735

ABSTRACT

Objective: To review the evidence on the influence of social networks on tobacco use.

Method: Systematic literature review.

Data Sources: CINAHL (Cumulative Index to Nursing and Allied Health Literature); Informit Health Collection; PsycINFO; PubMed/MEDLINE; Scopus / Embase; Web of Science; and Wiley Online Library. The terms used for searching combined those for tobacco use with the terms for social network analysis.

Study selection: Journal publications (in English) that described social network analysis and tobacco use. Eligibility for inclusion of papers was assessed independently and in duplicate.

Data extraction: One reviewer identified studies to be excluded, included and extracted data. Five of the co-authors independently assessed the inclusion and exclusion of studies.

Data Synthesis: The studies were synthesised qualitatively using narrative analysis.

Results: Articles (n=279) indicated that social network structures, positions and relationships influence tobacco use (initiating, maintaining and ceasing) in a number of ways. We found that popularity (nodes/students receiving nominations from other nodes/students), social position (structural position or role within a social network) and network cohesion; parental; family and partner influence; educational setting and student influence; minority groups and indigenous people; males and females; and interventions were all identified as influences on tobacco use.

Conclusions: Social network analysis is relevant to smoking behaviour. Social relationships within a wide range of groups and social contexts impact the decision to smoke or not to smoke. There is value in designing and using interventions that leverage social networks both to prevent smoking uptake and support smoking cessation.

ARTICLE SUMMARY:

- This systematic review identified many studies that provided insight into the influence of social networks on tobacco use, consolidating our understanding of social network analysis and tobacco use.
- Social network analysis is relevant to tobacco use with social relations and social contexts impacting on the decision to smoke or not to smoke.
- There is value in designing and using interventions that consider and leverage social networks both to prevent smoking uptake, and support smoking cessation.
- Programs and policies should consider, and leverage the power of social networks and social interactions to promote smoke free norms.

Strengths and limitations of this study:

- A major strength and limitation of this review was the broad definition of 'social network analysis' which reflects the evolving types of approaches in the literature. This meant that a large number of studies met the inclusion criteria and resulted in a range of differing definitions, terminology and methods.
- The potential for publication bias and that many of the included studies did not provide detailed information or characteristics about the dynamic interactions of relationships, which are relevant to tobacco use is also a limitation. As a result, the sample may not be generalizable, with over representation within various settings, age groups, regions, and limited data detailed regarding some study samples.

BACKGROUND

Tobacco use is a major preventable cause of premature mortality and morbidity [1 2]. Previous research has shown that social networks and peer influence impact on tobacco use, and conversely, tobacco use can influence social networks with normative and peer influences transcending through network ties or relationships [3-6]. A broad definition of social network analysis is where social relationships are viewed in terms of network theory consisting of *nodes*, representing individuals within the network, and *ties* which represent relationships between the individuals, such as friendships. It includes a set of theories, methods, and analysis to characterise and understand social relationships and how they influence behaviours[7]. This approach included analysis of social networks; mapping, measuring and analysing relationships and exchange among people, also known as 'peer effect' or 'contagion' [8-15]. Given the considerable evidence regarding social networks and tobacco use, a systematic review is required to consolidate the evidence base to form a basis for future research, policy and practice in this area.

OBJECTIVE

This systematic review aims to synthesise the literature regarding social networks and tobacco use. This includes contextual features of social networks, such as the type of social network or relationship style.

SEARCH TERMS

Search terms were: tobacco; OR smoking; OR smokeless; OR cigarettes; OR cigar AND 'social network'.

DATA SOURCES

The protocol for this systematic review has been published [16] and follows the Preferred Reporting Items for Systemic Reviews and Meta-Analyses (PRISMA) guidelines [17]. The following databases were searched: CINAHL (Cumulative Index to Nursing and Allied

Health Literature); Informit Health Collection; PsycINFO; PubMed/MEDLINE; Scopus / Embase; Web of Science; and Wiley Online Library [16].

STUDY SELECTION

As detailed in the study protocol, the criteria used to identify studies included:

- published journal articles that described social network analysis, examining relationships between nodes with regards to tobacco use;
- written in English; and
- published in the last 10 years, between 1 January 2004 and 31 May 2014.

Studies were selected for inclusion through an iterative process in three stages:

1. The lead author pre-screened all identified papers for relevance and inclusion criteria.
2. Five of the co-authors independently assessed the inclusion and exclusion of studies. Any disagreement related to papers for inclusion were included for full text screening. Any disagreement for inclusion and relevance at the full text screening stage was resolved through discussion between all authors.
3. The lead author extracted full data from included studies, with reviewers independently reviewing each study.

Types of participants

We evaluated studies that included children, adolescents, siblings, family, parents, peers and friends. There was no age limit, or specific population exclusion criteria.

DATA EXTRACTION

The key findings (PICOS) from included studies were combined using narrative synthesis. As outlined in the study protocol, narrative synthesis is used to describe and synthesize the evidence base due to the broad definition of ‘social network/s’ and consequently, the diversity of included papers.

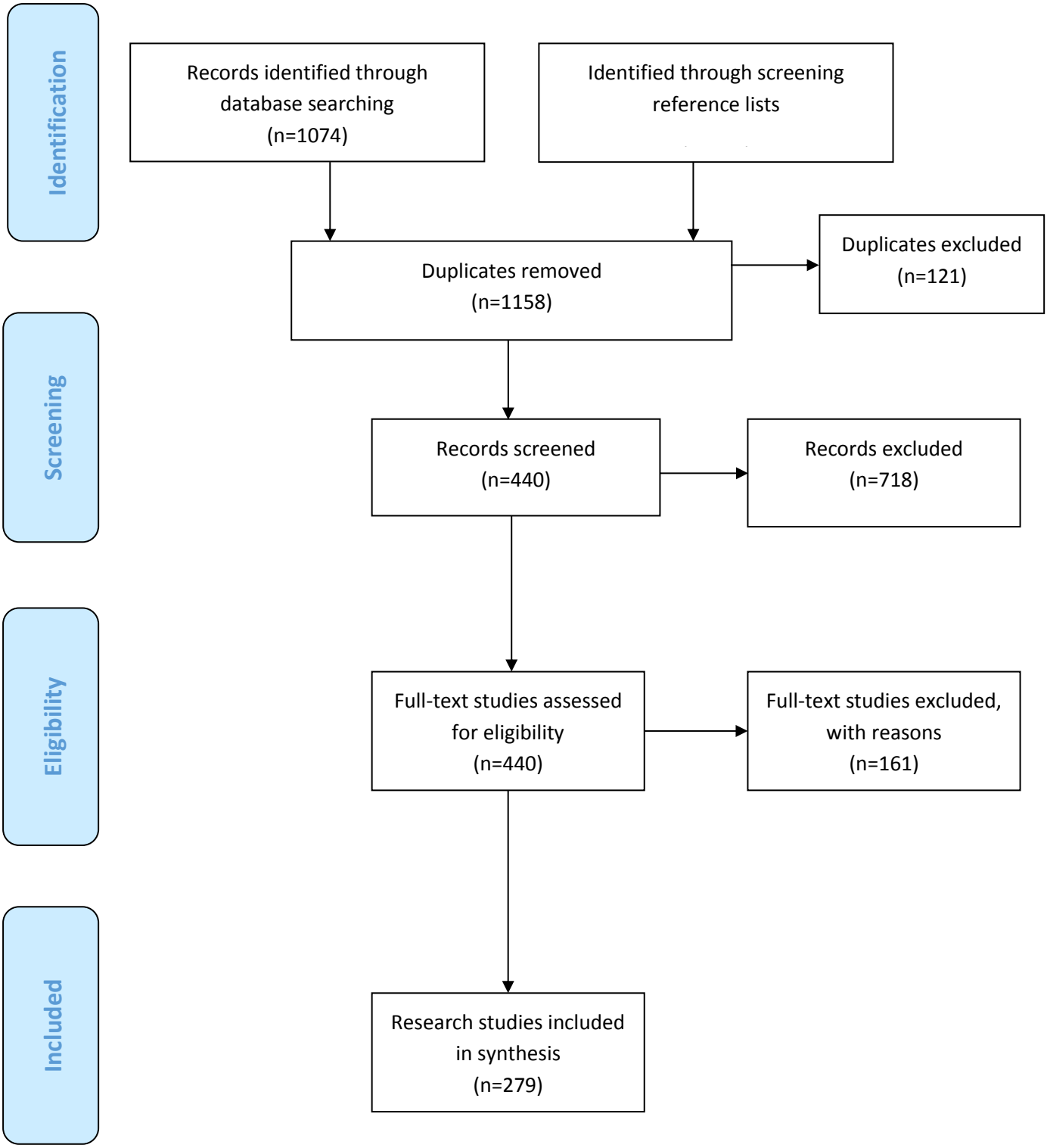
In line with the review protocol, quality was assessed with limitations and bias of the included papers noted and outlined in *Supplement Table 1*, including threats to internal and external validity. These limitations were noted and taken into account in the analysis and synthesis of evidence, with review limitations detailed in the Discussion.

DATA SYNTHESIS

As outlined in the study protocol, narrative synthesis is appropriate where synthesis of diverse evidence is required [16 18], and was selected as the most appropriate method of synthesis. This was predominantly due to the broad definition of social network analysis which lacked some uniformity across studies, as well as the high degree of heterogeneity in the types of 'social network analysis' used. Narrative synthesis identified and textually described meaningful patterns and themes in the included studies, providing a synthesis of the evidence and noting variations in study characteristics.

Figure 1 illustrates the systematic review process. Of the papers, *n=279* were included for review: 264 employed quantitative inquiry methods, 11 used qualitative methods, four used both quantitative and qualitative methods, and 13 included reviews of the literature.

Figure 1: Process of study selection using the PRISMA Guideline



RESULTS

A detailed summary of all included 279 papers is provided in the *Supplement Table 1*. Included studies ranged in size from hundreds of participants to tens of thousands of participants across the globe, and a substantial number of studies from the United States of America. The systematic review identified a range of 'social network' factors for different sub-groups that influenced tobacco use. The following groups of related studies were identified, although there was some overlap between the groups:

1. popularity, social position and social context (n=279);
2. parental, family and partners (n=117);
3. education setting and students (n=94);
4. minority groups and indigenous peoples (n=67);
5. females and males (n=29);
6. interventions using social networks (n=20); and
7. literature reviews (n=13).

1. Popularity, social position and social context

Popularity

Studies identified that peer influence depended on the strength of smokers' popularity—those smokers receiving many friendship nominations [19 20]. When smokers were popular, peer influence increased tobacco use, but decreased smoking when smokers were unpopular [19 20]. Schaefer, Adams and Haas [19] found that changing smoking-based popularity only affected smoking prevalence when the influence of peers was present. Similarly, Ramirez-Ortiz et al. [20] found that popular students were at higher risk of tobacco use [20] while nominating more friends was protective against tobacco use [20 21].

Social position

Social position is important in understanding youth substance use [22-27]. Henry and Kobus [23] identified that liaisons (a person brokering a relation between two groups, but not part of either group) were found to be at greater risk for substance use than isolated people or members of a group [23]. However, isolates' and members' smoking were significantly associated with peer smoking [24]. Liaisons to a smoking group were more likely to belong to the delayed tobacco use up take [28]. Explanations for these findings were thought to relate to the characteristics of the liaison position or may indicate that the liaison position provided a snapshot of movement between social groups [23]. In contrast, Turner et al. [29] found that smoking was more common among dyads (two individuals regarded as pair, for example, a husband and wife) and isolates [29]. Features of an individual's social networks, such as social position and social support, may have long-lasting associations with smoking behaviours [28 30].

Social context

Social context should be considered and addressed by anti-smoking programs and policies [31-34]. Findings support the need for tobacco control strategies that take account of the complex array of contextual factors that constrain and enable smoking [34 35]. For example, Siahpush [36] reported that smoking prevalence was lower in communities that were more egalitarian, and with higher social capital. There is value in exploring tobacco control social network interventions to account for peer selection, influence and social network dynamics [19 35 37-85].

2. Parental, family and partner influence

There was agreement among many papers that parental and sibling smoking directly influenced children and young peoples' smoking behaviours [60 66 79 80 82 86-122]. Furthermore, parents' smoking status, knowledge, attitude, parenting style, and quality of communication [34 59 60 66 79-82 85 88-132], as well as parent-child closeness, parental concern, control and strictness

were identified as being influential to children's tobacco use, tobacco attitudes and beliefs. [60] [74 82 84 92 95 98 104 105 109 113 115 133-138]. Proximate social contexts appeared to have a more direct and immediate role in adolescent smoking than macro-level factors [38 115 139-141]. Peterson et al. [80] found no evidence that the increased risk was dependent on the gender of the parent or child, while smoking by a non-biological parent also appeared to be at least as influential as smoking by biological parents [142].

Tobacco use initiation

Parental smoking status was not only predictive of transitions from never smoking to trying smoking, but also the progression to monthly smoking or daily smoking [95]. The influence of parents' smoking on smoking initiation was stable and enduring [95 107], but evidence also suggested that parents influence increased substantially over the course of adolescence [107]. Children who reported a parent as a smoker were more likely to have experimented with smoking [92 101 119 143], and were more likely to go beyond initial experimentation [101 119 143]. Bee, Jere and Britton [119] indicated that parental and sibling smoking influenced smoking uptake by children and young people, reporting that the relative odds of smoking uptake in children increased significantly if: at least one parent smoked; more so by the mother's smoking when compared with the father smoking; and if both parents smoked [119]. Even children whose parents did not smoke, but were former smokers, had an elevated risk for smoking [101 143].

Findings from Waa et al. [104] suggested that not allowing smoking in the home and communicating non-smoking expectations were likely to reduce risk of smoking uptake [104]. Peer and adolescent substance use was highly correlated, with evidence indicating that young children who had parents who smoked associated having dinner with a cigarette [144 145]. If an adolescent had a friend whose mother was authoritative, that adolescent was less likely to smoke [60].

Findings indicated that a change in adolescent dating status from not dating to having a partner that smokes significantly increased the odds of smoking at 15 months, but not for those who dated a non-smoker [177]. This effect was particularly distinct among boys [177]. All boys who dated a smoker, smoked themselves. Conversely, there was a strong protective effect among boys dating a non-smoker, compared with either those who did not have partners or those with partners that smoked [177]. However, smoking among wives' did not predict husband smoking initiation [158].

Maintaining tobacco use

The risk of daily smoking among children was also reduced for those whose parents had quit smoking, compared with those whose parents were current smokers [93 97]. Parental smoking cessation in the adolescent years, when compared to the childhood years, was strongly associated with less daily smoking among respondents at age 26 [146]. Engels and Willemsen [147] found that generally mothers were more positive about anti-smoking socialization than adolescents and fathers [147].

One paper suggested that White and Native American parents were very similar in their anti-smoking socialization beliefs, with the exception that Native American parents were less likely to believe that schools were better than parents in teaching children about the dangers of cigarette smoking [148]. Family influences, except for parent–adolescent activities and intention to monitor, were significantly protective against recent smoking and ever smoking among Whites; ethnic-specific family influence predictors of smoking were found in Blacks and Hispanics [149]. For non-White racial/ethnic groups, the prevalence of smoking among women with young children (0-4 years) in the household was lower than that among women without young children [150]. However, White women were more likely to smoke if they were poor and living with young children [150].

Cessation

Evidence generally indicated that 'significant others', 'romantic partners', 'spouses', 'husbands', 'wives', and 'intimate partners' influenced tobacco use, although there was some mixed evidence regarding social support [21 30 38 47 56 122 151-173]. Wagner, Burg and Sirois [153] found that having the support, trust and acceptance of a friend or family member increased an individual's use of the smoking cessation processes of change [153]. Husbands and wives were more likely to quit smoking if their spouse was a non-smoker [171], with spousal and heavy smoking decreasing the chances of successfully quitting [152 162 171]. A number of other factors also influenced the likelihood of a successful quit attempt, such as nicotine dependence, education, smoke free homes and other supports [90 152 171 174 175].

Bricker et al. [97] reported that parents who quit early had children with higher odds of quitting smoking for at least one month in young adulthood, compared to those whose parents did not quit early. Kreager et al. [56] observed that, where partner and direct friends smoked, there was a strong and significant association with future smoking, but smoking by friends-of-partner was not associated with future smoking [56]. Romantic partner smoking and injunctive norms were predictive of smoking when controlling for parallel friend variables [176]. However, Homish and Leonard [158] found more support for spousal influence on relapse than cessation [158]. Furthermore, there was more support for husband's influence compared to wife's influence; non-smoking wives were more likely to relapse and recommence smoking in the early years of marriage if their partners were smokers.

Research identified the importance of partners and family in successful cessation [30 38 56 152-170]. However, these significant others were generally not involved in cessation interventions, suggesting potential for improvement [155]. Cessation by a spouse decreased the reporting of smoking by 67% (95% CI, 59-73) [152]. In comparison, cessation by a friend or a sibling decreased the chances by 36% (95% CI, 12-55) and 25% (95% CI, 14-35) respectively [152].

This has prompted some cessation programs to take advantage of social support through the incorporation of smokers' partner [153]. Park et al. [178] reported that cessation interventions to enhance partner support showed promise for clinical practice when implemented with live-in, married, and equivalent to married partners [178]. However, social relations may encompass both positive and/or negative health behaviours [154], with not all social ties having a positive effect on health. Social interactions can reinforce positive behaviours, such as physical activity, but can also support and be interwoven with negative health behaviours, such as smoking and drinking [12 154 179]. Moreover, a smoking significant other can impair the cessation effort [153].

It was suggested that 'would-be quitters' require general support from family and peers, not just smoking-specific support [30 38 153 163 180]. The need for a comprehensive understanding of the functions and characteristics of dynamic social contextual factors, including social networks and social support in order to develop, implement and maintain more efficient and effective anti-smoking programs and policies is important [34 151 163 181-185].

3. Education setting and student influence

Numerous studies concerned social network analysis, tobacco use and students within education settings [11 19-21 23 24 28 29 32 33 47 48 60 68 69 72 80 110 112-115 120 128 139 141 145 186-218]. Peer effects, for both younger and older peers, in the school setting influenced tobacco use [11 19-21 23 24 28 29 32 33 47 48 60 68 69 72 80 110 112-115 120 128 139 141 145 186-218]. Wen et al. [115] highlighted that peer, family and school were all important contextually in influencing smoking behaviours among adolescents. Contextual features of social networks impacted on development and indicated significant interactions among: place; network composition; age; and gender [139]. The social image of smokers mediated the influence of social environment on adolescent smoking. Furthermore, social image had a greater effect on smoking among high school girls and middle school boys in comparison to other school groups [219].

Protective factors – school and peer

Protective factors to smoking (uptake, maintenance and cessation) included a perceived anti-tobacco atmosphere in school; being taught smoking-related health knowledge and no smoking signs [110]. Wen, Van Duker and Olson [115] also reported from the United State National Longitudinal Study of Adolescent Health (Add Health) survey, that parent-child closeness, parental control, attending a private school and having a higher percentage of Hispanic students at school were also protective, while controlling for other factors [115]. Smokers were also more likely to become non-smokers if they initially belonged to a non-smoking group in contrast to a smoking group, suggesting peers also influenced smoking cessation [200].

Risk factors – school and peer

Numerous studies reported that both perceived and actual peer [19 24 29 42 47 48 68 110 115 118 128 139 188-190 192-195 199 201 202 207 213 220-222] and friend cigarette use predicted cigarette use and uptake across adolescent years [28 68 188 195 197 198 201 204-208 223-225]. Smoking by peers, mothers, fathers, brothers, supervising teachers, passive smoking or seeing someone smoking on campus increased the risk of experimental smoking when compared to non-smokers and broader exposure to smoking in the community [110 221 223]. Similarly, factors associated with regular smoking compared to experimental smoking, included teachers' tolerance of smoking, passive smoking and smoking among: peers; fathers; brothers; and supervising teachers [110 223]. Schaefer et al. [208] observed a significant positive effect for friend selection and smoking similarity [208], with other studies showing adolescents were more likely to select each other as friends if they engaged in similar levels of smoking [43 208 214 217 224]. Daw, Margolis and Verdery [193] reported that generally, identical twins showed higher levels of homophily than members of other sibling pairs. After siblings, friends were the next most homophylic for smoking [193]. Course-mates, club-mates and schoolmates reported similar behaviours for

smoking [193], with correlating health behaviours differing in sport club and non-sport pairs [193]. Ennett et al. [195] reported that embeddeness, friendship quality and peer social status had a unique interaction with friend's smoking behaviours; thus, smoking involvement was associated with multiple social dimensions [195].

Smoking increases among adolescents as the number of smokers in an adolescent's environment increases [112 188 195 196 199 202 207]. The influence of close friends from adolescence continued to have an impact on smoking, even after transition into adulthood [188]. Students were at increased risk for smoking if they: attended a school with a relatively high senior student smoking rate; and often saw students smoking near their school [205]. Each percentage point increase in the smoking rate among grade 8 students increased the odds that a student in the two grades below (year 6 or 7) was an ever smoker, in comparison to a never smoker [205]. In addition, a low-risk student (no family or friends who smoke) was more than twice as likely to try smoking if he/she attended a high-risk school [205]. When controlling for friendship selection, the influence of friends played a significant role in adolescent smoking behaviour, with school type and socioeconomic background mediated by the school friendship networks [201 226].

Adolescents with a greater number of smoking friends were more likely to belong to the higher tobacco use projections [28]. De-selection and indirect influence effects were not significant after controlling for school norm interactions [199]. Once someone has commenced tobacco use more regularly, peers may become less influential [192].

University based studies overwhelmingly found that psychosocial and behavioural factors accounted for significant variation in smoking involvement, including smoking initiation [227]. Osgood et al. [22] found that isolates were more likely to use cigarettes than core members, and this could not be explained by their friends' cigarette use and/or demographic characteristics.

A substantial share of differences in smoking were associated with more limited integration in other domains of adolescent life, such as school, family and religion [22]. When controlling for other factors, the general connectedness to peers accounted for much of the variation in smoking across group positions [22]. This aligns with and supports the notion of belonging, protection and family, identified by Costa, Jessor and Turbin [227] and others [60 74 82 84 92 95 104 105 107 109 115 135 138 141 149 153 158 171 180]. Support protection and family moderated the impact of vulnerability, i.e - when support protection was high, the risk of smoking was somewhat alleviated [22 178 227].

The important influence of school contexts was consistently identified in relation to smoking behaviours and attitudes. School focused research recognized and stressed the influential nature of the school context, including the influence of peers, mothers, fathers, brothers, supervising teachers, passive smoking, household smoking/rules, role models and smoking on campus peers in relation to tobacco use [19 20 23 24 28 29 32 33 47 48 60 68 69 72 80 110 112-115 126 128 139 141 186-209 213 220 228 229 230].

4. Minority groups and indigenous peoples

In this case, minority groups are defined as culturally, ethnically or racially distinct groups with many studies reporting social network analysis among a range of racial/ethnic groups, including; Hispanic/Latino[68 72 83 103 162 176 227 231 232], African American[85], Asian[233], Asian American, American Indian, Asian Black, Caucasian[80], European American, and other or mixed ethnic groups[66 67 72 88 89 108 117 122 124 150 162 166 176 177 207 220 227 231-246]. Furthermore, a number of studies focused on minority population groups, such as: Aboriginal and Torres Strait Islander people [182 247]; Californians of Korean descent [248]; Maori communities [104 146]; LGBT (lesbian, gay, bisexual, and transgender) communities [249]; lone mothers [185 250]; Puerto Rican adolescents [251]; Filipino immigrant men [252]; and youth experiencing homelessness [64]. In alignment with the majority of included studies [33 253], research focused on minority

population groups highlighted the importance of social context in understanding and addressing tobacco use [64 68 83 89 102 161 182 226 244 247-249 254]. Smoking role models and smoking socialisation practices among social networks, particularly partners, parents, family and peers were identified as having a key role in smoking uptake and tobacco use [32 67 83 89 102 161 162 175 247 249 255 256]. Lopez et al. [68] and others [42 118] reported that perceived peer substance use was directly related to substance use [42 118] and Scragg and Laugesen [99] indicated that the relative risk of adolescent daily smoking was associated with both parents smoking, although this varied by ethnicity [99 246].

Evidence highlights the influence of social norms and de-normalizing tobacco use [40 42 46 67 83 152 182 249 251 252 257 258], Ji et al. [248] reported that social networks with members who discouraged smoking increased the likelihood of quitting, compared with smokers whose friends did not discourage smoking. Johns et al. [249] indicated that the conceptualization of LGBT community connection was protective against smoking. In contrast, Reitze et al. [244] suggested that social cohesion may facilitate smoking cessation among Black smokers, through effects on psychosocial mechanisms that can result from living in a community with strong interpersonal connections [244]. Numerous studies discussed interventions to address broader external influences, including stressors, attitudes toward smoking and normalising smoke free communities [40 42 46 67 83 152 182 249 251 252 257 258]. For example, education and/or counselling can be important components of interventions, and the establishment of smoke free policies in homes, helping to develop social networks of non-smokers and normalise being smoke free [42 45 162 248 252 259]. Stanton et al. [67] also indicated that a parent monitoring intervention can significantly broaden and sustain protection through an adolescent risk-reduction intervention [67].

5. Females and males

Studies included in this review generally reported gender differences, with a number of studies focussing on females [46 155-157 182 250 258 260-267]. The evidence indicated that tobacco use by females was strongly influenced by social networks [46 139 156 157 162 163 172 250 261 264 265 267]. Homish et al. [156] reported that women were more likely to smoke if they had a greater proportion of friends (but not relatives) who smoked, and greater exposure to tobacco smoke [156 268]. This indicates that understanding relationships and not just the number of smokers, could be important in cessation efforts [156 269]. Furthermore, age-adjusted odds of smoking cessation was smaller among lone mothers than partnered mothers [260]. The age-adjusted odds of relapse was 1.7 times greater among lone mothers than partnered mothers [260], with socioeconomic status, social support and mental health accounting for some of the association [250 260 270].

The most frequently reported reason for smoking initiation in women was having a friend who smoked [261]. Women who started smoking because their friends smoked or to look 'cool'; were more likely to start smoking at a younger age when compared to those who commenced smoking for other reasons [261]. Girls had definitive opinions about products that were at risk and/or protective [271]. Particular brands were symbolised as desirable or 'cool' [265, 496], or feminine, with female participants indicating that they were required to take care to smoke the 'right' [265, 502] brands, or expected to share with the 'right' peer group [265, 497].

A number of studies provided insight regarding social networks, tobacco use and pregnancy [38 46 155-157 160 266 268 272-274]. Aligning with studies focused on the general population, evidence indicated that tobacco use was influenced by social networks during pregnancy. A number of barriers to being smoke free were identified: influence of family and friends; shifts in relationship interactions; changes in smell and taste; issues with cessation provision; meaning of smoking; the role of smoking; understanding of facts; and willpower [272 275 276].

Gould et al. [182] highlighted that pregnancy provided an opportunity to promote smoke free norms and encourage change, but also emphasised that social norms and stressors within the Aboriginal community perpetuated tobacco use [182]. Moreover, Nguyen et al. [157] identified three emerging themes among women who quit smoking during pregnancy:

i. smoking norms within the social network/s [157]. The three main networks identified were families, friends, and co-workers [157];
ii. being tempted to smoke by social network members, due to the pervasive nature of smoking [157]; and
iii. changing relationships within social networks as a result of changes to smoking behaviours.

The most common source of second hand smoke exposure during pregnancy was the partner [268]. For some couples, tobacco reduction in pregnancy was associated with heightened conflict and increased vulnerability to abuse [267]. Partners may use economic and verbal abuse, isolation, intimidation and children as strategies of power and control to influence pregnant or postpartum women's tobacco reduction [267]. The importance of exposure from the general social network was also evident among non-smoking women with non-smoking partners; 50% reported some level of second hand smoke exposure in the preceding week [268], with no changes in smoke exposure across the three trimesters of pregnancy [268]. Thompson et al. [155] indicated that partner support to quit was 'potential' rather than 'real'. For example, partners generally made 'token gestures' such as smoking outside [155]. None of the respondents received assistance in educating their partner/family about the risks of smoking, therefore limiting their role in cessation [155]. Hennrikus et al. [46] suggested that increased support from a family member or a female friend is a promising strategy for prenatal smoking cessation [46]. In alignment with this concept, three tobacco-related interaction patterns with

couples and tobacco use were identified by Bottorff et al. [274]: accommodating; disengaging; and conflicting.

In summary, there were various common barriers to successful cessation: smoking norms within the social network/s [157]; being tempted to smoke by their social networks members [157] [272]; changing relationships and interactions within social networks as a result of changes to smoking behaviour [157]; influence of family and friends; changes in smell and taste; issues with cessation provision; the meaning of smoking; the role of smoking; understanding of facts and willpower [272]. In contrast, the social context could also be protective against smoking. For example, being married was associated with reduced likelihood of smoking [38].

6. Interventions using social networks

As summarised in the *Supplement Table 2*, a number of articles identified tobacco control interventions that utilised social networks [39 41 45-48 50 52-55 67 79 102 116 145 167 183 184 216 256 259 277-281]. These included using peers, role models, social networks of lung cancer patients [183 184]; Web-Assisted Tobacco Interventions (WATI); and other online social support networks [39 41 45-48 50 52-55 67 79 102 116 145 167 183 184 216 259 277-281]. For example, the Canadian Cancer Society's Smokers' Helpline Online, StopSmokingCenter.net' [45] and the QuitNet [45] community promotes cessation and abstinence and meets the social support and social influence criteria required for a sustainable large-scale social network (7,569 participants with 103,592 connections) [41]. Metrics of social network integration were associated with increased likelihood of: not smoking; being female; being older; and having been in the system longer [41].

Online social support networks may be particularly beneficial to smokers requiring timely quit attempt assistance, with rapid peer responses to new users [279]. This function may be particularly useful in preventing relapse [279]. Furthermore, evidence suggested that greater peer engagement via e-mail was associated with increased smoking abstinence, and greater

perceived support was associated with reduced frequency of smoking [39]. Similarly, A Stop Smoking In Schools Trial (ASSIST) peer nomination procedure was successful in recruiting and retaining peer supporters, who worked informally rather than under the supervision of teaching staff, to diffuse health-promotion messages [47]. Tobacco control interventions that utilise social networks, including online peer support, WATI, and other online social support networks may be an important strategy for smoking cessation programs [39 183 279].

7. Literature reviews

Numerous literature reviews were identified which were related to social networks and tobacco use [75 119 151 154 159 178 182 253 267 282-285]. These reviews reinforce the finding that there is a diverse range of social network influences. The included reviews aimed to:

- examine social relations and health, including exploring psychosocial, social-structural vulnerability and how social position, social support and social integration of smokers influence smoking initiation and tobacco use [119 154 159 253 267 283 285];
- determine and assess interventions to enhance partner and family support, helping to strengthen non-smoking attitudes and promote being smoke-free [119 154 159 253 267 283 285];
- explore the conceptualization and assessment of health-related social control in marriage [282]; and
- review several theories to elucidate the relationship between adolescent cigarette smoking and friends' cigarette smoking [286].

In sum, the reviews reported that social networks are complex and dynamic, but can facilitate positive health behaviours [154]. Peer group homogeneity of tobacco use; support for socialization and selection effects; interactive influence of best friends, peer groups and crowd affiliation; and an indirect protective effect of positive parenting practices - can all help protect against uptake of smoking [285]. There are various psychosocial and social-

structural factors influencing tobacco use [268]. Interventions to enhance support in smoking cessation and facilitating smoke free norms have shown promising signs [178].

DISCUSSION

Social networks and social context should be considered as components of tobacco control approaches. This includes:

- The need to tailor tobacco control interventions—both those preventing uptake and those targeting smoking cessation—to effectively and efficiently utilise social networks.
- Identify and empower groups and opinion leaders, those in key positions and role models, to play a role as community educators to promote and facilitate smoke free norms.
- Utilise a variety of social networking platforms, such as Facebook®, Twitter®, and YouTube® for positive health messaging, social support and empowerment, to promote cessation and smoke free norms.
- Shift social networks and the normalisation of smoke free behaviours through the use of smoke free legislation and policies that limit the 'socially-desirable' aspects of smoking, reduce exposure to tobacco smoke and minimise individuals' role modelling tobacco use.
- Since 90% of smokers commence smoking by 18 years of age [287], efforts should concentrate on preventing the uptake of smoking in youth, including targeting educational settings.
- Changes in health behaviour might be facilitated through social networks, noting there is debate regarding the direction of influence. Tobacco control programs and policies should support opportunities to be smoke free, such as facilitating planned and opportunistic quit attempts during pregnancy, and utilising smoke free policies.
- Social network interventions should include rigorous evaluation and share 'best practice'.

Limitations of this systematic review

A limitation of the review was the broad definition of 'social network analysis' which reflects the evolving types of approaches in the literature. This meant that a large number of studies met the inclusion criteria and resulted in a wide range of differing definitions, terminology and methods.

Another limitation is the potential for publication bias and that many of the included studies did not provide detailed information or characteristics about the dynamic interactions of relationships, which are relevant to tobacco use [288]. Furthermore, there is a risk of ecological fallacy with the results from aggregated studies potentially having differing characteristics from individuals within the study. Finally, the search terms did not include emerging products, such as electronic nicotine delivery device systems (ENDS) or e-cigarettes.

CONCLUSION

This systematic review identified many studies that provided insight into the influence of social networks, social context and tobacco use. The findings suggest that decisions to start, maintain or quit smoking are not made solely by individuals, but reflects the influence made by groups including; peers, parents, spouse/partner and those connected directly and indirectly. Smoking cessation interventions should take account, and build on social influence and social interactions to promote smoke free normative behaviors. Programs and policies should consider, and leverage the power of social networks and social interactions, for example; utilising online peer support and social network platforms to promote smoke free norms.

WHAT THIS PAPER ADDS

Social network analysis is relevant to tobacco use with social relations and social contexts impacting on smoking and non-smoking behaviours.

This systematic review consolidates our understanding of social networks and tobacco use.

There is value in designing and using interventions that consider and leverage social networks both to prevent smoking uptake, and support smoking cessation.

COMPETING INTERESTS

The authors declare that they have no competing interests.

AUTHOR'S CONTRIBUTIONS

RM[1] conceived the protocol and systematic review. RM had overall responsibility for the data search, extraction and undertaking narrative synthesis of the evidence.

RD[1] was responsible for validity and reliability checks (by themed areas), including independently verifying a random sample (10% or a minimum of 3 papers depending on the number of papers in each themed area). RD assisted with the drafting and finalising the manuscript, including critical revision of the manuscript for important intellectual content, analysis and interpretation of data.

TC[1] contributed to the study, with particular input on analysis and interpretation of data. TC was responsible for validity and reliability checks (by themed areas), including independently verifying a random sample (10% or a minimum of three depending on the number of papers in each themed area). TC assisted with the drafting and finalising the manuscript, including critical revision of the manuscript for important intellectual content, analysis and interpretation of data.

RL[2] has been involved in the preliminary discussion around the systematic review, including the protocol. RL contributed to the design of the review and was involved in the analysis and interpretation of the systematic review data. RL was responsible for validity and reliability

checks (by themed areas), including independently verifying a random sample (10% or a minimum of three depending on the number of papers in each themed area). RL assisted with the drafting and finalising the manuscript, including critical revision of the manuscript for important intellectual content, analysis and interpretation of data.

AVDS[3] contributed in the design of the study and was involved in drafting the manuscript and revising it critically for important intellectual content. AVDS was responsible for validity and reliability checks (by themed areas), including independently verifying a random sample (10% or a minimum of three depending on the number of papers in each themed area). AVDS assisted with finalising the manuscript, including critical revision of the manuscript for interpretation of data.

JC[1] contributed in the design, was involved in drafting the manuscript, and was involved in the analysis and interpretation of the systematic review data. JC commented was responsible for validity and reliability checks (by themed areas), including independently verifying a random sample (10% or a minimum of three depending on the number of papers in each themed area). JC assisted with the drafting and finalising the manuscript, including critical revision of the manuscript for important intellectual content, analysis and interpretation of data.

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1.5 Co-authors' declaration

As co-authors of the paper **Social Network Analysis of Tobacco Use: A Systematic Review**, we confirm that the lead author, Raglan Maddox, made the following significant contributions:

- conception and design of the research proposal;
- gaining of ethical approval to conduct the research;
- conducting the research and data collection;
- analysis and interpretation of data;
- writing the papers and critical appraisal of content;
- drafting, submitting and finalising the manuscript for publication; and
- acting as corresponding author for journal communication and the publication peer-review process.

Rachel Davey

Signed: Rachel Davey Date: 10 February 2015

Tom Cochrane

Signed: T Cochrane Date: 10 February 2015

Joan Corbett

Signed: Joan Corbett Date: 10 February 2015

Ray Lovett

Signed: Date: 10 February 2015

Anke van der Sterren

Signed: Anke van der Sterren Date: 10 February 2015

Chapter 2 Research design and methods

2.0 Protocol overview

This chapter outlines the research design and methods, detailing information regarding the context and the underpinning conceptual framework that informed the methodology, noting the manuscripts were not finalised for publication until 2014. The paper 'Study protocol – Indigenous Australian social networks and the impact on smoking policy and programs in Australia: protocol for a mixed-method prospective study' discusses a number of underpinning theories and the research methods that were used, including the survey, focus group and key informant interview processes [13].

The paper details various considerations, explaining that the research was undertaken to explore and assess the evidence of social networks and Action Area 1 of the ACT Strategy in the ACT region. The aim of the study was to explore how Aboriginal and Torres Strait Islander people are influenced to smoke, or not smoke. As outlined in the following paper 'Study protocol – Indigenous Australian social networks and the impact on smoking policy and programs in Australia: protocol for a mixed-method prospective study', the prospective study used a mixed-method approach to explore the socio-cultural context underlying Aboriginal and Torres Strait Islander tobacco use and answer the following questions:

1. Do individuals' social networks influence smoking behaviours?
2. Is there an association between various social and cultural factors and being a smoker or non-smoker?
3. Do the tobacco control programs under Action Area 1 of the ACT Strategy (including smoking cessation groups, youth and community health promotion programs and education campaigns) impact on tobacco behaviours, attitudes and beliefs in the Aboriginal and Torres Strait Islander population [13]?

2.1 Ethical considerations

The Smoke Ring Study was informed by, and complied with, the World Medical Association Declaration of Helsinki and the National Statement on Ethical Conduct in Human Research, Values and Ethics—Guidelines for Ethical Conduct in Aboriginal and Torres Strait Islander Health Research and Guidelines for Ethical Research in Australian Indigenous Studies. The research received ethics approval (see Appendix v: Ethics Approval documentation) from the University of Canberra Human Research Ethics Committee (Project number 12163) on 28 September 2012 and from the ACT Health Human Research Ethics Committee (ETH10.12.232) on 14 November 2012.

2.2 Published work—Study Protocol—Indigenous Australian Social Networks and the Impact on Smoking Policy and Programs in Australia: Protocol for a Mixed-method Prospective Study, *BMC Public Health*

Raglan Maddox, Rachel Davey, Ray Lovett, Tom Cochrane and Anke van der Sterren. 2013. Study Protocol—Indigenous Australian Social Networks and the Impact on Smoking Policy and Programs in Australia: Protocol for a Mixed-method Prospective Study. *BMC Public Health*.

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BMC Public Health

STUDY PROTOCOL Open Access

Study protocol - Indigenous Australian social networks and the impact on smoking policy and programs in Australia: protocol for a mixed-method prospective study

Raglan Maddox[1*], Rachel Davey[1], Tom Cochrane[1], Ray Lovett[2] and Anke van der Sterren[3]

Abstract

Background: Tobacco use is the most preventable cause of morbidity and mortality in Australia. Comprehensive tobacco control has reduced smoking rates in Australia from approximately 34 per cent in 1980 to 15 per cent in 2010. However, 46 per cent of Aboriginal and Torres Strait Islander people (Indigenous Australians) smoke on a daily basis, more than double the rate of non-Indigenous Australians. The evidence of effective tobacco control strategies for Indigenous Australians is relatively scarce. The aim of this study is to (i) explore the influences of smoking in Indigenous Australian people and to (ii) help inform and evaluate a multi-component tobacco control strategy. The study aims to answer the following questions: - do individuals' social networks influence smoking behaviours; - is there an association between various social and cultural factors and being a smoker or non-smoker; and - does a multi-component tobacco control program impact positively on tobacco behaviours, attitudes and beliefs in Indigenous Australians.

Methods and design: Our prospective study will use a mixed-method approach (qualitative and quantitative), including a pre- and post-test evaluation of a tobacco control initiative. The study will explore the social and cultural context underlying Indigenous Australian tobacco use and associated factors which influence smoking behaviour. Primary data will be collected via a panel survey, interviews and focus groups. Secondary data will include de-identified PBS items related to smoking and also data collected from the Quitlines call service. Network analysis will be used to assess whether social networks influence smoking behaviours. For the survey, baseline differences will be tested using chi^2 statistics for the categorical and dichotomous variables and t-tests for the continuous variables, where appropriate. Grounded theory will be used to analyse the interviews and focus groups. Local Aboriginal community controlled organisations will partner in the study.

Discussion: Our study will explore the key factors, including the influence of social networks, that impact on tobacco use and the extent to which smoking behaviours transcend networks within the Indigenous Australian community in the ACT. This will add to the evidence-base, identifying influential factors to tobacco use and the effectiveness and influence of a multi-component tobacco control strategy.

* Correspondence: Raglan.Maddox@canberra.edu.au
[1]Centre for Research and Action in Public Health, University of Canberra, University Drive, Canberra, ACT 2606, Australia
Full list of author information is available at the end of the article

Background

Tobacco use is the most preventable cause of morbidity and mortality within Australia [1]. While Australia is a world leader in comprehensive tobacco control, including the recent implementation of the world's first plain packaging policy through the Tobacco Plain Packaging Act 2011, there is room for improvement, especially in certain sub-populations [1,2]. Tobacco control policies in Australia have resulted in reducing the smoking rates from approximately 34 per cent in 1980 to 15 per cent in 2010 [1,2]. However, this is not the case for all population groups with 46 per cent of Indigenous Australians smoking on a daily basis, more than double the rate of non-Indigenous Australians [1]. Indigenous Australians have a notable history with tobacco [3,4]. For example, tobacco provided an incentive for labour with many Indigenous Australians continuing to receive rations of tobacco from employers up to the 1960s [4-6]. The high rates of smoking among Indigenous Australians [7-10], is the single most significant contributor to premature deaths (one in five) among Indigenous Australian people. Tobacco smoking also contributes significantly to shorter life expectancy when compared with non-Indigenous Australians [11].

It is well established that there are a number of cultural and socio-environmental factors that influence mainstream tobacco use [12-19]. Evidence has indicated that peer associations can impact on behaviours, including the initiation and cessation of smoking predominantly among young people, and in relation to substance use [20-22]. Smoking can be a mechanism to maintain and strengthen kinship bonds and social relationships and to enhance a sense of belonging and social cohesiveness [23-25]. Research has investigated socially, culturally and politically appropriate approaches to behaviour change in relation to tobacco use [26-31] with social networks theorised to have a significant influence in the behaviour change processes [32-36]. However, our understanding of attitudes, behaviours and the way in which social networks influence and operate in relation to smoking behaviours in Indigenous Australian communities is very limited. Our study aims to investigate various social and cultural factors and their influence on smoking behaviours, attitudes and beliefs. Measures of smoking behaviour include smoking status and levels of tobacco consumption, while indicators of attitudes and beliefs include:

- how often a respondent thinks about 'enjoying smoking';
- if respondents' perceive cigarette brands to be more prestigious or more harmful than other cigarette brands; or
- the perceived level of importance of a number of statements, such as 'smoking may interfere with my performance', 'smoking may make me vulnerable and put me at risk for harm' or 'my culture does not allow smoking'.

The study will use a number of underpinning theories, including the theory of triadic influence, social network analysis, diffusion of innovations theory and homophily in order to triangulate evidence and add validity to our interpretation of this complex issue [37,38]. This will assist to develop our ability to design and implement optimal, culturally appropriate and effective tobacco control targeting Indigenous Australians [39,40].

Research questions

The research will investigate the impact of tobacco control programs and policies among the Indigenous Australian population in the ACT region and ask the following research questions:

- do individuals' social networks influence smoking behaviours?
- is there an association between various social and cultural factors and being a smoker or non-smoker?
- do tobacco control programs in the Australian Capital Territory (ACT) impact on tobacco behaviours, attitudes and beliefs in the Indigenous population?

Underpinning theories

In recent times there has been a strong commitment to address the high rates of smoking in the Indigenous Australian population through the Close the Gap campaign, the National Tobacco Strategy 2012–2018, the National Partnership Agreement on Closing the Gap in Indigenous Health Outcomes and the National Healthcare Agreement [41-47]. The National Healthcare Agreement has set the target of closing the life expectancy gap for Indigenous Australians within a generation (2030) and to halve the 2009 Indigenous smoking rate by 2018 [42]. The ACT Government made a further commitment to reduce smoking rates among Indigenous Australians through the development of the ACT Aboriginal and Torres Strait Islander Tobacco Control Strategy 2010–2014 [41].

The Strategy recognises that while there is evidence regarding the prevalence of smoking in the Indigenous Australian community, reports on the effectiveness of tobacco control initiatives for Indigenous Australian people and communities are scant [48]. Much of the work to date in Indigenous Australian tobacco control draws two central tenets:

1. tobacco control is best delivered in the community setting; and

2. to be effective participation must be based in the social, work or family environment [41].

Evidence indicates that the social network structure can influence health behaviour and that normative and other peer influences transmitted through network ties can shape risk behaviours [13,49]. A better understanding of the relationship between Indigenous Australian social networks and smoking is required [13]. Our research will utilise four associated underpinning theories in a prospective study of smoking behaviours of Indigenous Australian people [37,38,50].

The theory of triadic influence

The theory of triadic influence describes three streams of influence in relation to tobacco use:

1. cultural/environmental influences - community characteristics, media influences, legislation and policy;
2. social-situational or normative influences - including parent and peer influences and their attitudes, use of tobacco and characteristics of relationships; and
3. individual, person or biological influences - genetic, biological, personality variables, gender, ethnicity and age [51,52].

As illustrated in Figures 1 and 2, the theory outlines three variables across the three streams of influence; ultimate, proximal and distal. Proximal factors influence behaviours directly (e.g. smoking related attitudes and beliefs) in contrast to ultimate factors, which are beyond the control of individuals, indirectly placing them at risk of smoking behaviour (e.g. broader cultural, social and biological influences) [51,52]. Given this context and based on research in relation to smoking among young people in the USA [20,21], it is expected that similar attitudes and beliefs will be reflected in participants' broader social networks. Furthermore, it is this evidence and context that leads us to social network analysis, diffusion of innovations theory and homophily as directly and indirectly relevant theories regarding smoking among Indigenous Australian communities.

Social network analysis

A network is a structure made up of nodes (individuals, organisations, etc) that are connected together by ties (relations such as friendship, kinship, exchanges, activities, etc) [53-55]. Social network analysis provides a way of characterising and investigating such structures, including through network visualisation (using graphic display as illustrated in Figure 2), structural analysis and statistical analysis [55-58]. If participants' networks influence smoking behaviours, it would be expected that participant's networks would share similar smoking behaviours. Thus, we would compare the observed network to a simulated network with the same network characteristics, including the same overall rate of smoking prevalence, but with the incidence of smoking randomly distributed across the network [59]. If clustering is occurring among smokers or non-smokers, then the probability that a participant who smokes has a network contact who is also a smoker should be higher in the observed network than in the simulated network [21,60]. Perceived proportion of peers who smoke will be measured by analysing the respondents' perceptions of how many of their peers smoke (about what proportion (%) of your friends and acquaintances use tobacco?) and respondents' perceptions of how many of their five closest friends and family are regular smokers (thinking about your five closest friends and family, how many of these five are regular smokers?).

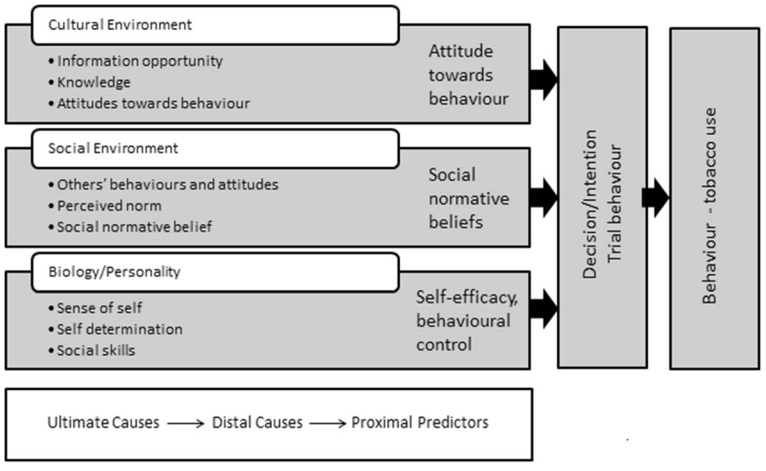

Figure 1 The theory of triadic influence. Source: Modified from [35,51].

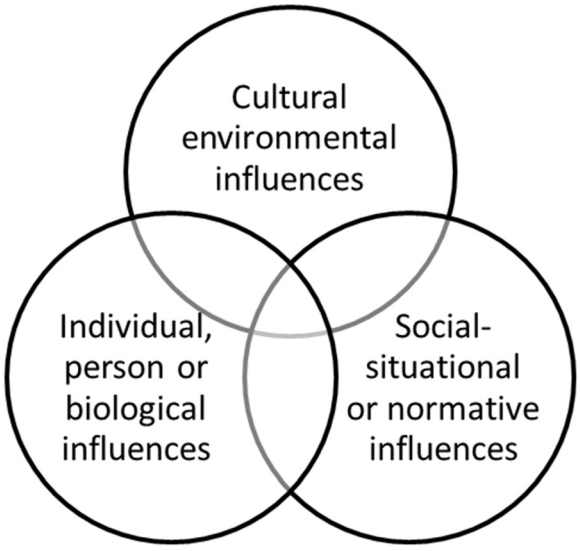

Figure 2 The theory of triadic influence. Source: Modified from [35,51].

Wellman [61] outlined that individuals' behaviour is best predicted by examining their social network and ecological characteristics in which they are entrenched; not intrinsic factors such as attitudes, drivers or demographic characteristics. Furthermore, nothing can be accurately understood in isolation or without context [61]. Therefore, these structures—social networks of interconnected individuals—and characteristics can be useful to develop, tailor and implement health promotion and public health programs, including tobacco control [62]. Within the Indigenous Australian context, tobacco was seen as a prestigious substance and has been a highly valued commodity [3,7,63]. Smoking has been a central mechanism for relationships, assisting to maintain and reinforce kinship bonds and social relationships and also used as a practical currency and an incentive prior to Indigenous Australian peoples full engagement with the cash economy in the late 1960s [4-6]. As a result, the primary data collection in this study is expected to reflect the importance of social and cultural norms regarding smoking and the influence of social networks. It is anticipated that similar behaviours and beliefs about smoking will resonate among participant networks [23-25].

Diffusion of innovations theory

The diffusion of innovations theory is the most prominent behavioural application of network analysis and has been widely used in public health; explaining the steps, processes and how new ideas and practices spread within and between communities [64]. Given the context that has influenced the high rate of smoking among the Indigenous Australian community and the evidence regarding the social role of tobacco [3,4,7,63], it is logical that the diffusion of innovations theory will provide the theoretical foundations to investigate how social networks can affect behaviour and behaviour change around smoking [64]. Diffusion of behaviours and effective programs are a significant challenge for public health, health promotion and subsequently, tobacco use [65,66]. Ryan and Gross [67] identified significant influence on social contacts, interactions and interpersonal communication on the adoption of new behaviours. New behaviours and practices may originate in a community and can be disseminated and diffused through the community where they originated and beyond through numerous communication channels, such as mass media, social media, interpersonal channels and electronic communication [58,68,69]. As a result, it is evident that factors influencing diffusion are not static factors of behaviour change. Influential factors are generally dynamic interactions that occur between a number of factors, individuals and the environment [64]. If effective public health programs, products and practices are not effectively disseminated and diffused, they will not achieve optimal impact to improve public health [64].

Homophily

Individuals' social networks can be homogeneous with regard to socio-demographic characteristics, intrapersonal factors or behaviours, such as smoking; "similarity induces homophily" [70]. Homophily is the principle that interaction between similar individuals or organisations occurs more frequently than among dissimilar individuals or organisations [70]. This is related to the process of peer socialisation, whereby people take on the values and behaviours of the 'group' in order to be accepted [71]. In the context of the social norms around tobacco among Indigenous Australian people and the high rate of smoking, homophily is a sound underpinning for this research. McPherson and colleagues [70] indicated that behavioural, cultural, genetic or other information that flows through networks is more likely to be clustered. In alignment with the theory of triadic influence, this may be one factor for the inconsistent effect of tobacco control on smoking rates of different population groups [70].

Synthesis: underpinning theories

Our research will use triangulation to enhance the validity and generalisability of the study by increasing the likelihood that the findings and interpretations will be credible and dependable [37,38,50,72]. Triangulation will strengthen the research and lead to a more comprehensive understanding of the complex issue of tobacco use, using multiple disciplinary and theoretical lenses to view and investigate the research findings and data sets [37,50,73].

Triangulation was originally used in the health and social sciences by psychologists Campbell and Fiske [74] using multiple tests to measure the same constructs to look for convergent validity. It has been used in a broad range of research related to health sciences and within the public health and health promotion sphere [75-80]. Our research will use these underpinning theories, data sources and analyses to enhance the validity of the study [37,38,50,72]. There is limited evidence regarding effective tobacco control for Indigenous Australian people and insufficient evidence in relation to network analysis in this area. It is this gap in knowledge that motivates the research questions. Therefore, this research will strengthen our understanding of the factors that influence smoking, including exploring cultural and social beliefs and attitudes.

Methods/design

Aim and objectives

The objectives of the research are to answer the following questions:

- do individuals' social networks influence smoking behaviours;
- is there an association between various social and cultural factors and being a smoker or non-smoker; and
- do the tobacco control programs under the Action Area 1 of the ACT Aboriginal and Torres Strait Islander Tobacco Control Strategy 2010–2014 (this includes smoking cessation groups, youth and community health promotion programs and education campaigns) impact on tobacco behaviours, attitudes and beliefs in the Indigenous Australian population.

We will undertake surveys, focus groups and interviews in two waves approximately 12 months apart; pre- and post-implementation of the multi-component tobacco control initiative. This will assist to identify commonalities and disparities, assessing the effectiveness of program and further exploring socio-environmental mechanisms that influence tobacco use, attitudes and behaviours [81,82]. Data will be collected via:

1. surveys;
2. interviews;
3. focus groups; and
4. use of existing de-identified health data, for example, the Talking About the Smokes survey data, data regarding relevant Pharmaceutical Benefit Scheme (PBS) item listings related to smoking (e.g. item codes for nicotine replacements) and Quitlines call data and volume.

Data collection instruments: survey, interview guide and focus group guide

The data collection instruments were developed based on valid, reliable and tested surveys, including the:

- Australian Census;
- Fagerström Test for Nicotine Dependence;
- National Aboriginal and Torres Strait Islander Social Survey questionnaire;
- National Aboriginal and Torres Strait Islander Health Survey questionnaire; and
- National Drug Strategy Household Survey questionnaire [2,83-88].

The network analysis components are adapted from previous studies of social networks by Alexander et al. [89], De Lange et al. [90] and others [14,90-94]. Each instrument includes social network questions in relation to the characteristics of the participants' friends, family and people that reside in their household. The data collected, including responses to the network questions, will provide invaluable insight into the centrality of participants, their relationships/networks and smoking behaviours and beliefs. Network analysis will also be supported through recruitment via convenience and snowball sampling.

The sample population

Participants will generally be Indigenous Australian people residing in the ACT region. The sample will include adults and children (12 years and above). Young people have been included to reflect the younger Indigenous Australian demographic profile and the early uptake of tobacco use in children [95,96].

The sampling frame

Our primary points of recruitment in the ACT include the ACT Indigenous Network, an Aboriginal Community Controlled Health Organisation, an Aboriginal Community Controlled Youth Centre, local community events, and a number of other Indigenous Australian organisations and their networks. These organisations will be used to help recruit participants via convenience and snowball sampling [37,97]. After potential participants receive the study information sheet and voluntarily make contact with the researcher to participate, the potential participants will be asked to provide informed consent prior to participating in the study.

The survey

The survey (paper and online versions) will collect quantitative data on individuals' behaviours, attitudes and ecological characteristics, including social network data to explore the influence of family and peers.

Therefore, while the participants are the source of all information, there are two different sampling units: the individual respondent; and the relationships/networks [98]. Objectives of the survey will include the domains; demographics; socio-economic status, and will explore:

- factors that influence smoking, including cultural and social beliefs and attitudes related to smoking, smoking cessation and non-smoking;
- attitudes, knowledge, beliefs and awareness in relation to smoking behaviours;
- nicotine dependence (Fagerström Test for Nicotine Dependence) [83,84];
- the impact of tobacco control programs and campaigns, including awareness and recognition;
- smoking, quitting and non-smoking behaviours; and
- family, friends and peers influence in relation to smoking behaviours.

Sample size

A minimum sample size of 102 participants was determined. This sample size is sufficient to obtain 90 per cent power to detect a 10 per cent reduction in smoking between the pre-intervention group (36%) when compared with the post-intervention group. The current population smoking rate is based on data obtained from the 2008 National Aboriginal and Torres Strait Islander Social Survey (NATSISS) relating to the ACT Indigenous Australian population [87].

Analysis

Statistical and social network analysis will be used to characterise and describe the results, using multiple imputation of missing data prior to analysis [55,81]. In examining the association between various social factors, data will be aggregated and entered in SPSS, UCINET, NetDraw and Microsoft Excel for statistical and network analysis. In assessing if tobacco control programs have influenced behaviours, attitudes and beliefs in relation to smoking, analysis will incorporate common descriptive statistics and comparisons between the pre- and post-intervention groups. For example, comparisons between the pre and post-intervention groups will use X^2 (categorical distributions) and T-tests (interval or ratio data). Bivariate associations between variables will be tested by X^2 in analysing smoking type (daily smoker, occasional smoker, light smoker, social smoker, ex-smoker and non-smoker) by gender, age group, income group, education level, etc. Wilcoxon rank sum tests or Spearmans rank correlations will also be used depending on whether the variables are binary or ordinal. Multiple regression will be used to test whether individual variables are independently predictive of outcomes. Comparisons will be conducted across and between the sub-groups for both pre- and post-intervention [81,99]. Analysis will also include examining the data from the Fagerström Test for Nicotine Dependence questions in the survey for reductions in means scores, indicating reduced nicotine dependence. The higher the accumulated Fagerström score per participant, the more intense the participant's physical dependence on nicotine [84]. Computations will be undertaken using SPSS and Microsoft Excel [83-85].

Social network analysis will be used to assess if individuals' social networks influence smoking behaviours. Network analysis will include exploring smoking and non-smoking networks constructed from the survey data and complemented by the qualitative data collection. This will include network visualization, structural analysis and statistical analysis [55]. Several network level measures of structure will be assessed, including clustering, network size, number of ties and reciprocity [55,58]. To study the clustering of smoking behaviour, we will compare the observed network at each data collection point to a simulated network with the same network characteristics, including the same overall rate of smoking prevalence, but with the incidence of smoking randomly distributed across the network [59]. If clustering is occurring among smokers or non-smokers, the probability that a participant who smokes has contact with other smokers should be higher in the observed network than in the simulated network [21,60]. These network metrics will be used to provide a descriptive presentation of the network/s and any changes over time. The pre- and post-test survey will be analysed using Analysis of Variance (ANOVA) on the gain scores and Analysis of Covariance (ANCOVA).

Interviews and focus groups

The interview component of the research study aims to collect in-depth qualitative data on individuals' behaviours, attitudes and ecological characteristics, including exploring potentially more sensitive factors, such as the influence of family and peers. It is expected that the interviews will expand on the depth of survey findings, broadening the perspective of contextual factors and their influence on tobacco use [50,81]. The use of open ended questions will provide broader scope and more detailed and enriched qualitative data on the determinants of tobacco use, including both barriers and enablers to tobacco use [50,82]. As outlined in the *Synthesis: underpinning theories*, analysis of a range of data sources, data collection methods and the weight of evidence is expected to provide a more comprehensive view of tobacco use [50]. Thus, each form of data collection—survey; interviews; focus groups; and existing data collections—will independently provide part of the story for the research aim, objectives and research questions, but together, they will contribute to a higher level of analysis and a more

comprehensive understanding of tobacco use of Indigenous Australians living in the ACT [50,81].

Objectives of the interview component include investigating and determining knowledge of the existence and content of the multi-component tobacco control strategy, and investigating and exploring in particular:

- smoking, quitting and non-smoking behaviours; and
- is there an association between various social determinants, such as education and employment, and being a smoker or non-smoker. This will include exploring social norms and the influence of social networks.

Sample size

The sample size of the interview component (and the focus group component) of this study is based on theoretical saturation. Thus, an exact sample size for the project can only be ascertained as the project progresses, as it will be based on the numbers required for the data to be rich and detailed enough to support thematic analysis. Theoretical saturation will be achieved through collecting data across a diverse range of participants to fully flesh out ideas and themes, until no new themes emerge [37,81,97,100]. Theoretical saturation also indicates the development of categories in relation to their properties and other characteristics, including variation [37,81]. It is anticipated that at a minimum, a sample of 25 participants will be required based on previous studies, such as the "Starting to Smoke" Experiences of Indigenous Youth study [101]. We will offer multiple days, times and locations to participate in the interviews, working with the community organisations and potential participants to ensure participation is as convenient as possible.

Analysis

In investigating the influence of social networks on smoking behaviours; the impact of tobacco control programs in the ACT on tobacco behaviours; and if there is an association between some social factors and being a smoker or non-smoker, we will follow some procedures and principles of grounded theory [100,102]. This is to ensure that we do not shift concepts into incongruent situations. Grounded theory involves grounding text in the context that it was constructed [100,102]. Grounded theory will form the underpinning conceptual framework that informs the analysis for the interview and focus group components of this research. The grounded theory approach will be modified as the research project is primarily descriptive in outcome, rather than theory generating. Grounded theory utilises a systematic, inductive research process to generate grounded theory that emerges through constant comparative analysis of qualitative data [37,103]. This "general method of comparative analysis" results in systemic theory, identifying core variables that are grounded in the collated and synthesised data; assisting to interpret the data [104, 105]. Glaser [104] explained that "grounded theory has the purpose of generating concepts and their relationships that explain, account for, and interpret the variation in behaviour (sic) in substantive area under study" [19,104]. Four fundamental criteria formed the basis for the methodology: fit, modifiability, relevance and work. *Fit (valid)*—grounded theory emerges from the analysis of data gathered from the system; therefore, the theory fits and is relevant. *Modifiability (control)*—grounded theory is induced from the interviews and associated documentation, thus, the theory closely reflects what is actually happening and is highly applicable [37,100,103]. *Relevance (understanding)*—as grounded theory fits and is relevant, it is readily understandable to the people interacting with the field because it portrays the latent patterns within the field [37,100,103]. *Work (generality)*—grounded theory fits the field, is relevant, and is understood by people within the field, it is important to understand that grounded theory produces theory, not description [37,100,103].

The research project is primarily descriptive in outcome, rather than theory generating and therefore, selected parts of the grounded theory process will be utilised during the research project. This modified grounded theory approach will include data collection through interviews and focus groups, which will be transcribed for coding, analysis and compilation of the findings [100]. Coding will include constant comparison, documentation and identification of themes throughout the findings, including core categories and sub-categories. The selective coding will also include constant comparison and documentation resulting in dense, saturated core categories. The core categories will be sorted, documented and described [37].

The interviews will follow an interview guide—informed by components of the National Aboriginal and Torres Strait Islander Social Survey, Health Survey and the National Drug Strategy Household Survey to address the research aim and objectives—to ensure methodological consistency. The interviews will be transcribed verbatim from electronic recordings. The transcripts will be coded using QSR Nvivo 10 and crosschecked with field notes. QSR Nvivo 10 will be utilised in coding each sentence according to meaning and content, supporting the thematic synthesis. As outlined in Figure 3, the text and codes will contribute to capturing the meaning and content of the interviews and each sentence. This will assist to identify similarities and differences, as abstract and analytical themes emerge, grouping the codes in a rational structure. The interview guide and the research objectives will also be utilised to group the sentences to

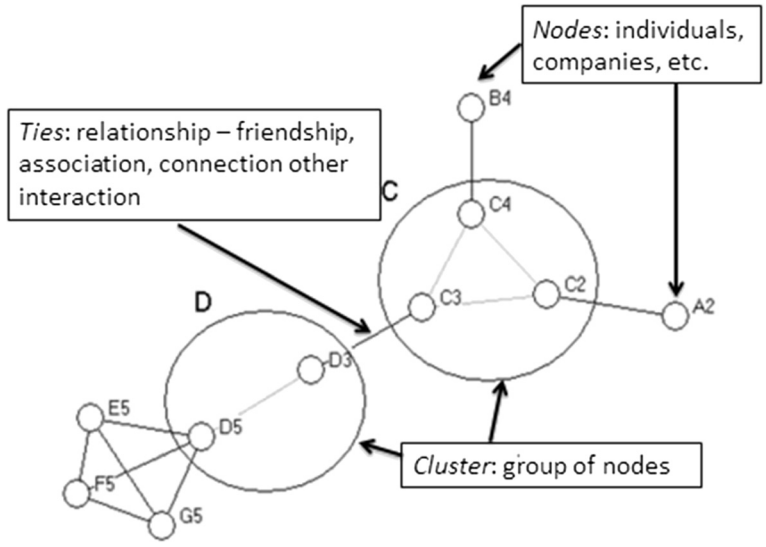

Figure 3 Network infrastructure.

ensure comprehensive analysis. This cyclical process will be repeated until no new themes emerge; adequately describing and explaining the aim and objectives of the research [37,103-106]. As outlined in Figure 4, the use of sentence coding will also assist to synthesize the qualitative research and recognise the concepts from individual interviews [37].

Focus groups

In complementing and expanding the other methods of data collection, the focus group component aims to generate more of a "real world" group dynamic with peers and to gain a combined local perspective from multiple viewpoints. This will help to explore the influence of social networks on smoking beliefs and behaviours and investigate if there is an association between some social factors and being a smoker or non-smoker. The use of focus groups can help generate new thinking and allow for a broader perspective of contextual factors in relation to the influences of tobacco use. As outlined, our research will utilise a number of data sources and analyses to enhance the validity of the prospective study, increasing the likelihood that the findings and interpretations will be credible and dependable [37,38,50,72]. Triangulation will strengthen our research and lead to a more comprehensive understanding of the complexity of tobacco use and tobacco control [37,50,91,107]. Thus, the objectives of the focus group component of the research run parallel to the other components of the research, further investigating and exploring in particular the influence of peers and social norms in relation to smoking behaviours.

Sample size

As with the interview component, the sample size of the focus group component of this study is based on theoretical saturation as previously outlined [37,97,100]. The focus group interviews will include a small group of participants, approximately 6 to 12 people of similar age, similar smoking habits or as deemed socially and culturally appropriate. For example: smokers, ex-smokers, non-smokers, men's groups, 'mums n bubs' and youth groups. The focus group interviews will be approximately an hour in length and held at convenient locations for the

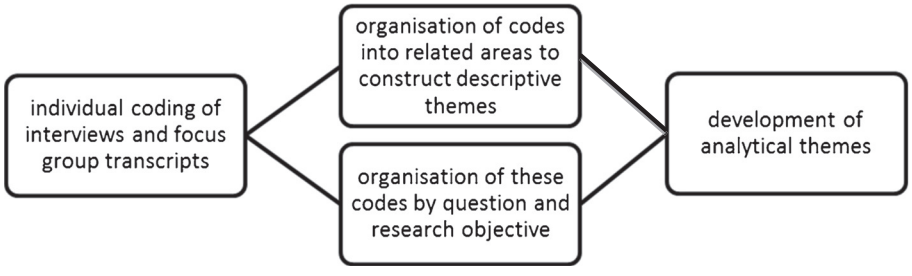

Figure 4 Analysis process of interviews and focus groups.

participants, such as the participant's office, clinic, the university or a nearby location.

Analysis

The analysis of the focus groups will align with the interview analysis, informed by the procedures and principles used in grounded theory to ensure that concepts are not shifted into incongruent situations [100,102]. The focus groups will follow a focus group guide to ensure methodological consistency. In investigating if social networks influence smoking beliefs and behaviours, if ACT tobacco control programs impact on tobacco behaviour and if there is an association between some social factors and being a smoker or non-smoker, we will follow some procedures and principles of grounded theory. Each focus group session will be transcribed verbatim from electronic recordings, with the transcripts coded using QSR Nvivo 10 and crosschecked with field notes. The text and codes will contribute to capturing the meaning and content of the focus groups, assisting to identify similarities and differences, as abstract and analytical themes emerge; grouping the codes in a logical structure. The focus group guide and the research objectives will also be utilised to group sentences and themes [37,103-106].

Existing data collections

A number of existing data collections will also be used in our study. These data collections will assist in triangulation, complementarity and integration of the quantitative and qualitative data [50,78,82,108]. The pre-existing data collections are expected to include de-identified data collected from health organisations, including:

- Talking About the Smokes data—Talking About the Smokes is a national survey modelled on the International Tobaccciso Control Policy Evaluation Project to improve the understanding of smoking and quitting behaviours within the Indigenous Australian community [109]. The Project has been adapted to suit the context of smoking cessation and tobacco control for Indigenous Australians, and includes a data collection site within the ACT region [109];
- PBS items—the PBS is part of the Australian National Medicines Policy and provides affordable access to necessary medicines for Australians [110]. There are a number of nicotine replacement therapy (NRT) items listed on the PBS (NRT items – 3414Q, 5571 F, 5572G, 5573H) to assist smokers with nicotine withdrawals and to help smokers make a quit attempt [110]. The volume of NRT items accessed through the PBS can be monitored by jurisdiction, including within the ACT [110]; and
- Quitline call data—Quitline is a telephone services that aims to offer treatment and provide timely information that will help smokers make a quit attempt [111]. De-identified data could include call volume, call volume by post code and number of quit attempts.

Analysis

Analysis will incorporate descriptive statistics and comparisons between the pre- and post-intervention groups, including usage patterns of relevant PBS items and Quitline call volume. For example, post-intervention comparisons between the pre and post-intervention groups using chi-square and T-tests will be carried out. It would be expected that there would be increased uptake of NRT on the PBS post intervention and increased calls to Quitlines [81,99]. Analysis will include assessment of the means, ranges and rates to identify commonalities and disparities between this existing data collection and the primary data collected through the survey, interviews and focus groups. The available data from Talking About the Smokes will influence what sort of analysis can be undertaken. This will be explored in due course. Computations will be undertaken using SPSS and Microsoft Excel for statistical analysis [83-85].

Ethical review

The project has been informed by and is in compliance with the World Medical Association Declaration of Helsinki, the National Statement on Ethical Conduct in Human Research, Values and Ethics - Guidelines for Ethical Conduct in Aboriginal and Torres Strait Islander Health Research and Guidelines for Ethical Research in Australian Indigenous Studies [112-114]. The project takes into account the sensitivities around sampling Indigenous Australian people aged 12 years of age and older. A key ethical component and integral facet of the study is community engagement. In engaging with the community, we are also partnering with Winnunga Nimmityjah Aboriginal Health Service, a community controlled health organisation and working with other community stakeholders in the area. The research received ethics approval from the University of Canberra Human Research Ethics Committee (Project number 12163) and the ACT Health Human Research Ethics Committee (ETH10.12.232).

Discussion

There is a challenge ahead if we are to achieve the ambitious 'Close the Gap' Campaign for Indigenous Health Equality target, to close the health and life expectancy gaps between Indigenous Australians and non-Indigenous Australians within a generation (2031) [47,115] and to halve the 2009 smoking rate of Indigenous Australian people by 2018 [42]. It is expected that this research will have benefits for the Indigenous Australian health sector

and the community in terms of adding to the evidence for what might influence smoking behaviour and to help inform future tobacco control interventions.

Our understanding of attitudes, behaviours and effective tobacco control and the influence of how social networks influence smoking in Indigenous Australian communities is very limited. Social networks are theorised to significantly influence behaviour change processes. Through this project, we expect to contribute new knowledge about factors influencing tobacco use among the Indigenous Australian community.

Limitations

Whilst the ideal study design would be one that included a randomised 'control' group it is not practical or possible due to resource constraints to run such a study when the intervention is aimed at all Indigenous Australian people living in the ACT. In order to address some of these limitations, we propose using a mixed-methods approach that offers a range of perspectives on a program's processes and outcomes and a greater understanding of the findings.

Pre-test and post-test design are not as robust, but they are widely used and accepted in behavioural research for the purpose of comparing groups and/or measuring change resulting from experimental treatments or interventions.

Conclusions

The importance of people's social context in relation to smoking and our understanding of the influence of social networks for health behaviour change process in the Indigenous Australian population is very limited. This study aims to fill a gap and add to the evidence to help close the health and life expectancy gaps between Indigenous Australians and non-Indigenous Australians [47,115]. The research will increase our understanding of:

- individuals' social networks and their impact on beliefs, attitudes and behaviours in regards to smoking;
- any association between various social factors and being a smoker or non-smoker; and
- the effectiveness of tobacco control programs under the ACT Aboriginal and Torres Strait Islander Tobacco Control Strategy on tobacco behaviours, attitudes and beliefs.

Given the recent commitment to address the high rates of smoking in the Indigenous Australian population through the Close the Gap campaign, the National Tobacco Strategy 2012–2018, the National Partnership Agreement on Closing the Gap in Indigenous Health Outcomes, the National Healthcare Agreement and the ACT Aboriginal and Torres Strait Islander Tobacco Control Strategy 2010–2014 [41], the results of this research could be of interest to a number of stakeholders. These include policy makers, General Practitioners and other health professionals such as Regional Tobacco Coordinators, Tobacco Action Workers, Quitlines, Aboriginal Health Workers, General Practitioners and other Allied health professionals who are engaged with addressing smoking, or should be engaged with addressing smoking, through Indigenous programs and policy initiatives. Furthermore, the results will potentially inform the design of tobacco control programs and policies and may influence the sector's ability to meet the Close the Gap targets and the National Healthcare Agreement goal to halve the 2009 smoking rate of Indigenous Australian people by 2018 [42,47].

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

RM[1] is a PhD Candidate who conceived the study and participated in the design involved in drafting and finalising the manuscript. RD[1] participated in the design of the study, drafting the manuscript and revising it critically for important intellectual providing final approval of the version to be published. TC1 contributed to the design of the study, with particular input on analysis and interpretation of data. TC has been involved in drafting the manuscript and revising it critically for important intellectual content. RL[2] is a Wongaibon man and has been involved in the preliminary discussion around the acquisition of data, contributing in the design of the study and will be involved in the analysis and interpretation of data. RL was also involved in drafting the manuscript and revising it critically for important intellectual content. AVDS[3] contributed in the design of the study and was involved in drafting the manuscript and revising it critically for important intellectual content. All authors read and approved the final manuscript.

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Author details

[1]Centre for Research and Action in Public Health, University of Canberra, University Drive, Canberra, ACT 2606, Australia. [2]Australian Institute of Aboriginal and Torres Strait Islander Studies, Australian National University, GPO Box 553, Canberra, ACT 2601, Australia. [3]Centre for Excellence in Indigenous Tobacco Control, University of Melbourne, 207 Bouverie Street, Melbourne, VIC 3010, Australia.

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2.3 Co-authors' declaration

As co-authors of the paper **Study Protocol—Indigenous Australian Social Networks and the Impact on Smoking Policy and Programs in Australia: Protocol for a Mixed-method Prospective Study**, we confirm that the lead author, Raglan Maddox, made the following significant contributions:

- conception and design of the research proposal;
- gaining of ethical approval to conduct the research;
- conducting the research and data collection;
- analysis and interpretation of data;
- writing the papers and critical appraisal of content;
- drafting, submitting and finalising the manuscript for publication; and
- acting as corresponding author for journal communication and the publication peer-review process.

Rachel Davey

Signed: Rachel Davey Date: 10 February 2015

Tom Cochrane

Signed: T Cochrane Date: 10 February 2015

Joan Corbett

Signed: Joan Corbett Date: 10 February 2015

Ray Lovett

Signed: Date: 10 February 2015

Anke van der Sterren

Signed: Anke van der Sterren Date: 10 February 2015

Chapter 3: Results

3.0 Baseline results overview

This chapter reports findings from The Smoke Ring Study and details key demographic, behavioural and social network characteristics. The baseline surveys (n=204), key informant interviews (n=10) and focus groups (n=40; 3 focus groups) are analysed and described in Appendix vi: The Smoke Ring: preliminary survey results and the peer-reviewed paper 'The Smoke Ring—Factors Influencing Smoking among Aboriginal and Torres Strait Islander People in the Australian Capital Territory: A Mixed Method Study' [91]. This paper presents the results in four sections:

1. participant characteristics;
2. predictive model was used to determine factors significantly associated with smoking;
3. network analysis; and
4. thematic analysis of the interviews and focus groups [91].

'The Smoke Ring—preliminary results' (at Appendix vi: The Smoke Ring: preliminary survey results) was prepared and used to inform the partnering organisations, the community and the funding body of the preliminary survey findings on Aboriginal and Torres Strait Islander tobacco behaviours, beliefs and attitudes. The report provided an overview of smoking behaviours among the Aboriginal and Torres Strait Islander population in the ACT region in 2012–13 and informed communication materials that were developed by Winnunga Nimmityjah Aboriginal Health Service.

Key findings

At baseline, there was a significantly higher smoking rate among the Aboriginal and Torres Strait Islander community (36.4%; 95% CI, 27.8–44.9) when compared with the general population. Preliminary analysis included using multiple logistic regression models to determine factors significantly associated with smoking. Two independent variables made a unique, statistically significant contribution to the model:

- completing year 12 or equivalent; and
- the proportion of housemates that smoke [91].

In describing and characterising the social network, the average distance between connected smokers and non-smokers was 2.8 and 2.7 ties or relationships respectively (provided that participants could reach one another). This partially highlights the differences among smoking and non-smoking groups. It suggests that smoking and non-smoking networks were very cohesive independently, with somewhat limited crossover between smoking and non-smoking groups. The

results indicate a substantially more cohesive network among the smoking and non-smoking networks when compared with the total network. The total participant-nominated network had a mean of 11.0 steps or relationships away from everyone else in the network. This result was expected because of the larger network size. The baseline data highlighted the complexity of why people smoke and the important influence of education and social networks in tobacco use. The data highlighted the need to tailor tobacco control interventions—by both preventing uptake and providing cessation programs and policies—to effectively and efficiently utilise social network characteristics to address tobacco use [91].

3.1 Published work—The Smoke Ring—Factors Influencing Smoking among Aboriginal and Torres Strait Islander People in the Australian Capital Territory: A Mixed Method Study, *International Journal of Health, Wellbeing and Society*

Raglan Maddox, Rachel Davey, Ray Lovett, Tom Cochrane, Anke van der Sterren and Joan Corbett. The Smoke Ring—Factors Influencing Smoking Among Aboriginal and Torres Strait Islander People in the Australian Capital Territory: A Mixed Method Study. *International Journal of Health, Wellness and Society.* [In press]

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3.1 Published work

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This section is available as:

Maddox, R., Davey, R., Lovett, R., Cochrane, T. Van der Sterren, A., Corbett, J. (2015) The Smoke Ring - Factors Influencing Smoking among Aboriginal and Torres Strait Islander People in the Australian Capital Territory: A Mixed Method Study. *International Journal of Health, Wellness and Society*. 5(2): 55–68.

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UC Online subscribed content	n/a
DOI	n/a

Abstract

To help inform tobacco control targeting Aboriginal and Torres Strait Islander people (Indigenous Australians) in the Australian Capital Territory (ACT), the research explored smoking behaviours and assessed: if there is an association between social and cultural factors and smoking behaviours; and if social networks influence smoking behaviours?

Methodology

A mixed-method approach, using a survey, key informant interviews and focus groups was conducted to explore and assess factors that predict and influence smoking behaviours. This included age, education, employment and cultural and social network characteristics such as the proportion of friends and housemates that smoke.

Results

The smoking rate was 36.4%, significantly higher than the general Australian population. Logistic regression was performed to examine predictors of smoking. The full model containing all predictors was statistically significant, $\chi 2$ (5) = 28.491, $p < .001$. Two independent variables made a unique, statistically significant contribution to the model: completing Year 12 in Australia (equivalent to High School in the United States of America); and the proportion of housemates that smoke.

Social network analysis indicated that the total nominated network topography included branches within the network that were mostly inaccessible through the recognised ties. The nominated social network had a mean of 11.0 steps away from everyone else in the network, provided they could reach one another. In contrast, the average distance between reachable smokers and non-smokers was 2.8 and 2.7 respectively. Results indicate a more cohesive network among the smoking and non-smoking networks when compared to the total network.

Conclusions and Implications

The complexity of smoking and the importance of education and social networks in tobacco use, support the need to tailor tobacco control to effectively and efficiently utilize social network characteristics among Aboriginal and Torres Strait Islander people in the ACT.

3.2 Co-authors' declaration

As co-authors of the paper **The Smoke Ring—Factors Influencing Smoking Among Aboriginal and Torres Strait Islander People in the Australian Capital Territory: A Mixed Method Study**, we confirm that the lead author, Raglan Maddox, made the following significant contributions as the lead author:

- conception and design of the research proposal;
- gaining of ethical approval to conduct the research;
- conducting the research and data collection;
- analysis and interpretation of data;
- writing the papers and critical appraisal of content;
- drafting, submitting and finalising the manuscript for publication; and
- acting as corresponding author for journal communication and the publication peer-review process.

Rachel Davey

Signed: Rachel Davey Date: 10 February 2015

Tom Cochrane

Signed: T Cochrane Date: 10 February 2015

Joan Corbett

Signed: Joan Corbett Date: 10 February 2015

Ray Lovett

Signed: Ray Lovett Date: 10 February 2015

Anke van der Sterren

Signed: Anke van der Sterren Date: 10 February 2015

3.3 Follow-up results

This section reports the 2013–14 follow-up findings from the Smoke Ring Study, as reported in 'The Smoke Ring—Social Network Analysis of the ACT Aboriginal and Torres Strait Islander Community and the Impact on Smoking: A Longitudinal Mixed Method Study'. 'The Smoke Ring—Social Network Analysis of the ACT Aboriginal and Torres Strait Islander Community and the Impact on Smoking: A Longitudinal Mixed Method Study' explored whether Aboriginal and Torres Strait Islander social networks influenced smoking behaviours.

While participants may not be representative of the ACT Aboriginal and Torres Strait Islander population, a broad cross-section of the Aboriginal and Torres Strait Islander community in the region, covering a wide range of smoking behaviours, participated in the longitudinal study.

Social network analysis was applied to the data and mapping was undertaken. The data indicated that the total nominated network was complicated and dynamic, shifting over time. Findings suggested some differences among smoking and non-smoking groups, with limited relationships crossing over between the two groups. The paper hypothesised that:

1. a member of a social network who smokes is more likely to continue smoking if they have a best friend that smokes.
2. a member of a social network who smokes is more likely to continue smoking if they have friends that smoke.
3. a member of a social network who smokes is more likely to continue to be a smoker if they have household members that smoke.

The Smoke Ring Study results confirmed the hypothesis that exposure to smokers in one's social network would influence smoking behaviour over time. The following paper 'The Smoke Ring—Social Network Analysis of the ACT Aboriginal and Torres Strait Islander Community and the Impact on Smoking: A Longitudinal Mixed Method Study', reports the mixed-method longitudinal study findings that were obtained using social network analysis to examine and map local Aboriginal and Torres Strait Islander social networks and smoking patterns. The complexity of why participants smoke was evident from the findings, as was the cohesive nature of both the smoking and non-smoking social networks. These findings provide insight into the nature of social networks and smoking, highlighting the need to focus efforts on preventing uptake as well as encouraging and supporting attempts to quit smoking, and remain smoke free.

The findings indicated that exposure to smokers in a person's social network strongly influenced that person's smoking behaviour. A best friend who smoked at follow up was associated with higher rates of current smoking; and/or the presence of friends who smoked being associated with higher rates of smoking. This shifted from the proportion of house members that smoked [91] at baseline. This aligns with the systematic review findings which suggested that social influences are complex and dynamic. This research suggested that at follow up best friends provided the greatest social network influence on participants' smoking, but the influence of social networks may interact with common environmental factors such as broader tobacco control policies. These findings imply that social networks can promote tobacco use but, importantly, they also help to facilitate smoking cessation and prevent smoking uptake.

The findings highlighted the complexity of smoking behaviours as well as the cohesive nature of both the smoking and non-smoking social networks. There was considerable similarity between the smoking behaviours in a participant's social network and the smoking behaviour of that participant, suggesting some level of dissimilarity in smoking and non-smoking participants' social networks. The Smoke Ring Study provided insight into the nature of social networks and smoking, including the potential for social network interventions. There is value in considering the individual and social context of tobacco use: the decision to not take up or to quit smoking may not be an individual decision exclusively but may reflect the influence of an individual's social network and community norms [92, 118].

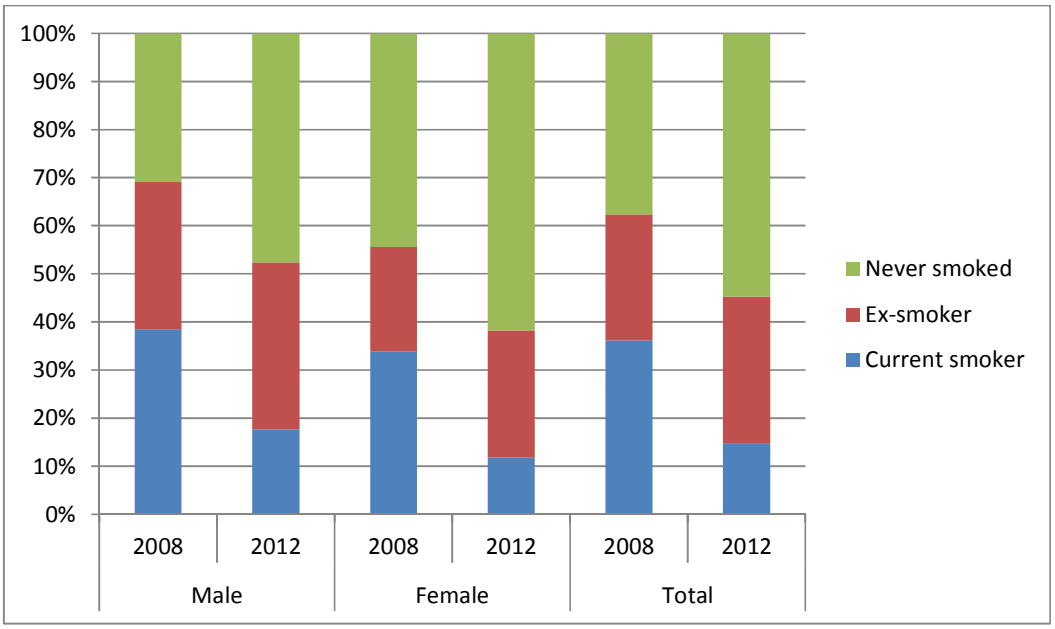
Through Action Area 1—Development and implementation of a multi-component cessation and reduction program based on family, social and workplace networks (Appendix i: ACT Aboriginal and Torres Strait Islander Tobacco Control Strategy 2010/11–2013/14), the ACT Strategy aimed to improve the health of the Aboriginal and Torres Strait Islander community. The ACT Strategy aimed to:

1. reduce rates of smoking and increase quit attempts (assisted and unassisted);
2. prevent people from taking up smoking;
3. increase levels of understanding and awareness of health issues surrounding smoking; and
4. increase access to assisted tobacco control initiatives.

Results indicated that the ACT Strategy had progressed in addressing these aims [2]. Firstly, there was a reduction in smoking among the Aboriginal and Torres Strait Islander people in the ACT. Analysis of results from re-contacted Smoke Ring Study participants at follow-up found a decrease in smoking prevalence from 31.0% to 23.9% (p=0.179), although this was not statically significant. However, as outlined in Figure 3, there was a statistically significant 7.8 percentage point decrease

identified in the ACT component of the National Aboriginal and Torres Strait Islander Social Survey 2008 (pre-Strategy implementation) and the 2012–13 Aboriginal and Torres Strait Islander Health Survey (post-Strategy implementation) among those aged 15 years and over (from 36.2% to 28.4%). While the figures are not directly comparable, it should be acknowledged for the purposes of comparison that the current number of daily smokers aged 18 years and over decreased by 2.3 percentage points among ACT residents between 2007–08 and 2011–12 (15.7% to 13.4%) [119]. The comparisons provide useful context for within-state variation and to understand how effective tobacco control programs and policy are in addressing tobacco use among different population groups [120]. The results shown in Figure 3 suggest that tobacco control measures targeting Aboriginal and Torres Strait Islander people had gained some traction with the target population.

Figure 3: Aboriginal and Torres Strait Islander people aged 15 years and over—smoking status in the ACT by sex, 2008 to 2012



Source: [21, 121]

Furthermore, there were encouraging signs in regard to the ACT Strategy's aim of preventing people taking up smoking. Figure 3 shows that there was a statistically significant increase in never-smokers in the ACT component of the Australian Bureau of Statistics' National Aboriginal and Torres Strait Islander Health Survey, from 37.7% to 54.8%, among Aboriginal and Torres Strait Islander people aged 15 years and over in 2008 and 2012 respectively [21, 121].

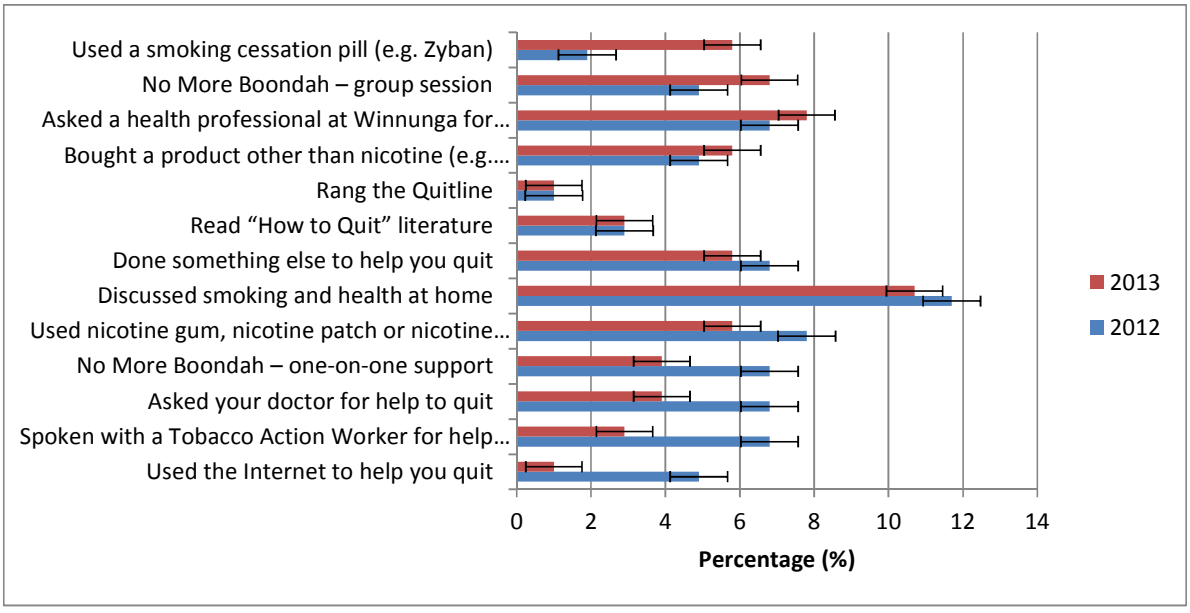
The Smoke Ring Study identified a reduction in the number of participants between baseline and follow-up who reported the incorrect perception that 'some cigarette brands are more harmful than others'. Furthermore, in alignment with health promotion and education components of the ACT

Strategy, a range of reasons resonated with participants as motivation to try giving up, cutting down or not smoking at all. Main reasons for giving up, cutting down or not smoking at all included effects on health and fitness, cost and health warnings they received through social marketing at both baseline and follow-up. In addition to these motivating factors, participants reported a range of access points for health and medical advice. Participants identified the following access points as important:

- brief interventions by GPs and health professionals;
- individual counselling/discussion with health service providers;
- accessing books, videos/DVDs and websites;
- single classes or seminars or series of classes or seminars;
- discussion/advice from community Elders or traditional medicine women; and
- series of classes or seminars.

During the previous 12 months, participants had undertaken various activities under Action Area 1 of the ACT Strategy to help them to make an attempt to quit. These activities are outlined in Figure 4. However, the results were mixed—given the limited awareness of tobacco control and cessation activities, there was potential for improvement due to generally limited awareness of tobacco control and cessation initiatives and low participation rates.

Figure 4: Activities undertaken by participants to assist in making a quit attempt during the previous 12 months, 2012 and 2013



3.4 Publication—The Smoke Ring—Social Network Analysis of the ACT Aboriginal and Torres Strait Islander Community and the Impact on Smoking: A Longitudinal Mixed Method Study, *Public Health Research & Practice*

Raglan Maddox, Rachel Davey, Tom Cochrane, Ray Lovett and Anke van der Sterren. The Smoke Ring: Social Network Analysis of the ACT Aboriginal and Torres Strait Islander Community and the Impact on Smoking: A Longitudinal Mixed Method Study. *Public Health Research & Practice. [Under review]*

The Smoke Ring: Social network analysis of the ACT Aboriginal and Torres Strait Islander community and the impact on smoking – a longitudinal mixed method study

Raglan Maddox[a,d], Rachel Davey[a], Tom Cochrane[a], Ray Lovett[b], Anke van der Sterren[c],

[a] Centre for Research and Action in Public Health, University of Canberra, University Drive, Canberra, ACT 2606 Australia

[b] Australian Institute of Aboriginal and Torres Strait Islander Studies, Australian National University, GPO Box 553, Canberra, ACT 2601 Australia

[c] Centre for Health & Society, Melbourne School of Population and Global Health, University of Melbourne, 207 Bouverie Street, Melbourne, Victoria 3010 Australia

[d] Corresponding author: Raglan.Maddox@canberra.edu.au

Email addresses:

RM: Raglan.Maddox@canberra.edu.au

RD: Rachel.Davey@canberra.edu.au

TC: Tom.Cochrane@canberra.edu.au

RL: Ray.Lovett@aiatsis.gov.au

AVDS: anke@atoda.org.au

Key words: Smoking; Influence; Selection; Longitudinal; Social network; Health behaviour; Aboriginal; Torres Strait Islander; Indigenous

Abstract

Background

Smoking is the single most preventable cause of morbidity and mortality within Australia. While there have been reductions in smoking, Aboriginal and Torres Strait Islander people are twice as likely as non-Indigenous people to be daily smokers. This Smoke Ring research explores Aboriginal and Torres Strait Islander smoking behaviours in the Australian Capital Territory (ACT) region by examining social networks and smoking behaviours.

Methods

Quantitative and qualitative data from the 2012 baseline and 12-month follow up survey (2013), interviews and focus groups were analysed for network and statistical analysis of change overtime. The interviews and focus groups applied principles of grounded theory to enable a more detailed understanding of smoking behaviours.

Results

There was a statically significant difference between smokers and non-smokers who reported the presence of their best friend as a smoker at follow up. The presence of a best friend who smoked among the smoking network was 42.9% and 44.4% at baseline and follow up respectively, and 21.1% and 22.7% among the non-smoking network.

At baseline, 52.0% of smokers nominated at least one friend who smoked in comparison to 31.6% of non-smokers. In 2013, 63.6% of smokers nominated at least one friend who smoked in comparison to 36.4% of non-smokers. This indicated some polarisation among smokers and non-smokers.

The qualitative analysis identified the following themes in unpacking the polarisation among smokers and non-smokers: social normalisation of smoking; tobacco being convenient and easy to obtain; role modelling; and tobacco use as a way to facilitate social interactions.

Conclusions

To our knowledge, the Smoke Ring is the first mixed-method longitudinal study to utilise social network analysis to examine the Aboriginal and Torres Strait Islander social networks in relation to smoking. The complexity of smoking behaviour among the Aboriginal and Torres Strait Islander community is evident, as is the cohesive and somewhat polarised nature of the smoking and non-smoking social networks. This study provides insight into the nuanced nature of social networks and smoking.

Policy, programs and service implications include the need to focus efforts within Aboriginal and Torres Strait Islander smoking networks to reduce smoking rates and within the non-smoking social networks to limit uptake of tobacco smoking.

Background

Tobacco use is the single most preventable cause of morbidity and premature mortality within Australia with smoking responsible for one in five deaths among Aboriginal and Torres Strait Islander people. While tobacco control policies have resulted in significant reductions in tobacco use , there has not been an equal reduction across all population groups. There are significantly higher rates of smoking among Aboriginal and Torres Strait Islander people when compared to the total population in the Australian Capital Territory (ACT) and nationally (2-5).

A number of factors that influence tobacco use have been identified (6-11). Studies indicated that social network structures, positions and relationships can influence tobacco use (initiating, maintaining and ceasing). For example, evidence suggests that the influence of parents' smoking on smoking initiation was stable and enduring (10, 11). Smoking cessation can also be difficult due to multiple factors that assist to maintain smoking behaviours . These include: environmental cues (e.g., peer smoking); physical addiction (e.g. effects of nicotine on the brain); and psychological factors (e.g. learned habits) .

Environmental cues such as peer smoking exerted by individuals, referred to as 'peer effects', 'contagion effects' or 'induction' through relationships, ties, association and social network structures can impact on smoking behaviours (14, 15).

Social networks

A social network is a structure made up of nodes (i.e. – individuals) that are connected together through relationships (i.e. – friends, household members, family, etc.) . Healthier norms and behaviours among social networks have been hypothesised to reduce the likelihood of smoking, while networks dominated by people who engage with risky health behaviours, such as smoking can contribute to higher rates of tobacco use (17-19). Such social structures can be useful to develop, tailor and implement public health programs, including tobacco control programs (20-22).

Structural aspects of social networks are likely to influence smoking behaviour, as clusters of smokers tend to quit together (23). Evidence suggests in relation to tobacco use that there is some influence of best friends, peer groups and affiliation; an indirect protective effect of positive parenting practices; peer group homogeneity; and support for socialization and selection effects . There is value in exploring tobacco control social network interventions to

account for peer selection, influence and social network dynamics (20, 25-74) and utilise the social multiplier effect (i.e. - increased efforts or expenditure in cessation and smoke free behaviours can be multiplied throughout ones network) .

There are various psychosocial and social-structural factors influencing tobacco use (76). Social networks can be homogeneous with regard to socio-demographic characteristics, intrapersonal factors and behaviours, such as smoking; with similarity inducing homophily (77). Homophily is the principle that interaction between similar individuals occur more frequently than among dissimilar individuals (77). This is related to the process of peer socialisation, whereby people take on norms, values and behaviours of the 'group' in order to be accepted (18, 19).

The diffusion of innovations theory and Bandura's Social Learning Theory (78, 79) are prominent behavioural theories that help explain the influence of social networks. These theories explain the steps and processes of transferring new ideas and behaviours within and between communities, partially due to humans' tendencies to observe, model and imitate the behaviour (78-80). Therefore, people who observe tobacco use in their social network, such as family, friends and household members, learn to use tobacco and view tobacco use as a normative behaviour (81, 82). As a result, social network characteristics are crucial for starting, maintaining and ceasing tobacco use .

Aim

Based on previous research and the principles detailed by Maddox et al. (84), we aim to assess how participants egocentric social networks would influence smoking behaviours. To achieve this, it was hypothesised that:

- h^1 a member of a social network who smokes is more likely to continue smoking if they have a best friend that smokes.
- h^2 a member of a social network who smokes is more likely to continue smoking if they have friends that smoke.
- h^3 a member of a social network who smokes is more likely to continue to be a smoker if they have household members that smoke.

Methods

A mixed-method approach was used as detailed in the published research protocol . The quantitative and qualitative data analysed in this paper came from the 2012–baseline and 12 month follow up Smoke Ring surveys, interviews and focus groups. Interviews and focus groups were undertaken following preliminary analysis of the survey, enabling a more in-depth understanding of tobacco use. All participants were Aboriginal and Torres Strait Islander people aged 12 years and over residing in the ACT region. This reflects the young uptake of tobacco use among Aboriginal and Torres Strait Islander people, and higher smoking rates across all age groups (2-5). It is acknowledged that while the egocentric survey participants were Aboriginal and Torres Strait Islander people, their social networks were not restricted to Aboriginal and Torres Strait Islander people. This enabled analysis of a more comprehensive and realistic egocentric social network.

Recruitment and data collection

Our primary points of recruitment were the ACT Indigenous Network, an Aboriginal Community Controlled Health Organisation, an Aboriginal Community Controlled Youth Centre, local community events, and a number of other Indigenous Australian organisations and their networks (84, 85). Recruitment for the surveys, interviews and focus groups were undertaken independently and sequentially. The use of a survey name generator also seeks participants' friends, family and household members. However, this may not be conducive for participants' to name all of their friends, peers and household members in their entirety

The egocentric baseline survey participants (n=204) were recruited in November 2012 using a purposive sampling framework. One hundred and three participants were recontacted approximately one year later (2013), giving a follow-up survey rate of 50.5%. Participants lost to follow up were unable to be contacted, due to changes in email addresses, physical addresses and phone numbers. This may reflect the mobility and somewhat transient nature of the Aboriginal and Torres Strait Islander population (86).

Analysis

Quantitative analysis: statistical and social network analysis

All quantitative Data was entered into SPSS Version 21.0, UCINET Version 6, NetDraw Version 2.089, Microsoft Excel 2010 and NodeXL for social network and statistical analysis to characterise and describe the results.

Participant analysis

Analyses examined the differences between respondents at baseline and follow up (repeated measures). The repeated measures analysis used McNemar's Test, chi square (χ^2) and Wilcoxon Signed Rank Test (categorical distributions) for categorical variables, and independent samples t-test for continuous variables (84).

Multiple logistic regression analysis was used to assess associations between smoking (outcome variable) and influences on smoking behaviour (predictors). In developing the model, predictors were identified based on theory and the qualitative data analysis, prior to testing for bivariate interactions. We included age, sex, education (completion of year 12 or equivalent), household income, smoking status of friends and household members as baseline predictors.

The analysis also included separate cross-sectional analyses examining smoking status at baseline and follow-up. This included two analyses, one at baseline (cross-sectional), the other at follow-up (cross-sectional). In building each model, predictors were entered one by one starting with the predictor variables with the strongest bivariate association and additional variables retained if they made a significant improvement in the fit to the data.

Social network analysis

We analysed data from respondents recontacted at follow-up (n=103), i.e. - the same cohort of participants at baseline and follow up. Social network analysis was then used to assess the influence of individuals' social networks longitudinally in relation to smoking behaviours (84). This included examining smoking and non-smoking participant subgroups; as well as ties; Average Geodesic Distance (AGD); Graph Density; In-Degree; Out-Degree and other network measures outlined in *Table 3*. Social network analysis was used to characterise and investigate network structures, through structural analysis and statistical analysis (16, 87).

To examine the clustering of smoking, we compared the observed egocentric network of smokers and non-smokers at baseline and follow up (84, 89). If clustering occurred, then participants who smoked would be more likely to have a contact who also smoked (23, 75). These network metrics as well as network maps were used to provide a descriptive and visual presentation of the networks, demonstrating differences between the baseline and follow-up, noting the isolates were removed from figures for visual presentation.

Qualitative analysis: key informant interviews and focus groups

As detailed in the published research protocol , the key informant interviews and focus groups followed and complemented the statistical and social network analysis. Participants answered a number of open ended questions, for example, 'why do people use tobacco?' This enabled a more detailed and enriched understanding of the influence of social networks and tobacco use. We collected in-depth qualitative data on the influence of social networks, specifically family, household members and peers . This approach used applied thematic analysis (23) with the research objectives used to group the sentences and ensure comprehensive analysis. This cyclical process was repeated until theoretical saturation, where no new themes emerged to adequately abstract, describe and explain the aim and objectives of the research (85, 90).

Triangulation

The quantitative and qualitative data independently addressed the aim and objectives, and triangulated findings contributed to a more comprehensive understanding of tobacco use and social networks among the Aboriginal and Torres Strait Islander community in the ACT region (84, 91).

Ethics

The Smoke Ring was informed and complied with the: World Medical Association Declaration of Helsinki; and the National Statement on Ethical Conduct in Human Research, Values and Ethics - Guidelines for Ethical Conduct in Aboriginal and Torres Strait Islander Health Research and Guidelines for Ethical Research in Australian Indigenous Studies (92, 93). The research received ethics approval from the ACT Health Human Research Ethics Committee (ETH10.12.232) and the University of Canberra Human Research Ethics Committee (Project number 12163).

Results

Participant analysis

As presented in *Table 1*, participants included a broad cross section of the Aboriginal and Torres Strait Islander community in the ACT region, covering smokers (n=74 baseline; n=29 follow up) and non-smokers (n=130 baseline; n=74 follow up) with a range of experiences and smoking histories. Analyses of smoking status, sex, age, education and household income indicated that there were no significant differences between the baseline (*n*=204) and followed-up sample (*n*=103). However, there was a tendency for more participants who completed the follow-up survey to be women.

Table 1 Study participants, baseline and follow up

	Baseline 2012	**Follow up 2013**	
			McNemar's χ^2
Participants (*n*)	204	103	50.5% follow up rate
Smokers (%)	36.4	28.1	p=0.824
Men (%)	34.3	25.7	p=0.307
Women (%)	65.7	74.3	
Household size range (person/s)	1 – 7	1 – 9	
Mean household size (persons)	3.9 (SD=2.4)	3.8 (SD=2.6)	p=0.721
Completed Year 12 or equivalent (%)	53	48	p=0.511
			Wilcoxon Signed Rank Test
Age			z=0.442, p=0.659 very small effect size (r = 0.022)
≤ 17 years (%)	7.9	9.1	
18-29 years (%)	25.7	29.5	
30-45 years (%)	31.7	34.1	
≥ 46 and over years (%)	34.7	27.3	
Income			z=1.874, p=0.061 small effect size (r = 0.142)
Nil or negative income	0.0	0.0	
$1-$20,799 per annum or $1-$299 per week	46.4	53.8	
$20,800 - $51,999 per annum or $400-$800 per week	35.7	36.3	

$52,000 – $103,999 per annum or $1,000-$1,999 per week	10.7	3.3	
$104,000 or more $2,000 per week or more	7.1	6.6	

Risk and protective factors associated with tobacco use

Table 2 presents the results of the direct logistic regression assessing the impact of six factors on the likelihood that participants were smoking at follow-up: age; sex; education (completed year 12 or equivalent); household income; lives with a smoker; and a best friend who smokes. The full model containing all predictors was statistically significant, χ^2 (6, N=53) =18.4, p=0.005, indicating that the model was able to distinguish between participants who smoked and those who did not smoke. The model explained between 29.4% (Cox and Snell R square) and 44.7% (Nagelkerke R squared) of the variance in smoking status, and correctly classified 79.2% of smokers. As shown in *Table 2*, two of the independent variables (completing Year 12 or equivalent; and best friend who smokes) made a statistically significant contribution to the model, in that not completing Year 12, and having a best friend that smokes were significant predictors of participant smoking. Inversely, the strongest protective factor against smoking was completing Year 12, with an Odds Ratio (OR) of 0.11 (95% CI, 0.02–0.67). Having a best friend that smoked was a strong predictor of smoking, with an OR=16.14 (95% CI, 2.11–123.75).

Table 2 - Logistic regression predicting the likelihood of smoking at follow up

Variables in the Equation								
	B	**S.E.**	**Wald**	**df**	**Sig.**	**Exp(B)**	**95% C.I.for EXP(B)**	
							Lower	**Upper**
Age	-0.02	0.03	0.74	1	0.40	0.97	0.91	1.04
Sex	-0.32	0.89	0.13	1	0.71	0.72	0.13	4.13
Education (Year 12 or equivalent)*	-2.20	0.92	5.74	1	0.02	0.11	0.02	0.67
Household Income	1.61	0.97	2.76	1	0.10	5.01	0.75	33.63
Lives with smoker	-1.10	0.99	1.22	1	0.27	0.33	0.05	2.34
Best friend smokes*	2.78	1.04	7.16	1	0.01	16.14	2.11	123.75
Constant	-0.41	1.57	0.07	1	0.79	0.66		

*Statistically significant

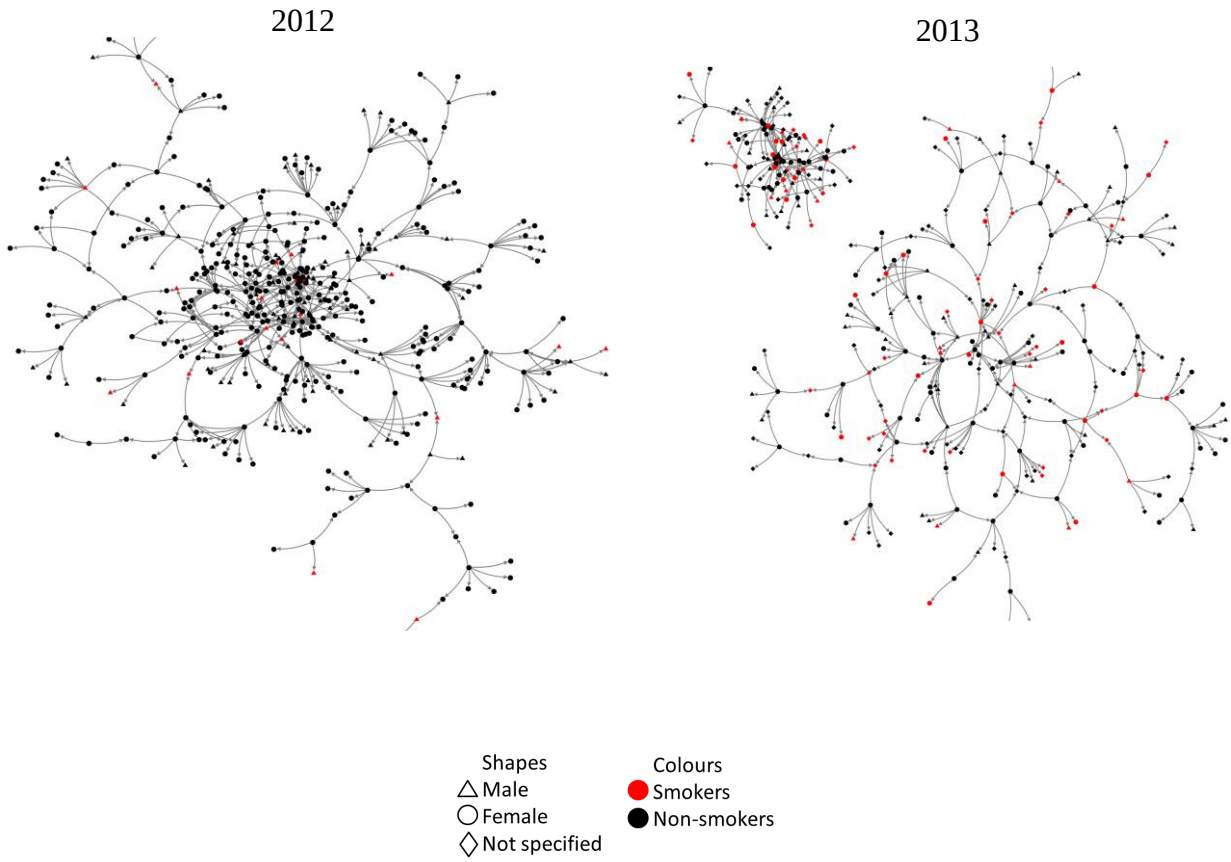
Social network analysis of the data from recontacted participants demonstrated that the total nominated network topography was complex, decreasing from 464 people, and 541 ties at baseline to 369 people at follow-up with 371 ties. The network divided into two groups and numerous people were inaccessible through recognised ties. The variations in network structure were likely due to differences in household members and friendship groups. *Table 3* displays measures of network structure assessed at baseline and follow-up, which are illustrated in *Figure 1*. When we investigated the network by participants' smoking status—participant smoking networks and non-smoking networks—the nominated smoking participants' network consisted of 125 people and 136 ties at baseline; and 90 people and 78 ties at follow-up. The non-smoking participant network consisted of 362 people and 404 ties; and 303 people and 293 ties at baseline and follow-up respectively.

In social network analysis, the AGD is an indicator of network cohesion (16). The smaller the AGD, the more cohesive the network . In assessing the connectedness of the social network outlined in *Table 3*, the AGD of the total nominated network in 2012 was 8.21 steps and 8.03 steps at follow-up. However, the AGD for the nominated smoking and non-smoking networks were 2.24 and 4.38 steps, and 7.62 and 10.45 steps respectively.

Table 3 - Social network measures by smoking status, 2012 and 2013

	Smokers		**Non-smokers**		**Total**	
	2012	**2013**	**2012**	**2013**	**2012**	**2013**
Nodes (*n*)	125	90	362	303	464	369
Unique ties	101	78	319	293	421	371
Average Geodesic Distance (AGD)	2.24	4.38	7.62	10.45	8.21	8.03
Graph Density	0.01	0.01	0.00	0.00	0.00	0.00

Figure 1: Nominated network by smoking status and sex, 2012 and 2013



To assess if participants' networks influenced smoking behaviours, we compared the observed participant network of smokers and non-smokers at baseline and follow up as detailed in *Table 4* and illustrated in *Figure 2* and *3.* If social networks influence smoking behaviours, we would expect the participant to share similar smoking behaviours to their social network (84, 89). The presence of a best friend that smoked increased across the smoking network (42.9% to 44.4%), non-smoking network (21.1% to 22.7%) and the complete network (25.6% to 30.7%) between baseline and follow-up.

At baseline, 52% of smokers nominated at least one friend that smoked in comparison to 31.6% of non-smokers (OR=2.3; 95% CI, 0.90-6.15). Noting this is not a significant difference. This increased at follow-up to 63.6% and 36.4% (OR=3.1; 95% CI, 1.12-8.35) for smokers and non-smokers respectively. This indicated some polarisation among smokers and non-smokers. In addition, the mean number of smokers among the participant's five best friends declined between baseline and follow-up among smokers (3.22 to 2.38), among non-

smokers from 2.38 to 2.02 and overall from 3.21 to 2.11. The mean proportion of all friends that smoke decreased from 46.5% to 32.1% among smokers, from 32.1% to 29.9% among non-smokers and from 33.5% to 30.4% among all participants.

The nominated household members that were reported to smoke increased among smokers from 40% to 50%. Among non-smokers, the household members that were reported to smoke remained stable at 43.9%. Overall, there was an increase between data collection points of the household members identified as smokers from 42.7% to 45.5%. Just under half of the non-smoking participants (49.1%) lived with a smoker compared to 52% of smokers at baseline, and 50% of smokers and non-smokers lived with a smoker in 2013.

Table 4 - Exposure to smokers within participants' nominated network, by smoking status, 2012 and 2013

	Smokers		**Non-smokers**		**Total**	
Year	**2012 (n=125)**	**2013 (n=90)**	**2012 (n=362)**	**2013 (n=303)**	**2012 (n=464)**	**2013 (n=369)**
Nominated friends that smokes (%)	52	63.6	31.6	36.4	**37.8**	**43.2**
Best friend smokes (%)	42.9	44.4	21.1	22.7	**25.6**	**30.7**
Mean number of five best friends that smoke	3.2	2.4	2.4	2	**3.2**	**2.1**
Mean proportion of friends that smoke (%)	46.5	32.1	29.9	29.9	**33.5**	**30.4**
Proportion of housemates that smoke (%)	40	50	43.9	43.9	**42.7**	**45.5**
Lives with a smoker	52.0	50	49.1	50	**50.0**	**50.0**

Figure 2: Smoking participant network by smoking status and sex, 2012 and 2013

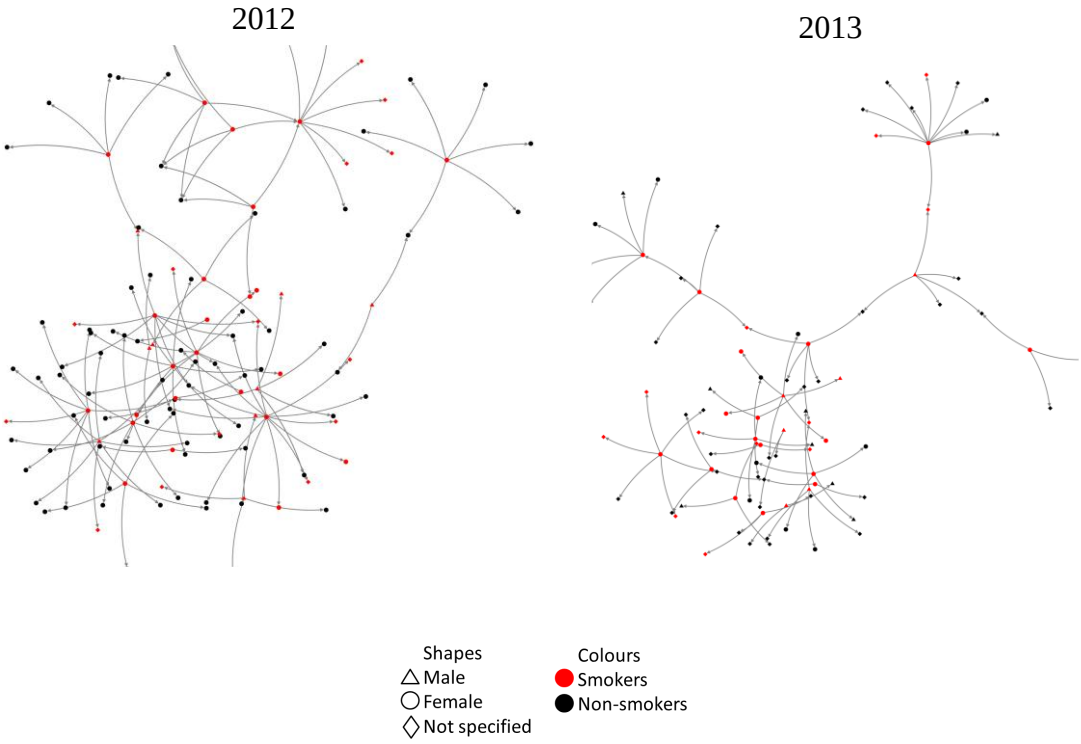
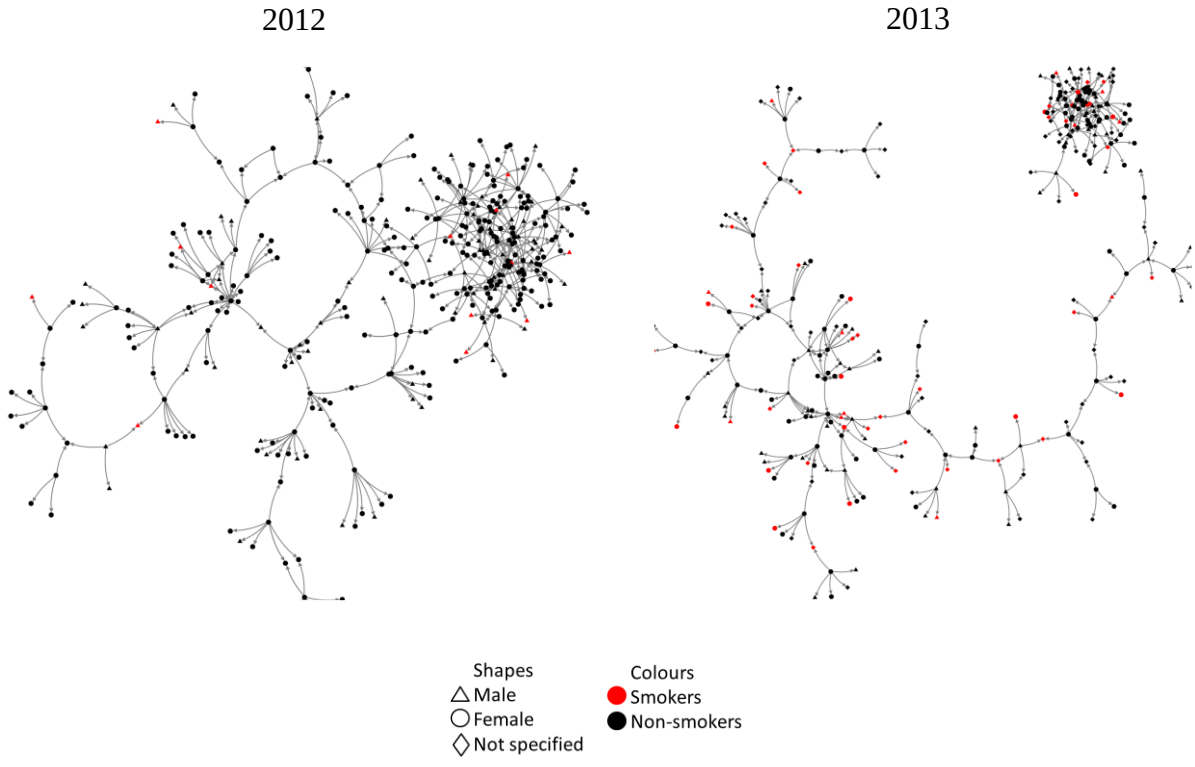


Figure 3: Non-smoking participant network by smoking status and sex, 2012 and 2013



Qualitative results

The majority of key informant and focus group participants were smokers as outlined in *Table 5*, with participants unanimous that social networks influenced tobacco use. *Table 6* presents the participant identified themes and exemplars in relation to how and why social networks influence tobacco use: social normalisation; access and convenience; role modelling; and social interactions. One focus group explained that while making a quit attempt there was a 'lack of collective commitment' to reducing tobacco use or being smoke free, as friends, family and community members would continue to smoke in the home. Participants also outlined that social networks could have the opposite effect with several participants outlining that exposure to tobacco users within their networks had 'turned them off tobacco use'.

Table 5: Sample characteristics for key informant interviews and focus groups

	Key informant interviews	**Focus groups participants**
Participants (*n*)	9	30 (3 focus groups)
Smokers (%)	55	80
Men (%)	45	50
Women (%)	55	50

Table 6 - Focus group and interviews themes

Theme	**Narratives (Exemplars)**
Social normalisation	*I mean, if people around you are smoking whether they are the people in the house, friends, family, then that's difficult for somebody to try and quit, um, if they've got that access to, um getting cigarettes but also that environment to um, being around other smokers while they're trying to be smoke free.*
Social interactions	*Also like if you're visiting family and that and they're smokers, um, because there's that sort of social connection attached to smoking as well. Sitting around with family having a smoke, you know. If somebody is trying to quit and the mob's there together having fun and they're smoking then that makes it really difficult as well.*
Social interactions	*…family is a huge influence, as is friends. So similar thing again, that social aspect and, um, in addition to that as well as family, you know getting together if you're having a drink and you're all together um, and, um, you know people are smoking and drinking that can often be difficult too…*
Access and convenience	*…if somebody is trying to quit smoking and they're living in a household where somebody else smokes, and it does make it really difficult because they've got that access to cigarettes*

Role models	*…I think it sets a role model for a start, and I, and I know, don't know if there's any evidence, but I reckon if you're, if you're subjected to passive smoking that you get a, some form of addiction already. You know? I think that uh, I think that they hunger and they want it… …then you'll probably smoke...*
Role models	*…Both my brothers smoked and, yeah, they both killed themselves, so. And my, you know, some- I've had nephews and, like, I would be one of the very few non-smokers, but the reason for that is because for me it was always connected to drinking, and I always knew that as soon as the smoking started to get heavier, people would drink, and then I'd get a flogging or worse...*
Role models - Elders	*…I mean, some people will say that, um, there are Elders in the community that aren't really leading a really healthy lifestyle, so not necessarily somebody that is seen to be a good role model, but in other ways they're good role models, so...*
Gender	*…for some women it can be difficult to quit if they're with a man that smokes in the house and they are seen as the person, the man of the house…*

Discussion

Economics, sociology, health and political science have all studied how social networks can influence the spread of complex behaviours, such as smoking, alcohol use, obesity, suicide prevention and political expression (19, 94-96). Our findings partially support the principles of homophily and the diffusion of innovations theory among the Aboriginal and Torres Strait Islander community (77, 80, 84). The results indicate that the community is well connected with clustering of smokers and non-smokers. The recontacted participants nominated friends and household members with a network topography that decreased in size and AGD across the total nominated network demonstrating more cohesion, but also splitting into two groups at follow-up. However, the AGD increased for the smoking and non-smoking networks, suggesting that they were less cohesive at follow up. This may suggest that as the smoking rate decreased over time, there was some further cross pollination among smoking and non-smoking networks. The findings partly support the outlined hypotheses that there is an association with exposure to smokers in one's social network and smoking behaviours, such as:

h^1 a member of a social network who smokes is more likely to continue smoking if they have a best friend that smokes.

h^2 a member of a social network who smokes is more likely to continue smoking if they have friends that smoke.

h^3 a member of a social network who smokes is more likely to continue to be a smoker if they have household members that smoke.

As outlined in the results and in support of h^1 and h^3, similarity among social network was reflected by smokers being more likely to report that their best friend smoked at baseline (42.9%) and at follow-up (44.4%). Smokers were also more likely to nominate at least one friend that smoked, in contrast to the non-smoking network. In partially supporting h^2 and h^3, just under half of the non-smoking participants (49.1%) reported that they lived with a smoker compared to 52% of smokers at baseline. However, half the smokers and non-smokers lived with a smoker at follow-up. Similarly, when we compared network measures by smoking status, we identified that cohesiveness of the smoking network had increased from the baseline survey compared to the non-smoking network. In alignment with other social network analysis studies of tobacco use, this ads to the evidence base partly suggesting that some aspects of social networks are influencing smoking, as well as non-smoking, and vice versa. However, further research examining multiple networks is required. The decision to quit smoking may not be an individual decision exclusively, but a reflection of the choices made by an individuals' social network which could influence smoking or non-smoking behaviours (97, 98). These findings imply compatibility between social networks and smoking, suggesting that network density can constrain or facilitate smoking and non-smoking behaviours.

The qualitative findings support the statistical and social network analysis suggesting social networks influence tobacco use. Qualitative data also indicated that having a best friend that smokes, having friends and family that smoke and living with a smoker was associated with smoking. Favourable perceptions of smoking were seen to facilitate social interactions to contribute to the normalisation of tobacco and were important in legitimizing smoking behaviours. Furthermore, factors identified to influence smoking included: easy access and social cueing; role modelling tobacco with limited punishments; barriers to tobacco use; a lack of collective commitment to being smoke free with reduced or constrained social support from family and friends to reduce and/or cease tobacco use.

The results support the hypothesis that exposure to smokers in an individual's social network can influence smoking behaviours, providing a barrier to being smoke free, a barrier to quit attempts and facilitating smoking. Although the results for the household are not conclusive, these findings align with numerous other social network studies (83, 99). Research findings suggest exposure to tobacco use could be a risk factor for smoking, but there are limited papers regarding Aboriginal and Torres Strait Islander tobacco use (97, 98). There is a paucity of research on social influences of tobacco use among Aboriginal and Torres Strait Islander social networks with few papers comparing and mapping the effects of best friend, friends, and household members over time (97, 98).

Policy implications

A challenge exits in reducing tobacco use among Aboriginal and Torres Strait Islander people if we are to achieve the National Healthcare Agreement target of halving the 2009 smoking rate by 2018 (100). The decrease in tobacco use may be due to various tobacco control policies and programs, such as the ACT Aboriginal and Torres Strait Islander Tobacco Control Strategy, the Tackling Indigenous Smoking programme, excise increases and plain packaging. These findings provide insight into addressing tobacco use and refining tobacco control: providing support for policy interventions that influence social networks and normalise smoke free behaviours, reducing access, convenience, role modelling and other social cues to smoking. Through smoke free social networks, the de-normalization of smoking may reduce uptake and improve quit attempts, rates of relapse and facilitate smoke free norms (101). There are numerous public health network interventions that have been developed, tested and should be considered for implementation to address tobacco use among the Aboriginal and Torres Strait Islander population. This includes:

- identification and utilisation of groups and opinion leaders, key positions and role models to advocate, champion and play a role as community educators to promote and facilitate smoke free norms . Opinion leaders are present in all types of organisations, communities and settings at various levels (16, 81).
- expanding utilising and evaluating social networking platforms for public health messaging, including the use of Facebook®, Twitter®, YouTube® and Yahoo!® Groups (for example, the ACT Indigenous Network) (102, 103). These platforms can assist in engaging people when, where and how they want, building on the trust and credibility embodied in family, friends, peer networks and social dynamics to increase

awareness of the harms of smoking; as well as increasing awareness and encouraging participation and conversation of existing programs and supports in the quitting journey (103, 104).

- shifting social networks and the normalisation of smoke free behaviours through the use of smoke free legislation and policies that limit social aspects of smoking, limiting exposure to tobacco smoke and reducing the numbers of individuals role modelling tobacco use. For example, expanding smoke free public spaces, workplaces, hospitals, detention centres, homes and cars, particularly when there is an opportunity for brief interventions and supports for smokers to make a quit attempt (16, 81).

Our findings suggest that social networks and network characteristics influence tobacco use. As outlined by Christakis and Fowler (105), this indicates increased cost-effectiveness in tobacco control. For example, if we invest $1,000 to assist a person to quit, and if this person's quitting translates to one out of twenty of their social contacts quitting, as well as translating to one of that person's social contacts quitting, we can see the social multiplier effect and the diffusion of innovation in action; with three people quitting for the price of one (105). This knowledge can be used to implement network interventions to empower the Aboriginal and Torres Strait Islander community. Social network approaches should also be used to complement and accelerate existing tobacco control efforts. These results indicate a need for further research and evaluation into what interventions might influence social networks for more effective and targeted tobacco control activities which consider the social and cultural context of smoking.

Limitations

This research is subject to various limitations. Firstly, the use of a survey name generator may not have been conducive for participants' to name all of their friends, peers and household members. Secondly, the use of self-reported measures of smoking and network characteristic behaviours with participants potentially self-censoring their behaviours and responding in a manner perceived to please the researcher (85, 106). Noting that self-reported smoking status in surveys has been validated with cotinine (107) and the proportion of misclassification is very low (e.g. - 0.9% and 1.4%) (108) in most community-based studies (109). Another limitation was the participants' reporting of information on alters (receiving actor/individual). However, it is not the alters' actual tobacco use that is important, but the

perception of tobacco use (97). Another limitation is the relatively small sample size, especially for the follow up survey which limited the capacity to detect small effects.

Another limitation is that pre-test and post-test design are not as robust random control trials. However, they are widely used and accepted in behavioural research for the purpose of comparing groups and/or measuring change, although direction of causation cannot be determined (i.e – selection and influence could not be differentiated among peers and tobacco use) . Furthermore, we acknowledge that the influence and selection effects of social networks are dynamic and may vary across sub-groups and age groups. However, we included analysis of participants to meet the aims and objectives of the research, gaining an understanding of the social context of Aboriginal and Torres Strait Islander tobacco use and reflecting the high smoking rates across all age groups within the community (2-5). Finally, the study's attrition at follow up is also a limitation possibly leading to a bias e.g. more women. Individuals of lower socioeconomic background are less likely to participate in surveys , although there is limited evidence that survey non-participation results in biased study findings (110, 111). Including a range of variables as covariates in the regression models adjusts for these effects to some degree. In analysing data from the same cohort at two time points we also used social network analysis and multiple participants to measure relational properties as well as a mixed-methods approach, to triangulate the data and gain a greater understanding of the data.

Despite these limitations, this study has a number of strengths, including input and participation by the Aboriginal and Torres Strait Islander community at all stages of the research process. The study findings provide insight into nuances of Aboriginal and Torres Strait Islander social networks and tobacco use, demonstrating merit in exploring social networks and smoking to inform future tobacco control programs and policies.

Conclusion

To our knowledge, the Smoke Ring is the first mixed-method longitudinal study to utilise social network analysis to examine the Aboriginal and Torres Strait Islander social networks in relation to smoking. The Smoke Ring research supports the hypothesis that exposure to smokers in one's social network strongly influences smoking behaviours. This could include: a best friend who smokes being positively associated with smoking; the presence of friends that smoke could be positively associated with smoking. This research suggests that best

friends provide the greatest social network influence on participants' smoking, but may also interact with that of the participants' friends, and common environmental factors. These findings imply that social networks and structures can constrain or facilitate tobacco use. Therefore, there is great value in considering the individual and social context of tobacco use. This study provides insight into the nuanced nature of Aboriginal and Torres Strait Islander social networks and smoking, providing evidence to help reduce tobacco use and consequently, tobacco related morbidity and mortality.

Key Points

- The paper indicated that the Aboriginal and Torres Strait Islander community in the ACT region is well connected with clustering of smokers and non-smokers, suggesting some polarisation among smoking and non-smoking groups.
- The findings support the hypotheses that there is an association with exposure to smokers in one's social network and smoking behaviours.
- Programs and policies can utilise social networks to normalise smoke free behaviours; reducing access, convenience, role modelling and other social cues to smoking.

List of abbreviations

ACT Australian Capital Territory

AGD Average Geodesic Distance

OR Odds Ratio

Competing Interest

The authors declare that they have no competing interests.

Author's contributions

RM[1] is a PhD Candidate who conceived the study and participated in the design involved in drafting and finalising the manuscript.

RD[1] participated in the design of the study, drafting the manuscript and revising it critically for important intellectual providing final approval of the version to be published.

TC[1] contributed to the design of the study, with particular input on analysis and interpretation of data. TC has been involved in drafting the manuscript and revising it critically for important intellectual content.

RL[2] is an Aboriginal man and has been involved in the preliminary discussion around the acquisition of data, contributing in the design of the study and was involved in the analysis and interpretation of data. RL was also involved in drafting the manuscript and revising it critically for important intellectual content.

AVDS[3] contributed in the design of the study and was involved in drafting the manuscript and revising it critically for important intellectual content.

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3.5 Co-authors' declaration

As co-authors of the paper **The Smoke Ring—Social Network Analysis of the ACT Aboriginal and Torres Strait Islander Community and the Impact on Smoking: A Longitudinal Mixed Method Study**, we confirm that the lead author, Raglan Maddox, made the following significant contributions as the lead author:

- conception and design of the research proposal;
- gaining of ethical approval to conduct the research;
- conducting research and data collection;
- analysis and interpretation of data;
- writing the papers and critical appraisal of content;
- drafting, submitting and finalising the manuscript for publication; and
- acting as corresponding author for journal communication and the publication peer-review process.

Rachel Davey

Signed: Rachel Davey Date: 10 February 2015

Tom Cochrane

Signed: T Cochrane Date: 10 February 2015

Joan Corbett

Signed: Joan Corbett Date: 10 February 2015

Ray Lovett

Signed: Ray Lovett Date: 10 February 2015

Anke van der Sterren

Signed: Anke van der Sterren Date: 10 February 2015

Chapter 4: Discussion

4.0 Discussion

Researchers in economics, sociology, health and political science have all studied how social networks can influence the spread of complex behaviours such as smoking, alcohol use, suicide and political expression [122-125]. The results of the Smoke Ring Study investigating Aboriginal and Torres Strait Islander social networks and tobacco behaviours indicated that the Aboriginal and Torres Strait Islander community is well connected with numerous relationships and subsequent clustering of smokers, and non-smokers respectively.

The findings of the Smoke Ring Study on tobacco use amongst the ACT Aboriginal and Torres Strait Islander community supported the following theories and principles'

- the principle of homophily;
- the theory of triadic influence;
- diffusion of innovations theory; and
- Bandura's social learning theory [34-38].

These theories and principles suggest that social networks and social network structures influence health behaviour and that normative and other peer influences can be transmitted through network ties or relationships [33-39]. They therefore align with the research findings. We concluded that there was an association between the Aboriginal and Torres Strait Islander social network in the ACT region and smoking behaviours. Findings addressed the two research questions:

1. Do individuals' social networks influence smoking behaviours? There was a statistically significant difference (p=0.007) between the number of smokers and non-smokers who reported at follow-up that their best friend was a smoker. Furthermore, in contrast with non-smokers, smokers were more likely to nominate at least one friend who smoked. This suggested some polarisation or separation of smoking and non-smoking groups. Polarisation may occur for a number of reasons (illustrated in Figure 5), including:
    - social normalisation of smoking behaviours;
    - tobacco being convenient and easy to obtain;
    - role modelling; and
    - smoking being seen as a way to facilitate social interactions.

These reasons aligned with evidence from the systematic review that indicated that social network structures, positions and relationships influence tobacco use (initiating, maintaining and ceasing) in numerous ways. We found that the following were identified as important influences on the tobacco use:

- popularity, social position and network cohesion;
- parental influence;
- partner or spouse influence;
- school and peer student influences;
- influences whilst at university;
- sex-specific issues; and
- pregnancy.

The research therefore supports the theory of homophily, the theory of triadic influence, diffusion of innovations theory and Bandura's social learning theory [34-38].

2. Was there an association between several social factors and being a smoker or non-smoker? Multiple logistic regression analyses described in the results section assessed the impact of various factors on the likelihood that participants would be smoking at baseline and follow-up. Factors included:

    - age;
    - sex;
    - education level;
    - household income;
    - living with a smoker; and
    - having a best friend who smokes.

    The strongest protective factor against smoking was completing year 12, while having a best friend who smoked was a strong predictor of smoking. The factors outlined above are somewhat supported by the systematic review finding, which suggested peer group homogeneity of tobacco use, support for socialisation and selection effects, interactive influence of best friends and peer groups and crowd affiliation can all help to protect against uptake of smoking. The findings support the principle of homophily, the theory of triadic influence, diffusion of innovations theory and Bandura's social learning theory [34-38]. The various themes illustrated in Figure 5 regarding social networks and tobacco use also suggested that there was an association between social factors and being a smoker.

Figure 5: Interview and focus group themes regarding social networks and tobacco use

Source: 'The Smoke Ring—Social Network Analysis of the ACT Aboriginal and Torres Strait Islander Community and the Impact on Smoking: A Longitudinal Mixed Method Study' (Under review).

The influence and selection effects of social networks are dynamic and may vary across subgroups and age groups. The Smoke Ring Study research has given a better understanding of the social context of Aboriginal and Torres Strait Islander tobacco use in the ACT region, which is reflected in the high smoking rates across all age groups within the community. However, the direction of influence could not be differentiated among participants—i.e. did peer selection and/or peer influence contribute to tobacco use [13]. The results of the study highlighted the role of social context in smoking initiation, maintenance and cessation. Furthermore, the effect size may vary when combined with other potentially confounding factors such as strength of relationships and broader tobacco control policy.

The Smoke Ring Study highlights the significance of programs and policy in influencing change—specifically, the use of social networks to influence tobacco use. The findings underscore the importance of collaboration and partnerships within and across sectors, suggesting the social multiplier effect of programs and policies in influencing health and community wellbeing (that is, an increase in effort/expenditure on cessation and smoke-free behaviours increases smoke-free efforts among networks, resulting in a greater level of effort than the initial level of effort/expenditure). Given the level of polarisation of smoking and non-smoking networks, there is a need to focus efforts on smoking social networks to reduce smoking rates and on non-smoking social networks to minimise tobacco uptake. This is particularly pertinent given that the vast majority of adult smokers commence tobacco use before 26 years of age [126]. Aboriginal and Torres Strait Islander people

have a young population profile [127]: approximately 36% of Aboriginal and Torres Strait Islander people are aged under 15 years. Tobacco is responsible for one in five Aboriginal and Torres Strait Islander deaths [20, 127]. If these findings are considered and utilised appropriately, they can provide useful mechanisms for taking appropriate action to help facilitate and normalise smoke-free behaviours as well as disseminating public health messages.

Social network interventions have been developed, tested and implemented in various settings. Social network interventions have included:

- empowerment of key groups and opinion leaders [3];
- better utilising and evaluating social networking platforms such as Facebook®, Twitter®, YouTube® and Yahoo!® Groups (for example, the ACT Indigenous Network) for health promotion messaging [128, 129]; and
- shifting social networks and normalising smoke-free behaviours by extending 'smoke-free' legislation and policies that limit social smoking—for example, smoke-free bus shelters [3, 130].

There is no safe level of tobacco smoke exposure, but entrenched tobacco use is too often socially and culturally accepted in many social networks. This social and cultural acceptance of tobacco use further exacerbates disadvantage and increases smoking behaviour, which affects health, and thus perpetuates a cycle of disadvantage.

The continuing challenge in tobacco control in the Aboriginal and Torres Strait Islander population is the limited evidence base [28-30]. More work is required to reduce the high rates of tobacco use among the Aboriginal and Torres Strait Islander community. However, early signs are encouraging and there is further potential for change. The study findings show that social selection and influence on tobacco use should be considered when developing prevention programs and policies, including components of the ACT Strategy, that target groups including youth, pregnant women and their partners.

The study 'Plain Packaging Implementation: Perceptions of Risk and Prestige of Cigarette Brands among Aboriginal and Torres Strait Islander People' indicated that Action Area 1 of the ACT Strategy had some influence in preventing people from taking up smoking; reducing rates of smoking and increasing quit attempts; increasing some levels of understanding and awareness of health issues surrounding smoking; and increasing access to tobacco control initiatives. Importantly, there was a reduction in smoking among Aboriginal and Torres Strait Islander people in the ACT region. Furthermore, the action area was reflected in the reasons that resonated with participants as

motivation to try giving up, cutting down or not smoking at all—including health, fitness and cost. Participants reported various access points for health and medical advice, including those programs and services identified under Action Area 1 of the ACT Strategy.

Although we are seeing many encouraging indicators, such as reductions in smoking rates, among the Aboriginal and Torres Strait Islander people in the ACT, for many these changes are not coming fast enough. Tobacco use is a significant contributor to poor health outcomes. Based on the literature and the evidence produced, we can confidently say that multi-faceted interventions, such as the ACT Strategy, that take into account multiple aspects of tobacco use can be effective. The Smoke Ring Study also highlights the importance of public health programs in preventing uptake of tobacco use and promoting smoking cessation. Development, implementation and management of tobacco control and smoking cessation programs, services and social marketing is complex. However, there is evidence to support the development of locally tailored programs and services to help meet the needs of the Aboriginal and Torres Strait Islander community in the region [2, 22, 131-134].

The findings of the Smoke Ring Study recognise and reflect that substantial work has been and is being undertaken in Aboriginal and Torres Strait Islander tobacco control. While these findings are somewhat encouraging, it should be acknowledged that the ACT Strategy should form part of a sustained approach to ensure a healthier future and smoke-free norms. In other words, while good work has been undertaken, more work is required.

It is important that tobacco cessation programs are tailored to meet local community needs. Furthermore, as social networks are intrinsically embedded within communities, there are numerous strengths to locally tailored programs which build on these networks. Programs could facilitate addressing the social determinants of health and providing outlets for stress, which could include physical activity and art. The findings provide invaluable insight into areas that could be further tailored and improved in addition to providing a sound baseline for evaluation.

4.1 Limitations

There are a number of limitations to this research in both the systematic literature review and the prospective study.

Systematic review

As discussed in the systematic review, the studies that were included in the review used different methods and were carried out in a range of settings at various points in time. In addition, a major limitation—and, paradoxically, a strength of the systematic review—was the broad definition of 'social networks' and 'social network analysis'. There was no uniform definition of these terms

across the studies that were included in the systematic review. However, the systematic review highlighted and reflected the evolving and complex nature of social networks and social positions and the influence of relationships on tobacco use. Also, the systematic review's search strategy resulted in a large number of studies meeting the inclusion criteria and a wide range of aims, objectives and differing definitions and terminology. For example, it is unclear what exactly constitutes a 'friendship tie' or a 'family tie'.

Another limitation was that many of the studies that were reviewed did not provide detailed information about or characteristics of the dynamic interactions of relationships. These characteristics are potentially relevant to tobacco behaviours and may have resulted in suboptimal characterisation of the complex and dynamic interplay between social networks and tobacco use.

The possibility of publication bias—that is, where significant results have a better chance of being published [135]—is also present. Therefore, conclusions based on published studies alone can potentially be misleading [136].

A final limitation of the literature review component is that the sample may not be generalisable, with overrepresentation within various settings, age groups and regions and limited data on study samples. For example, numerous papers reported on findings from the National Longitudinal Study of Adolescent to Adult Health (Add Health) in the United States of America. As a result, findings should be considered with these limitations in mind.

Prospective study

There are also a number of limitations in regard to the primary data collection.

The ideal study design would have included a randomised controlled group. However, this was not practical or possible due to resource constraints. While pre-test design and post-test design are not as robust, they are widely used and accepted in behavioural research for the purpose of comparing groups and/or measuring change, although causation cannot be determined [13].

The use of a survey name generator may not have been conducive to encourage participants to exhaust all of their social networks in their entirety: friends, peers and household members.

The prospective study used self-reported measures of smoking and network characteristic behaviours. Participants potentially could have self-censored their behaviours and this may have produced bias. Respondents may have replied in a manner perceived to please the researcher [37, 137]. However, self-reported smoking status in surveys has been validated using cotinine—a biomarker for exposure to tobacco smoke [138]. It could be seen that the proportion of

misclassification (that is, the proportion of self-reported non-smokers who have increased cotinine levels indicative of active smoking) is very low in most community-based studies [139, 140].

Another limitation was that the participants, or 'egos' (sending actor/individual), reported information about others, or 'alters' (receiving actor/individual). However, it could be argued that it is not the alters' actual tobacco use but, rather, the perception of the alter's tobacco use by the ego that is important to the research [118].

The Smoke Ring Study

The Smoke Ring Study attrition at follow-up could possibly have led to a bias—for example, there could have been a higher proportion of women in the follow-up. Furthermore, individuals from lower socioeconomic backgrounds are less likely to participate in surveys [141], although there is limited evidence that survey non-participation results biased study findings [141, 142]. Another limitation is the relatively small sample size, especially at follow up, which limited the capacity to detect small effects. Furthermore, it was not possible to differentiate the impact of social networks on different aspects of smoking, such as initiation, maintenance and cessation.

In order to address some of these limitations and to adjust for these effects to some degree, a range of variables were included as covariates in the regression models. In addition, the same cohort was analysed at two time points, utilising social network analysis and multiple participants to measure relational properties as well as a mixed-methods approach. This facilitated the triangulation of data to enable a greater understanding of smoking behaviours and social networks among the ACT Aboriginal and Torres Strait Islander community [13, 37].

4.2 Strengths

Although the Smoke Ring Study has some limitations, outlined above, it has a number of strengths, including the following:

- Aboriginal and Torres Strait Islander community input and participation at all stages of the research process;
- involvement of a diverse cross-section of the community; and
- the ability to build on limited published literature regarding tobacco control and the Aboriginal and Torres Strait Islander population.

The findings of the Smoke Ring Study provide invaluable insight into Aboriginal and Torres Strait Islander social networks and tobacco use, demonstrating merit in exploring social networks and the influence on tobacco use. The study can also inform future smoking cessation interventions, tobacco control programs and policies.

4.3 Contribution to knowledge

The Smoke Ring Study adds to the literature, building on the findings of the systematic review and specifically the dearth in evidence regarding Aboriginal and Torres Strait Islander tobacco use and social networks. The Smoke Ring Study was the first mixed-method longitudinal study to utilise social network analysis to examine Aboriginal and Torres Strait Islander social connections and how they impact on smoking. This study demonstrated that achieving at least a year 12 level of education was protective against smoking. By utilising a longitudinal mixed method study design, this research provided a novel understanding of smoking behaviours, knowledge and attitudes. It has helped to inform local services and community communication campaigns, including by raising awareness of cessation supports and increasing awareness that it may take more than one quit attempt to successfully quit. Findings from this study suggest that individuals' social networks influenced smoking behaviours and that there is an association between various social factors and being a smoker or non-smoker. Factors could include:

- a best friend who smoked being associated with smoking; and
- the presence of friends who smoked being associated with smoking.

These findings indicate that best friends provide the greatest single social network influence on participants' smoking, but this influence may interact with common environmental factors. There was considerable similarity between smoking behaviours of the participants and smoking behaviours in their social networks', suggesting some disparities between smoking and non-smoking networks. These findings imply that social networks and structures can facilitate tobacco use. Furthermore, as social networks intrinsically embedded within communities, this research highlights the strengths of locally tailored tobacco control programs to meet the needs of the local community.

These findings imply that social networks can facilitate smoking behaviours, providing insight into the nuanced nature of social networks. The findings demonstrate that there is a need to focus policy, program and service delivery on smoking networks in order to reduce smoking rates and on non-smoking networks to minimise smoking uptake.

These findings highlight a number of policy, programs and service implications, including the need to focus efforts within smoking networks to reduce smoking rates and to limit uptake of tobacco smoking within the non-smoking social networks. Furthermore, this research identified gaps in the research, such as the appropriateness of tobacco prevention, including social context and the needs of the Aboriginal and Torres Strait Islander community. The findings of the Smoke Ring Study indicated that the influence and selection effects of social networks may vary due to a number of factors, including age groups and geographic spread. As a result, a broader understanding of the

dynamic social context of Aboriginal and Torres Strait Islander tobacco use—initiation, maintenance and cessation—by age, gender and location is required. Such comprehensive analysis may provide a more detailed understanding of the potentially different roles of social networks across the lifespan, and examine any associations with different aspects of tobacco use, such as uptake, maintenance and cessation and was considered in providing the following recommendations.

4.4 Recommendations

The Smoke Ring Study has generated both practical and research recommendations. These recommendations should not be considered in isolation. For example, when developing and implementing the practical recommendations, it is important to include a robust evaluation component. Similarly, the research recommendations will also have practical implications.

4.4.1 Implications for practice

Policy, programs and service implications include the need to focus efforts within smoking networks to reduce smoking rates and to limit uptake of tobacco smoking within the non-smoking social networks. If considered and utilised appropriately, social networks can provide a mechanism for taking appropriate action to help facilitate smoke-free norms. Social network interventions, including those that have already proved effective in other populations, should be considered for the Aboriginal and Torres Strait Islander population. Interventions could include:

- identifying, utilising and empowering social networks, groups and opinion leaders, those in key positions and role models to advocate, champion and play a role as community educators to promote and facilitate smoke-free norms [3]. As identified in this research, opinion leaders are present in all types of organisations, communities and settings. For example, those in leadership roles within organisations (for example, chief executive officers, managers and human resources staff), the community (for example, Elders and community leaders), families (for example, mothers, fathers, uncles, aunties, siblings, cousins, grandparents) and those in other roles could be targeted by education, prevention and cessation programs and policies [3, 130].
- utilising and evaluating social networking platforms for public health messaging—for example, by using Facebook®, Twitter®, YouTube® and Yahoo!® Groups (like the ACT Indigenous Network) [128, 129]. These platforms can engage and empower people when, where and how they want, building on the trust and credibility embodied in family, friends, peer networks and social dynamics to increase awareness of the harms of smoking. They can also increase awareness of, and encourage participation in, and conversation around existing programs and supports in the quitting journey [129, 143]. Social networking platforms can enable health professionals to present to, empower and engage the community [143, 144]. Many organisations—for example, the Institute of Urban Indigenous Health, Winnunga Nimmityjah Aboriginal Health Service, the National Aboriginal Community Controlled Health Organisation, the No Smokes website (www.nosmokes.com.au) and British American Tobacco—already use social media to varying degrees [145]. More can be done in this expanding environment to engage and empower the community to facilitate smoke-free norms.

- shifting social networks to normalise smoke-free behaviours by using 'smoke-free' legislation and policies that limit the social aspects of smoking. This would limit exposure to tobacco smoke and reduce the number of individuals who role-model tobacco use. For example, legislation and policies could promote smoke free public spaces, workplaces, hospitals, detention centres, homes and cars, particularly when there is an opportunity for brief interventions and supports for smokers to make a quit attempt [3, 130]. Bus shelters could be made smoke free. Existing restrictions on smoke-free policies could be reviewed with a view to limiting the use of tobacco in social interactions.

Given the young Aboriginal and Torres Strait Islander demographic [127] and that the vast majority of adult smokers commenced tobacco use before 26 years of age [126], smoking prevention efforts targeting youth are important. These efforts are likely to benefit from incorporating social network approaches and focusing efforts on isolates/loners. That is, a person that has no connections to other people [10]—it should not be assumed that only peers cause their friends to smoke. Youth could be encouraged to resist peer pressure and be helped to actively engage in peer groups (that is, to become a clique member with peer/social support). Generally, tobacco prevention programs do not take into account peer selection as a tool that leads to smoking initiation—i.e. developing friendships based on smoking or non-smoking behaviours [28, 29]. However, the findings suggest that isolates should be considered as a population that is at high risk of smoking. Therefore, prevention programs should consider empowering youth to join and function in cliques with peer/social support.

The findings of the Smoke Ring Study suggest that social networks and network characteristics influence tobacco use. Therefore, social network approaches could be used to complement and accelerate existing tobacco control efforts. The results of the study indicate a need for further research on and evaluation of what interventions might influence social networks for more effective and targeted tobacco control activities that take into account the social and cultural context of tobacco use.

4.4.2 Recommendations for future research

A number of research recommendations were identified from the literature review and primary research findings.

An ongoing challenge in tobacco control in the Aboriginal and Torres Strait Islander population is the limited evidence base. The need to address the effectiveness and efficiency of Aboriginal and Torres Strait Islander tobacco control and the need for further research is evident. This research identified many organisations that have developed tobacco control programs targeting Aboriginal and Torres Strait Islander people. As a result, there is an opportunity to evaluate programs and policies.

When tailoring programs to meet the needs of the Aboriginal and Torres Strait Islander community, the appropriateness of tobacco prevention, including social context, needs to be considered. When designing interventions, thought needs to be given to exposure, duration and culturally appropriate training wherever possible to enhance the uptake of prevention messages and empower the community. Continuous quality improvement should also be incorporated and should include process data collection as well as outcome measures to quantify the degree of implementation.

The findings of the Smoke Ring Study indicated that the influence and selection effects of social networks may vary due to a number of factors, including age groups and geographic spread. As a result, it would assist if analysis of a number of Aboriginal and Torres Strait Islander networks in different regions around Australia was undertaken to gain a broader understanding of the social context of Aboriginal and Torres Strait Islander tobacco use. This type of analysis would provide comparators—for example, it could facilitate comparisons by geographic spread, sex, age group as well as the type of relationship: friends, family, house members, etc. Furthermore, such comprehensive analysis may provide a more detailed understanding of the potentially different roles of social networks across the lifespan, and examine any associations with different aspects of tobacco use, such as uptake, maintenance and cessation.

The Smoke Ring Study findings highlighted the need for more research to reduce tobacco use, including tobacco use among Aboriginal and Torres Strait Islander pregnant women and their partners. Several studies have examined the role of counselling and group support in addition to Nicotine Replacement Therapy (NRT) for cessation. There have been good short-term results for the duration of the pregnancy. However, cessation is not often sustained in the long term. Further research is required to examine how to help new mothers to remain smoke free after giving birth [30]. The potential to use the social network, building on the trust and credibility embodied in

family, friends and peer networks, to increase awareness of the harms of smoking during pregnancy and provide support in the quitting journey is an area for future research [129, 143].

It may be thought by some as simplistic to say ‘more research is needed’. But, clearly, when it comes to Aboriginal and Torres Strait Islander tobacco control and network effects, we are just beginning the journey. Further research will provide an opportunity to evaluate, undertake continuous quality improvement of, and refine programs as well as share tobacco control learnings to reduce tobacco use.

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ACT Aboriginal and Torres Strait Islander Tobacco Control Strategy

2010/11-2013/14

A plan to tackle Aboriginal and Torres Strait Islander smoking in the ACT.

Abbreviations

ACTDGP	Australian Capital Territory Division of General Practice
ADP	Alcohol and Drug Program
AIATSIS	Australian Institute of Aboriginal and Torres Strait Islander Studies
COAG	Council of Australian Governments
MCDS	Ministerial Council on Drug Strategy
NACCHO	National Aboriginal Community Controlled Health Organisation
NGO	Non Government Organisation
NRT	Nicotine Replacement Therapy
PHAA	Public Health Association of Australia
TCH	The Canberra Hospital
WNAHS	Winnunga Nimmityjah Aboriginal Health Service

Contents

Introduction *4*
Consultation and Development 4
Proposed way forward 4
Strategy oversight, monitoring and implementation 5

Tobacco control context *6*

ACT Government **6**
The ACT Alcohol, Tobacco and other Drug Strategy 2004 6
ACT Chronic Disease Strategy 2008-2011 6

Australian Government **6**
The Council of Australian Government Commitment 6
National Drug Strategy 2004-2009 7
National tobacco policy 7
Australia: The Healthiest Country by 2020: National Preventative Health Strategy 8

The Strategy *9*

Aims **9**

Areas of focus **9**

Action Area 1 - Development and implementation of a multi-component cessation and reduction program based on family, social and workplace networks **10**

Action Area 2 – Social marketing **10**

Action Area 3 – Research and evaluation **10**

Action Area 4 – Building on existing legislation, bans and policy initiatives **11**

ACT Aboriginal and Torres Strait Islander Tobacco Control Strategy Action Plan *12*

Introduction

The ACT Government has made a commitment to reduce smoking rates amongst Aboriginal and Torres Strait Islander people living in the ACT. (ACT Government 2008)

This commitment has involved the development of an Aboriginal and Torres Strait Islander tobacco control strategy (The Strategy). This was achieved using two methods: examining the tobacco control research and other evidence and; designing the strategy on areas of priority.

While there are many reports about the prevalence of smoking in the Aboriginal and Torres Strait Islander community, reports on the effectiveness of tobacco control initiatives for Aboriginal and Torres Strait Islander people and communities in Australia are scant. (Ivers 2003)294-299. Much of the work to date in Aboriginal and Torres Strait Islander tobacco control draws two main conclusions; that tobacco control is best delivered in the community (outreach) setting and that for it to be effective participation must be based in the social, work or family environment.

It is fortunate that the development of this strategy has occurred at a point in time where, at the national level, there has also been a commitment of financial resources and political will to tackle the high rates of smoking in the Aboriginal and Torres Strait Islander population. (Commonwealth Department of Health and Ageing 2009) The allocation of over 100 million dollars over the next four years by the Commonwealth to this issue alone, and the commitment by the ACT Government, will ensure a heightened focus.

A substantial allocation of financial resources and placement of tobacco control on the national agenda through reports such as the National Preventative Health Strategy has generated prominent Aboriginal leaders such as Tom Calma, the Racial Discrimination and Social Justice Commissioner and others in prominent roles to publicly speak out about smoking and the damage it does to individuals and the community. (Calma 2009)

Consultation and Development

A stakeholder forum and additional organisation/community level consultations occurred in the development of this strategy. These included a stakeholder forum in July 2009 and additional consultations across primarily Aboriginal and Torres Strait Islander community organisations. The details of these processes can be found at **Appendix 1**.

Proposed way forward

Through a review of the literature and through the consultation process, four key areas for action have been identified for resourcing under this strategy. These areas are:

1. Development and implementation of a multi-component cessation and reduction program based on family, social and workplace networks;
2. A social marketing program;

3. A research and evaluation agenda; and
4. Building on legislative change, bans and other policy initiatives.

To implement this agenda it is important to recognise that there are a number of organisations within the ACT that can contribute to effective implementation and outcomes based on each element above. Therefore a steering committee model is recommended. This should include a number of stakeholders.

Strategy oversight, monitoring and implementation

A Strategy advisory group made up of stakeholders for implementation of this strategy will provide the driving force to ensure the work set out in the implementation plan is implemented, monitored and evaluated.

Tobacco control context

ACT Government

The ACT Government has committed $200,000 per annum over 4 years to implement initiatives to decrease tobacco smoking rates amongst the ACT Aboriginal and Torres Strait Islander population.

In ACT Health's submission to the National Partnership Agreement on Closing the Gap in Indigenous Health Outcomes: ACT Implementation Plan" a commitment is made to

> "Reduce Aboriginal and Torres Strait Islander smoking rates, with additional focus on specific groups e.g. Aboriginal health service staff, pregnant women and mothers, young people, people with drug and/or mental health issues and adults and young people in detention" (ACT Government 2009)11 pp11.

The ACT Alcohol, Tobacco and other Drug Strategy 2004

The ACT Alcohol, Tobacco and other Drug Strategy 2004 has been developed in the context of the National Drug Strategy 2004-2009; the National Tobacco Strategy 1999-2004; and the ACT Government's policies in the areas of health; policing; justice and community safety; education youth and family services; and disability housing and community services.

ACT Chronic Disease Strategy 2008-2011

Under Action Area 1 – Prevention and risk reduction across the continuum there is an emphasis on chronic disease and prevention – to prevent the condition itself, where possible, and to prevent and reduce progression of the condition and its associated complications and co-morbidities. 1.7 of the recommended actions states that ACT health will "develop and implement smoking cessation programs for people of Aboriginal and Torres Strait Islander background, including pregnant women." (ACT Health 2008) pp 19.

Australian Government

The Council of Australian Government Commitment

The Council of Australian Governments (COAG), a forum of federal, state and local government meets to consider policy issues of national importance. In November 2008 COAG announced a 1.6 billion dollar reform package with the intention of "closing the Gap" on Indigenous disadvantage.

As a component of this the Commonwealth Government has allocated 100.6 million dollars for smoking cessation/harm minimisation initiatives.

National Drug Strategy 2004-2009

At a national level, the Ministerial Council on Drug Strategy (MCDS) endorsed the National Drug Strategy 2004-2009 in May 2004. The National Strategy outlines a coordinated approach to reducing problems associated with harmful alcohol and other drug use in Australia. It affirms Australia's commitment to harm minimisation as the main principle underpinning approaches to alcohol and other drug use.

Australia's obligations under international drug treaties and conventions are met through the National Strategy, and through Commonwealth and State and Territory legislation. The ACT Alcohol, Tobacco and other Drug Strategy 2004 applies the national agenda by continuing to approach harms associated with alcohol, tobacco and other drug use through applying the principles of harm minimisation, improving the evidence base that informs policy development and extending community partnerships beyond law enforcement and health.

National tobacco policy

The goal of the National Tobacco Strategy is to improve health and to reduce the social costs caused by, and the inequity exacerbated by, tobacco in all its forms.

The objectives of the Strategy are, across all social groups to:

1. prevent uptake of smoking;
2. encourage and assist as many smokers as possible to quit as soon as possible;
3. eliminate harmful exposure to tobacco smoke among non-smokers; and where feasible,
4. reduce harms associated with continuing use of, and dependence on, tobacco and nicotine.

The National Tobacco Strategy is a comprehensive approach to reducing tobacco-related harm. A heavy emphasis is placed on jurisdictions to implement tobacco control initiatives. The strategy emphasises that jurisdictions will:

1. further use regulation to reduce the use of, exposure to, and harm associated with tobacco;
2. increase promotion of Quit and Smokefree messages;
3. improve the quality of, and access to, services and treatment for smokers;
4. provide more useful support to parents, carers and educators in helping children to develop a healthy lifestyle;
5. endorse policies that prevent social alienation associated with uptake of high risk behaviours such as smoking, and advocate policies that reduce smoking as a means of addressing disadvantage;
6. tailor messages and services to ensure access by disadvantaged groups; and

7. obtain the information needed to fine-tune policies and programs.

(Ministerial Council on Drug Strategy 2004)

This Strategy has been developed and complements the National Strategy in that it will advocate for stronger regulation and enforcement of that regulation, develop a specific, local social marketing campaign, improve access to tobacco control services and put in place a framework to measure the effectiveness of the ACT's approach.

Australia: The Healthiest Country by 2020: National Preventative Health Strategy

To date, success in tobacco control has occurred not through clinical, classroom or workplace interventions but through a comprehensive whole-of-population approach that has profoundly changed cultural values about smoking. (The Cancer Council of Australia 2003); (Commonwealth Department of Health and Ageing 2003) As well as regulation, the various campaigns, programs, treatment and efforts of advocates for tobacco control have played a crucial role (World Health Organisation 2008) in keeping smoking and its effects in the news (Wakefield, Germain et al. 2006)338-347 and on the political agenda . (Wakefield, Morley et al. 2002)I73-I80.

The Strategy

Aims

The Strategy aims to improve the health of the ACT Aboriginal and Torres Strait Islander community through improved tobacco control measures. Specifically, the Strategy aims to:

- Prevent people taking up smoking.
- Reduce rates of smoking and increase quit attempts (assisted and unassisted).
- Increase access to assisted tobacco control initiatives.
- Increase levels of understanding and awareness of health issues surrounding smoking.

Areas of focus

The Strategy includes four areas for action:

- Action Area 1 - Development and implementation of a multi-component cessation and reduction program based on family, social and workplace networks;
- Action Area 2 - Social marketing;
- Action Area 3 - Research and evaluation ; and
- Action Area 4 - Building on existing legislation, bans and policy initiatives.

Action Area 1 - Development and implementation of a multi-component cessation and reduction program based on family, social and workplace networks

The rate of smoking for Aboriginal and Torres Strait Islander people has decreased a small amount recently after little change over the last 10 years, however the prevalence of smoking amongst the Aboriginal and Torres Strait Islander community nationally is close to 50 percent, and in the ACT it is around 46 percent.

While focusing on tobacco control it is important to recognise that most people will quit smoking unassisted. It is also important that assisted and unassisted approaches to smoking cessation be available and access to and information about them improved. This could be facilitated by a tobacco control worker with part of their role dedicated to facilitating access to and information about smoking cessation and reduction options.

Much of the literature discussing how to reduce smoking rates amongst the Aboriginal and Torres Strait Islander population leaves two areas to approach:

1. Initiatives focused on the family; and
2. Initiatives focused on social networks.

A whole of family approach in conjunction with individual approaches to smoking cessation and harm reduction are supported within this Strategy. Assisted cessation and harm reduction programs need to be creative in how they are developed e.g. family and community focus and specific for this community, not transplanted. They also need to have a wellbeing focus and be much broader than programs currently available.

Assisted cessation and harm reduction can be provided by identifying a client and making the assistance available to the whole family. This assistance can then be delivered in the household/social/workplace setting. This approach could also be used to provide opportunities to promote messages of not smoking in the home/socially and at the workplace. Aboriginal people and organisations, trained in the delivery of programs and committed to the messages would be required to achieve this.

Action Area 2 – Social marketing

Leadership is a defining issue in tobacco control especially to be supported in Aboriginal and Torres Strait Islander communities. Elders' organisations and role models need to be supported to take an active role in relaying messages that support family and community approaches to reduce smoking rates and to reinforce harm minimization approaches. It is necessary for positive messages from people respected within the ACT community about smoking to make a difference.

Action Area 3 – Research and evaluation

Little evidence exists regarding what works to reduce smoking in Aboriginal and other high-prevalence communities (Thomas et al., 2008). This lack of evidence exists primarily because Aboriginal and Torres Strait Islander tobacco control research often

fail to produce results due to problems with maintaining adequate numbers of people in the study group. The Strategy highlights the need for evaluation of Action Area 1 so that:

- the progress of the Strategy can be tracked, and
- the effectiveness of cessation and reduction approaches implemented are monitored and reported on.

Action Area 4 – Building on existing legislation, bans and policy initiatives

There is evidence to suggest that legislation and bans have a significant impact on reducing smoking; they also have an effect of changing community perceptions, including social acceptance of smoking. It is acknowledged that much work is being progressed in the legislative area in the ACT and that this Strategy will monitor the implementation of these changes. At the policy level there is an opportunity to assist community and other organisations to adopt or create smoke free workplace policies.

ACT Aboriginal and Torres Strait Islander Tobacco Control Strategy Action Plan

Action Areas	Best placed to deliver	Required for implementation	Implementation target
Action Area 1- A multi-component cessation and reduction program based on an outreach model that prioritises family, social and workplace networks			
The multi-component cessation and reduction outreach program delivers: ▪ One-to-one and group support at organisations (for workers and community members) or in the home or social setting (outreach); ▪ Nicotine replacement therapy for those requesting it; ▪ Subsidies for access to additional therapies and treatments; ▪ Health promotion and education at the individual, group and community level; ▪ Referrals to specialist or other services; ▪ A directory of services for people wanting to reduce or quit smoking; and ▪ Initiatives targeted towards antenatal and child health, young women and men's groups, sporting groups and those with a chronic disease such as diabetes in the first instance. ▪	Aboriginal and/or Torres Strait Islander NGO sector	▪ Submission process Providing: 1. A project implementation plan with timeframes, budget and evaluation measures. 2. Assessment of application 3. Awarding of contract 4. Disbursement Project Governance arrangements Monitoring of project performance	May 2010 July 2010 May/June 2010 June 2010 July 2010 May 2010 Incorporate into regular reporting sequence (6 monthly)

Action Areas	Best placed to deliver	Required for implementation	Implementation target
Action Area 2: Social Marketing			
The social marketing program incorporates: ▫ Aboriginal and Torres Strait Islander people of the ACT in leadership roles providing strong statements publically encouraging individuals and the community to reduce or quit smoking. Statements to be prepared and delivered by groups and individuals such as: ▫ The Aboriginal and Torres Strait Islander Elected body (ATSIEB); ▫ The United Ngunnawal Elders Council; ▫ The ACT Aboriginal Health Forum; ▫ Focused messages from children to parents about not wanting them to smoke and how they feel when an adult smokes; ▫ Messages about what individuals could do with the money saved by not smoking; and ▫ Messages about not smoking in the home and car.	ACT Health (Lead) Social marketing agency to develop local messages	Meet with stakeholders to discuss content of statements and get agreement Prepare statements Tender for agency to develop and deliver	June – December 2010 2011
Action Area 3: Research and evaluation			
Research and evaluation is funded to: ▫ Assesses the effectiveness of the interventions based on the family and social networks model of	Research institute.	Evaluation framework developed by advisory group with input from	September 2010

Action Areas	Best placed to deliver	Required for implementation	Implementation target
cessation/reduction; and ▪		expert.	
	Research institution	Tender process	June 2010
▪ Assess whether there is any role for stress management in assisting Aboriginal and Torres Strait Islander people in stopping smoking.		Appoint researcher/s	June – December 2012.
Action Area 4-Build on existing legislation, bans and policy initiatives			
Monitor existing legislation, bans for: ▪ Banning smoking in cars where children are present	ACT Health & AFP	Meetings with area within Government/monitoring	Ongoing
Encourage and assist organisations to implement smoke free workplace policies by including clauses in contracts that require ACT Health funded organisations to have a smoke free work place policy (over an agreed timeframe), that includes information about: ▪ Designated outdoor smoking area; ▪ Providing access for staff to cessation/reduction programs (and provides leave for people to attend if required); and ▪ Providing access assisted methods of quitting/reduction to employees and clients.	ACT Health		Ongoing

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Appendix ii: Aunty Lorraine Webb's artwork: The Smoke Ring

The title of this study, 'The Smoke Ring', was reinforced by Aunty Lorraine Webb, a Wiradjuri and Ngunnawal woman from Cowra, New South Wales. Aunty Lorraine produced the artwork *The Smoke Ring*. The artwork represents the community striving for good health and wellbeing. The footprints in the work pose the question: 'Which way – which path will you take?' The artwork questions attitudes, beliefs and behaviours about smoking and being smoke free. Therefore, it captures the essence of this research.

Appendix iii: Social Networks and Tobacco Use: A Systematic Review — Supplementary Table 1

Title	Author/s	Participants	Outcomes	Study design	Limitations / Quality of the evidence
"Coming to Town": The Impact of Urbanicity, Cigarette Advertising, and Network Norms on the Smoking Attitudes of Black Women in Cape Town, South Africa	Chyvette T. Williams, Sonya A. Grier, and Amy Seidel Marks	N = 975	• Urbanicity moderated the relationship between network smoking norms and smoking attitudes, but not cigarette advertising exposure and smoking attitudes. • Urbanicity, cigarette advertising, and networks play important roles in women's attitudes toward smoking, and potentially, smoking behaviour. • Rresults suggest that strong and creative anti-smoking efforts are needed to combat the potential for a smoking epidemic among an increasingly urbanized population of black women in South Africa and similar emerging markets.	Cross-sectional analysis	• Cross sectional: unable to test causal pathways around smoking behaviours and cannot assess how smoking behaviours shift and interact with the community and their peers. • The use of self-reports of advertising exposure. • Results may be subject to recall bias whereby the extent to which particiapnts report having seen advertising may not accurately reflect their objective exposure.

A Comparison of Peer Influence Measures as Predictors of Smoking Among Predominately Hispanic-Latino High School Adolescents	Thomas W. Valente, Kayo Fujimoto, Daniel Soto, Anamara Ritt-Olson, and Jennifer B. Unger	N = 1950	• An egocentric measure of perceived friend smoking was strongly and consistently associated.	Longitudinal analysis	• The data from this study were collected, by design, from schools that are predominately Hispanic/Latino and so may not be generalizable to schools of different ethnicities or different ethnic
A Dynamic Model of US Adolescents' Smoking and Friendship Networks	David R. Schaefer Steven A. Haas Nicholas J. Bishop	N = 509	• A significant positive effect for smoking similarity regarding how smoking affects friend selection was observed. • Adolescents were more likely to select each other as friends to the extent they engaged in similar levels of smoking. • A significant, positive smoking alter effect, and nonsignificant smoking alter squared effect was observed. • This suggests that adolescents were more likely to nominate students with higher levels of smoking as a friend. • Our results for selection indicate that smoking helps drive friend selection through both popularity and similarity	Longitudinal analysis	• Effects are not generalizable due to the sample. • Given the lower smoking rates among adolescents compared with Add Health data were collected, a key question is whether the strong effects observed exist in schools with lower smoking rates. The higher smoking prevalence in Jefferson High may have been a reflection of a particular school

	context where peer influence processes were especially strong, resulting in greater diffusion of smoking. Conversely, high smoking prevalence may have magnified its role in friend selection and increased adolescents' exposure to smoking peers, setting the stage for negative peer influence. Examining multiple schools is the only means to assess contextual and temporal variations in the smoking---friendship association. • It would also be worthwhile to consider friendships that extend outside the

	school grounds. The smoking behaviour of such friends may differ from that of in-school friends and may be an important alternative peer influence. Furthermore, the identification of causal peer effects requires controlling for any shared environmental factors that may both promote friendships and affect smoking.

A Family-Focused Randomized Controlled Trial to Prevent Adolescent Alcohol and Tobacco Use: The Moderating Roles of Positive Parenting and Adolescent Gender	Deborah J.Jones, Ardis L. Olson, Rex Forehand, Cecelia A. Gaffney, J.j. Bau	N = 1235 in substance use group N = 918 in control group	• Findings revealed no main effect of the prevention program. • Positive parenting and adolescent gender were moderators of internalizing problems and adolescent gender was a moderator of externalizing problems.	RCT	• All variables of interest were measured by self-report and may contain bias.

A Longitudinal Social Network Analysis of Peer Influence, Peer Selection, and Smoking Behavior Among Adolescents in British Schools	Liesbeth Mercken, Philip Sinclair, Christian Steglich, Jo Holliday, and Laurence Moore	N = 1716	• Adolescent's tendency to select friends based on similar smoking behaviour was found to be a stronger predictor of smoking behaviour than friends' influence. • The proportion of smoking behaviour similarity explained by smoking-based selection of friends increased over time, whereas the proportion explained by influence of friends decreased. • Smoking prevention should not solely focus on social influence but also consider selection processes and changes in both processes over time during adolescence.	longitudinal analysis	• Preliminary analyses revealed that the retained and non-retained families differed on demographic variables and two outcome variables. Such differences limit the conclusions from the study.
A Multilevel Analysis Examining the Relationship Between Social Influences for Smoking and Smoking Onset	Scott T. Leatherdale, Paul. W. McDonald, Roy Cameron, and K. Stephen Brown	N = 22091	• Students are at increased risk for smoking if they: have smoking friends; have smoking family members; and attend a school with a relatively high senior-student smoking rate. • Students surrounded by smoking friends and family members were more likely to smoke. • Prevention programs should target both at-risk schools and at-risk students.	Cross sectional secondary analysis	• Causal relationships cannot be inferred from these cross-sectional data. • Data were also based on self-reports, so the validity of the responses may be questioned, although some students were asked to provide pre-announced saliva samples for biochemical

	validation to further encourage honest reporting. • Data were not available to examine the influence of younger-sibling smoking behaviour.

A Network Method of Measuring Affiliation-based Peer Influence: Assessing the Influences of Teammates' Smoking on Adolescent Smoking	Kayo Fujimoto, Jennifer B. Unger, and Thomas W. Valente	N = 3137 baseline N = 2602 remained until the one-year follow-up survey N = 2186 remained until the two-year follow-up survey.	• Adolescents may be influenced to smoke by observing their sports teammates smoke and this tendency might be stronger among girls. • Results indicate that being exposed to teammate smokers of the same gender was significant only for girls, and these effects were stronger for girls-only boundary specification. • Results lend additional support for the validity of affiliation exposure.	Longitudinal analysis	• Statistical analysis did not address the possible overlap of the affiliation exposure measure with friendships.

A social contextual analysis of youth cigarette smoking development	Susan T. Ennett, Vangie A. Foshee, Karl E. Bauman, Andrea Hussong, Robert Faris, John R. Hipp, & Li Cai	N = 6544 youth N = 1663 parents of adolescents who completed the Wave 1 survey completed a 25-min telephone interview at Waves 1, 3, and 5.	• All the family context variables and the two-way interactions between family smoking and family social bond indicators were significantly associated with smoking from ages 11 through 17 years. • Family closeness and social regulation buffered the detrimental effect of family smoking on adolescent smoking, while family strain magnified the effect. • In the peer context, peer strain increased youth smoking, but did not magnify the effect of friends' modelling of smoking. • Peer closeness and social regulation amplified the positive relationship between youth smoking and friends' modelling of smoking. • In the school context, only classmates' modelling of smoking positively predicted adolescent smoking. • Neighbours' modelling of smoking was positively associated with the youth smoking trajectories. • None of the neighbourhood social bond variables predicted smoking or moderated the effect of neighbours' smoking. With the addition of the neighbourhood variables, all the significant relationships between adolescent smoking and the family,	Longitudinal analysis	• Analysis of time-varying measures demonstrated the contribution of social context characteristics to smoking averaged across all ages examined. • The study did not test differences at each age in the relationships between the social context variables and smoking. • The statistical models, while based on longitudinal data, did not allow us to assess temporality of relationships. • The models assessed the contemporaneous relationships between the time-varying social context measures and smoking at each time point assessed; the

	peer, and school context variables remained unchanged, although some significance levels were attenuated.		models did not assess whether the social context attributes at earlier ages predicted smoking at subsequent ages after controlling for prior smoking. • Temporality precludes determining whether the relationship between adolescent smoking and their friends' smoking is due to the adolescent's selection of friends or to socialization by those friends.

A Social Operational Model of Urban Adolescents' Tobacco and Substance Use: A Mediational Analysis	Michael J. Mason Jeremy Mennis Christopher D. Schmidt	N = 301	• The findings suggested that for these urban adolescents, social network quality partially mediates the effects of tobacco use on alcohol and drug use, while accounting for post-traumatic stress disorder (PTSD) symptoms and relations with parents. • Findings support the social operational hypothesis that the effects of tobacco use on substance use can be at least partially mediated by social networks. • Finding concluded by the multi-group analysis contradicted the hypothesis of group differences by gender and age, indicating no significant difference between groups. • The robust fit of the path model adds confidence to the claim that a social approach to addressing the linkage between tobacco and substance use for urban youth.	Cross-sectional analysis	• Cross-sectional and therefore cannot fully test the causal hypotheses that were advanced. • The social network assessment was limited to the adolescent report of their peers' substance use. • Research with adolescents outside of school settings makes capturing full network data extremely difficult and could not be done with the sample located within a primary health care setting. • The study could not say definitively whether the differential influence of the peer and family variables was due to true differences of influence between these

					variables or because of measurement differences. • The family variable assessed teen perceptions of support and warmth, the network measure primarily assessed risky behaviour. The different focus could be confounding the results. • Only one item was used to measure tobacco use.
Accuracy and Bias in Adolescents' Perceptions of Friends' Substance Use	David B. Henry Kimberly Kobus Michael E. Schoeny	N = 163 and N = 2194 Two samples that collected data on peer nominations, perceptions of peer substance use, and self-report substance use.	• Results from both samples provided evidence supporting the false consensus effect i.e - adolescents' reports of their friends' substance use were biased in the direction of their own use. • Users and nonusers did not differ in accuracy of perceptions; however, across all substances and samples, they differed significantly in bias. • Substance users displayed nearly perfect liberal bias, assuming their friends also used substances. Nonusers displayed an opposite,	Cross-sectional analysis	• The study cannot determine with absolute certainty that the friends on whom youth were asked to report their perceptions of substance use behaviours were the same friends nominated in the social network assessments. • The Teen Survey

			conservative bias, assuming their friends did not use substances. Gender and age differences in bias also were observed, with older adolescents and girls having more liberal biases than younger adolescents and boys. • Results suggest the importance of differentiating the effects of actual and perceived peer substance use.		and Add Health used different timeframes when asking about individual substance use. • Using dichotomous variables for perceived peer and individual substance use involves loss of information. • The use of non-reciprocated friendship nominations and ego networks instead of reciprocated nominations.
Actor-based analysis of peer influence in A Stop Smoking In Schools Trial (ASSIST)	Christian Steglicha, Philip Sinclair, Jo Holliday, Laurence Moore	School A: N = 158 (baseline); N = 158 (follow up); and N = 156 (follow up). School B: N = 191 (baseline); N = 189 (follow up); and N =	• The co-evolution of friendship and smoking is a time heterogeneous process, and that results are sensitive to specification details. However, the peer influence parameter is not affected by either, but emerges as surprisingly stable over time and robust to model variation. This establishes confidence in the method and encourages detailed future investigations of peer influence in	Longitudinal cluster randomised trial	• ???

		185 (follow up). School C: N = 247 (baseline); N = 244(follow up); and N = 244 (follow up).	ASSIST. • All results demonstrated robust evidence of friends' influence on adolescents' smoking, even after controlling for various sources of friendship selection. This encourages the use of SAB modelling in more detailed further investigations of factors potentially affecting peer influence in the school context		
Adding valued data to social network measures - Does it add to associations with adolescent substance use	Karl E. Baumana, Robert Faris, Susan T. Ennett, Andrea Hussong, Vangie. Foshee	N = 5224	• The social network measures in-degree, normed eigenvector centrality, and ego network density were not more often associated with adolescent substance use. • Data reaffirmed the suggestion that friend use, as measured with social network data, is substantially implicated in adolescent substance use. • Adding information about the closeness of adolescent relationships, and about relationships that occur in multiple contexts and that involve parents, to selected social network measures did not increase associations with adolescent substance use.	Cross-section analysis	• Cross sectional: unable to test causal pathways around smoking behaviours and cannot assess how smoking behaviours shift and interact with the community and their peers.

Adolescent Girls' Perceptions of Smoking Risk and Protective Factors: Implications for Message Design	Barbara Curbow; Janice Bowie; JoAnn Binko; Stephanie Smith; Erin Dreyling; Karen A. McDonnell	N = 108	• Girls, as a group, had definite opinions about items that were risk and protective, with the exception of one item, "worries about her weight," which, by a slim margin was placed with the risk items. • The categorization process is the high level of agreement given to negative affect (depressed, stressed, angry, hopeless) as a reason for smoking among adolescent girls. • The high level of agreement found for protective items; with over 90% agreement for all but five items, girls espouse definite opinions about the importance of positive factors in preventing smoking. • Overall, girls who attended public schools, who were in the younger age category, and who had never smoked and had no friends who smoked gave higher importance ratings to the factors.	Theory development and the establishment of an advisory panel	• This study is somewhat limited by its small sample size, and the use of snowball rather than random sampling hinders the generalizability of results.

Adolescent smoking and drinking: The role of communal mastery and other social influences	Bettina F. Piko	N = 634	• High levels of communal mastery were an important protective factor against adolescent boys' smoking and drinking. • Communal mastery did not play an important protective factor role for girls. • The role of social motives, friends' and best friend's substance use and parental approval were justified. • Smokers and regular drinkers, both girls and boys, scored significantly higher on social motives than nonusers. • Overall, findings supported the mechanism of social influences in determining adolescent smoking and drinking. • There is no doubt about the importance of peer context and other social influences. • Results also suggest that there may be important gender differences in the ways of how these social influences work.	Cross-sectional survey analysis	• The study relies on the use of self-reports of data. In addition, because data are cross-sectional, it is not possible to make causal inferences.

Adolescent smoking networks: The effects of influence and selection on future smoking	Jeffrey A. Hall Thomas W. Valente	N = 1960 at baseline N = 880 at follow up	• Results indicate that peers impact both immediate and future smoking behaviour and influence the development of friendship networks. • In 6th grade, selection processes (nominating smokers as friends) predicted future smoking and susceptibility to smoke, controlling for smoking in 6th grade. • Sixth grade peer influence processes (being nominated by smokers) shaped 7th grade peer environment, which indirectly affected smoking susceptibility. • Findings suggest that smokers' influence in 6th grade negatively predicted 7th grade smoking and smoking susceptibility. • When a non-smoking adolescent chooses not to reciprocate a friendship tie from a smoker, results indicate the student decreases her/his chances of smoking by keeping her/his friendship environment undiluted by smokers' influence. • Over the long-term, however, nominations received from smokers can increase the chance of future smoking indirectly through the future friendship environment. Smokers' influence in 6th grade	Longitudinal analysis	• This includes the use of surveys which included a name generator and may have limited participants' ability to name all of their friends and household members. Another limitation was the use of self-reported measures of smoking and network characteristics behaviours with participants potentially self-censoring their behaviours and responding in a manner perceived to please the researcher

			predicts the selection of smokers in 7th grade. If a student is picked by smokers to be their friend in 6th grade, by 7th grade that student is likely to choose more smokers as friends.		
Adolescent substance use in different social and peer contexts: A social network analysis	Michael Pearson, Helen Sweeting, Patrick West, Robert Young, Jacki	N = 3146	• For smoking, there was a significant main effect of sociometric position, with lower than average rates among those in groups, and higher rates among dyads and isolates. • There was an interaction between school SES and popularity (highest smoking rates among the least	Cross-sectional analysis	• Cross sectional: unable to test causal pathways around smoking behaviours and cannot assess how smoking behaviours shift

	Gordon, & Katrina Turner		popular in lower SES schools, but the most popular in higher SES schools), and there was no effect of expansiveness. • The only significant result was that between popularity and expansiveness in respect of smoking. • Among pupils with high or very high popularity, rates of smoking were 14% among the majority (n=646) who were normal on expansiveness, increasing to 22% among those (n=46) low, and further to 36% among the small group (n=14) very low on expansiveness. • Among unpopular or low popularity pupils there was no association between expansiveness and smoking.		and interact with the community and their peers.
Adolescent Tobacco Use in the Netherlands: Social Background, Education, and School Organization	Chip Huisman, Herman G. van de Werfhorst, and Karin Monshouwer	N = 7415	• Parental education and attitudes play a significant role in adolescent smoking. • The composition of the school in two ways: the average score on the variables at the school level and by examining the dispersion within schools. Model 4 demonstrated that the average score of parents' education has a positive effect on smoking. So, among students with	Cross-sectional analysis	• The survey data used here for the measures for the compositional effects are not optimal to measure network effects. • Assumptions about the norm-enforcing or horizon-expanding structure of

		the same individual social background, students are more inclined to smoke if they attend a school with a high average parental educational attainment. • Model 5 demonstrated that the dispersion of parents' education at the school level has a negative effect on smoking. • Parental norms regarding smoking on the school level have no significant effect.	networks. • The mean and standard deviation of parental educational level and attitudes on smoking and a dichotomous variable for school organization are used as proxy indicators for social capital. • School composition effects have often been theorized from the perspective of social networks in educational studies.

Alcohol, Tobacco and Caffeine Use: Spouse Similarity Processes	Chandra A. Reynolds, Tracy Barlow, and Nancy L. Pedersen	N = 769	• Social homogamy may be more important for some substance use traits such as alcohol consumption and tobacco use status but not others.	Cross-sectional analysis	• Cohort-specific influences such as the historical Swedish alcohol rationing system that limit generalizability to later-born cohorts as well as other nationalities. • Studies of the changes in the relative contributions of shred environmental influences versus heritable influences across cohorts for alcohol consumption would provide further weight as to the effect of the rationing system on earlier than later cohorts. • The study assumed a particular model of initial spouse similarity that includes phenotypic

	assortment and social homogamy, modelled as a shared social background effect, i.e., a shared environmental effect. • The study did not consider other mechanisms of similarity such as marital interaction, convergence, or other models of initial spousal similarity (e.g., Tambs et al., 1993). • The study included only same-sex twins that constrain testing of sex limitation.

Superusers in Social Networks for Smoking Cessation: Analysis of Demographic Characteristics and Posting Behavior From the Canadian Cancer Society's Smokers' Helpline Online and StopSmokingCenter.net	Robert Tait, Helen Christensen, and Alison Calear	N = 21128 Canadian Cancer Society's Smokers' Helpline Online N = 11,418 StopSmoking Center.net	• Superusers drive network traffic, organizations promoting or supporting WATI should dedicate resources to encourage superuser participation.	Cross-sectional analysis	• It is also important to note that this study focused only on smokers, and future studies should examine social network behaviour and demographic characteristics from superusers, superuser subsets, moderate posters, and lurkers from other condition areas.
Antismoking Parenting Practices Are Associated With Reduced Rates of Adolescent Smoking	M. Robyn Andersen; Brian G. Leroux; Jonathan B. Bricker; Kumar Bharat Rajan; Arthur V. Peterson	N = 3555	• Adolescents of parents who report having rules about smoking in one's home, using non-smoking sections of public establishments, or asking others not to smoke in one's presence were significantly less likely to smoke than adolescents of parents who did not engage in antismoking actions. • Parents' antismoking actions may help prevent smoking by their teenaged children	Cross-sectional analysis	• The cross sectional nature of these data on parental antismoking parenting practices.

Anti-smoking socialization beliefs among rural Native American and White parents of young children	Michelle C. Kegler, and Lorraine Halinka Malcoe	N = 356	• White and Native American parents in this study were very similar in their anti-smoking socialization beliefs, with the one exception that Native American parents were less likely to believe that schools are better than parents in teaching children about the dangers of cigarette smoking. • Parental education was significantly associated with the beliefs that all children will try smoking and that forbidding children to smoke will only make them want to smoke more, with less-educated parents more likely to share these beliefs. • Findings suggest that interventions to promote anti-smoking socialization beliefs among parents with high school education or less may be important in low-income, rural communities with high smoking rates.	Cross-sectional interview analysis	• Cross sectional study in specific rural setting. • Limited generalizability. • Parents in the study had young children; many other studies of anti-smoking socialization focus on parents of adolescents or older children.

Association between parental and individual psychiatric/substance use disorders and smoking stages among Puerto Rican adolescents	Lisa C. Dierker, Glorisa Canino, Kathleen R. Merikangas	N = 450 San Juan, Puerto Rico N = 350 New Haven, CT, USA	• Experimental smoking among adolescent offspring was associated with parent proband disorders. • In contrast, regular smoking behaviour, defined as at least weekly smoking for a month or more, and DSM-IV nicotine dependence were more strongly associated with the adolescents' own psychiatric disorders. • With the exception of anxiety disorders, significant bivariate associations were shown between each psychiatric/substance use disorder and nicotine dependence. • Combining family and migrant research strategies within a single study, the investigation was able to simultaneously examine familial, individual and sociocultural factors that may play a role in development and/or persistence of smoking behaviour among Puerto Rican adolescents.	Cross-sectional analysis	• Cross-sectional nature of the study precludes cause and affect analysis. • Self-reported psychiatric disorders may underestimate prevalence. • Limited sample size. • Diverse nature of drug abuse and dependence limited specificity of relationships.

Asymmetric peer effects in the analysis of cigarette smoking among young people in the United States, 1992–1999	Jeffrey E. Harris, Beatriz Gonzalez Lopez-Valcarcel	N ≈ 90000	• The presence of additional smoking sibling in a household increased a young person's probability of smoking by 7.6%, while each non-smoking sibling lowered the probability by an estimated 3.5%. • The overall deterrent effect of an increase in cigarette price on the probability of smoking was approximately 60% greater than the estimated effect when peer influences were held constant. • The concept of asymmetric social influence may have applications in other fields, including labour economics, education, crime prevention, and group dynamics.	Longitudinal analysis	• The study may have relied too heavily upon the assumption of a multivariate normal error structure to distinguish peer effects from household-specific "common shocks". • The peer group in the study was restricted to only young people within the household. • When it comes to smoking decisions, the study assumed that adults influenced young people, and that young people influenced each other, but that young people did not influence adults.

Behavioral Heterogeneity in Adolescent Friendship Networks	Callie H. Burt and Carter Rees	N > 90000 N = 7394 for the smoking N = 7379 getting drunk	• Results suggest that variation in involvement in delinquency among the peers in an adolescents' friendship network influences peer smoking and drunkenness in ways that are not captured by simply averaging or summing the levels of delinquency among peers. • These findings underscore the idea that non-delinquent peers can counterbalance the influence of delinquent peers. Thus, adding pro-social or at least non-delinquent peers to a youth's network can counteract some of the influence of delinquent peers. • These findings also imply that given the struggle or fears that many caregivers have about their children hanging around with troubled friends, one avenue for mitigating potentially "bad" influences is exposing their children to a range of pro-social individuals, institutions, and networks.	Longitudinal analysis	• The study only examined two substance-use (status) offenses. • Concerns the operationalization of friendship networks in the Add Health data. Respondents can nominate up to ten individuals as friends: five same-sex peers as well as five opposite-sex peers.

Beliefs About the Risks of Smoking Mediate the Relationship Between Exposure to Smoking and Smoking	Rodriguez, Daniel; Romer, Daniel; Audrain-McGovern, Janet	N = 963	• Beliefs about the personal harm and general immediate harm of smoking had significant and negative direct effects on smoking one year post high school. However, controlling for 10th grade smoking, only personal harm beliefs mediated the relationship between household smoking exposure and smoking behaviour. • Exposure to household smoking may affect adolescent smoking, through its effects on beliefs about the personal harm of smoking, beyond the effects of previous smoking.	Longitudinal analysis	•
Beyond modeling: Parenting practices, parental smoking history, and adolescent cigarette smoking	Molly Middlecamp Kodl, Robin Mermelstein	N = 345	• Parents with a history of smoking and parents of adolescents who had tried smoking were less efficacious, held weaker antismoking beliefs, and less often reported household smoking rules. • Children who had at least one parent who was a current smoker were two times more likely to have experimented with smoking and two and a half times more likely to go beyond initial experimentation. • Children whose parents did not currently smoke, but who were former smokers, had an elevated risk for smoking.	Cross-sectional analysis	• Adult smoking rates in the current sample are much lower than national averages, reflecting the lower response rates from smoking parents and the high socioeconomic status of the sample. The lower prevalence rate of smoking in the study, coupled with a relatively

	high level of parental education and lack of ethnic and cultural diversity, suggests that results may not be generalizable across socioeconomic status and ethnicity. • The cross-sectional design of the study prevented an examination of reciprocal effects between child smoking and the development of parental behaviours or vice versa. • The data in this study were not sufficient to examine whether parental behaviours were precursors to adolescent smoking or whether

					adolescent experimentation with smoking served as a catalyst for antismoking parenting. • Data came primarily from mothers. Although parental behaviour did not vary by parental gender in the study.
Bi-Directional Relations Between Anti-Smoking Parenting Practices and Adolescent Smoking in a Dutch Sample	Rose M. E. Huver, Rutger C. M. E. Engels and Ad A. Vermulst, Hein de Vries	N = 2410	• Adolescent smoking behaviour was a stronger predictor of parenting than vice versa. • Anti-smoking house rules decreased as a result of adolescent smoking behaviour, while communication increased. The reduction in house rules was more pronounced if parents smoked, while the increase in communication was greater for non-smoking parents. Results were independent of adolescent sex. • This study emphasizes the need for caution in interpreting cross-sectional research findings relating parenting to adolescent smoking.	Cross sectional	• Data were based on self-reports. First, adolescents thus reported on their own smoking behaviour. • The design of this study did not allow data collection among multiple informants and, as such, limited to adolescent reports on parenting behaviours.

Chain reactions in adolescents' cigarette, alcohol and drug use: similarity through peer influence or the patterning of ties in peer networks?	Deirdre M. Kirke	N = 267	• Similarity in substance use among adolescents and their peers is usually attributed to peer influence or, occasionally, to either peer influence or selection. • This paper suggests that similarity is due to both peer influence and selection.	Cross-sectional analysis	• The use of self-reported measures of smoking and network characteristics behaviours with participants potentially self-censoring their behaviours and responding in a manner perceived to please the researcher.
Challenges to the peer influence paradigm - Results for 12–13 year olds from six European countries from the European smoking prevention framework approach study	H de Vries, M Candel, R Engels, L Mercken	N = 7102	• No support was found for peer smoking as an important predictor of smoking onset in most countries. • Support was found for the selection paradigm, implying that adolescents choose friends with similar smoking behaviour. • Support for the impact of parents on adolescent behaviour and the choice of friends was also found. • Smoking uptake in this age cohort may be more strongly influenced by personal and parental influences than initially believed. • Social inoculation programmes teaching youngsters to resist the pressures to smoke may be less appropriate if youngsters have a positive attitude towards smoking,	Longitudinal analysis	• Self-reported smoking behaviour was not validated by biochemical measures. • Reports on parental and friends' smoking were based on the adolescents' reports. • Friendships may change rapidly in adolescence and may not have been able to assess these changes.

	associate smoking with various advantages and look for peers with similar values.	

Changes in Adolescents' Sources of Cigarettes	Leslie A. Robinson, William T. Dalton III, and Leslie M. Nicholson	N = 4461	• Social sources are the primary method through which young teens obtain cigarettes. • Data suggested that for seventh graders, purchasing cigarettes was relatively uncommon, even though they believed it would be easy to get. • Only 11% of the adolescents reported buying cigarettes in a store, and even fewer (6%) used vending machines. • At this young age most of teen smoked infrequently. • The new-onset smokers had the same access patterns, regardless of when smoking initiation occurred. Thus, late-onset smokers used the same number and type of sources as early-onset smokers. • Apparently, even for older teens, peer offers of cigarettes are highly influential. • Specifically, teens who smoked throughout the two-year interval developed social networks with more smokers. By Year 3, continuous smokers had more friends who used tobacco than did teens who had recently initiated smoking. This pattern suggests that once adolescents become smokers, they bond with other smokers,	Longitudinal analysis	• Limitations include the assessment of only a few major sources of tobacco • Self-reporting bias

	imbedding themselves in a tobacco-friendly network. In essence, they structure their social system to support their tobacco use, and even though purchase from stores may become easier as they age, social smoking remains important.	

Changes in the influence of parents' and close friends' smoking on adolescent smoking transitions	Jonathan B. Bricker Arthur V. Peterson Jr., Irwin G. Sarason, M. Robyn Andersen, K. Bharat Rajan	N = 6006	• Results showed that the influence of parents' smoking was substantial for all three transitions during most of the grade periods and, for the transition from monthly to daily smoking, increased during adolescence. • The influence of close friends' smoking was strongest for the transition to trying smoking and did not significantly change for any of the smoking transitions as the adolescent became older. • The influence of close friends' smoking on smoking transitions might be stable during adolescence whereas the influence of parents' smoking on the transition to daily smoking might markedly increase across adolescence.	Longitudinal analysis	• This study did not explore whether other known predictors of smoking, such as family-level socioeconomic status, moderate the associations studied here. • This study included a representative Washington sample, but did not include a large percentage of non-Caucasian racial groups. • Selection bias may also be possible because baseline and follow-up data were not available for all. • Adolescents reported on their friends' smoking status and as a result the findings may have overestimated close friends' smoking influence

(Kandel, 1996).

Childhood friends who smoke: Do they influence adolescents to make smoking transitions	Jonathan B. Bricker, Arthur V. Peterson Jr., M. Robyn Andersen, K. Bharat Rajan, Brian G. Leroux and Irwin G. Sarason	N = 4744	• Results provide new evidence suggesting that childhood close friends who smoke influence not only initiation but also escalation of adolescents' smoking. • Results confirmed the important role of parents' smoking. • Targeting both childhood close friends' and parents' smoking would be valuable in prevention research.	Longitudinal analysis	• This study did not explore whether other known covariates of smoking, such as family-level socioeconomic status, influence the associations studied here. • The study does represent the general population of Washington residents. • Child smoking was biochemically validated, but there was no biochemical validation of self-reported smoking by the adolescents' other parent(s). • It is conceivable that the effects of smoking parents on child smoking may be different for smoking parent(s) who do not reside in the same household

	with the child, who are stepparents, or who are other kinds of parent figures. • There is a possibility of selection bias because baseline and follow-up data were not available for all the families.

Choosing adolescent smokers as friends: The role of parenting and parental smoking	L. Mercken, E.F.C. Sleddens, H. de Vries, C.E.G. Steglich	N = 254	• Results showed adolescents perceiving high parental psychological control had a significant higher tendency to select smoking friends. • Perceived behavioural control and perceived parental support did not affect the selection of smoking friends. • Maternal smoking behaviour affected the selection of smoking friends, although no effect of paternal smoking behaviour on the selection of smoking friends was found. • Adolescent smoking prevention efforts should focus on the influence of parents through their smoking behaviour and their psychological control to decrease adolescents' tendency to select smoking friends resulting in fewer opportunities for negative peer influences to occur.	Longitudinal analysis	• Self-reported smoking behaviour for adolescents and friends, which were not validated biochemically. • Parental smoking was measured dichotomous which ruled out the possibility to examine effects of heavy smoking parents. • No direct measures of parenting dimensions and parental smoking were available which might have biased estimated effects since parents and adolescents may differ in the perceptions of parenting and parental smoking. • The study did not separate paternal and maternal parenting dimensions, even

	though the used parenting survey was developed to distinguish between parents. • The sample existed from one school, which makes it hard to generalize the findings. • The study focused on friends within grades 2, 3 and 4 of the school.

Close friends', parents', and older siblings' smoking: Reevaluating their influence on children's smoking	Jonathan B. Bricker, Arthur V. Peterson, Jr., M. Robyn Andersen, Brian G. Leroux, K. Bharat Rajan, Irwin G. Sarason	N = 4,576	• The probability that each close friend's smoking influenced the child to smoke daily was 9% (95% CI 6%–12%). • The probability that each parent's smoking influenced the child to smoke daily was 11% (95% CI9%–14%). • The probability that each older sibling's smoking influenced the child to smoke daily was 7% (95% CI51%–13%). • Results suggest that close friends', parents', and siblings' smoking were similarly important influences on children's smoking. • Family-focused interventions could be a valuable future direction of prevention research.	Longitudinal analysis	• The study accounted for variations in district-level correlates of children's smoking, but did not explore whether other known covariates of smoking, such as family-level socioeconomic status, moderate the associations studied here. • The study represents the general population of Washington residents, but does not represent non-White racial groups. • There were no biochemically validated self-reports of smoking by the child's other parent, older siblings, and close friends. • Selection bias is possible because

	baseline and follow-up data were not available for all the families.

College student involvement in cigarette smoking: The role of psychosocial and behavioral protection and risk	Frances M. Costa, Richard Jessor, Mark S. Turbin	N = 975	• The protection/risk theoretical model accounted for substantial variation in college students' cigarette smoking. • Psychosocial and behavioural protective and risk factors accounted for significant variation in smoking involvement, and protection moderated the impact of risk. • Findings were consistent, for the most part, for both genders and across three separate waves of data. Psychosocial predictors of smoking involvement in the cross-sectional multivariate models included two aspects of controls—social and individual—and two types of risk—models risk/peers and vulnerability risk/individual. • In addition, support protection/ family (expressed interest and support from parents) moderated vulnerability risk/individual (stress, depression, and low self-esteem); that is, when support protection was high, the influence of vulnerability risk was attenuated. \ • Behavioural protective and risk factors were consistent and significant predictors of college smoking involvement: Greater academic achievement, a	Longitudinal analysis	• The limited number of social contexts of college student life assessed. • The sample was drawn from a single university. • The sample was large and similar on demographic measures to the entire freshman class. However, it is not possible to generalize for the entire freshman class as this is not a random sample. • Sample attrition between Waves 1 and 3 (35%). •

behavioural protective factor, was associated with lower smoking involvement; and higher involvement in problem drinking and marijuana use, both behavioural risk factors, was associated with greater smoking involvement.

- The present study has shown that psychosocial and behavioural protective factors and risk factors play a significant role in cigarette smoking involvement and initiation in this sample of college students.

Communication about smoking in Dutch families: associations between anti-smoking socialization and adolescent smoking-related cognitions	Rutger C. M. E Engels and Marc Willemsen	N = 116	• Findings showed that parents and adolescents differ in their reports on antismoking socialization. • Generally, mothers are more positive about anti-smoking socialization than adolescents and fathers. • The results demonstrate that aspects of anti-smoking socialization, such as parental monitoring, norms on adolescents smoking and reactions on adolescent smoking, are related to smoking related cognitions, such as negative attitudes to smoking, lower intentions to start smoking and higher self-efficacy.	Cross-sectional analysis	• The cross-sectional design of the study does not permit any conclusions about causality. • The total number of families that provided data was limited. This small sample size does not allow for analyses in different subgroups, such as gender, educational level and age of the adolescent.
Correlates of expected positive and negative support for smoking cessation among a sample of chronically ill veterans	Laura J. Fish, Jennifer M. Gierisch, Karen M. Stechuchak, Steven C. Grambow, Lesley D. Rohrer, Lori A. Bastian	N = 471	• When participants enter a smoking cessation program expecting high levels of positive support, they may be less likely to engage in an intervention which teaches strategies that enhance positive support. • Smokers with high expectations for positive support might be more vulnerable to suffer setbacks if support received is lower than expected. • Smokers who begin a cessation program expecting high levels of negative support may desire more	RCT	• The cross-sectional design means analyses cannot assess causal relationships. • This study involved chronically ill veterans enrolled in a smoking cessation intervention; findings may not generalize to other smokers not enrolled in a

			intensive support-based strategies to minimizing anticipated negative support. • Individual differences that influence perceptions of expected support are likely to influence intervention participation and engagement.		research study. • The study sample included a small number of women veterans which may also limit generalizability.
Correlates of Smoking Cessation Among Filipino Immigrant Men	Gabriel M. Garcia A Romina A. Romero A Annette E. Maxwell	N = 318	• Those who reported more English language use with their family, friends and neighbours (OR = 1.31) and who lived in households with complete smoking prohibition (OR = 3.82) were more likely to be successful in quitting smoking. • Those who endorsed more positive beliefs on physical and social consequences of smoking (OR = 0.69) and who had mostly smoking friends (OR = 0.37) were less likely to be successful in quitting smoking. • Findings suggest that prohibiting smoking in households, creating social networks of non-smokers, and education or counselling are important components of a smoking	Cross-sectional analysis	• It analysed cross-sectional data, limiting the study's ability to make causal inferences. • The data collected were from a convenience sample, limiting generalizability.

			cessation intervention for Filipino immigrant men.		
Could the peer group explain school differences in pupil smoking rates? An exploratory study	Katrina Turnera, Patrick West, Jacki Gordon, Robert Young, Helen Sweeting	N = 896	• Smoking was more common among dyads and isolates.	Mixed method (qualitative and quantitative) cross sectional analysis	• Generalizability is limited due to the sample being only from two schools, both served deprived areas in the west of Scotland. • The data are cross-sectional, thereby limiting any conclusions about the direction of causality (selection/ influence) between socio-metric position and smoking. • As only reciprocated relationships were defined as friendships, some of those classed as isolates may have been friends with

	individuals not surveyed. • As most participants described themselves as non-smokers, the discussion group data might not have reflected the views of smokers as fully as those of non-smokers. • Smokers may have been reluctant to voice their views, as non-smokers were the majority in most of the groups. • The sampling approach used to recruit participants may have led to an under-representation of isolates, and therefore smokers.

Current smoking among young adolescents: assessing school based contextual norms	S B Pokorny, L A Jason, M E Schoeny	N = 5399	• Students in schools with higher average reported peer tobacco use were more likely to be current smokers than students in schools with lower average peer tobacco use. • The effect of school level perceived peer tobacco use on current smoking was significant when individual perceived peer tobacco use was excluded from the model but was non-significant when individual perceived peer tobacco use was added to the model. • A multilevel model indicated that the effect of school level perceived peer tobacco use on current smoking was not significant when individual perceived peer tobacco use was added to the model.	Cross-sectional analysis	• A cross sectional research design, and thus it was not possible to make conclusions about causality. • The relatively limited number of schools sampled may results in difficulties in assessing the effects of contextual factors, such as schools. • The selection of the contextual measure, school based perceived peer tobacco use, was based on previous research and a theoretical focus on social learning theory. However, there may be a range of other school based contextual factors that impact risk for current smoking. • The inability to obtain a significant

	school level effect in the present analyses may be that the peer group influence was more salient to individual behaviour and the selection of a variable that measured perceptions of peer behaviour may pose some difficulties with finding school level effects.

Dating and changes in adolescent cigarette smoking: Does partner smoking behavior matter	Robin J. Mermelstein , Peter J. Colvin , & Sven D. Klingemann	N = 1263	• Findings indicated that a change in dating status from not dating to having a partner significantly increased the odds of the adolescent smoking at 15 months but significantly only for those who dated a smoker. • All boys who dated a smoker smoked themselves. • Among adolescents who smoked at 15 months, there was also a strong protective effect among boys for dating a non-smoker, compared with either those who did not have partners or those with smoking partners; boys with non-smoking partners smoked significantly less than those with partners who smoked or those without partners.	Longitudinal analysis	• Self-report/recall bias

Dating and substance use in adolescent peer networks: a replication and extension	Derek A. Kreager, Dana L. Haynie & Suellen Hopfer	N = 744 dating couples	• Partner (b = 0.77, P < 0.01) and direct friends (b = 1.19, P < 0.05) smoking showed strong and significant associations with future smoking, but friends-of-partner smoking did not (b = -0.44, P > 0.10). • Romantic partner and peer behaviours have substantially different associations with adolescent smoking. • Intervention efforts aimed at reducing teenage smoking should be aimed at proximal peer and romantic relationships.	Longitudinal analysis	• The sample consists of adolescents living in rural Iowa and Pennsylvania communities, limiting generalizability.
Decomposing the Components of Friendship and Friends' Influence on Adolescent Drinking and Smoking	Kayo Fujimoto and Thomas W. Valente	N = 2533	• Results indicated that the influence from mutual or reciprocated type of friendship relations is stronger on adolescent substance use than directional, especially for smoking. • Results for intimate friends' friendship relations indicated that the influence from "best friends" was weaker than the one from "non-best friends" which indicates that the order of friend nomination may not matter as much as nomination reciprocation. • This study demonstrated that considering different features of friendship relationships is important in evaluating friends' influence on adolescent substance use.	Longitudinal analysis	• Our results are limited in their ability to understand the process of peer selection. • The network exposure model does not account for the network dependencies that arise within the community from network structure. • The exponential random graph model (ERGM), which has been widely used as a

					method of directly modelling underlying structural forces in combination to actor attributes using observed social network data, deals with network dependencies, but may be limited in its ability to directly model peer influence.
Demographic and Psychosocial Characteristics of Smokers and Nonsmokers in Low-Socioeconomic Status Rural Appalachian 2-Parent Families in Southern West Virginia	Hana Song and Margaret Fish	N = 121.	• Compared to non-smokers, prenatal smokers were less likely to have completed high school, less extroverted, and also had lower self-esteem, less intimate support, and more negative marital relationship. • High school graduation and variables related to positive personality and supportive relationships distinguished smokers from non-smokers.	Cross sectional analysis of face-to-face interviews.	•

Determinants of smoking initiation among women in five European countries: a cross-sectional survey	Debora L Oh, Julia E Heck, Carolyn Dresler, Shane Allwright, Margaretha Haglund, Sara S Del Mazo, Eva Kralikova, Isabelle Stucker, Elizabeth Tamang, Ellen R Gritz, Mia Hashibe	N = 5000	• Being older, being divorced, having friends/family who smoke, and having parents who smoke were all significantly associated with ever smoking, though the strength of the associations varied by country. • The most frequently reported reason for initiation smoking was friend smoking, with 62.3% of ever smokers reporting friends as one of the reasons why they began smoking. • Women who started smoking because their friends smoked or to look 'cool' were more likely to start smoking at a younger age. • In all five participating countries, friends were the primary factor influencing ever smoking, especially among younger women. • The majority of participants began smoking in adolescence and the average reported age of smoking initiation was youngest in Sweden and oldest in the Czech Republic.	Cross-sectional analysis	• The study used a stratified sampling approach using available telephone numbers. However, administering the survey via telephone prevented us from verifying self-reported data. • The potential for recall bias on reported age of initiation may have affected the accuracy of results. • No mobile phone numbers were included in the phone list, the study could have excluded a substantial number of women who may have unknown differences than those who could be reached.

Differential contributions of parents and friends to smoking trajectories during adolescence	Frank Vitaroa, Brigitte Wannera, Mara Brendgena, Catherine Gosselinb, Paul L. Gendreau	N = 812	• Findings supported expectations and helped resolve the conflicting results from past studies. For adolescents aged 13–14 years or older, friends are the main source of influence for smoking initiation. • For early adolescents aged around 12–13 years old, parents' and friends' behaviour both matter. • For preadolescents, parents' smoking behaviour appears to matter more than friends'. • Personal characteristics also seem to be an important predictor of smoking initiation at this young age.	Longitudinal analysis	
Diffusion, cohort change, and social patterns of smoking	Fred C. Pampel	N = 14274	• The effect of education becomes increasingly negative across cohorts as cigarette diffusion proceeds. • The results for once smoked and now smokes support the hypothesis that the effect of father's education becomes increasingly negative across cohorts as cigarette diffusion proceeds. • The results for once smoked and now smokes support the hypothesis that the effect of parents' income becomes increasingly negative across cohorts as cigarette diffusion proceeds. • The results for now smokes support the hypothesis that the effect of adolescent city size of residence	Longitudinal analysis	•

	becomes increasingly negative across cohorts as cigarette diffusion proceeds. • The results for once smoked and now smokes support the hypothesis that the effect of being male becomes increasingly negative (or less positive) across cohorts as cigarette diffusion proceeds. • The results for once smoked and now smokes do not support the hypothesis that the effect of being white becomes increasingly negative across cohorts as cigarette diffusion proceeds.	

Disentangling social selection and social influence effects on adolescent smoking - the importance of reciprocity in friendships	Liesbeth Mercken, Math Candel, Paul Willems & Hein de Vries	N = 1886	• Social selection and social influence both played an important role in explaining similarity of smoking behaviour among friends. • Within non-reciprocal friendships, only social selection explained similarity of smoking behaviour, whereas within reciprocal friendships, social influence and possibly also social selection explained similarity of smoking behaviour. • Sibling smoking behaviour was a more important predictor of adolescent smoking behaviour than parental smoking behaviour. • Social selection and social influence both promote similarity of smoking behaviour, and the impact of each process differs with the degree of reciprocity of friendships.	Longitudinal analysis	• Self-reported smoking behaviour was not validated by biochemical measures. • No direct measures of parental smoking behaviour and sibling smoking behaviour were available. • The use of a fixed-response name generator might have restricted the ability to reciprocate, as respondents were allowed to nominate only up to five best friends. • Only two possible social positions were considered: reciprocal and nonreciprocal friends. A reciprocal friend can still be part of an isolated friendship pair, connected to someone within

	the group but not part of the group, or a group member.

Distal and proximal family predictors of adolescents' smoking initiation and development: A longitudinal latent curve model analysis	Tore Tjora, Jørn Hetland, Leif Edvard Aarø, and Simon Øverland	N = 1053	• Parents' and siblings' smoking behaviours acted as mediators of parents' SES on the smoking habits of adolescents. • Parents' SES was significantly associated, directly and indirectly, with both smoking initiation and development. • Parental and older siblings' smoking behaviours were positively associated with both initiation and development of smoking behaviour in adolescents. • Over time, parents' SES both directly and indirectly predicts smoking initiation and development among children. Although the direct association between parents' SES diminishes as adolescents grow older, the combination of parental and sibling influence is important.	Longitudinal analysis	• Missing values and attrition were limitations. • Parents' job status and education level were used for parent-based socioeconomic status.

Do Peers' Parents Matter? A New Link Between Positive Parenting and Adolescent Substance Use	Michael J. Cleveland, Mark E. Feinberg, Wayne Osgood, and James Moody	N = 7439	• Findings suggest that the parenting style in adolescents' friends' homes plays an important role in determining adolescent substance use.	Longitudinal analysis	• The study relied on adolescent reports of parenting behaviours at both the individual and friendship-group level. • The current results also must be considered in terms of the relatively homogenous sample, which was primarily White and drawn from semirural and rural areas in two states. • Measures of parents' use of positive reinforcement of prosocial activities were not available.

Do popular students smoke? The association between popularity and smoking among middle school students	Thomas W. Valente, Jennifer B. Unger, Ph.D., and C. Anderson Johnson	N = 1486	• Popularity was associated with increased susceptibility to smoke (Adjusted Odds Ratio [AOR] 5.64, $p < .001$) and smoking (AOR = 5.09, $p < .05$) over the 1-year interval between surveys. • Popular middle school students were more likely to become smokers compared to their less popular peers. • There seems some difference in the association by gender and ethnicity, the evidence does not suggest subgroup effects in this population.	Longitudinal analysis	• Interpretation and the generalizability of these results must acknowledge the limited sample. • Schools were purposely selected for their ethnic diversity, as required by the larger study of cultural influences on smoking. • Smoking prevalence is expected to be high in these schools. • The study was conducted in the context of an intervention designed to slow smoking uptake which may have affected outcomes.

Does Enhancing Partner Support and Interaction Improve Smoking Cessation? A Meta-Analysis	Eal-Whan Park, Fred Tudiver, Jennifer K. Schultz, and Thomas Campbell	Nine studies (31 articles) met inclusion criteria.	• Interventions to enhance partner support showed the most promise for clinical practice when implemented with live-in, married, and equivalent to- married partners.	Literature review and meta-analysis	• All studies included self-reported smoking cessation rates and may include bias, but there was limited biochemical validation of abstinence.
Does parental smoking cessation encourage their young adult children to quit smoking? A prospective study	Jonathan B. Bricker, K. Bharat Rajan, M. Robyn Andersen & Arthur V. Peterson Jr	N = 1553	• Parental early smoking cessation is associated with increased odds of their young adult children's smoking cessation. • Parents who smoke should be encouraged to quit when their children are young.	Longitudinal analysis	• The cell sizes for smoking cessation and reduction out-comes were small for the late parental quitting analysis, which reflects a general difficulty of most smoking cessation studies. The study's measure of smoking cessation (30-day abstinence) is the likely possibility that a non-negligible

	proportion of these abstainers will relapse (Hughes et al. 2003). • A biochemical validation of smoking cessation would have been valuable. • This study did account for variations in district-level correlates of children's smoking, other known predictors of smoking, such as family level socio-economic status and being a single parent, may have influenced the association between parent smoking cessation and their young adult children's smoking cessation. • This study's sample was representative of Washington State, noting it was

					only 10% non-Caucasian. • A randomized controlled trial to help parents quit would test whether the parental cessation–child cessation link established in this study is merely associational or causal.
Dyadic Efficacy for Smoking Cessation: Preliminary Assessment of a New Instrument	Katherine Regan Sterba, Vance Rabius, Matthew J. Carpenter, Pamela Villars, Dawn Wiatrek, & Alfred McAlister	N = 634	• The role of partner relationships in smoking cessation may be better understood through dyadic efficacy.	Longitudinal analysis	• Only eight dyadic efficacy items were examined at a single point, limiting the ability to make conclusions about the properties of the instrument over time. • All participants were called a Quitline with some degree of motivation to quit, and as a result are not representative

	of the general smoking population. • Data was collected from only one partner in dyads, preventing an understanding of the support providers' perspective. • The response rates at follow-up were low and could include bias, while limiting the ability to detect potential relationships between dyadic efficacy and quit outcomes over time. • Important aspects of relationship functioning were not assessed in the study e.g. - negative support, which may be relevant to dyadic

		efficacy and quit outcomes particularly in couples for whom teamwork is maladaptive. • The study did not assess relationship functioning at follow-up, and it is possible that changes in relationships over the course of the study could impact dyadic efficacy or smoking cessation outcomes.

Dynamics of adolescent friendship networks and smoking behavior	Merckena, T.A.B. Snijdersc, C. Steglichd, E. Vartiainene, H. de Vriesa	N = 1326	• Selection and influence processes both played an important role in creating and maintaining smoking behaviour similarity within friendships. • Adolescents preferred to select friends with similar smoking behaviour. Non-smokers were the most attractive for those smoking less than once a week, whereas those smoking on average more than one cigarette per week preferred to choose friends that smoked at the highest rate.	Longitudinal analysis	• Self-reported smoking behaviour was not validated by biochemical measures. • The use of a name generator limited to a maximum of five friends might have limited adolescents' possibilities to nominate all their best friends. • There was a focus on friendships within schools in the same grade. Although for adolescents, these specific friends form an important social environment, they do not represent their entire social network of peers. The study controlled for alternative selection and influence mechanisms

	involving observed and reported variables, although there could be selection and influence mechanisms involving unobserved covariates too. • The conclusions obtained are based on the specification of the actor-based model and it is possible that other specifications, e.g., controlling for other processes by including other characteristics of adolescents or different specifications of the influence mechanism, would yield different results.

Dynamics of adolescent friendship networks and smoking behavior: Social network analyses in six European countries	Liesbeth Mercken, Tom A.B. Snijders, Christian Steglich, Hein de Vries	N = 7704	• Findings clearly demonstrate that selection processes play an important role in creating smoking behaviour similarity within friendships. • Adolescents preferred to select friends with similar smoking behaviour in each country.	Cross sectional questionnaire	• Self-reported smoking behaviour was not validated by biochemical measures. • No direct measures of parental and sibling smoking were available, which might have biased estimated parental and sibling smoking behaviour effects. • The use of a fixed name generator might have limited adolescents' possibilities to nominate their best friends • There was a focus on friendships within the same school grade. Although these specific friends form an important social environment, they do not represent the entire social network of

	adolescents. • The study did not include classroom membership effects because this information was not available, which is a disadvantage mainly for the countries where schools were larger and school grades contained a higher number of adolescents (Netherlands, Portugal, UK), as SIENA makes the assumption that all network members are equally available as potential friends.

Early Adolescent Social Networks and Substance Use	David B. Henry and Kimberly Kobus	N = 1119	• The results point to the importance of social position for understanding youth substance use. • Liaisons were found to be at greater risk for substance use than either isolates or members. • Liaisons were more likely to use tobacco than members or isolates and were more likely to use alcohol than isolates. • No effects were found for marijuana or inhalant use, despite adequate power to detect effects on these substances.	Participants completed the measures at their school desks,	• The collection of social network data within classrooms in the Metropolitan Area Child Study. • Participants in the large-city schools and half of the small-city schools were in K-8 settings, where sixth graders spent most of their time with the same classmates. • Approximately 30% of the sample was in more typical middle school settings, where they changed classrooms throughout the day. In these settings, all sixth graders were included in the peer nominations and it is possible that different results would have been obtained

	were it possible to do grade-level social network analyses for all participants. • The use of the question "Who would you like to be your best friend?" for identifying friendship networks possibly tapped desired friendships, more than actual ones. However, 80% of the peers who were nominated as one of three best friends also were nominated in response to this question, which allowed for unlimited nominations. • The data are cross-sectional rather than longitudinal and cannot assess the extent to which the liaison position

	predicted substance use, or vice versa. • Cross-sectional data also do not allow examination of the patterns of change in network alignment that may be responsible for some of the effects obtained.

Effects of partner smoking status and gender on long term abstinence rates of patients receiving smoking cessation treatment	Paula Manchón Walsh, Paloma Carrillo, Gemma Flores, Cristina Masuet, Sergio Morchon, Josep Maria Ramon	N = 1516	• Having a smoking partner is a determinant of relapse 1year after the beginning of the cessation program. • Interacting not just with the smoker, but also with his or her partner, could neutralize interpersonal influences making smokers more accessible to behavioural and pharmacological techniques	Prospective longitudinal study	• The heterogeneity of the non-smoking partner group. This group includes single persons and subjects whose partners do not smoke. Non-smoking partners can be either never-smokers or former smokers. A former smoking partner might stimulate cessation more than a partner who has never smoked.
Enabling Parents Who Smoke to Prevent Their Children From Initiating Smoking	Christine Jackson; Denise Dickinson	N = 873 at baseline N = 776 at follow up (3 years post baseline)	• Children in the pre-initiation phase of smoking who receive antismoking socialization from their parents are less likely to initiate smoking, even if their parents smoke.	Three-year randomized controlled trial.	• The study design and method limit the external validity of the findings. By using a volunteer sample,

					the findings are generalizable only to adult smokers who are receptive to the opportunity to engage in antismoking socialization. • This study measured only the effects of antismoking socialization on children's initial experience with smoking at 3 years of follow-up. Longer-term follow-up with assessment of subsequent phases of smoking is needed to evaluate the duration of the effect.
Escalation and Initiation of Younger Adolescents' Substance Use: The Impact of Perceived Peer Use	Elizabeth J. D'Amico, and Denis M. McCarthy,	N = 974	• Perceived peer use is important in predicting both onset and escalation of substance use.	Longitudinal survey	• Self-report

Estimating Peer Effects in Adolescent Smoking Behavior: A Longitudinal Analysis	Mir M. Ali and Debra S. Dwyer	N ≈ 90000 N = 20745 A subset of the initial sample	• The influence of close friends from adolescence years continue to have an impact on smoking propensities even when a transition into adulthood is made. • Peer effects are important determinants of smoking even after controlling for potential biases in the data and that these effects persist into adulthood. • Effective policy aimed at reducing smoking rates among adolescents would consider these long-lasting peer effects.	Using longitudinal data of a nationally representative sample of adolescents	• It might be possible that the influence of peer network varies with smoking frequencies or intensities. For example, a person who smokes every day could very well be affected differently by peers compared with a person who does not smoke every day. • Self-report
Ethnic Density Effects on Birth Outcomes and Maternal Smoking During Pregnancy in the US Linked Birth and Infant Death Data Set	Richard J. Shaw, Kate E. Pickett, and Richard G. Wilkinson	N = 1344352	• Higher levels of same-ethnic density were associated with reduced odds of infant mortality among Hispanic mothers, and reduced odds of smoking during pregnancy for US-born Hispanic and Black mothers. • For Black mothers, moderate levels of same-ethnic density were associated with increased risk of low birth weight and preterm delivery; high levels of same ethnic density had no additional effect. • Our results suggest that for Hispanic mothers, in contrast to Black mothers, the advantages of shared	cross-sectional design	• Data available from vital records and the census are limited in scope, and resulting in limited control of variables and county-level factors that might confound or mediate the effect of ethnic density on maternal and infant health. • The study is unable

	culture, social networks, and social capital protect maternal and infant health	to examine ethnic density at a lower geographic scale than counties. Whereas some smaller counties may feel and operate like a genuine community or neighbourhood for residents, larger counties include numerous different communities.

Ethnic variation in socioenvironmental factors that influence adolescent smoking	Ellen Dornelas, Christi Patten, Edward Fischer, Paul A. Decker, Ken Offord, M.S.b, Jeremy Barbagallo, Suzanne Pingree, Ivana Croghan, and Jasjit S. Ahluwalia	N = 1305	• Preliminary results indicate that familial and household norms play a critical role in influencing cigarette smoking among black teens.	cross-sectional design	• The primary limitation of the present study is the small sample size.

Ethno-specific patterns of adolescent tobacco use and the mediating role of acculturation, peer smoking, and sibling smoking	Mark Asbridge, Julian Tanner & Scot Wortley	N = 3400	• This paper demonstrates that disparities in tobacco use among certain ethnic groups can be explained by peer and sibling smoking and acculturation; however, for other ethnic groups, knowledge of the processes that account for differences in tobacco use remains less clear.	Cross-sectional analysis	• Data were cross-sectional rather than longitudinal, and therefore this study was unable to capture the temporal nature of acculturation and the potential cause-and effect relationship between mediators and tobacco use. • The ethnic identity was derived from self-identification and categories were collapsed on the basis of geography and nationality. As such, it is not possible to capture the strength of respondent's ethnic identity, commitment to their ethnicity, or their ethnic pride.

Examination of the Relationship between Community Support and Tobacco Control Activities as a Part of Youth Empowerment Programs	Laurie W. Hinnant, Christian Nimsch and Brenda Stone-Wiggins	N = 281	• Coordinators did not believe that tobacco control issues received a high level of support from any specified entity in their community. • Schools were believed to be providing the greatest support, which is perhaps not surprising because many of these groups are either located in the schools or are working to create change within and around schools. • The lowest levels of support came from youths who are not involved in the group. By using a youth empowerment framework, where youth are in charge of the direction and management of these groups, it was hoped that these groups would appeal to those not typically considered "involved" youths and perhaps those who may be most at risk for tobacco use. • Results also indicate that if youths outside of the group are supportive of these groups, then the activities conducted by these groups tend to be more policy focused. With such perceived low levels of support from youths outside of the group, extra work may be needed to attract youths to these groups and to the issue of tobacco control.	cross-sectional analysis	• Data is a limited cross-sectional design, and not a longitudinal study. • These data were collected from one adult working with these SYMATU groups. Support is therefore based on one individual's perception of community support for certain tobacco control policy issues.

Exploring the barriers of quitting smoking during pregnancy: A systematic review of qualitative studies	Ingall, G. & Cropley, M	N = 183	• Women were aware of the health risks to the foetus associated with smoking; however knowledge of potential health risks was not sufficient to motivate them to quit. • Several barriers to quitting were identified which included willpower, role, and meaning of smoking, issues with cessation provision, changes in relationship interactions, understanding of facts, changes in smell and taste and influence of family and friends. • Cessation service provision by health professionals was viewed negatively by women. • Women face barriers, whether from family and friends and personal issues such as willpower, highlighting that smoking is more than a physical addiction. • Smoking is embedded in these women's whole lives, from behavioural routine to interactions with their partners; and purely addressing the biological mechanism of addiction is not sufficient. • The challenges and difficulties of quitting smoking during pregnancy have been documented; ranging from personal willpower to influence of friends and family.	Systematic review	•

	• Women felt pressure to quit smoking and faced common barriers to successful quitting, these being 'control' and 'health risks to self and baby'.	

Exposure to parental and sibling smoking and the risk of smoking uptake in childhood and adolescence - a systematic review and meta-analysis	Jo Leonardi-Bee, Mirriam Lisa Jere, John Britton	58 studies were included in the meta-analyses.	• Parental and sibling smoking is a strong and significant determinant of the risk of smoking uptake by children and young people and, as such, is a major and entirely avoidable health risk. • The relative odds of uptake of smoking in children were increased significantly if at least one parent smoked (OR 1.72, 95% CI 1.59 to 1.86), more so by smoking by the mother (OR 2.19, 95% CI 1.73 to 2.79) than the father (OR 1.66, 95% CI 1.42 to 1.94), and if both parents smoked (OR 2.73, 95% CI 2.28 to 3.28). • Smoking by a sibling increased the odds of smoking uptake by 2.30 (95% CI 1.85 to 2.86) and smoking by any household member by 1.92 (95% CI 1.70 to 2.16). • Adjusting for overestimation of RRs it is estimated that, in England and Wales, around 17,000 young people take up smoking by the age of 15 each year as a consequence of exposure to household smoking.	Systematic Review	• Excluded studies at the full text stage which were written in a non- English language, so the findings of the meta-analyses are biased towards English speaking countries.

Factors Influencing Smokeless Tobacco Use in Rural Ohio Appalachia	Julianna M. Nemeth, Sherry T. Liu, Elizabeth G. Klein, Amy K. Ferketich, Mei-Po Kwan, Mary Ellen Wewers	N = 116 15 Focus groups 23 interviews.	• Cultural standards dictated that tobacco use, in general, is a necessary rite of passage in the development of masculine identity in Ohio Appalachia. • Gender, itself, is at stake through one's choice and use of tobacco products. A person's male social network was consistently cited as the primary influence on smokeless tobacco (ST) initiation and continued use. ST marketers used messages that resonated with the underlying regional and masculine cultural standards and advertisements present in the region functioned to normalize ST use. • The primacy of underlying cultural values influencing initiation by male social networks expands current knowledge regarding tobacco use in Ohio Appalachia. • This study adds to the growing body of research suggesting (1) marginalized men, worldwide, may use tobacco in order to construct an accessible form of masculinity [32–35]; and (2) ST marketers not only use culturally specific images to target vulnerable populations [36, 37] but usurp culturally-specific masculine norms in order to	Cross sectional analysis - Separate adult and adolescent focus groups were undertaken.	• Purposive sampling of males and ST users. As such, the perceptions regarding cultural beliefs captured may be more reflective of this sub-population than of the rural Ohio Appalachian community, in general.

	conflate tobacco use, through brand marketing, with masculine enactment itself [38].

Family characteristics and smoking among urban and rural adolescents living in China	Sohaila Shakib, Hong Zheng, Anderson Johnson, Xinguang Chen, Ping Sun, Paula H. Palmer, Li Yan, Gong Jie, and Jennifer B. Unger	N = 3629	• Girls are less likely than boys to report smoking and are more likely to report positive family relationships, and having parents with negative attitudes toward them smoking. • Positive family relationships and age were strongly associated with smoking for both genders. • No significant differences exist by gender. • These findings suggest that the quality of family relationships are important for adolescent female and male smoking in China.	Cross-sectional analysis	• The study only assessed adolescents' perceptions of family characteristics. Those perceptions might not accurately reflect characteristics from other family members such as parents' perspectives. • Cross sectional study - Longitudinal studies are necessary to understand the direction of causality. The associations reported here are cross-sectional and therefore causality cannot be inferred. • The degree to which adolescents report their parents' disapproval for their smoking

	might be underreported. • According to cognitive dissonance theory, smokers would likely downplay parents' disapproval of their smoking. • The accuracy of adolescent smoking behaviour is unknown. • The questions developed for this survey were adapted from surveys of adolescents in the United States, in consultation with cultural experts. It is possible that other important aspects of Chinese family functioning were not assessed in this survey.

Family influences on the risk of daily smoking initiation	Karl G. Hill, J. David Hawkins, Richard F. Catalano, Robert D. Abbott, and Jie Guo	N = 808	• The present findings indicate that parent smoking contributes to the onset of daily smoking in their teenagers even if parents practice good family management, hold norms against teen tobacco use, and do not involve their children in their own tobacco use. • Smoking prevention programs should include components focused on parents of adolescents. To reduce risks for daily smoking among adolescents, it is important to encourage parents to stop or reduce their own smoking. • These data indicate that parents can reduce their children's risk of daily smoking initiation by reducing family conflict, by maintaining strong bonds with their children, by setting clear rules, and by closely monitoring their children's behaviours	Longitudinal analysis	• The sample was drawn from schools serving high-crime neighbourhoods in Seattle, Washington. Thus, sample members tended to be from lower income families and were more ethnically diverse than would be expected from a representative national sample. • The relative contribution of family smoking, family processes, and parental attitudes and norms were examined in predicting daily smoking initiation, the mediational relationships among these domains of family factors remain to be fully studied. • Parent smoking

	and attitudes about smoking were not available through age 18, and were included in the model at age 12. Although there is a high degree of stability in parent smoking (annual stability coefficient of .85), additional power may have been obtained by including these as time-varying predictors. Nonetheless, it is important to note that parental smoking at age 12 (of the child) itself continues to predict onset of smoking throughout adolescence.

Family Socialization of Adolescent's Self-Reported Cigarette Use: The Role of Parents' History of Regular Smoking and Parenting Style	Sarah E. Foster, Deborah J. Jones, Ardis L. Olson, Rex Forehand, Cecelia A. Gaffney,, Michael S. Zens	N = 934	• Parental warmth was associated with a decreased likelihood of the adolescent ever having smoked a cigarette; however, this was true only if neither parent had a history of regular cigarette smoking. • Findings suggest that adolescent smoking prevention programs may be more efficacious if they address both parental history of regular smoking and parenting behaviour.	Longitudinal analysis	The age of the sample and the limited variability in the adolescent smoking data at earlier assessments, this study relied on measures collected at the final assessment of a longitudinal study.

Family-based programmes for preventing smoking by children and adolescents (Review)	Thomas RE, Baker PRA, Lorenzetti D	22 RCTs	▪ Four of the nine studies that tested a family intervention against a control group had significant positive effects, but one showed significant negative effects. ▪ One of the five RCTs that tested a family intervention against a school intervention had significant positive effects. ▪ None of the seven studies that compared the incremental effects of a family plus a school programme to a school programme alone had significant positive effects. ▪ One RCT that tested a family tobacco intervention against a family non-tobacco safety intervention showed no effects. ▪ The trial that used general risk reduction interventions found the group which received the parent and teen interventions had less smoking than the one that received only the teen intervention. ▪ In the trial of CD-ROMs to reduce alcohol use, both groups which received the alcohol reduction intervention had less smoking than the control. In neither trial was there a tobacco intervention, but tobacco outcomes were measured.	Cochrane Systematic Review	Cross sectional study - causal direction of the study variables using a longitudinal design should be undertaken.

Frequency and Quality of Parental Communication as Antecedents of Adolescent Smoking Cognitions and Smoking Onset	Roy Otten, Zeena Harakeh, Ad A. Vermulst, Regina J. J. M. Van den Eijnden, and Rutger C. M. E. Engels	N = 428	• The results of this study emphasized the importance of quality of parental communication rather than frequency. • Communication patterns based on mutual respect and equality help to prevent adolescent smoking onset.	Cross-sectional analysis	• The study showed the indirect effects of communication on smoking through cognitions; however, this picture is incomplete. Communication may also have an effect on smoking through other factors (e.g., affect). • Generalizability of the results from this study is limited, due to the focus on traditional Dutch families, including both parents and two children. • The associations reported are cross-sectional and therefore causality cannot be inferred

Friends in the 'hood: Should peer-based health promotion programs target nonschool friendship networks?	M. Margaret Dolcini, Gary W. Harper, Susan E. Watson, Joseph A. Catania, and Jonathan M. Ellen	N = 91	• The high proportion of non-school friendships suggests that out-of-school networks may be an important influence in this population. • Youth spend time with their friends, regardless of network type, on weekends, and weekends are a high-risk period for health-damaging behaviours. • Levels of experience with health risk behaviours suggest that both school and non-school environments require intervention.	Cross-sectional analysis Qualitative	• The study is focused on a single neighbourhood and findings may not generalize to other ethnic minority inner city communities. • The study relied on a general question about experience with various activities in the past year. • A two-stage sampling procedure involving a probability study followed by recruitment of networks which resulted in a unique sample.

Friendship group position and substance use	D. Wayne Osgood, Mark E. Feinberg, Lacey N.Wallace, James Moody	N ≈ 9500	• Isolates are more likely to use cigarettes than core members. • Liaisons are more likely to use marijuana than core members. • Core group members are more likely to drink than isolates and liaisons.	Longitudinal analysis	• The sample is limited to small, non-affluent, majority white communities in two states, and it would be valuable to replicate these findings in other populations and settings. • These relationships should be investigated in middle to late adolescence, when dangerous substance use becomes more common.

Friendship networks and trajectories of adolescent tobacco use	Michael S. Pollard, Joan S. Tucker, Harold D. Green, David Kennedy, Myong-Hyun Go	N = 6696 N=837 "saturated" schools	• Adolescents with a greater number of smoking friends were more likely to belong to the higher use trajectories. • Beyond this exposure to smoking peers, individuals who at baseline were either members of a smoking group or liaisons to a smoking group were more likely than members of a non-smoking group to belong to the higher use trajectories. • Liaisons to a smoking group were particularly likely to belong to the delayed increaser trajectory group. • Trajectory group membership for adolescents who belonged to a non-smoking group did not significantly differ from those who were isolates or liaisons to a non-smoking group. • The study suggests features of an individual's social network have long-lasting associations with smoking behaviours.	Longitudinal analysis	• The samples are not nationally representative and rely on small and/or area samples. • Adolescents report on both their own smoking and that of their peers, which may inflate the correspondence between the two (Bauman & Fisher, 1986).

Gender and the social context of smoking behaviour	Nicole Dedobbeleera, Francois Beland, Andre-Pierre Contandriopoulosa, Manuella Adrian	N = 1494 articles corresponding to the year preceding the end of each survey.	• Smoking occurs in social contexts within which the price of cigarettes appears to have a significant negative impact on the prevalence of smoking and the quantity of cigarettes smoked by men, but no effect on either the prevalence of smoking or the amount smoked by women. • Newspaper articles negatively influence smoking prevalence for women and men.	A repeated cross-section design is used and analysed	• Data on individual socio-psychological factors were either not available over time, or not measured through questions with similar wording in the nine surveys. • Data on individual health behaviours that affect smoking behaviour had to be omitted due to missing values. • The tobacco control legislation measured in this study only measures the existence of the policy and not its actual enforcement in each province or municipality. • The poor performance of the models is also a limitation, with the level of significance of the coefficients being very

sensitive to the large size of the samples.

Gender modifies the relationship between social networks and smoking among adults in Seoul, South Korea	John W. Ayers, C. Richard Hofstetter, Suzanne C. Hughes, Hae-Ryun Park, Hee-Young Paik, Yoon Ju Song, Veronica Irvin, Melbourne F. Hovell	N = 500	• Social network mechanisms were differentially associated with the high smoking prevalence among men and low prevalence among women and should be targeted by interventions tailored to these differences.	Cross-sectional analysis	• Weaknesses of this study include the relatively small cross-sectional survey (N = 500), restricting investigation of infrequent behaviours, self-reports subject to recall and reporting biases, and sampling from only the most metropolitan part of South Korea. • The social network measures used a pre-generated list of family and friends and excluded other possible social influences of smoking behaviours.

General parenting, anti-smoking socialization and smoking onset	Roy Otten, Rutger C. M. E. Engels and Regina J. J. M. van den Eijnden	N = 4351	• In the model, strictness and psychological autonomy granting were related to lower likelihood of smoking onset, and parental smoking was positively related to smoking onset. • Involvement and strictness were positively related to anti-smoking socialization, whereas parents who smoke where less likely to be engaged in anti-smoking socialization. • Anti-smoking socialization was negatively related to adolescent smoking. • Parental smoking appeared to moderate the link between anti-smoking socialization and smoking onset.	Longitudinal analysis	• Self-reports and perceived parenting by adolescent reports. • The incompleteness of the model tested. Anti-smoking socialization was based on five smoking-specific parenting practices, although one might suggest there are more specific parenting practices conceivable. • The study was not able to include some background variables that might have influenced the outcome. For example, the effect of socioeconomic status might affect both the effect parents have on their children as well as the actual risk of smoking of

their children.

Gutka and Tambaku Paan Use Among South Asian Immigrants: A Focus Group Study	Smita C. Banerjee, Jamie S. Ostroff, Sehrish Bari, Thomas A. D'Agostino, Mitali Khera, Sudha Acharya, Francesca Gany	N = 39	• The relative contributions of social influence and perceived benefits of gutka/tambaku paan use in encouraging initiation must be examined. Findings identify strong social norms as motivating gutka and tambaku paan use in South Asians. • Immigration-related changes in patterns of gutka and tambaku paan use were identified in current research. For instance, South Asians acknowledged the unease around using gutka/tambaku paan in public places, particularly due to spitting restrictions. This uneasiness could be utilized better for motivating quitting efforts and creating a social norm that discourages smokeless tobacco use. However, this issue needs to be addressed with caution because prior research has indicated that South Asians use smokeless tobacco products as a celebration of their culture and an expression of their ethnic identity in a foreign land.	Cross-sectional analysis - qualitative	• The survey sample from which the focus group sample was drawn was largely male South Asians from New York, so the results may not be generalizable. • Only one women-only focus group and some themes emerged that were relevant only to women, such as perceived cosmetic benefits and inter-generational influence as factors leading to initiation. • The associations reported are cross-sectional and therefore causality cannot be inferred

Having the wrong friends? Peer effects in adolescent substance	Petter Lundborg	N = 3253 N = 2640 (smoking) N = 2606 (binge drinking) N = 3027 (illicit-drug use)	• Peer smoking showed a significant positive effect on the probability of smoking, but less in magnitude than peer binge-drinking. • Perceived lung cancer risk had a significant negative effect on the probability of smoking. • The variable indicating the year in which the survey was conducted showed no effect on smoking. • The resulting marginal effect was 0.197, which should be compared to the marginal effect of 0.166 obtained in the fixed-effects regression. Thus, including fixed effects reduced the magnitude of the marginal effect of peer smoking by 16 percent. • The school/grade fixed effects were jointly significant ($p < 0.01$). By including school/grade fixed effects, the effect of living in a single-parent household became significant and positive. The effects of the other variables did not change to any large extent.	Longitudinal analysis	• The author does not address the potential endogeneity of peer behaviour due to endogenous sorting. As a result, the estimated peer effects are considered as upper bounds of the true peer effects, and the possibility exists that the estimated peer effects merely reflect sorting.
Homophily and health behavior in social networks of older adults	Flatt, J.D. , Agimi, Y., Albert, S.M	Low-income senior housing	• Findings suggest strong effects for homophily, especially for those who smoked and were physically inactive. • Public health interventions for older adults should consider the influence that social relationships have on	Cross-sectional analysis - qualitative	• The associations reported are cross-sectional and therefore causality cannot be inferred.

	personal health behaviours. Network-based interventions may be required

Identifying cluster subtypes for the prevention of adolescent smoking acquisition	Wayne F. Velicer, Colleen A. Redding, Milena D. Anatchkova, Joseph L. Fava, James O. Prochaska	N = 5011	• Family support for non-smoking was related to subtype much more strongly than peer interactions. Subjects in the Protected subgroup were the most likely to remain in the aPC stage at each follow-up assessment. • Subtype membership, along with membership in the aC and aPR stages, provides important additional information for tailoring smoking prevention materials. Tailored interventions can focus on those adolescents at highest risk and limit or avoid expending resources on those at very low risk.	Longitudinal analysis	•

Image, context and transition: smoking in mid-to-late adolescence	Susan Wiltshirea, Amanda Amosa, Sally Hawb, Ann McNeill	N = 99	• This study has shown that the mid-to-late teens are a period of considerable flux and transition in young people's lives which can impact in different ways on their smoking. • Personal, social and environmental factors were described as influencing patterns and levels of smoking. • The importance of smoking as a 'lubricant' for social relations and a means of dealing with undesirable feelings, what Johnson et al. (2003) have conceptualized as the social (connecting, partying and fitting in) and emotional (relaxation and stress relief) aspects of adolescent tobacco dependence, and as a marker of acceptable identity in familiar and new contexts, reinforced and increased smoking. • Smoking policies and restrictions at home and work or educational settings moderated consumption, though often to a lesser extent than restrictions at school.	Cross-sectional analysis - qualitative interviews	• The associations reported are cross-sectional and therefore causality cannot be inferred.

Impacts of a support intervention for low-income women who smoke	Miriam J. Stewart, Kaysi Eastlick Kushner, Lorraine Greaves b, Nicole Letourneau c, Denise Spitzer, Madeline Boscoe	N = 44	• The intervention exerted positive impacts on smoking reduction/cessation, social networks, coping, and health behaviours. • Participants reported satisfaction with the intervention. Quantitative data revealed significant decreases in temptation to smoke and number of cigarettes smoked, and significant increases in instrumental support seeking, eating breakfast, and breathing exercises. • Moreover, non-significant trends in increased social network size and decreased loneliness were promising. • Findings derived from a participatory approach support the use of the peer/mentor model to deliver a support intervention with low-income women.	Mixed method (qualitative and quantitative)	• The study did not have a comparison group and the sample did not allow inferences about effects due specifically to low-income status or generalization to other population groups. • There is potential bias from retention of participants most invested in smoking reduction.

Increasing support for smoking cessation during pregnancy and postpartum - results of a randomized controlled pilot study	Deborah Hennrikus, Phyllis Pirie, Wendy Hellerstedt, Harry A. Lando, Jeanne Steele, Caroline Dunn	N = 82	• Increasing the frequency and quality of support from a woman in the smoker's social network is a promising prenatal smoking cessation strategy. • Increasing support from a female friend or family member is a promising prenatal smoking cessation strategy. • The difference in continued smoking between the intervention and control groups at the end of pregnancy compares well to the difference between groups typically seen in trials of pregnancy smoking interventions (Lumley et al., 2004; Fiore et al., 2008). • 53% of the low-income women eligible for the study consented to participate, confirming that pregnancy is a time when smokers are willing to accept help to quit smoking.	RCT	• The small sample restricted the power to detect differences between groups and limited ability to evaluate potential confounders. • Findings from the low-income urban sample might not be generalizable to individuals from other socioeconomic groups or recruited from other settings. • Because more control subjects were lost-to-follow-up and due to intent-to-treat analysis, smoking outcome results might have been biased in favour of the intervention group.

Individual and social environment influences on smoking in children and adolescents	S. Pusta, S.M. Mohnena, S. Schneider	N ≈ 1298	• Smoking is a major public health problem among German children and adolescents. • Tobacco control measures must tackle the structural and social pressures that shape smoking behaviour during childhood.	Cross sectional analysis	• The lack of information on parental smoking behaviour. • It has been shown that the greatest factor influencing smoking in childhood and adolescence is the fact that a household member smokes. This suggests that children and adolescents 'learn' smoking from other household members (in most cases, from their parents). • These results may also explain the higher prevalence of smoking in eastern Germany compared with western Germany, and in large cities compared with small towns. • The same regional disparities in

					smoking prevalence are evident in the adult population as can be seen among children and adolescents.
Individual and Social Influences on Progression to Daily Smoking During Adolescence	Min Jung Kim, Charles B. Fleming, and Richard F. Catalano	N = 270	• Youth depression, prosocial beliefs, and antisocial behaviour had overall associations with risk of smoking escalation. • Parents' and peers' smoking, family management, academic grades, and school commitment had significant univariate associations with smoking progression. • This study supports preventing escalation in adolescent smoking by targeting parents' and peers' smoking and involvement in other forms of antisocial behaviour and working with parents to improve their use of positive family management practices.	Longitudinal analysis	• This study was based on a primarily white sample from a suburban school district in the Pacific Northwest, and the findings may not be generalizable to populations in urban or rural areas. • Rates of progression to daily smoking were relatively high, however, and the

			sample was heterogeneous with respect to gender and family income. In addition, peers' smoking was assessed with 1 item on how many close friends smoked cigarettes. The narrow range of peer influences cannot capture the smoking atmosphere of a broader peer group (e.g., what proportion of youths at an individual's school smoked). • The study focused on the unique contributions of individual and social influences in predicting the risk of smoking progression among experimental intermittent smokers.

	• The possible indirect effects of some predictors on more-proximal risk and protective factors (e.g., the possible effects of antisocial behaviour on parenting) remain to be investigated. • The study examined 1 dimension of smoking transition, namely, the transition from uptake to daily smoking. Other transitions (e.g., initiation, dependence, and quitting) were not modelled. Certain factors may be more or less salient with respect to these other types of transitions in smoking behaviour.

Influence and selection processes in friendships and adolescent smoking behaviour: the role of parental smoking	Rutger C.M.E. Engelsa, Frank Vitarob, Endy Den Exter Blokland, Raymond de Kempa, Ron H. J. Scholte	N = 1969 at baseline N = 1595 at follow up	• The study showed that the effects of parental and best friend smoking on smoking onset are quite similar in magnitude. • Parental smoking did not affect adolescents' susceptibility to peer influences. • Parental and adolescent smoking status affects selective affiliation with smoking friends.	Longitudinal analysis	• Limitations included short-term longitudinal design, • large number of subjects, • information on reciprocity of friendships by including friends' reports, • inclusion of friend's own smoking and not adolescent perceptions,

Influence of smoking by family and best friend on adolescent tobacco smoking: results from the 2002 New Zealand national survey of Year 10 students	Robert Scragg and Murray Laugesen	N = 14522 girls N = 14167 boys	• Parental behaviour is a key determinant of smoking by New Zealand adolescents and explains a similar proportion of daily adolescent smoking to that by peer smoking.	Cross-sectional analysis	• A major limitation of this study is that its cross-sectional design cannot distinguish cause and effect. Thus, the timing of when parental and peer effects occur can only be properly studied by cohort studies. • The measure of parental smoking did not allow for single-parent and extended family households; nor did the measure of smoking by older siblings identify students who did not have an older sibling. • The study did not examine the full range of personal variables associated with adolescent smoking (e.g. personality, attitudes), which

					could potentially confound the association with parental smoking. The study did not include other parental variables (besides amount of pocket money and allowing smoking in the home) that may influence risk of adolescent smoking. • The findings may not apply to students from decile 1 and 2 schools, who are under-represented.
Influence of Socio-Economic Status, Parents and Peers on Smoking Behaviour of Adolescents	Andrea Madarasová Gecková, Roy Stewart, Jitse P. van Dijk, Ol'ga Orosová, Johan W. Groothoff and Doeke Post	N = 2616	• Peers' smoking is the strongest predictor of adolescent smoking. • Parents' smoking behaviour influences adolescents' smoking directly, but also indirectly through the parents' influence on peers' smoking behaviour. • Socio- economic status influences adolescent smoking indirectly through its influence on parents' and peers' smoking behaviour.	Cross-sectional analysis	• The associations reported are cross-sectional and therefore causality cannot be inferred.

Influence of the friends' network in drug use and violent behaviour among young people in the nightlife recreational context	Amador Calafat, Luka Kronegger, Montse Juan, Mari Angels Duch and Matej Kosir	N = 1232	• Socializing and helping networks are also associated with fighting, smoking, use of illegal drugs — except for cannabis— and getting drunk. • Not having a deviant network and not having a helping/socializing network can be protective against smoking, violence and illegal drug use, as well as protecting ex-users from relapse. • Closeness to friends is also a network protective factor. • A possible reason why socializing networks are related to fighting, illegal drugs and drunkenness is that these behaviours are somehow desired, adaptive and prosocial in recreational contexts.	Cross sectional analysis	• The sample is not a representative sample of young people. • The study is not based on longitudinal data and the causality of relationships is difficult to study. • The self-reported values of some of variables, and also in values reported for network members who may reflect respondents' perception of their friends, rather than the actual situation in the field.

Intention to Quit Smoking: Is the Partner's Smoking Status Associated with the Smoker's Intention to Quit	J. Rüge, S. Ulbricht, A. Schumann, H. J. Rumpf, U. John, and C. Meyer	N = 1653	• The data confirm that the partner's smoking status is related to the intention to quit smoking. • Living with a non-smoking partner is associated with a higher intention to change smoking behaviour. • Smokers with a non-smoking partner were more often found in the stages of contemplation and preparation and showed a more frequent use of the processes of change, such as taking control, commitment to change, coping with temptation, and helping relationships.	Cross-sectional analysis	• The data are cross-sectional only. Causal inferences of the partner's smoking status on the constructs are therefore not possible. • The study did not collect more detail information about the smoking status of the smoker's partners e.g. – if they are ex-smokers or have never been smokers. • The effect sizes of the results are small.

Interplay of Network Position and Peer Substance Use in Early Adolescent Cigarette, Alcohol, and Marijuana Use	Kimberly Kobus and David B. Henry	N = 163	• For cigarettes, network position and the interaction between position and peer-group use predicted use in the model using social network analysis to measure peer use. • Liaisons were most likely to smoke, but isolates' and members' smoking was significantly associated with peer smoking. • There was no overall effect of peer-group cigarette use, regardless of whether network use or perceived friend use was the measure of peer smoking. In the model using network use, there was a significant effect for network position Liaisons smoked significantly more than isolates and members.	Cross-sectional analysis	• The dataset is cross sectional and therefore cannot test causal pathways. • These results might have been influenced by the criteria used to define members, liaisons, and isolates. • The group identified as isolates is a mixed group, including unconnected isolates, with no reciprocated relationships, and connected isolates, with only one reciprocated tie. • Participants' responses to the question assessing perceptions of peer substance use may reflect a different set of friends than those identified by social network analysis.

It's good to talk: Adolescent perspectives of an informal, peer-led intervention to reduce smoking	Suzanne Audrey, , Jo Holliday, Rona Campbell	N = 10730	• The ASSIST peer nomination procedure was successful in recruiting and retaining peer supporters of both genders with a wide range of abilities. • Outcome data at 1-year follow-up indicate that the risk of students who were occasional or experimental smokers at baseline going on to report weekly smoking at 1-year follow-up was 18.2% lower in intervention schools. • Qualitative data from the process evaluation indicate that the majority of peer supporters adopted a pragmatic approach, concentrating their attentions on friends and peers whom they felt could be persuaded not to take up smoking, rather than those they considered to be already 'addicted' or who were members of smoking cliques. • ASSIST demonstrated that a variety of school-based peer educators, who are asked to work informally rather than under the supervision of teaching staff, will engage with the task they have been asked to undertake and can be effective in diffusing health-promotion messages.	Longitudinal mixed method (qualitative and quantitative)	•

Knowledge and Views About Maternal Tobacco Smoking and Barriers for Cessation in Aboriginal and Torres Strait Islanders: A Systematic Review and Meta-ethnography	Gillian S. Gould, Joanne Munn, Tracey Watters, Andy McEwen, Alan R. Clough	Seven studies	• The synthesis illustrates 11 third-order constructs operating on the levels of self, family, and social networks, the wider Aboriginal community, and broader external influences. Highlighted are social norms and stressors within the Aboriginal community perpetuating tobacco use; insufficient knowledge of smoking harms; inadequate saliency of antismoking messages; and lack of awareness and use of pharmacotherapy. • Indigenous Health Workers have a challenging role, not yet fulfilling its potential. • Pregnancy is an opportunity to encourage positive change where a sense of a "protector role" is expressed. • This review gives strength to evidence from individual studies across diverse Indigenous cultures. Pregnant Aboriginal and Torres Strait Islander smokers require comprehensive approaches, which consider the environmental context, increase knowledge of smoking harms and cessation methods, and provide culturally targeted support.	Systematic review and meta-ethnography	• Evidence considered generally of low level (6 of 7 studies rated descriptive only and 1 of 7 conceptual). • No studies considered generalizable. • Three papers were rated good overall on methodological quality. • The review represented urban, rural, and remote locations, but papers were not found for all states or the Torres Strait Islands. • Male participants were under-represented and given their apparent influence on maternal smoking, their views are important. • Meta-ethnography is most useful to

			synthesize themes resulting from qualitative studies and thus this review may not have accurately captured the included quantitative elements. • Each included study had different aims and measured different aspects of the broad topic, thus some individual studies contributed more data to the meta-ethnography than others. Making inferences about the value of each individual study to the meta-ethnography may be problematic. • Reporting biases may impact: authors selectively represent first-order constructs, so it is unknown

					how closely their second-order constructs relate to their first order and papers also varied in reporting of themes.
Latent Growth Curve Analyses of Peer and Parent Influences on Smoking Progression Among Early Adolescents	Bruce Simons-Morton, Rusan Chen, Lorien Abroms and Denise L. Haynie	N = 1320	• These results confirm the association over time of social influences with smoking. • The results provide evidence that parenting behaviour may protect against smoking progression by limiting increases in number of friends who smoke.	Longitudinal analysis	• Generalization of the present findings is limited by the reliance on self-report data, and a sample that was mostly White and middle class, and the substantial attrition rate among participants who were more likely than those included in the analyses to have smoked and to be male, Black, and eligible for free or reduced-cost lunches.

LGBT community, social network characteristics, and smoking behaviors in young sexual minority women	Michelle Marie, Johns Emily, S. Pingel, Emily J. Youatt, Jorge H. Soler. Sara I. McClelland, Jose A. Bauermeister	N = 471	• The study provided support for the conceptualization of LGBT community connection as protective against smoking and highlighted the importance of strong social ties for young sexual minority women • Findings underscore the importance of differentiating between psychological connection and participation in evaluating these relationships. • The results legitimize the inclusion and incorporation of LGBT community and sexuality-specific social network ties in intervention work with young sexual minority women.	Cross-sectional analysis	• The dataset is cross sectional and therefore cannot test causal pathways around smoking behaviours and cannot assess how smoking behaviours shift and interact with the community and their peers over time. • The survey relied on self-report data on the smoking behaviours. • The study utilized a web-based, convenience sampling strategy, and as a result, the findings are not generalizable. • Due to data constraints the study is not able to evaluate the structural properties of social networks through methodologies

such as egocentric network analysis.

Lifetime parental smoking history and cessation and early adolescent smoking behavior	Endy A.W. den Exter Blokland, Rutger C.M.E. Engels, William W. Hale III, Wim Meeus, and Marc C. Willemsen	N = 2206	• Logistic regression analyses revealed that likelihood increased gradually: adolescents with both parents being current smokers were four times more likely to be a smoker compared to adolescents with parents who had never smoked. • The earlier the parents stopped smoking in the life of their offspring, the less likely their children were to start smoking in adolescence. • Parental smoking history is associated with smoking initiation in early adolescence.	Cross-sectional analysis	• The cross-sectional design of the study does not allow any conclusions about causality. • The use of adolescent self-reports. With respect to the measurement of adolescent smoking, self-report is considered to be reliable and valid as long as total anonymity is guaranteed. • There is some evidence that children are very capable to estimate current or recent parental smoking behaviour. • When the actual moment of quitting is early in the life of the child, he or she might not remember whether the

parent had smoked or not, or at which moment the parents stopped.

Longitudinal analysis of large social networks - Estimating the effect of health traits on changes in friendship ties	A. James O'Malleya and Nicholas A. Christakisa	N = 2572	• Results for BMI support the hypotheses that people of similar BMI are less likely to dissolve existing ties and more likely to form ties. • Smoker to non-smoker ties were the least likely to dissolve and smoker to smoker ties were the most likely to form.	Longitudinal analysis	•
Menthol and non-menthol cigarette use among Black smokers in Southern California	Jennifer B. Unger, Bruce Allen, Earl Leonard, Madé Wenten, & Tess Boley Cruz	N = 720	• In multivariate analyses, preference for menthol taste/sensation, belief in medicinal effects of menthols, and menthol smokers in current social network differentiated menthol-only and combined smokers from regular-only smokers, controlling for confounding variables. Correlates of menthol smoking varied across genders and age groups.	Cross-sectional analysis	• These findings are based on self-reports • These results were limited to people who appeared to be Black, were in Los Angeles County, and were intercepted in public places. People who do not go to public places (e.g., those with severe physical disabilities) and multiracial people who do not appear Black may have been under-represented. • This convenience sample also does

		not include people who refused to participate in the initial intercept screening or the telephone survey. • The study attempted to increase participation by personally engaging potential respondents at community intercept locations before requesting their participation in the telephone survey. • This cross-sectional study identified correlates of menthol smoking, but it does not prove causality.

Modifiable family and school environmental factors associated with smoking status among adolescents in Guangzhou, China	Xiaozhong Wen, Weiqing Chen, Joshua E. Muscat, Zhengmin Qian, Ciyong Lu, Caixia Zhang a, Yijuan Luo, Caihua Liang, Ke Han, Xueqing Deng, Yongjun Ou, Wenhua Ling	N = 3957	• The cigarette smoking of peers, mothers, fathers, brothers, and supervising teachers, passive smoking, and seeing someone smoking on campus increased the risk of experimental smoking vs. non-smoking, • No-smoking signs, perceived anti-tobacco atmosphere in school, and being taught smoking-related health knowledge decreased the risk of smoking vs non-smoking. • The factors associated with regular smoking compared to experimental smoking included the smoking of peers, brothers, fathers and supervising teachers, teacher's tolerance, and passive smoking. Being taught smoking-related knowledge, perceived anti-tobacco atmosphere and no-smoking signs in school were positively associated with regular smoker's attempt to quit, while supervising teacher's smoking, parents' and teachers' tolerance could delay it. • These modifiable family and school environmental factors as well as their interaction with gender and age should be highly considered in adolescent smoking prevention in China.	Cross-sectional analysis	• This cross-sectional study did not follow the transition from non-smoking, experimental smoking, regular smoking to quitting smoking. Although it is somewhat reasonable to compare the three pairs of smoking behaviour to identify the factors associated with different smoking status, the results need to be confirmed within a single cohort through follow-up studies. • Only one district of Guangzhou was sampled and the descriptive data such as the smoking prevalence could only be generalized within limited area (Guangzhou City or

	Guangdong Province). • The study lacked objective measures to test the validity of self-reported smoking behaviour, which could lead to some misclassification of adolescent smokers. • Beliefs about the health consequences of smoking or low self-esteem and other psychological factors were not addressed in this study but might also play an important role in smoking onset and transfer in this population.

Motivating Latino smokers to quit - does type of social support matter	Brittany M. Brothers; Belinda Borrelli	N = 5131	• Partner status (absence/presence of a partner) and positive support from a partner were associated with smoking cessation • Partner status buffered the effect of depressed mood on smoking cessation in Latino smokers with children with asthma. • Previous studies using general populations of smokers have found that perceived social support predicts future smoking cessation.	Longitudinal analysis	• The majority of the current sample consisted of low-income females and may limit the generalizability. • The follow-up assessment was conducted 3 months after the intervention cessation or approximately 5.5 months from the baseline assessment, limiting the study's ability to examine duration of effects.
Multiple Trajectories of Cigarette Smoking and the Intergenerational Transmission of Smoking: A Multigenerational, Longitudinal Study of a Midwestern Community Sample	Laurie Chassin and Clark Presson, Dong-Chul Seo, Steven J. Sherman, and Jon Macy, R. J. Wirth and Patrick Curran	N = 8487	• A parent's smoking trajectory had a unique effect on their adolescent's smoking, beyond both parents' current smoking and the parent's educational attainment. However, although adolescents' personality characteristics were related both to adolescent smoking and to their parents' smoking, these characteristics could not explain the effects of the parent's smoking trajectory. • Parents whose smoking had an early onset, steep acceleration, high	A longitudinal	• As is characteristic of all longitudinal, multigenerational studies, prospective data on smoking trajectories from adolescence to adulthood were available on only one of the adolescent's two parents. • The study has

		levels of smoking, and persistence over time had the highest risk for intergenerational transmission of smoking to their adolescent children.	limited data on emerging smoking in the next generation and thus could not consider the escalation and persistence of adolescent smoking trajectories. • The sample is representative of its population, the population itself is predominantly White and well educated, and samples with different demographic characteristics might produce different findings.

Neighborhood Influences on Adolescent Cigarette and Alcohol Use: Mediating Effects through Parent and Peer Behaviours	Ying-Chih Chuang, Susan T. Ennett, Karl E. Bauman and Vangie A. Foshee	N = 959	• Findings suggest that neighbourhoods can influence adolescents through parent and peer factors. • Parental relationships, which have received little attention in prior studies, provide a main mechanism through which neighbourhoods influence adolescent cigarette and alcohol use. • By increasing parental monitoring, parents were able to protect their children from substance use behaviours in disadvantaged neighbourhoods. • Future neighbourhood research is needed to identify the kinds of monitoring strategies employed by parents in disadvantaged neighbourhoods and to examine whether adolescents benefit from these strategies.	Longitudinal analysis	• Longitudinal neighbourhood measurements may generate selection bias. • Findings are subject to shared reporter bias whereby the associations between adolescent's own behaviours and peer behaviours may be falsely inflated because of the correlated errors since the measures are all from the same respondent. • The study did not measure all social and physical aspects of neighbourhoods, such as informal social control, social networks, concentration of alcohol outlets, and availability of social service

			agencies. Therefore, several potential neighbourhood effects on adolescent cigarette and alcohol use could not be examined, such as institutional effects. • The study did not measure the length of time that families had spent in their neighbourhoods and thus the extent of their exposure to the neighbourhood environment. It is possible that some families had recently moved into the neighbourhood, but others may have lived in their neighbourhoods for more than 10 years.

- The sample retention rate was 72.9 percent, suffering from attrition bias.

Neighborhood Residence and Cigarette Smoking Among Urban Youths: The Protective Role of Prosocial Activities	Yange Xue, Marc A. Zimmerman, and Cleopatra Howard Caidwel	N = 824	• Neighbourhood effects on adolescent cigarette use were contingent upon both contextual and individual characteristics. • Participation in prosocial activities had a protective effect among adolescents in high-risk neighbourhoods. • Engaging adolescents in such activities may help offset the adverse effects of living in a disadvantaged neighbourhood	Longitudinal analysis	• Findings were based on a sample of low-achieving students from a medium-sized city. As a result, they may not be generalizable to all urban populations. • Data was collected more than a decade ago and may be somewhat dated. • Selection of at-risk youths for a study of resilience raises concerns that regression to the mean may be a plausible alternative explanation for the resilience findings. • The data were dependent on self-reported information, which may suffer from social desirability effects.

Nine-year prediction of adolescent smoking by number of smoking parents	Arthur V. Peterson Jr., Brian G. Leroux, Jonathan Bricker, Kathleen A. Kealey, Patrick M. Marek, Irwin G. Sarason, M. Robyn Andersen	N = 3012	• Logistic regression analyses revealed that having one parent who smokes substantially increases the risk that children will become daily smokers, relative to families where neither parent smokes (OR=1.90, p <.01). • There is no evidence that the increased risk depends on parent or child gender. • Results suggest the need for public health interventions that inform parents of young children that their own smoking behaviour increases their children's risk for future smoking.	Longitudinal analysis	• Limitations of this investigation are that the study population is largely Caucasian and drawn predominantly from small towns and rural communities in Washington State. • The smoking status of the second (non-respondent) parent was a proxy report by the respondent parent. • Data was not collected about whether the non-respondent parent actually resided in the household.

Nonresident Fathers' Involvement and Adolescents' Smoking	Chadwick L. Menning	N = 1932	• Results indicate that adolescents who are more involved with their fathers are less likely to begin smoking regularly, that changes in involvement over time predict changes in the probability that adolescents will begin to smoke regularly, and that fathers' smoking also affects this outcome.	Longitudinal analysis	• The results recorded here are limited to the investigation of one outcome: adolescents' propensity to begin smoking regularly. • It is important to note that some control measures, especially those related to mothers' involvement, lack strong reliability. Therefore, it may not be entirely appropriate to conclude that non-resident fathers' involvement transcends the importance of resident mothers' involvement in predicting this outcome. • Measures of non-resident fathers' involvement available in Add Health are not exhaustive and do

	not allow for a truly in-depth accounting of the effects of fathers' parenting style on the outcome being studied.

One bad apple may not spoil the whole bunch - Best friends and adolescent delinquency	Carter Rees, Greg Pogarsky	N = 6927	• On average, best friends were not more influential than remaining friends were. • Best and remaining friends are comparably influential.	Longitudinal analysis	• Generalization should consider the sample limitations.

Online Social and Professional Support for Smokers Trying to Quit: An Exploration of First Time Posts From 2562 Members	Peter Selby, Trevor van Mierlo, Sabrina C Voci, Danielle Parent, and John A Cunningham ,	N = 16764	• Peer responses to new users were rapid, indicating that online social support networks may be particularly beneficial to smokers requiring more immediate assistance with their cessation attempt. This function maybe especially advantageous for relapse prevention. • Accessing this kind of rapid in-person support from a professional would take an inordinate amount of time and money. • Further research regarding the effectiveness of WATIs with online social support networks is required to better understand the contribution of this feature to cessation, for both active users (posters) and passive users ("lurkers") alike.	Longitudinal analysis - online monitoring of WATSI	• The content of first posts was analysed by one coder and resources were not available to determine inter-rater reliability with a second coder.
Other-sex friendships in late adolescence - Risky associations for substance use and sexual debut	Sylvie Mrug, Casey Borch. Antonius H. N. Cillessen	N = 320	• After controlling for demographics, previous problem behaviour, and friends' behaviour, other-sex friendships in 10th grade were associated with initiation of smoking among girls over the following year, and other-sex friendships in 11th grade were linked with lower levels of subsequent alcohol use among boys. • Friends' smoking and sexual experience in 10th grade predicted	Cross-sectional analysis	• The exclusion of out-of-school friends was a limitation. • The definition of friendships that utilized only same-age, school based peers. • The present results are thus likely to underestimate the

			the same behaviours for all adolescents over the following year. Other-sex friendships thus appear to serve as a risk context for adolescent girls' smoking and a protective context for adolescent boys' drinking. • Promoting mixed-gender activities and friendships among older high school students may be helpful in reducing males' alcohol use, but may need to incorporate additional components to prevent increases in females' smoking.		influence of other-sex friendships and friends' behaviours, especially for those students whose peer networks include primarily out of- school peers.
Over time relationships between early adolescent and peer substance use	Bruce Simons-Morton, Rusan S. Chen	N = 2453	• Initial substance use predicted an increase in the number of substance using friends over time, indicating an effect of selection, and the initial number of substance using friends predicted substance use progression, providing evidence of socialization. • The magnitudes of these relationships were similar. Bivariate, lagged autoregressive analyses of the successive relationships from one assessment to the next showed consistent, significant associations from peer use to adolescent substance use. • The association from adolescent to peer use was significant only from 7th to 8th grade.	Longitudinal analysis	• Generalization is limited by reliance on self-report data; a study population drawn from a single suburban county, attrition of subjects who were more likely than those included in the analyses to have used substances and to be male, black, and eligible for free or reduced lunch.

			• The findings provide evidence of reciprocal influences, but socialization was a more consistent influence than selection.		
Parent, sibling and peer influences on smoking initiation, regular smoking and nicotine dependence. Results from a genetically informative design	Jeffrey F. Scherrer, Hong Xian, Hui Pan, Michele L. Pergadia, Pamela A.F. Madden, Julia D. Grant, Carolyn E. Sartor, Jon Randolph Haber, Theodore Jacob, and Kathleen K. Bucholz	N = 1919	• Parent, sibling and peer level variables contribute to offspring ever smoking, regular smoking and nicotine dependence. • Even after controlling for familial vulnerability to nicotine dependence, environmental contributions to smoking remain significant. • Results of multinomial logistic regression using 1919 offspring at varying levels of genetic vulnerability for nicotine dependence suggested ever smoking was associated with increasing offspring age, white race, high maternal pressure to succeed in school, sibling drug use, and friend smoking, alcohol and drug use.	Cross-sectional analysis - interviews	• Sample size limitations may have reduced statistical power to detect differences in the risk for smoking outcomes. • It was not possible to measure all environmental influences on offspring. The study lacked data on offspring perception of sibling smoking and lacked self-reported measures from siblings on smoking, alcohol and drug use.

		• Offspring regular smoking was associated with these same factors with additional contribution from maternal nicotine dependence. Offspring nicotine dependence was associated with increasing offspring age, male gender, biological parents divorce, high genetic risk from father and mother nicotine dependence, maternal problem drinking, maternal rule inconsistency and sibling drug use, and friend smoking, alcohol and drug use.	Expansion of the shared environment assessment may reveal key parent, sibling and peer level variables that have not been adequately measured. • Longitudinal data will help clarify the direction of effect for peer substance use. • Since offspring who smoke are more likely to perceive peers smoke it is possible that the study overestimated the environmental contribution from peer smoking to offspring smoking. • Due to the ubiquitous exposure to tobacco in the military the present cohort may be more

					exposed to tobacco than those found in offspring of civilian populations.
Parental and peer influences on teen smoking: Are White and Black families different?	Martie L. Skinner , Kevin P. Haggerty, & Richard F. Catalano	N = 331	• Several factors affected both groups: (a) parenting factors reduced association with deviant peers, (b) association with deviant peers increased the risk of smoking in the 10th grade, and (c) teens were more likely to smoke if their parents smoked. • Reduced smoking among Black teens compared with White teens may be due to the protection of clear parental guidelines about substance use and clearly stated	Longitudinal analysis	• The study did not collect smoking status of the teens' peers. • The study failed to ask questions of the teens and parents that dealt more specifically with efforts the parents make to discourage their teens from

	consequences for failure to observe those guidelines.	smoking. • The tested model predicts smoking behaviours at one time point. Including measures of earlier smoking behaviours would shift the focus to predicting change in smoking over time, increase the explained variance in later smoking, and possibly eliminate the significance of other predictors.

Parental and Peer Influences on the Risk of Adolescent Drug Use	Stephen J. Bahr, John P. Hoffmann, and Xiaoyan Yang	N = 4230	• All six of the family variables have significant associations with adolescent cigarette smoking. • Parental attitudes and siblings who smoke are the most important family variables. Each of these variables doubles the risk of adolescent cigarette smoking. After peers are entered into the equation, the coefficients for the family variables decrease substantially. • The number of close friends who smoke is the strongest predictor of adolescent smoking and it appears to be a mediating variable for the family characteristics. However, even net of peers, the family variables are important, particularly parental attitudes and sibling use. • Sibling smoking is associated with a 50 percent unit increase in the risk of smoking. As parental attitudes increase by a point (become more tolerant of cigarette use), the unit increase in cigarette use increases by 40 percent. Attachment to mother, attachment to father, and parental monitoring tend to decrease the risk of adolescent smoking and these effects are partially mediated by peers. • Gender is not associated with adolescent smoking net of peers	Cross-sectional analysis	• The data were cross sectional. • There may be reciprocal influences among some of the variables. For example, associating with drug-using adults may affect peer selection, but the reverse is also possible. • Longitudinal data are needed to capture these reciprocal relationships. • Adolescents provided all of the information including parental monitoring and attitudes which may not reflect the actual behaviours and attitudes of parents, and adolescent reports of peer behaviours may not reflect actual peer

	while the risk of smoking increases with age.	behaviours. • A direct measure of parental drug use was not available. • Peer influences may have been overestimated due to the inability to account for temporal order selection effects. • The prevalence of all types of drug use was relatively low in this sample compared with national data.

Parental behaviours, but not parental smoking, influence current smoking and smoking susceptibility among 14 and 15 year-old children	Andrew Waa, Richard Edwards, Rhiannon Newcombe, Jane Zhang, Deepa Weeraseker a, Jo Peace and Ingrid McDuff	N = 3189	• Not allowing smoking in the home, communicating non-smoking expectations to children, monitoring pocket money, and setting rules to guide behaviour are strategies which are likely to reduce risk of smoking uptake. • The study provides evidence to inform the development of parent focused interventions to reduce the risk of smoking initiation by children.	Cross-sectional analysis	• A limitation of the study was that the analysis was based on cross-sectional data. • A further limitation for the present study was that only two of the three validated items developed by Pierce et al.21 were available to measure susceptibility to smoking.

Parental factors and adolescents' smoking behavior: an extension of The theory of planned behavior	Zeena Harakeh, Ron H.J. Scholte, Ad A. Vermulst, Hein de Vries, and Rutger C.M.E. Engels	N = 1070	• The findings showed that the quality of the parent–child relationship and parental knowledge affected adolescents' smoking behaviour indirectly, while parental smoking behaviour had a direct effect. • Strict control and psychological control were found to be unrelated to adolescents' smoking onset. • In prevention campaigns, parents should be informed of the extent to which they exert influence on their child's smoking behaviour and should be given advice and information on how they can prevent their children from starting to smoke.	Longitudinal analysis	• Self-report bias • Although the study focused (primarily) on parental factors as distal factors, the explained variance of adolescents' smoking onset in the model on future smoking behaviour is lower compared with the explained variance of adolescents' smoking behaviour in the model on current smoking behaviour. • The study looked at the short-term effects of parental factors on adolescents' smoking onset. • Future studies are needed to investigate the long-term effects of parental factors on adolescents' smoking onset.

Parental influence on substance use in adolescent social networks	Holly B. Shakya; Nicholas A. Christakis; James H. Fowler	N = 90118	• If an adolescent had a friend whose mother was authoritative, that adolescent was 40% (95% CI, 12%-58%) less likely to drink to the point of drunkenness, 38% (95% CI, 5%-59%) less likely to binge drink, 39% (95% CI, 12%-58%) less likely to smoke cigarettes, and 43% (95% CI, 1%-67%) less likely to use marijuana than an adolescent whose friend's mother was neglectful, controlling for the parenting style of the adolescent's own mother, school-level fixed effects, and demographics. • These results were only partially mediated by peer substance use. • Social network influences may extend beyond the homogeneous dimensions of own peer or own parent to include extra-dyadic influences of the wider network. The value of parenting interventions should be reassessed to take into account the influence to the greater network.	Longitudinal analysis	• The results may not be generalizable to all adolescents in the United States, as the final network cannot be weighted to be nationally representative. • Self-report substance abuse measures may be subject to bias due to social desirability or inexact recall.

Parental rules and communication: their association with adolescent smoking	Zeena Harakeh, Ron H. J. Scholte, Hein de Vries & Rutger C. M. E. Engels	N = 428	• Compared with fathers and adolescents, mothers reported being more involved in antismoking socialization. • There were robust differences in antismoking socialization efforts between smoking and non-smoking parents. • Perceived parental influence and frequency and quality of communication about smoking were associated with adolescents' smoking. • The association between antismoking socialization practices and adolescents' smoking was not moderated by birth order, parents' smoking or gender of the adolescent. • Encouraging parents, whether or not they themselves smoke, to discuss smoking-related issues with their children in a constructive and respectful manner is worth exploring as an intervention strategy to prevent young people taking up smoking.	Cross-sectional analysis	• The study used a cross-sectional design. • The adolescents may have under-reported their actual smoking because their questionnaire was completed in the presence of their parents. • The findings cannot be representative for all families in the Netherlands because, for example, the inclusion of only intact families. • The study did not examine adolescents' smoking onset or adolescents' regular smoking, but focused solely on the association between antismoking socialization practices and

adolescents' life-time smoking.

Parental smoking and adolescent smoking initiation: an intergenerational perspective on tobacco control	Stephen E. Gilman, Richard Rende, Julie Boergers, David B. Abrams, Stephen L. Buka, Melissa A. Clark, Suzanne M. Colby, Brian Hitsman, Alessandra N. Kazura, Lewis P. Lipsitt, Elizabeth E. Lloyd-Richardson, Michelle L. Rogers, Cassandra A. Stanton, Laura R. Stroud, and Raymond S. Niaura	N = 564	• Parental smoking is an important source of vulnerability to smoking initiation among adolescents, • Parental smoking cessation might attenuate this vulnerability.	Longitudinal analysis	• Limitations of this study include the use of parents' retrospective reports of lifetime smoking to establish patterns of cigarette smoking, symptoms of nicotine dependence, and ages at smoking onset and offset. • Adolescents' ages at smoking initiation were also reported retrospectively. • Inaccuracies in these reports may have weakened the ability to detect differences between various aspects of intergenerational transmission. • Information on parental smoking was obtained partly by self-report and partly

			by adolescent report, giving rise to the possibility of overestimating the intergenerational transmission if there were systematic reporting biases. • The findings are specific to smoking initiation defined as first puff of a cigarette. However, prior research has shown that smoking just once is associated with a higher risk of subsequent regular smoking.

Parental Smoking and Adolescent Smoking Stages: The Role of Parents' Current and Former Smoking, and Family Structure	Roy Otten, Rutger C. M. E. Engels, Monique O. M. van de Ven, and Jonathan B. Bricker	N = 7426	• The role of parental smoking is not restricted to smoking onset and is present throughout different phases of the acquisition process. • Results support the delayed modelling hypothesis that parental smoking affects the likelihood for children to smoke even when parents quit many years before. • Children living in single-parent families are only exposed to the behaviour of one parent; in two-parent families the behaviour from one parent may magnify or buffer the behaviour of the other parent.	Longitudinal analysis	• All concepts were determined and measured by proxy reports from the children. • The use of teachers to collect the data may have resulted in lower reports of smoking behaviour. • The cell sizes for some of the regressions were small, which prevented taking transitions as outcome variable while looking at the effects of parental smoking cessation point.

Parental smoking and pretend smoking in young children	Rebecca N H de Leeuw, Rutger C M E Engels and Ron H J Scholte	N = 100	• Children's explicit attitudes were unrelated to their smoking-related play behaviour. These findings indicate that young children, who reported having parents who smoke, already associate having dinner with a (after-dinner) cigarette	Cross-sectional analysis	• It is difficult to generalise the present findings as the study is not representative, and is characterised by an over-representation of children from parents with higher educational levels, etc. • Measurements of parental smoking were not validated biochemically and, therefore, it is unclear who may have misreported.

Parental Smoking and Smoking Behavior in Asthmatic and Nonasthmatic Adolescents	Roy Otten, M.A., Rutger C.M.E. Engels, And Regina J.J.M. Van Den Eijnden	N = 10087	• Compared with non-asthmatic adolescents, asthmatic adolescents were more likely to have smoking parents. Furthermore, similar associations were found between parental smoking and adolescent smoking among asthmatic and non-asthmatic adolescents. • The time at which maternal smoking ceased was associated with a decreased likelihood for ever smoking for both asthmatic and non-asthmatic adolescents. • Asthmatic adolescents need to become more aware of the health risks of smoking. Therefore, tailor-made antismoking campaigns are needed at schools to reduce misconceptions among asthmatic adolescents about the risks of smoking. • A personal intervention approach aimed particularly at smoking parents of an asthmatic child may make them aware of the consequences for their offspring and help them to stop smoking.	Cross-sectional analysis	• The study used a cross-sectional design. • Adolescents with asthma symptoms may affect parental smoking behaviour. The same kind of reasoning could be made for the relationship between child smoking behaviour and parental smoking behaviour. • There is, however, hardly any proof that child smoking behaviour affects parental smoking behaviour (31). The information about asthma in the present study was derived exclusively from self-reports of the adolescents. Extra validation of these self-reports could have been made by including

			peer reports, parent reports, or physical measurements. However, several studies have examined the validity of the ISAAC questionnaire by comparing responses to this self-report assessment with a physician's assessment of their asthma status, or with other written questionnaires and video questionnaires (32–34). • Information about smoking behaviour was also solely derived from self-reports and respondents had to estimate their parents' smoking behaviour. • The study focused exclusively on the

	role of parents in terms of associations between their smoking behaviour and that of their children. However, it is known that during adolescence peer acceptance is also very important.

Parental smoking and smoking experimentation in childhood increase the risk of being a smoker 20 years later: the Childhood Determinants of Adult Health Study	Seana L. Paul, Leigh Blizzard, George C. Patton, Terry Dwyer & Alison Venn	N = 6559. N = 8498	• Parental smoking was not associated with childhood smoking experimentation. • Findings suggest that any childhood smoking experimentation increases the risk of being a smoker 20 years later. • As exposure to parental smoking predicted current smoking, parents should be aware of the association between their own smoking behaviour and that of their children. • This may increase their susceptibility to peer pressure and, therefore, increases the importance of examining the influence of peer smoking.	Cross-sectional analysis	• The response proportion at follow-up was 55%, and participants differed from non-participants in terms of parental smoking and 1985 area-based SES. • The 1985 data were reported by children in a school environment, which may have led to socially desirable responses. • Younger children may have had difficulty understanding and responding to some items. • Investigators attempted to address these issues by having children complete questionnaires in small groups led by a person who was not a staff member at the school.

	• Self-reports of smoking from adolescents have been shown to be reliable when validated with cotinine concentrations [20]. • Inclusion of childhood current smokers with experimenters could be considered a limitation.

Parental smoking cessation and children's smoking: Mediation by antismoking actions	Jonathan B. Bricker, Brian G. Leroux, M. Robyn Andersen, Kumar Bharat Rajan, Arthur V. Peterson, Jr.	N = 1600	• Asking to sit in a non-smoking section of a public establishment substantially mediates the relationship between parental smoking cessation and children's smoking.	Longitudinal analysis	• The lack of an experimental manipulation prevents the conclusion that parental antismoking actions cause reductions in child smoking. • An alternative explanation is that child smoking causes parents to become more lenient in their antismoking actions. Perhaps these causal mechanisms are reciprocal. • The sample was not representative with 90% White child participants, caution should be used in generalizing the findings to other racial groups. • Selection bias may have occurred because baseline

	and follow-up data were not available for all the families.

Parental tobacco smoking behaviour and their children's smoking and cessation in adulthood	Rob McGee, Sheila Williams & Anthony Reeder	N = 1037	• Less daily smoking among the participants at age 26 was related more strongly to parental smoking cessation in the adolescent years than the childhood years. • Inconsistent advice about smoking in childhood and adolescence predicted later daily smoking. • Cessation attempts to age 26 were unrelated to earlier parental quitting but were related to consistent advice in adolescence from both parents about smoking. • Encouraging parents to voice consistent messages about their disapproval of smoking has a significant role to play in discouraging smoking in their adult children and promoting attempt to quit where their children are smokers.	Longitudinal analysis	• Missing data are a problem in longitudinal studies and especially in a follow-up over a 26- year period. Analyses relied on having data for both parents and the study is unable to show that separate models based on paternal and maternal smoking behaviours. • The information about father's smoking in childhood came in most cases from the mother, and later information about parent smoking came from the study participants themselves.

Parenting Style and Smoking-Specific Parenting Practices as Predictors of Adolescent Smoking Onset	Laurie Chassin, Clark C. Presson, Jennifer Rose, Steven J. Sherman, Matthew J. Davis, and Jeremy L. Gonzalez	N = 556	• Adolescents from disengaged families (low acceptance and low behavioural control) were most likely to initiate smoking. • Adolescents' reports of parents' smoking-related discussion was related to lowered smoking risk for adolescents with non-smoking parents, but unrelated to smoking onset for adolescents with smoking parents. • Smoking-specific parenting practices did not account for the effects of general parenting styles. • Both parenting style and smoking-specific parenting practices have unique effects on adolescent smoking, although effects were largely confined to adolescents' reports; and for smoking-specific parenting practices, effects were confined to families with non-smoking parents. • Interventions that focus only on smoking-specific parenting practices may be insufficient to deter adolescent smoking.	Longitudinal analysis	• The relatively small number of participants who increased their smoking precluded the possibility of disaggregating transitions to first cigarette from transitions to experimental smoking and to regular smoking, etc. • The sample was predominantly non-Hispanic white, so that generalization to other ethnic groups is not possible. • The size of the sample provides ample statistical power for detecting main effects and interactions of moderate magnitude, it is not optimal for detecting small

	interaction effects or the multiple mediational chains that might occur if both maternal and paternal smoking-specific socialization were tested as mediators. • No observational measures of parenting were included, and these measures might produce different findings and provide a better understanding of the discrepancies that were observed between adolescent and parent reports.

Parents' and older siblings' smoking during childhood: Changing influences on smoking acquisition and escalation over the course of adolescence	Jonathan B. Bricker, Arthur V. Peterson, Jr., M. Robyn Andersen, Irwin G. Sarason, K. Bharat Rajan, Brian G. Leroux	N = 5520	• The results suggest that the influence of parents' smoking on smoking initiation is stable and enduring whereas it increases substantially for smoking escalation occurring over the course of adolescence. • The results showed that the influence of parents' smoking at the start of the childhood and adolescent smoking acquisition period (i.e., 3rd grade) was stable and significant for the transition to trying smoking and increased across the grade intervals for the third transition. • The influence of each parent's smoking was highest (22%) for the transition from monthly to daily smoking in the 9th–12th grade interval. The same pattern of results was found in a supplementary analysis of the parents who reported the same smoking status when the child was in 3rd and 11th/12th grades. • Older siblings' smoking at the start of the childhood and adolescent smoking acquisition period was associated with a 7% probability of making the transition to trying smoking in the up-to-5th-grade interval and a 9% probability of	Longitudinal analysis	• This study accounted for variations in district-level correlates of adolescents' smoking (e.g., district-level socioeconomic status), it did not explore whether other known predictors of smoking, such as family-level socioeconomic status, moderate the associations studied here. • This study's population was not representative of non-White racial groups, it does represent the general population of Washington residents. • It is possible that selection bias occurred because baseline and follow-up data

	making this transition between 7th and 9th grades but was non-significant for the other grade intervals and the two subsequent smoking transitions. • These probabilities are 'per parent who smokes' and 'per older sibling who smokes.' • The model posits that the number of parents and older siblings has a linear effect on the log scale. The fit of the estimated probabilities suggests that linearity was a reasonable assumption.	were not available for all the families. • The analysis could be non-prospective for the up-to-5th grade period because the two smoking transitions examined for that grade interval (transitions 1 and 2) could have occurred before the 3rd-grade assessment of parents' and older siblings' smoking. • The study makes no assumptions about the impact of older siblings' or parents' taking up or quitting smoking following the 3rd-grade smoking assessment.

Participating in health issue-specific social networking sites to quit smoking - How does online social interconnectedness influence smoking cessation self-efficacy	Joe Phua	N = 252	• Active participation in health issue-specific SNSs for smoking cessation also significantly influenced both bridging and bonding social capital on the sites. As such, participation has the ability to expand the breadth, and depth, of one's relationships with other members. • With bridging social capital, regular SNS usage can help members increase the breadth of their relationships online, connecting with more heterogeneous ties, including people from all walks of life and disparate geographic locations, who may not be exposed to one another otherwise (Williams, 2006). • With bonding social capital, on the other hand, regular SNS usage can help individuals to deepen their relationships with similar others online, connecting with more homogeneous ties, and building stronger trust and emotional bonds (Ellison et al., 2007; Haythornthwaite, 2002).	Cross-sectional analysis	• Self-reporting biases. • The survey methodology may also be subject to self-selection bias. • The researcher had little control over the type and number of sites examined, as permission was needed from moderators to post the questionnaire. Hence, both general health social network sites (albeit those with a smoking cessation community hosted within the main sites) and social network sites catering only to smoking cessation were included. • The six study sites did have some differences structurally (e.g., design of site,

	number of message boards, information in personal profiles, etc.) and in site activity (e.g., number of posts per day, number of active members, etc.).

Peer acceleration - effects of a social network tailored substance abuse prevention program among high-risk adolescents	Thomas W. Valente, Anamara Ritt-Olson, Alan Stacy, Jennifer B. Unger, Janet Okamoto & Steve Sussman	N = 541	• Towards No Drug Abuse Network was effective in reducing substance use. • The program effect interacted with peer influence and was effective mainly for students who had peer networks that did not use substances. • Students with classroom friends who use substances were more likely to increase their use. • A peer-led interactive substance abuse prevention program can accelerate peer influences. • For students with a peer environment that supports non-use, the program was effective and reduced substance use. • For students with a peer environment that supports substance use, an interactive program may have deleterious effects.	RCT	• Participant attrition and non-response in the study sample (36.7% lost to follow-up). • Results may not generalize to students who were lost to follow-up or never participated.

Peer and parental influences on longitudinal trajectories of smoking among African Americans and Puerto Ricans	Judith S. Brook, Kerstin Pahl, Yuming Ning	N = 5230 African American N = 5221 Puerto Rican	• A community-based sample of 451 African American and Puerto Rican adolescents was interviewed four times during adolescence and in early adulthood, covering a span of 12 years. For both ethnic/racial groups, four distinct trajectories were identified: Non-smokers, maturing-out smokers, late-starting smokers, and early-starting continuous smokers. • Compared with Puerto Ricans, African Americans were over-represented in the non-smoking group, whereas Puerto Ricans were over-represented in the early-starting continuous group. • Females were more likely than males to be early-starting continuous smokers than late starters. • Adolescents who were exposed to peer and parental smoking in early adolescence were more likely to belong to trajectory groups characterized by higher levels of smoking. • Findings show that exposure to peer and parental smoking in early adolescence constitutes a risk factor for engaging in elevated levels of smoking behaviour at an early age and for continued smoking into	Longitudinal analysis	• The development of smoking behaviour that occurs between adolescence and the mid-20s is related not only to gender and peer and parent smoking but also to factors not included in the present study, including genetic, other biological, and childrearing factors (Melby, Conger, Conger, & Lorenz, 1993; White et al., 2000). • The study has relies on adolescents' reports of peer and parent smoking. • Oversampling participants who were drug users at T2 may have resulted in a more deviant sample at T3 than would have been the case

		adulthood for urban African Americans and Puerto Ricans. • To be most effective, smoking prevention programs should address peer group and family influences on adolescent smoking.	otherwise.

Peer Effects and Multiple Equilibria in the Risky Behavior of Friends	David Card, and Laura Giuliano	N > 90000	• Our estimates suggest that patterns of initiation of risky behaviour by adolescent friends exhibit significant interaction effects. • The likelihood that one friend initiates intercourse within a year of the baseline interview increases by 4 percentage points (on a base of 14%) if the other also initiates intercourse, holding constant family and individual factors. Similar effects are also present for smoking, marijuana use, and truancy. • There are larger peer effects for females and for pairs that are more likely to remain best friends after a year.	Longitudinal analysis	•

Peer Effects and Selection Effects on Smoking among Canadian Youth	Brian V. Krauth	N = 9210	• The results indicate that peers have some influence on a young person's decision to smoke, but that influence is much weaker than is suggested by reduced form models.	Cross-sectional analysis	•

Peer Effects in Drug Use and Sex Among College Students	Greg J. Duncan, Johanne Boisjoly, Michael Kremer, Dan M. Levy, and Jacque Eccles	N = 3361	• Findings illustrate that early adolescents who engage in smoking and drinking are not only perceived as self-confident and sociable, but also with less interest in school and academic performance, emotionality and nervousness, and aggression. Some subgroups of higher engagement are distinguished.	Cross-sectional analysis	• A limitation of the study it is not a longitudinal investigation. • Caution should be used when generalising the findings to other countries and cultures.
Peer effects on risky behaviors - New evidence from college roommate assignments	Daniel Eisenberga, Ezra Golbersteinb, Janis L. Whitlock	N = 4971	• There are significant peer effects for binge drinking but little evidence of effects for other outcomes, although there is tentative evidence that peer effects for smoking may be positive among men and negative among women. • The peer effects for binge drinking are significant for all subgroups defined by sex and prior drinking status. • Pre-existing risky behaviours predict	Longitudinal analysis	• This analysis is limited by the fact that predicted friendship levels have much less variation than actual friendship levels. • The lack of clear evidence for differential peer effects by

			the closeness of friendships, which underscores the significance of addressing selection biases in studies of peer effects. • There is tentative evidence that peer effects for smoking may be positive for men and negative for women. • The matching of baseline substance use behaviours between roommates significantly predicts friendships.		friendship closeness is consistent with a previous study using a different identification strategy (based on year-to-year continuity in residential co-location) that finds no evidence for larger academic peer effects among students who are more likely to be friends.
Peer effects on substance use among American teenagers	Daiji Kawaguchi	N = 6356	• The estimation of peer effects on substance usage through perceived peer behaviours shows significant peer effects. • When the perceived peer substance use increases by ten percentage points, the probability that a teenager will use substances increases by two to three percentage points. • The endogenous effect is found to be more important than the contextual effect when explaining the peer effects on youth substance use; implying that current peer behaviours, rather than peer	Cross-sectional analysis	• The limitation of an identification strategy that only uses observed behaviour becomes clear

			backgrounds, determine individual behaviours. If some exogenous shock reduces a group's substance use, this reduction affects other groups of youths through the endogenous effect. Hence, policy makers can expect a ''social multiplier'' effect in policies that discourage youth substance use.		
Peer group reputation and smoking and alcohol consumption in early adolescence	Rutger C.M.E. EngelsT, Ron H.J. Scholte, Cornelis F.M. van Lieshout, Raymond de Kemp, Geertjan Overbeek	N = 3361	• Analysis demonstrated that highest levels of smoking and drinking were found in adolescents who score high on sociability and self-confidence, and relatively low on aggression–inattentiveness, achievement–withdrawal, and emotionality–nervousness. • This suggests that beneficial functions of substance use are not only in the eyes of the beholder, at least not in that of the individual drinker or smoker.	Cross-sectional analysis	• The cross-sectional nature of this study does not permit conclusions about the causal direction of the observed associations, and the study may not be generalizable.
Peer influence and selection effects on adolescent smoking	Myong-Hyun Go, Harold D. Green Jr., David P. Kennedy, Michael Pollard, Joan S. Tucker	N = 1223	• Non-smokers were more likely to become smokers if they initially belonged to a smoking (vs. non-smoking) group, and smokers were more likely to become non-smokers if they initially belonged to a non-smoking (vs. smoking) group, indicating an influence effect on both initiation and cessation. • Group members who changed groups between waves were more	Longitudinal analysis	• Study limitations include reliance on self-reported smoking, use of a school-based sample, and the inability to rule out alternative, third variable explanations for results.

			likely to select groups with smoking behaviour congruent to their own, providing evidence of a selection effect. • The results suggest that gection effects on adolescent smoking maybe much weaker than assumed based on this earlier research.		
Peer Influences on Adolescent Cigarette Smoking: A Theoretical Review of the Literature	Beth R. Hoffman, Steve Sussman, Jennifer B. Unger, and Thomas W. Valente	n/a	• Perceived influence theories hinge upon an adolescent's perception of friends' smoking behaviour. • External influence theories are those in which friends' smoking behaviour overtly influences adolescent smoking. • Group level theories examine how differences at the level of subculture, gender, and race/ethnicity influence the relationship under study. • A model integrating relevant theories into a longitudinal model representing friend influences on adolescent smoking is presented, along with implications of the results presented for adolescent tobacco prevention programs.	Review of theories	• Theoretical review? • Attrition of higher use subjects • Small number of smoking subjects may have reduced reliability • Self-report of peer smoking • Non-representative sample • Factors related to smoking status may not be related to smoking initiation

Peer Influences: The Impact of Online and Offline Friendship Networks on Adolescent Smoking and Alcohol Use	Grace C. Huang, Jennifer B. Unger, Daniel Soto, Kayo Fujimoto, Mary Ann Pentz, Maryalice Jordan-Marsh, and Thomas W. Valente	N = 1563	• The frequency of adolescent social network site use and the number of their closest friends on the same social network sites were not significantly associated with risk behaviours. • Exposure to friends' online pictures of partying or drinking was significantly associated with both smoking ($b = .11$, $p < .001$) and alcohol use ($b = .06$, $p < .05$). Whereas adolescents with drinking friends had higher risk levels for drinking, adolescents without drinking friends were more likely to be affected by higher exposure to risky online pictures ($b = -.10$, $p < .05$). • Myspace and Facebook had demographically distinct user characteristics and differential effects on risk behaviours. • Exposure to risky online content had a direct impact on adolescents' risk behaviours and significantly interacted with risk behaviours of their friends. • Results provide evidence that friends' online behaviours should be considered a viable source of peer influence and that increased efforts should focus on educating adolescents on the negative effects	Longitudinal analysis	• Findings are based on adolescents' reports of their friends' risk and online behaviours. • This study focused on online friendships between existing close friends, other aspects of their online relationships were not captured. • The measures used to assess online risk exposures (displays of partying) were general and could have been transmitted through any social networking channel or interpreted differently by each student. • As a secondary data analysis study, interviews with adolescents or parental figures

			of risky online displays.		were not possible.
Peer Pressure, Psychological Distress and the Urge to Smoke	Yi-Wen Tsai, Yu-Wen Wen, Chia-Rung Tsai and Tzu-I Tsai	N = 1220	• These results suggest that both peer cues and psychological cues increase the possibility of contingent smoking, and should, therefore, be addressed by anti-smoking policies and anti-smoking programs. • Special attention can be paid to help smokers avoid or counter social pressure to smoke and to help smokers resist the use of cigarettes to relieve distress.	Cross-sectional analysis	• This study is subject subjective information and recall bias. • The study sample of female smokers was very small, limiting the generalization of results.

Peer Smoking, Other Peer Attributes, and Adolescent Cigarette Smoking: A Social Network Analysis	Susan T. Ennett, Robert Faris, John Hipp, Vangie A. Foshee, Karl E. Bauman, Andrea Hussong, Li Cai	N = 6579	• Friends smoking was confirmed as a risk factor for smoking involvement, as was smoking by schoolmates. • The study demonstrated the contribution of other peer variables net of the smoking behaviour of peers. • Indicators of embeddedness in friendships, friendship quality, and peer social status, as identified through social network analysis, were associated with adolescent smoking involvement across the ages examined either as unique effects or in interaction with friend smoking. • The only peer variable not related to adolescent smoking was reciprocated closeness.	Longitudinal analysis	• The statistical models, while based on longitudinal data, do not facilitate assessing temporality of relationships and therefore causal inferences are tempered.

Peer Standing and Substance Use in Early-Adolescent Grade-Level Networks: A Short-Term Longitudinal Study	Ley A. Killeya-Jones, Ryo Nakajima, Philip R. Costanzo	N ≈ 1400	• Early regular substance users enjoying elevated standing amongst their peers and maintaining this standing regardless of their maintenance of or desistance from current use later in the school year. • In the fall semester, users (n=20, 13%) had greater social impact, were described by their peers as more popular, and were more central to the peer network than abstainers (i.e., those who did not report current use). • In the spring semester, there were no differences between users (n=22, 13%) and abstainers in peer ratings of popularity or social impact. Notably, the spring semester users group retained fewer than half of the users from the fall semester. • Students who had reported current use in the fall, as a group, retained their positions of elevated peer standing in the spring, compared to all other students, and continued to be rated by their peers as more popular and as having greater social impact.	Longitudinal analysis	• Findings may be limited to this particular age group. • A limited sample of users prevented the study from exploring if smokers and drinkers gain and maintain similar positions within the peer groups of early adolescents? • The small sample of users prevented the study from addressing the role of gender in the relation between peer standing and substance use.

Perceived peer influence and peer selection on adolescent smoking	Beth R. Hoffman, Peter R. Monge, Chih-Ping Chou, Thomas W. Valente	N > 20000	• Results indicated that both peer influence and peer selection was occurring. Peer influence was more salient in the population than was peer selection.	Longitudinal analysis	• The degrees of freedom for the initial model were 3, which are rather low and so provides few opportunities for model adjustment. • The measure of smoking used was different at the two time points. The measure of smoking at T1 was assessing ever smoking. • The measure used for friends' smoking was reported by the adolescent.
Perceived peer smoking prevalence and its association with smoking behaviours and intentions in Hong Kong Chinese adolescents	Man Kin Lai, Sai Yin Ho & Tai Hing Lam	N = 13280	• Overestimation of peer smoking prevalence was common in Hong Kong Chinese boys and girls, and was associated with current and ever smoking in boys.	Cross-sectional analysis	• The uncertainty of the temporal sequence of independent and outcome variables was one of the limitations of this cross-sectional study. • The statistical power of this analysis was

					limited by the relativity small number of male experimental smokers. • Ex-smokers and triers were not differentiated among the experimental smokers, and the definition of 'ex-smokers' in adolescents is problematic.
Perceived smoking norms, socio-environmental factors, personal attitudes and adolescent smoking in China: a mediation analysis with longitudinal data	Xinguang Chen, Bonita Stanton, Xiaoyi Fang, Xiaoming Li, Danhua Lin, Jintao Zhang, Hongjie Liu, and Hongmei Yang	N = 813	• Data from this analysis indicate that among the six variables assessing smoking among influential others (best friends, father, mother, male teachers, female teachers, and adults in general) at baseline, each was either directly or indirectly associated with the amount of cigarette smoking at the six-month follow-up. • This finding was verified and extended with the longitudinal data used in this study.	Longitudinal analysis	• The sampled subjects in this study were not randomly selected, and represent only a miniscule percentage of Chinese adolescents. Therefore, it is not possible to directly generalize conclusions from this study. • Caution may also be needed when using results regarding female

					middle school students from this study because of the few female smokers in the sample. • The dependent variable of 30-day smoking used for the regression analysis was not "real" continuous.
Personal Network Correlates of Alcohol, Cigarette, and Marijuana Use Among Homeless Youth	Suzanne L. Wenzel, Joan S. Tucker, Daniela Golinelli, Harold D. Green Jr, and Annie Zhou	N = 419	• Youth with more substance users in their networks reported greater alcohol, cigarette, and marijuana consumption regardless of whether these network members provided tangible or emotional support. • Marijuana use was more frequent for youth who met more network members through homeless settings, but less frequent among those who met more network members through treatment or AA/NA. • Greater alcohol use occurred among youth who met more network members through substance use-related activities. • Youth having more adults in	Cross-sectional analysis	• The study achieved a representative probability sample of homeless youth in shelters, drop-ins, and street locations across a broad region of Los Angeles County, thus facilitating out ability to generalize results to the population of youth in these settings. • Results may not be representative of homeless youth in

		positions of responsibility in their networks consumed less alcohol, and those with more school attendees in their networks consumed less alcohol and cigarettes. • Findings highlight the importance of social context in understanding substance use among homeless youth. • Results also support the relevance of network-based interventions to change social context for substance using youth, in terms of both enhancing pro-social influences and reducing exposure to substance use.	other geographic areas. • The substance use behaviour of network members was not obtained directly; but reported on perceptions of use by members of their network.

Place-Based Social Network Quality and Correlates of Substance Use Among Urban Adolescents	Michael J. Mason, Thomas Valente, J. Douglas Coatsworth, Jeremy Mennis, Frank Lawrence, and Patricia Zelenak	N = 301	• These findings also suggest that contextual features of social networks matter for youth development and point to significant interactions among place, network composition, gender, and age. • The analysis demonstrated that young females' social networks are protective and underscores the need to further investigate the social processes of substance use and non-use for early adolescent females. • The findings that young males' social networks offer no protection against substance use is informative and could be interpreted in two ways. It could be attributed to a less relationally sensitive mechanism for substance use uptake among young males. That is, younger males' decisions about using substances are less dependent upon the social network quality compared to younger females. A second interpretation is that the substance using younger males are experiencing more School Problems (attitudes toward school, teachers, and sensation seeking), and that these educationally based experiences in schools have more	Cross-sectional analysis	• It analysed cross-sectional data, limiting the study's ability to make causal inferences. • The assessment did not capture family history of substance use or parenting practices which could have added another important dimension to these data. • The study was limited to one scale within a measure that focused on parent-teen relations from the adolescents' perspective. • The sample was drawn from a low-resource, urban primary care setting and may not generalize beyond this type of population.

salience on their substance use than their peer networks.

- The finding that older males are less likely to use substances with protective social networks at their riskiest location is revealing. In contrast to younger males, older males experience the most protective effects from their networks at their risky locations, indicating that social networks could be influential in their substance use.
- Thus every incremental increase in their risky place network score produces a 14% decrease in the odds of their using substances. While older male adolescents are at greatest risk for substance abuse and dependency, they also stand to benefit the most from protective networks at their riskiest locations.

Popularity as a Moderator of Peer Selection and Socialization of Adolescent Alcohol, Marijuana, and Tobacco Use	Cécile Mathys, William J. Burk and Antonius H. N. Cillessen	N = 450	• Results of a single multivariate model indicated that peer selection based on similar tobacco use was a more robust predictor of changes in friendship than selection based on similar alcohol and marijuana use; and peer socialization of alcohol use predicted more changes in adolescent drinking behaviours. • Popularity moderated selection based on alcohol use; popular adolescents were more likely to select friends with high levels of drinking behaviours. • Popularity did not moderate peer socialization.	Longitudinal analysis	• The study accounted for sex and ethnicity, but did not test whether they moderated friendship selection and socialization, nor the moderation effects of popularity differed as a function of sex or ethnic group. • The study focused on the role of (perceived) popularity on friendship and substance use dynamics and did not consider the role of likeability (peer acceptance).

Popularity Trajectories and Substance Use in early Adolescence	Moody, J., Brynildsen, W. D., Osgood, D. W., Feinberg, M. E. and Gest, S.	N = 61000	• Popularity structures tend toward a stable hierarchical social organization at the network level, but with considerably relational change in both particular friends and position at the individual level. • The HLM (random effects) models, identiefed a positive effect of popularity level and trajectory variability on substance use over time.	Longitudinal analysis	• The sample was drawn from limited districts where at least 15% of families are eligible for free or reduced cost school lunches, meaning section bias should be considered in generalisation.

Pressure to drink but not to smoke: Disentangling selection and socialization in adolescent peer networks and peer groups	Noona Kiuru, William J. Burk, Brett Laursen, Katariina Salmela-Aro, and Jari-Erik Nurmi	N = 1419	• Selection and socialization contributed to similarity of alcohol use, but only selection was a factor in tobacco use.	Longitudinal analysis	• The study included older adolescents (16 years at the beginning of the study), and therefore the results can be generalized only to this age group. • Peer relations were studied only among same-grade peers from the same schools. In other words, the study did not investigate peers from other schools and from other grade levels. • The method used to measure peer groups and networks allowed only three peer nominations. • The data were limited to self-reported individual behaviours.

Proactive recruitment of cancer patients' social networks into a smoking cessation trial	Lori A. Bastian, Laura J. Fish, Bercedis L. Peterson, Andrea K. Biddle, Jennifer Garst, Pauline Lyna, Stephanie Molner, Gerold Bepler, Mike Kelley, Francis J. Keefe and Colleen M. McBride	N = 496	• Proactive recruitment of smokers in the social networks of lung cancer patients is challenging. • Enlisting immediate female family members and friends, who live close to the patient as agents to proactively recruit other network members into smoking cessation trials could be used to extend reach of cessation interventions to patients' social networks. • Further consideration should be given to the appropriate timing of approaching network smokers to consider cessation.	RCT	• The study did not utilise a comparison group. • The measure of geographic proximity based on zip code congruence, with street level data having the potential to improve precision. • Behavioural or smoking related data on family members and close friends was not collected. • The study was restricted to adult family members and close friends (18 years and over).

Prospective prediction of children's smoking transitions: role of parents' and older siblings' smoking	Jonathan B. Bricker, Arthur V. Peterson Jr, Brian G. Leroux, M. Robyn Andersen, K. Bharat Rajan & Irwin G. Sarason	N = 5520	• The results provide new evidence suggesting that family smoking influences both initiation and escalation of children's smoking. • Results also quantify, in terms of probabilities, the importance of parents' and older siblings' smoking on children's three major smoking transitions. • Parents' and older siblings' smoking are important behaviours to target in preventing adolescents from making smoking transitions.	Longitudinal survey	• This study did not explore whether other known predictors of smoking, such as family-level socio-economic status and being a single parent, moderate the associations studied. • The study's population was not representative of non-Caucasian racial groups; however, it does represent the general population of Washington residents. • There was biochemical validation of children's smoking, there was no biochemical validation of parents' and siblings' smoking. However, such parent reported data are generally

					found to be reliable.
Prospective Study of the Effect of Exposure to Other Smokers in High School Tutor Groups on the Risk of Incident Smoking in Adolescence	Andrew Molyneux, Sarah Lewis, Marilyn Antoniak, William Browne, Ann McNeill, Christine Godfrey, Richard Madeley and John Britton	N = 1766	• The adjusted odds of incident smoking were significantly higher in girls, in students with parents or siblings who smoke, and in relation to school tutor group current smoking prevalence in 2000 (relative odds for highest relative to the lowest quartile of prevalence = 1.78, 95% confidence interval: 1.20, 2.64). • This tutor group effect was independent of having a best friend who smoked in the 2001 study. • Incident smoking is therefore increased among students exposed to other students who smoke, and preventing smoking at school may	Longitudinal analysis	• The sample limitations should be considered in generalizability.

			reduce adolescent smoking.		
Psychosocial correlates of smoking cessation among elderly ever-smokers in the United States	Keiko Honda	N = 32374	• Suggesting the importance of social support in smoking cessation, being married was positively associated with smoking cessation, although the smoking status of the spouses was uncontrolled. Having a spouse may have a positive influence on one's desire to quit and reinforce cessation efforts. • Having no regular source for care (adjusted OR = 0.54, 95% CI = 0.37–0.78) was an independent barrier to cessation, as were younger age, female, Hispanic race, being non-married and employed, and having lower income and education. • This work contributes to a knowledge base for the development of interventions to maximize smoking cessation of elderly smokers. • Findings suggest that strategies tailored to psychological distress and beliefs about smoking health harms and smoking restriction policies would aid in successful cessation.	Cross-sectional analysis	• Smoking status was assessed using self-report and subjected to bias, including social desirability. • The study design was cross-sectional and the analyses were correlational in nature. • The lack of data on other potential confounding factors, such as physician advice to quit, level of nicotine dependence, or varying smoking policy environments in which community elders reside, may mask the observed relationship between smoking

	• Specific measures reinforcing the importance of having a regular source for care may promote cessation. • The extent to which these psychosocial factors affect elders' motivation to quit smoking remains to be explored.		cessation and certain psychosocial factors.

Psychosocial predictors of smoking trajectories during middle and high school	Lorien Abroms, Bruce Simons-Morton, Denise L. Haynie & Rusan Chen	N = 1320	• Overall, being female, having friends who smoked, deviance acceptance and outcome expectations were associated with an increased likelihood of being an intender, delayed escalator, early experimenter and early user compared to a never smoker. • Comparisons with never smokers revealed unique identifiers for intenders, early experimenters and early users, but not delayed escalators. • There is much heterogeneity in the manner in which middle schoolers progress from having no intention of smoking to becoming smokers.	Longitudinal analysis	• Substantial attrition occurred (44.0%) and those who were not present for all five observation points were more likely than those included in the analyses to have smoked and to live with a single parent. • The reported distribution of adolescents across trajectory groups may not generalize to the distribution in the general population of adolescents. • It is possible that the attrition affected the risk factors found to be associated with trajectory group. • The generalizability is limited by reliance on a student population that was mainly

			white, middle-class and not assigned to special education classroom instruction. • Measures were taken from the baseline assessment in the fall of 6th grade. In some cases, measures taken at a later point might have been more predictive for differentiating smoking trajectories, especially trajectories which diverge later on in development. • The measure of smoking status relied upon self-report. • Multiple tests of significance were conducted in the analysis of risk factors for trajectory group

membership, type I errors are possible.

Randomized Trial of a Parent Intervention	Bonita Stanton; Matthew Cole, Jennifer Galbraith; Xiaoming Li; Sara Pendleton, Lesley Cottrel; Sharon Marshall, Ying Wu; Linda Kaljee	N = 817	• After adjusting for the intraclass correlation coefficient, 6 of 16 risk behaviours were significantly reduced among youth receiving ImPACT compared with youth who only received FOK (respectively, mean number of days suspended, 0.65 vs 1.17; carry a bat as a weapon, 4.1% vs 9.6%; smoked cigarettes, 12.5% vs 22.7%; used marijuana, 18.3% vs 26.8%; used other illicit drugs, 1.4% vs 5.6%; and, asked sexual partner if condom always used, 77.9% vs 64.9%). • Four of the 7 theory-based subscales reflected significant protective changes among youth who received ImPACT. • A parent monitoring intervention can significantly broaden and sustain protection beyond that conferred through an adolescent risk-reduction intervention.	Longitudinal analysis	• All youths received a risk-reduction intervention previously demonstrated to be effective. • These data are based on self-report, without biologic or other confirmation. • These data suggest that in some situations the boosters may have enhanced protection, but in others reduced protection. • In enrolling this community-based convenience sample, data were not maintained regarding potentially eligible youths who refused or were not approached. • There was a substantial attrition of youths at 24 months,

					whose baseline characteristics indicated greater risk than those youths remaining for follow-up.
Recent Findings on Peer Group Influences on Adolescent Substance Use	Bruce Simons-Morton, and Tilda Farhat	n/a	• Substantial peer group homogeneity of smoking behaviour. • Support for both socialization and selection effects, although evidence is somewhat stronger for selection; • An interactive influence of best friends, peer groups and crowd affiliation. • An indirect protective effect of positive parenting practices against the uptake of adolescent smoking.	Literature Review	• There are many papers on peer influences on adolescent smoking and other substance use, a limited number of papers have reported prospective findings in which both peer and adolescent smoking were assessed. • There is also a paucity of research on social influences among ethnic groups.

	• More information is needed regarding the circumstances surrounding socialization and selection. For example, a smoker at Times 1 and 2 with non-smoking friends at Time 1 but with friends who smoke at Time 2 may illustrate selection (choosing new friends) or socialization (influencing Time 1 friends to smoke) processes.

Resisting Smoking When a Best Friend Smokes: Do Intrapersonal and Contextual Factors Matter?	Joan S. Tucker and Maria Orlando Edelen, Myung-Hyun Go, Michael S. Pollard, Harold D. Green Jr., and David P. Kennedy	N = 4612	• In the present study, gaining a best friend who smoked daily was associated with a threefold increase in the likelihood of smoking initiation and a fivefold increase in the likelihood of escalation to daily smoking over a 1-year period. • Among the adolescents with a smoking best friend, 72% of the initial non-smokers did not start smoking and 80% of the initial experimenters did not escalate to daily use.	Longitudinal analysis	• The available data on smoking behaviour was limited - the quantity of best friend smoking; the number of best friends who smoked; and the smoking transitions could examine as outcomes. • The study relied on adolescent reports of their best friends' smoking, rather than information obtained directly from the friends themselves. • The study results may not be applicable to more casual friendships or to larger groups of peers. • The design involving only two waves of data does not provide certainty whether adolescents

	increased their smoking because they gained a smoking best friend or sought out a best friend who smoked after they had increased their smoking. • The data were collected in the mid-1990s when rates of adolescent smoking were higher than they were at the time of publication.

Role of Parent Support and Peer Support in Adolescent Substance Use: A Test of Mediated Effects	Thomas Ashby Wills, Jody A. Resko, Michael G. Ainette, and Don Mendoza	N = 1826	• Multiple regression analyses indicated that parental support was inversely related to substance use and that peer support was positively related to substance use, as a suppression effect. • Structural modelling analyses indicated that effects of support were mediated through pathways involving good self-control, poor self-control, and risk-taking tendency; parent and peer support had different patterns of relations to these mediators. • The mediators had pathways to substance use through positive and negative recent events and through peer affiliations.	Longitudinal analysis	• The parent and peer support measures indexed one aspect of support relationships—support seeking—and further research testing different dimensions of social support is warranted. • The inventory of positive events was based on descriptive research and had relatively few items; hence, research on different types of positive events in adolescence would be useful. • Environmental variables, which may explain additional variance in social factors. • The directionality of relations between

	constructs needs to be explored in research with multi-wave samples using techniques such as growth curve modelling.

Romantic Partner and Friend Influences on Young Adult Cigarette Smoking: Comparing Close Others' Smoking and Injunctive Norms Over Time	Paul E. Etcheverry, and Christopher R. Agnew	N = 912	• Friend and romantic partner smoking and injunctive norms were uniquely predictive of smoking over time. • Romantic partner smoking and injunctive norms were predictive of smoking, alone and when controlling for parallel friend variables. • Results were found while controlling for prior smoking and when predicting future, not concurrent, smoking, decreasing the likelihood of the results being due to selection and not influence processes.	Longitudinal analysis	• The use of single items to measure friend and romantic partner smoking and injunctive norms. • The correlational nature of the results. • The current sample lacked ethnic diversity.

Romantic partner selection and socialization of young adolescents' substance use and behavior problems	Julie Wargo Aikins, Valerie A. Simon, Mitchell J. Prinstein	N = 520	• Most selection and socialization effects were apparent for the eighth grade adolescents (at Time 1). • Prior to their relationship, eighth graders and romantic partners were alike on alcohol use. • Romantic socialization effects emerged for eighth graders' cigarette use and behaviour problems. • The nature of the partner socialization effects depended on the combination of adolescents' and partners' pre-relationship behaviours. • Eighth graders who dated partners with fewer problems showed the greatest instability in their behaviour problems and partner behaviour predicted greater decreased in problem behaviours among adolescents with more problems. • The implications of these findings are discussed within the broader context of adolescent peer relationships.	longitudinal analysis	• Differences may be reflective of sample specific differences (e.g., target adolescents were involved in higher levels of deviant behaviour or more problematic target adolescent boys dating younger girls). • The data are non-experimental and thus inconclusive with respect to causal explanations. • The sample was restricted to middle school students who dated other middle school students at their school. • The sample was limited to youth with same-sex friendships and other-sex romantic partners. Little is known about

	friend and peer group influences on romantic relationship formation in sexual minority youth.

Saturation of Tobacco Smoking Models and Risk of Alcohol and Tobacco Use Among Adolescents	Jennifer E. Taylor, Ph.D., Mark W. Conard, Kristin Koetting O'byrne, Ph.D., C. Keith Haddock, Ph.D., and W. S. Carlos Poston	N = 806	• Risk for smoking or using alcohol increased dramatically as the number of models who smoke increased in an adolescent's environment. For instance, adolescents with one significant other who smoked were nearly four times (OR 3.76, $p < .001$) more likely to smoke than someone with no significant others who smoked. • If an adolescent had four significant others who smoked, they were over 160 times more likely to smoke (OR 161.25, $p < .001$). Similar results were found for alcohol use; adolescents who had one significant other who smoked were more than 2.5 (OR 2.66, $p < .001$) times more likely to drink than those without smoking models. • As the number of cigarette smokers in an adolescent's environment increases, risk of tobacco and alcohol use increases substantially.	Cross-sectional analysis	• Tobacco and alcohol use and the substance use of significant others were based on self-reports.

School connectedness and daily smoking among boys and girls: the influence of parental smoking norms	Mette Rasmussen, Mogens T. Damsgaard, Bjørn E. Holstein, Lis H. Poulsen, Pernille Due	N = 1537	• An independent inverse association was found between school connectedness and smoking among both boys and girls. • Parents' attitude to their children's smoking significantly modified this association among boys. Among girls the modifying effect was less marked. • Neither among boys nor girls did parental smoking behaviour significantly modify the association between school connectedness and smoking, although a modifying tendency was observed among girls. • The smoking behaviour of Danish adolescents may be influenced by complicated interactions of varying sets of experienced smoking norms, and any research project or preventive programme focusing on the influence of school life on adolescent smoking behaviour needs to consider the family smoking norms. • Results stress the important role of gender by indicating that the smoking behaviour of girls may be more sensitive to restricting social influences than the smoking behaviour of boys.	Cross-sectional analysis	• Information bias: prior to data collection the full questionnaire was validated several times by focus group interviews and full-scale pilot tests in the classroom setting. • Misclassification: all covariates were conservatively dichotomized. Therefore, the potential bias due to misclassification tends to underestimate the associations between the covariates and smoking behaviour. • Selection bias: five of the nine non-participating schools were small schools from the city of Copenhagen, and this selective nonparticipation

may have affected the results.

School, Family, and Peer Factors and Their Association with Substance Use in Hispanic Adolescents	Barbara Lopez, Wei Wang, Seth J. Schwartz, Guillermo Prado, Shi Huang, C. Hendricks Brown, Hilda Pantin and Jose´ Szapocznik	N = 361	• Results indicated that only perceived peer substance use was directly related to adolescents' own substance use. • A significant interaction was found between parental monitoring and peer use vis-a-vis substance use, which suggests that the relationship between parental monitoring and the adolescents' own use was significantly stronger among youth who reported that more of their friends used substances.	Cross-sectional analysis	• The Hispanic population in Miami is quite different from the U.S. Hispanic population as a whole. Replication of these results are needed before any firm conclusions can be made and used to modify existing or design new prevention interventions for adolescent substance use in Hispanics. • The use of a small number of items to measure parental involvement in school and adolescent and parent report of school functioning. • The use of self-reports for some variables may include bias. • The use of lifetime substance use may be considered as

	less reliable. • This recruitment procedure may include selection bias because families who enrol in the intervention may have better functioning than those who do not enrol. • It analysed cross-sectional data, limiting the study's ability to make causal inferences. •

Selecting and Retaining Friends on the Basis of Cigarette Smoking Similarity	Jari-Erik Nurmi, Katariina Salmela-Aro, Noona Kiuru Dawn DeLay and Brett Laursen,	N = 1419	• Network analyses revealed similarity arising from selection and deselection on the basis of smoking. Selection effects (i.e., selecting new friends based on similarity) were stronger for adolescents in low-smoking groups. • Deselection effects (i.e., dropping friends based on dissimilarity) were stronger for adolescents in high-smoking groups.	Longitudinal analysis	• The use the original scale from the Finnish National School Health Survey, which included two categories of non-smokers. • The use of average level of cigarette smoking in the group as a continuous moderator also precluded a straightforward test of interactions.
Selection and socialization effects of fraternities and sororities on US college student substance use: a multi-cohort national longitudinal study	Sean Esteban McCabe, John E. Schulenberg, Lloyd D. Johnston, Patrick M. O'Malley, Jerald G. Bachman & Deborah D. Kloska	N = 5883	• Active members of fraternities and sororities had higher levels of heavy episodic drinking, annual marijuana use and current cigarette smoking than non-members at all three waves. • Although members of fraternities reported higher levels than non-members of annual illicit drug use other than marijuana, no such differences existed between sorority members and non-members. • Heavy episodic drinking and annual marijuana use increased significantly with age among	Longitudinal analysis	• A great deal of attention has been given to selection and socialization effects on alcohol use among fraternity and sorority members, but little attention has been given to these effects related to substance use other than alcohol. • Several studies have focused on

		members of fraternities or sororities relative to non-members, but there were no such differential changes for current cigarette use or annual illicit drug use other than marijuana.		samples drawn from single institutions; this limits the potential generalizability of the findings. • National efforts have been cross-sectional and have not examined selection effects by tracking samples prospectively from high school through college.
Sensitivity Analysis for Contagion Effects in Social Networks	Tyler J. VanderWeele	• The sensitivity analysis suggested that at least some of the findings indicating contagion effects for obesity and smoking (mutual friend for obesity, spouse for smoking) were reasonably robust to latent homophily or environmental factors for which control was not made. • The effect estimates for the supposed spread of happiness and loneliness were much more subject to latent homophily or shared environmental factors as a possible explanation.	Sensitivity analysis techniques to four social network analyses.	•

Sibling effects on smoking in adolescence: evidence for social influence from a genetically informative design	Cheryl Slomkowski, Richard Rende, Scott Novak, Elizabeth Lloyd-Richardson & Raymond Niaura	N = 1421	• Main effects of both shared environment and genetics were found on adolescent smoking frequency. • Social connectedness between siblings moderated shared environmental influences on smoking frequency at each time period, as well as on change in smoking frequency. • Shared environmental effects were more pronounced when siblings reported high levels of social connectedness. These environmental sibling effects on smoking were significant after controlling for parent and peer smoking. • This report identifies specific relationship dynamics that underlie transmission of risk within sibships and providing evidence that such relationship dynamics represent social rather than genetic processes.	Longitudinal analysis	• This is based on retrospective accounts of adult twin pairs, which diminishes the opportunity to examine whether social contact actually coincides with early use of tobacco.

Sibling Effects on Substance Use in Adolescence: Social Contagion and Genetic Relatedness	Richard Rende, Cheryl Slomkowski, Elizabeth Lloyd-Richardson, and Raymond Niaura	N = 20747	• Monozygotic twins had the highest levels of sibling contact and mutual friendships, the pattern of results for other sibling types were not consistent with genetic models, and biometric analysis indicated that shared environmental factors influenced these sibling relationship features. • Sibling contact and mutual friendships represent a source of social contagion for adolescent smoking and drinking independent of genetic relatedness. • The results were interpreted using a social contagion framework and contrasted with other competing models such as those focused on the equal environments assumption and niche selection.	Longitudinal analysis	• The assessment of the sibling relationship relied on a single self-report item and dichotomization. • Data on substance use were limited because of both the inherent low levels of use in adolescence and the short time period between waves of assessment.

Siblings, friends, course-mates, club-mates: How adolescent health behavior homophily varies by race, class, gender, and health status	Jonathan Daw, Rachel Margolis, Ashton M. Verdery	N = 90118	• Course-mates have on average lower levels of homophily than siblings and friends, but higher than schoolmates for TV watching and exercise, but not smoking and drinking. Club-mates are more similar than schoolmates for drinking, TV watching and exercise, but not smoking. • Overall, a there was a lack of large gender differences in homophily across all four health behaviours. There are no gender differences for siblings or course-mates across any of the behaviours and the differences are very small for club-mates. • There are some differences for friends, where for smoking and TV, girls are more similar for friend homophily than boys, but for drinking girls are less similar than pairs of boys. • There was some variation in homophily patterns by levels of parental education, but the amount depends on the type of tie being examined. Friend homophily is higher for high SES adolescents than those whose parents have not gone to college across all four behaviours. • Among the other relationship types, high SES adolescents are much	Longitudinal analysis	• There are strengths and limitations in the measurement of limited health behaviours. • The methods yield easily interpretable coefficients to measure homophily, but do not distinguish between those who do and do not partake in a health behaviour. Instead, they differentiate degrees of health behaviours. • The pair-level analyses of health behaviour homophily are not capable of analysing the interaction between higher-order network structures (e.g., cycles, or extra-local peer groups) and behaviours.

more similar to their siblings, course-mates and club-mates only for TV watching, but not the other behaviours.

- There was find no differences on health status for siblings on any health behaviours. However, there was some differences for friend, course-taking and club homophily. Those in poor health are more like their friends in terms of smoking behaviour and less like friends for TV and exercise. There are no differences in friend homophily for drinking. Adolescents in poor health are less like their course-mates for TV watching, but no different for smoking, drinking, and exercise.
- Finally, adolescents in poor health are less like their club-mates for TV and exercise, more similar for drinking, but no different for smoking.
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Smoker Characteristics and Smoking-Cessation Milestones	Sandra J. Japuntich, Adam M. Leventhal, Megan E. Piper, Daniel M. Bolt, Linda J. Roberts, Michael C. Fiore, and Timothy B. Baker	N = 1504	• These findings demonstrate that: (1) higher nicotine dependence predicted worse outcomes across every cessation milestone; (2) demographic and contextual variables are generally associated with initial abstinence rates and lapse risk and not the lapse-relapse transition. • Numerous contextual and demographic variables were associated with higher initial cessation rates and/or decreased lapse risk at 6 months post-quit (e.g., ethnicity, gender, marital status, education, smoking in the workplace, number of smokers in the social network, and number of supportive others). • These results identify groups who are at risk for failure at specific stages of the smoking-cessation process, and this may have implications for treatment.	Cross-sectional analysis	• Contextual variables were measured via retrospective questionnaires rather than real-time data acquisition methods. • The method of examining milestones for only those individuals who reached a previous milestone certainly affects the variables that are related to later milestones. • This group is somewhat unrepresentative of the general population, limiting generalizability.

Smoking and peer groups: Results from a longitudinal qualitative study of young people in Northern Ireland	Barbara J. Stewart-Knox, Julie Sittlington, Jorun Rugka, Sheila Harrisson, Margaret Treacy and Pilar Santos Abaunza	N = 102	• The findings are consistent with social identity theory and self-categorization theory in that for both smoking and non-smoking 14-year-olds smoking activity appears to provide a means through which to define social groups, to accentuate similarity within groups and differences between groups. • In-group favouritism was expressed in the sharing of cigarettes within the in-group and in the negative stereotyping of out-group members. • There was some evidence that group affiliation may be negotiated differently for boys and girls. • These findings imply that successful intervention needs to reconsider the normative processes that encourage young people to smoke.	Longitudinal analysis	• It is possible that the interviewees provided information that they thought the researchers wanted to hear
Smoking cessation patterns and predictors among adult Californians of Korean descent	Ming Ji, C. Richard Hofstetter, Melbourne Hovell, Veronica Irvin, Yoon Ju Song, Jooeun Lee, Haeryun Park, Hee-Young Paik	N = 52830	• Social networks where members discouraged smoking increased respondents' likelihood of quitting by almost four times, compared with respondents whose friends did not discourage smoking. • Finding verified social processes by which smoking and smoking cessation are influenced. • The degree to which respondents' established no-smoking rules in their home also predicted smoking cessation. Those who allowed	Cross-sectional analysis	• The associations reported are cross-sectional and therefore causality cannot be inferred.

	smoking in the home were at least five times less likely to quit compared with those who did not allow any smoking in the home. • This represents complex social and behavioural processes in the family in which smoking is restricted. Those who have successfully established such rules should be exposed to fewer smoking models and to less smoke and, hence, should be less likely to be prompted to smoke. • To enforce smoking restrictions, it is likely that one or more adult in the family must insist that other family members not smoke in the home and at least one family member probably also interacts with distant relatives and friends to the same end. This might change the degree to which some family members and friends praise tobacco control efforts and even encourage quitting. Thus this variable may serve both as a direct influence on quitting processes and as a marker for complex social relationships that might support quitting.	

Smoking Status of Adolescents in 2 Countries and the Impact of the Smoking Status of Mother, Father, Grandparents, and Siblings	Marie Leiner	N = 1437	• The results demonstrate that in both the United States and Mexico, the odds ratios for likelihood of smoking have increased in adolescents whose relatives are smokers. • The findings reveal that some relatives may have a greater effect on adolescent smoking behaviours. For example, the effect on adolescent smoking behaviours from siblings smoking was much greater in the United States compared with Mexico. • The effect on adolescent smoking behaviours by the father was much greater in the United States compared with Mexico. • The smoking behaviour of the grandparents in both countries had a definite impact on adolescents of Mexican origin. For these reasons, it may be important to focus additional tobacco prevention education on siblings, parents, and grandparents in both countries. • Moreover, it is important to remember that the smoking behaviours of all relatives from both countries are important factors that can be modified through prevention education.	Cross-sectional analysis	• The associations reported are cross-sectional and therefore causality cannot be inferred • Reliance on self-reports may include bias.

Smoking status of step-parents as a risk factor for smoking in adolescence	Jennifer A. Fidler, Robert West, Cornelia H. M. van Jaarsveld, Martin J. Jarvis & Jane Wardle	N = 650	• Smoking by a non-biological parent appears at least as influential as smoking by biological parents. • This confirms the importance of social influence on smoking initiation and suggests that attempts to work with parents in smoking prevention should involve, and perhaps pay particular attention to, step-parents who smoke.	Longitudinal analysis	• The availability of such a large data set from which these data have been drawn has allowed examination of the role played by smoking step-parents in smoking behaviour. Even so, numbers were limited and the use of current smoking behaviour by adolescents at any point across the study is an obvious limitation when smoking data were available at each of the 5 study years. • The small sample size also restricted the inclusion in the models of a larger number of factors that could, potentially, explain the association between step-parent smoking and adolescent

			smoking. • Although analyses were adjusted for gender, ethnicity and deprivation other potential confounding variables, such as stress or problem behaviour, restricted the sample size still further and were consequently not included in the models. • Other limitations include the self-reported nature of parental smoking status by students, which may have resulted in inaccurate classification of parent smoking behaviour, and the lack of information regarding the marital status of these stepfamilies. • It is plausible that non-smoking step-

	parents were more likely to be married to the biological parent and this relative stability of family structure could explain the effect as opposed to the smoking behaviour of step-parents per se.

Smoking-based selection and influence in gender-segregated friendship networks: a social network analysis of adolescent smoking	Liesbeth Mercken, Tom A.B. Snijders, Christian Steglich, Erkki Vertiainen & Hein de Vries	N = 1163	• Smoking-based selection of friends was found in male as well as female networks. • Support for influence among friends was found only in female networks. • Females and males were both influenced by parental smoking behaviour. • In Finnish adolescents, both male and female smokers tend to select other smokers as friends but it appears that only females are influenced to smoke by their peer group. • This suggests that prevention campaigns targeting resisting peer pressure may be more effective in adolescent girls than boys.	Longitudinal analysis	• Self-reported smoking behaviour was not validated biochemically. • Data were gathered from the Helsinki area only. • Only friendships within the same school grade. • Research has demonstrated that parents can also have an effect on the types of friends that adolescents select. • Several included constructs were measured with one item. • Results might be biased as no direct measures of parental and sibling smoking was available. • The study did not consider possible differences between the successive data waves.

Social contagion theory: examining dynamic social networks and human behavior	Nicholas A. Christakis, and James H. Fowler	N = 12067	• Human social networks may exhibit a 'three degrees of influence' property, and statistical approaches have been used to characterize interpersonal influence with respect to phenomena as diverse as smoking, obesity, cooperation, and happiness.	Longitudinal analysis	• Limitation worth noting concerns the operationalization of friendship networks in the Add Health data. • Respondents can only nominate up to ten individuals as friends, five same-sex peers as well as five opposite-sex peers.

Social contexts in adolescent smoking: does school policy matter?	D. Piontek, A. Buehler, U. Rudolph, K. Metz, C. Kroeger, S. Gradl, S. Floeter and C. Donath	N = 3364	• There are several positive associations of personal, family and peer variables on cigarette smoking that are comparable with international findings. Especially, other substance use (alcohol and illicit drugs) accounts for a relatively large amount of variance. Thus, a strong confirmation of the finding that cigarette smoking is highly comorbid with other substance use [3, 38]. • A strong positive association between adolescent smoking and the smoking behaviour of best friends and friends in general. In all multivariate analyses, peer variables are the most predictive factors, with ORs up to 6.10. • Together with significant effects of smoking siblings in 16- to 21-year olds, these findings emphasize the importance of social role models on the tobacco use of adolescents.	Longitudinal analysis	• The present analyses are based on cross-sectional data, and it is thus not possible to make conclusions about causality. • Measure of school smoking policies may pose some difficulties.

Social contexts of regular smoking in adolescence: Towards a multidimensional ecological model	Ming Wen, Heather Van Duker, Lenora M. Olson	N = 13552	• Results showed that peer, family and school were all important life domains contextually influencing subsequent smoking behaviour among adolescents. • Time spent with peers, best friend smoking and household member smoking were associated with higher risk. • Parent-child closeness, parental control, attending a private school and having a higher percentage of Hispanic students at school were protective factors. • Significant interaction effects were found between parental control and household member smoking and between parent-child closeness and communication. • None of the neighbourhood- and state-level factors were significant in the final full model but they were significant in reduced models. • More proximate social contexts appear to play a more direct and immediate role in adolescent smoking than macro-level factors.	Longitudinal analysis	• Several proximate factors such as attitudes or beliefs about smoking, perceived risks of smoking and rebelliousness at the individual-level that are plausibly relevant for adolescent smoking were not included in the study. • Despite the longitudinal design of this study, it was still possible that peers are formed based on traits, while traits of peers are also affecting other peers. • This research largely focused on main effects of theoretically relevant factors of adolescent smoking. • The exploration of moderation effects

					among variables was rather limited.
Social correlates of cigarette smoking among Icelandic adolescents: A population-based cross-sectional study	Alfgeir L Kristjansson, Inga D Sigfusdottir, John P Allegrante and Asgeir R Helgason	N = 7430	• Friends' smoking behaviour and attitude toward smoking were strongly associated with adolescent smoking and other tobacco use, as well as alcohol consumption during the previous 30 days. • Main protective factors were parent's perceived attitude toward smoking, the quantity of time spent with parents, absence of serious verbal conflict between parents and adolescents, and participation in physical activity. • Family structure was related to adolescent smoking to a small extent, but other background factors were not.	Cross-sectional analysis	• The study's cross-sectional design means that the study is unable to draw any firm conclusions regarding causality between the dependent and independent variables. • Small adjusted odds ratio values in a sample of this size (7,430 respondents) should be

			• Multiple social factors are related to adolescent smoking. • Parents and other primary preventive agents need to be informed about the complicated nature of the adolescent social world in order to maximize their impact.		interpreted with caution, particularly when the 95% confidence intervals are close to, but do not include, 1.0
Social differences in smoking and snuff use among Norwegian adolescents: A population based survey	Liv Grotvedt, Hein Stigum, Ragnhild Hovengen and Sidsel Graff-Iversen	N = 15931	• Tobacco use in adolescents is mainly associated with low educational ambitions and less affluent self-reported family economy. • Adolescents with divorced parents use more tobacco than those living with both parents. • Public health initiatives to avoid or reduce tobacco use should mainly target adolescents in vocational studies and those leaving school early.	Cross-sectional analysis	• All information is self-reported and collected at one point in time. • Ethnicity divided only into three groups is a crude measure and was chosen because Muslim cultural influence is a factor known to affect the use of tobacco. • In the light of the low smoking rates for Muslim women, girls with parents from these countries may underreport their smoking habits due to social desirability.

Social distance and homophily in adolescent smoking initiation	Myong-Hyun Go, Joan S. Tuckerb, Harold D. Green Jr, Michael Pollard, David Kennedy	N = 2065	• The association between peer smoking and adolescent smoking initiation appears to be due to both peer selection and direct influence. However, "friends of friends" effects are likely to be confounded with contextual factors. • Given that smoking initiation is primarily associated with close personal interactions between the adolescent and his/her friends, prevention efforts should focus on the role of smoking in fostering personal relationships among adolescents.	Longitudinal analysis	• Respondents can nominate up to ten individuals as friends, five same-sex peers as well as five opposite-sex peers.

Social Influence and Selection Effects in the Context of Smoking Behavior: Changes During Early and Mid-Adolescence	Liesbeth Mercken and Math Candel, Paul Willems, Hein de Vries	N = 1886	• Smoking-based selection processes decreased over time while the influence of friends increased. • Smoking prevention programs should focus on the structure of peer environments besides promoting social influence skills. • During early adolescence parents and siblings should be targeted, while during mid adolescence, the focus should shift toward the adolescents and their dynamic peer environment.	Longitudinal analysis	• Schools in these regions were assigned to the experimental or control condition according to their own preference, which may have resulted in some bias. • The use of a fixed response name generator might have restricted the ability to reciprocate friendships. • Only friends inside school in the same grade were included since only those nominated friends also filled in the same questionnaire including their self-reported smoking behaviours. • Respondents' self-reported smoking behaviour was not validated by biochemical

					measures and may include some bias. • No direct measures of parental smoking behaviour and sibling smoking behaviour were available. • An individual's data could appear within more than one observation, for example, as the smoking behaviour outcome for a given case and as one of the friends supplying data for other individual cases.
Social Influences on Adolescent Substance Use	Bruce Simons-Morton	N = 2453	• Adolescent substance use predicted the growth in substance-using friends, and substance-using friends predicted adolescent use, except for smoking.	Longitudinal analysis	• Generalization of the findings is limited and there is reliance on self-report data

			• The negative over-time relationship between parenting practices and adolescent substance use was mediated by the growth in the number of substance-using friends. • The results are consistent with both selection and socialization effects and provides evidence of the protective effects of positive parenting practices.		
Social influences on smoking cessation: a comparison of the effect of six social influence variables	Bas van den Putte, Marco C. Yzer, Suzanne Brunsting	N = 2895 N = 3428	• The regression analysis shows that subjective norm and injunctive norm, that is, the social norms on what ought to be done, are more important than descriptive norms, that is, the perceived smoking and smoking cessation behaviour of others. This holds especially for smokers whose past cessation attempts quickly failed. • Most smokers think that it is acceptable to smoke in most social situations, but simultaneously think that other people approve it if they quit smoking. • Results suggest that health campaigns should incite social interaction to increase smokers' awareness of social norms on the proper behaviour. • Studies into smoking cessation should take account of the various social influence factors outlined in	Cross-sectional analysis	• These data were cross-sectional, causal relationships cannot be inferred.

this study.

Social Influences on Smoking in Middle-Aged and Older Women	Holahan, C. J. North, R. J. Holahan, C. K. Hayes, R. B. Powers, D. A. and Ockene, J. K.	N = 37027	• The results indicate that social influences are important correlates of smoking status, smoking level, smoking cessation, and smoking relapse among middle-aged and older women. • Findings demonstrate a consistent link between social influences and negative smoking-related behaviours among middle-aged and older women who smoked at some point in their lives. • Results indicated that social support was consistently inversely associated with all of the smoking outcomes. • Living with a smoker was consistently positively associated with all of the smoking outcomes. • General social support was associated with a lower likelihood and living with a smoker was associated with a higher likelihood of being a current smoker and, among smokers, of being a heavier smoker.	Cross-sectional analysis	• Self-report variables of interest may include bias. • The results may not generalize to all middle aged and older women. • Missing data on the variables examined resulted in an underrepresentation of Hispanics in baseline analyses. • Follow up attrition resulted in an underrepresentation of several ethnic minority groups, as well as participants with less than a high school education. •

Social influences on the motivation to quit smoking: Main and moderating effects of social norms	Birte Dohnke, Edith Weiss-Gerlach, Claudia D. Spies	N = 168	• Findings confirmed that it is important to distinguish subjective and descriptive norms and that differences exist in how these norms motivate women and men to quit smoking. • Consistent quitting norms, such as quitting of significant others, in combination with their expectations that one should quit appear to be less common but more important in women to form a corresponding intention.	Cross-sectional analysis	• Social influences on the motivation to quit were examined within a cross-sectional design. • The social influences were not completely operationalised. The subjective norm was measured with regard to quitting but not with regard to smoking. In addition, quitting and smoking norms were measured with respect to different referents of influence: significant others and the partner. • The descriptive norms were assessed using single items only.

Social Influences, and Attitudes and Beliefs Associated With Smoking Among Border Latino Youth	Patricia Chalela, Luis F. Velez, and Amelie G. Ramirez	N = 2471	• The strongest predictor of lifetime and past-30-day smoking was peer influence; however, the strength of the association was greater with recent use. • There were also differences in the influence of family and attitudes and beliefs between the 2 groups. • Efforts should address social influences to smoke, particularly those from peers; promote changes in attitudes and beliefs toward smoking; increase understanding of the addictive nature of nicotine; and provide development of skills young people need to resist social and environmental pressures to smoke.	Cross-sectional analysis	• The study relies on self-reporting of smoking, and the possibility of over- or underreporting exists due to social desirability or recall bias. • The data are cross-sectional and causality may not be inferred between associations. • The study focuses on a school-based sample, specifically on youth attending middle or high school, findings cannot be generalized to adolescents' not in school or to all persons in this age group. • Population mobility was not assessed, which is known to be much higher in border communities; thus, social influences

	and attitudes in this study may reflect that mobility, as opposed to more stable non-border communities.

Social integration in friendship networks: The synergy of network structure and peer influence in relation to cigarette smoking among high risk adolescents	Cynthia M. Lakon, Thomas W. Valente	N = 851	• There is some modest evidence that the relationship between having reciprocated friendships and past month cigarette smoking was moderated by a network peer influence process, smoking with those in youths' best friend networks. • Findings indicate that being integrated within a social network context of peer influences favouring drug use relates to more smoking among these high risk youth. • When key structural and positional characteristics of adolescents' network ties and dimensions of peer influence are both individually and jointly considered in relation to past month smoking, being socially integrated in networks relates to more past month cigarette smoking. • In-degree centrality consistently relates to more past month cigarette smoking. • Some modest evidence that the number of reciprocated friendship ties was also important for past month smoking. • Some modest evidence that the peer influence from youth's best friend (egocentric) networks moderated the relationship between the reciprocity of ties and	Longitudinal analysis	• The findings are unlikely to be generalizable results and should be considered in light of the specific nature of the continuation high school population comprising the sample, and that the schools were drawn into the sample using a purposive sampling strategy to maximize ethnic and racial heterogeneity. • It is likely that bias may have been introduced into the samplewhen980 of the 1493 invited to participate provided valid consent and assent forms (65.5%). • The study is cross-sectional, and therefore do not account for the directionality of

		past month cigarette smoking. • The other peer influence processes under study, both classroom best friend network smoking and perceived normative beliefs of friends about drug use, did not moderate any relationships between network characteristics and past month smoking. However, each was consistently and positively related to past month cigarette smoking. • Findings provide some support for examining the interrelationship of the structure and position of ties with peer influence in relation to smoking among the youth under study.	study relationships. • Findings relating to the reciprocity of ties are interpreted at a less stringent significance level than is conventional. • The cap on the number of friendship nominations of up to five friends for both types of friend networks e a common network elicitation strategy. • The study did not collect full information from youth about those they nominated to be in their friends' network who did not attend their schools.

Social interactions and smoking: evidence using multiple student cohorts, instrumental variables, and school fixed effects	Jason M. Fletcher	N = 13381	• Preferred specifications suggest that increasing the proportion of classmates who smoke by 10% will increase the likelihood an individual smokes by approximately 3 percentage points. Falsification tests support the validity of the results.	Longitudinal analysis	• There could be school-grade specific correlated effects that are not eliminated through using school fixed effects.
Social modelling in the school environment, student characteristics, and smoking susceptibility: A multi-level analysis	Scott T. Leatherdale, K. Stephen Brown, Roy Cameron, and Paul W. McDonald	N = 6679	• Non-smoking students who attend a school with student smoking on the school periphery are at an increased risk for being susceptible to smoking if they have friends who disapprove of smoking. • School-based smoking prevention programs might benefit from targeting both individual students and entire schools with programming activities.	Cross-sectional analysis	• These data were cross-sectional, causal relationships cannot be inferred. • The study involved secondary data analysis so data were not available for all of the measures that would have been examined in an 'ideal' study. • These data were based on self-reports so the validity of the responses cannot be • The results from these data only

					pertain to students who attended secondary school.
Social Network Characteristics and Daily Smoking among Young Adults in Sweden	Mikael Rostila, Ylva B. Almquist, Viveca Östberg, Christofer Edling and Jens Rydgren	N = 2942	• The results show that having a large percentage of smokers in one's network was by far the most important risk factor for daily smoking. • Having a high percentage of physically active friends was inversely associated with daily smoking. • No main associations between the other network characteristics (relationship content and structural aspects of the network) and smoking were found. However, there was an interaction between the percentage of smokers in the network and relationship content (i.e., trust, relationship quality and propensity to discuss problems): positive relationship content in combination with peer smoking may increase the risk of smoking. • Women with a high percentage of smokers in their networks were also at higher risk of daily smoking than	Cross-sectional analysis	• The use of a name generator that limited the number of friends to a maximum of five. • Another issue concerns the use of self-reported measures of smoking and network characteristics. • Social desirability bias maintains that respondents tend to represent themselves in a favourable light. • Information on alters was given by egos. • The response rate was fairly low (51.6%) in the survey used. It may

	were men with many smoking friends. Hence, it is important to consider the interplay between peer smoking and other network characteristics on the risk of smoking, where features of networks which traditionally are seen as constructive may occasionally provide the impetus to smoke.	be that a larger number of smokers were included in the non-response. • The study was based on cross-sectional data; it was not possible to discern empirically whether network characteristics per se had a causal effect on smoking.

Social network influences on adolescent substance use: Disentangling structural equivalence from cohesion	Kayo Fujimoto, Thomas W. Valente	N = 15355	• Results indicate that influence based on structural equivalence tended to be stronger than influence based on cohesion in general, and that the magnitude of the effect decreased up to three steps away from the adolescent (friends of friends of friends). • Analysis indicated that structural equivalence acted as a mechanism of contagion for drinking and cohesion acted as one for smoking. • Results indicate that the two transmission mechanisms with differing network proximities can differentially affect drinking and smoking behaviours in American adolescents.	Longitudinal analysis	• This study was limited by the data sample design in that students from a broad age range are included in the analyses. • During adolescence, social networks evolve and change at the same time as the prevalence of smoking and drinking increases. Therefore, the amalgamation of all age groups might have masked age-dependent factors in the influence process. • The study used the network exposure model to measure peer influence based on cohesion and structural equivalence. This approach is not sensitive to larger sub-group contexts such as identifying

	with certain sub-population groups, etc. • The network exposure approach does not incorporate other structural dimensions of the overall network structure such as whether the individual is a member of a cohesive sub-group, or a bridging person, or someone on the periphery. • The data are cross sectional and not longitudinal. • This study employed a modified measure of structural equivalence with different distances.

Social network influences on smoking, drinking and drug use in secondary school - centrifugal and centripetal forces	Adam Fletcher and Chris Bonell	N = 20	• At the two case study schools, the young people reporting regular and heavy patterns of substance use often shared similar, disadvantaged family backgrounds, selected friends like themselves and reported being influenced by their peers. However, their use of cigarettes, alcohol, cannabis and other illegal drugs also appeared to be important for facilitating their 'styles' and building social 'survival' capital at school. • In the inner-city case-study school, these were a mass-network of 'safe associates', building protective bonds within an intimating environment while paradoxically, reinforcing local norms regarding drug use and gang involvement. • The shape of these networks and the way in which they influenced substance use appeared to be structured both by the school's composition and the institutional ethos, particularly at Grange House, where policies and practices appeared to favour the majority of middle-class students most likely to contribute towards schools achieving their attainment targets. • Once cliques of students were marginalised at Grange House, their patterns of substance use became	Longitudinal analysis	• Students with whom the strongest rapport was developed over the first two interviews typically invited friends to the third interview, although they may have also had the strongest views about school or substance use. This potential bias in favour of those with the most negative attitudes to school may have been compounded by the fact that no incentives were provided (e.g. vouchers for high street stores) other than the opportunity to miss lessons. • A further limitation with this research is it provides few insights regarding how schools are managed and how

		central to their identity at school, perhaps even their 'master status'. • At North Street school vulnerability was an over-arching theme across all students' accounts: students needed to bond with others because they did not feel safe. • Although previous studies have usually 'implicitly assumed a form of hierarchy' exists in all schools (Milner 2004: 100), there may be a disjuncture between depictions in popular culture of secondary schooling and the reality of inner-city school life. • Health inequalities may be reproduced through these distinctive centrifugal and centripetal forces in different institutional contexts, and this should be the focus of quantitative examination in the UK and elsewhere	institutional policies and practices relate to school ethos. • Data provided relatively few insights in terms of the potential safety strategies of more pro-education students on the periphery of the dominant street culture at North Street. • The study did not track students over an extended period of time and therefore provides few insights regarding how students' friendships change as they leave school.

Social Network Structure of a Large Online Community for Smoking Cessation	Nathan K. Cobb, Amanda L. Graham, and David B. Abrams,	N = 7569	• The QuitNet community is a large-scale social network with the characteristics required for sustainability of social support and social influence to promote smoking cessation and abstinence. • Characteristics include persistence of members over time, heterogeneity of smoking status, and evidence of rich, bidirectional communications. • Influential subgroups identified may provide targets for future network-level interventions.	Cross-sectional analysis	• The network was dynamic, and traditional network metrics may have overestimated the diffusion capacity of the network. • Information regarding smoking abstinence from participant provided quit dates of unknown validity. • A limited selection of ties defines the network. Many participants appeared to be lurkers, who did not actively communicate but may have been exposed passively to normative influences such as blog postings or the profile information of other members. • Little is known about communications

					and ties between individuals that did not occur through the QuitNet system (e.g., regular e-mail, pre-existing friendships, the use of other social networking systems), which may have resulted in underestimation of the strength of some ties or the omission of others.
Social Networks and Smoking: Exploring the Effects of Peer Influence and Smoker Popularity Through Simulations	David R. Schaefer, Jimi Adams and Steven A. Haas	N = 509	• Results indicate that both peer influence and smoking-based popularity affect smoking behaviour and that their joint effects are nonlinear. • This study demonstrated how a simulation-based approach can be used to explore alternative scenarios that may be achievable through intervention efforts and offers new hypotheses about the association between friendship and smoking	Longitudinal analysis	• The study is analysed data from only one school, meaning the findings may not be generalizable. • The processes represented by this simulation may vary across school contexts (e.g., the baseline rates of friendship formation or

					smoking uptake could differ from this school).
Social norms and the relationship between cigarette use and religiosity among adolescents in the United States	Jan Gryczynski, and Brian W. Ward	N = 14695	• Smoking abstinence was associated with structural and functional measures of social relations and depended on the closeness of the persons constituting the relations. • Further knowledge about these associations could lead to a potential in involving social relations in smoking cessation programmes.	Cross-sectional analysis	• The study was constrained by the types of questions asked of respondents. • Missing data is an issue, particularly when the analysis calls for controlling for numerous variables. • The study is a cross-sectional survey and the nature of the data does not permit causal inference.

Social relations and smoking abstinence among ever-smokers: A report from two large population-based Danish cohort studies	Ross, L. Thomsen, B. L. Boesen, S. H. Frederiksen, K. Lund, R. Munk, C. Dalton, S. O. Bidstrup, P. E. Kjær, S. K. Tjønneland, A. Johansen, C.	N = 10107 Younger women N = 21091 Older men N = 23800 Women	• Smoking abstinence was associated with structural and functional measures of social relations and depended on the closeness of the persons constituting the relations.	Cross-sectional analysis	• The study is a cross-sectional survey and the nature of the data does not permit causal inference and by the types of questions asked of respondents. • Missing data is an issue, particularly when the analysis calls for controlling for numerous variables.

Social Relations, Health Behaviors, and Health Outcomes: A Survey and Synthesis	Louis Tay, Kenneth Tan, Purdue University, Ed Diener, Elizabeth Gonzalez	51 articles	• Social relations are beneficial for health behaviours such as chronic illness self-management and decreased suicidal tendency. • The salutary effects of general measures of social relations (e.g. being validated, being cared for, etc.) on health behaviours (e.g. healthy diet, physical activity, smoking, alcohol abuse) are weaker, but specific measures of social relations targeting corresponding health behaviours are more predictive. • There is growing evidence that social relations are predictive of mortality and cardiovascular disease, and social relations play an equally protective role against both the incidence and progression of cardiovascular disease. • Evidence was mixed for the association between social relations and cancer.	Literature Review	• This review it does not always delineate how specific types of social support relate to health outcomes.

Social support and the transtheoretical model: Relationship of social support to smoking cessation stage, decisional balance, process use, and temptation	Julie Wagner, Matthew Burgb, Brian Sirois	N = 190	• Regression analyses revealed that social support was positively associated with both experiential and behavioural processes of change. • A trend for higher social support with advancing stage was also detected. Social support was not related to temptation or decisional balance. • When looking at specific sources of social support, family and peer support emerged as significant predictors, while significant-other support did not.	Cross-sectional analysis	• This study has limitations to its generalizability. The sample was uniquely White, male, largely unemployed, and unmarried. • Only two stages of change were well represented, and the study used a cross-sectional design. Hence, no temporal relationships among variables could be tested. • Self-report bias.

Social support in smoking cessation: Reconciling theory and evidence	Lee Westmaas, Jeuneviette Bontemps-Jones, & Joseph E. Bauer	4 RCTs	• Although the ability of smokers to quit is undoubtedly influenced to some degree by community-level or population-level factors (e.g., smoking restrictions, advertising, culture), many smokers have been helped in quitting by receiving social support through Quitlines, group behavioural therapy, or individual counselling. • These treatments clearly provide high levels of emotional, informational, and instrumental support even though they are not explicitly referred to as socially supportive interventions. • In apparent contradiction to these beneficial, supportive treatments are studies finding no differences in quit rates between smokers in socially supportive-enhanced treatments. • The paper argues that for research on the relevance of peer or partner social support in smoking cessation to advance, theoretical models need to be developed and tested. • The roles that social support constructs may play in facilitating cessation were presented, including a stress-buffering perspective. • Identifying and assessing potential mediators and moderators of	Literature Review	• Improved design could have been an RCT that compared a peer or partner support program with a control group that received minimal treatment. • The lack of a theoretical framework to guide interventions and methodological limitations.

relationships specified in the models could provide an even more informative account of why a particular function or dimension of social support is effective and for whom it is effective

Social Support, Network Heterogeneity, and Smoking Behavior in Women: The 10-Town Study	Ari Väänänen, AnneKouvonen, MikaKivimäk, Jaana Pentti, Jussi Vahtera,	N = 23069	• Findings suggest an association among network heterogeneity, sources of social support, and smoking in female employees. • The associations were more pronounced among non-manual vs. manual employees. • The preventive impact of these social resources on smoking behaviour is stronger among non-manual female employees.	Cross-sectional analysis	• Female sample, not generalizable, cross sectional, recall bias

Social–environmental factors related to prenatal smoking	Gregory G. Homish, Rina D. Eiden, Kenneth E. Leonard, Lynn T. Kozlowski	N = 316	• This work found differential impacts of the social network on smoking suggesting that understanding relationship type, not simply number of smokers, may be important for smoking cessation efforts. • Understanding differences in social network influences on smoking can help to inform interventions.	Cross-sectional analysis	• This is a sample of lower socioeconomic pregnant women; therefore, these findings cannot be generalized to pregnant women in general. • Information about social network factors was based only on the woman's report of her social network's smoking. • Selection bias with women who participated in the study may have been more likely to change their health behaviours to improve the health of their children.

Socio-demographic predictors of quitting smoking: how important are household factors?	Tarani Chandola, Jenny Head & Mel Bartley	N = 10264	• Degree of dependence was the strongest predictor of quitting smoking, followed by occupational social class, social support, marital status and the proportion of smokers in the household. • There was some evidence of clustering of quitting smoking behaviour within households—members of the same household had similar quitting smoking behaviours. • This clustering at the household level appeared to be explained by mechanisms related to the household level. However, there was little evidence for clustering of smoking behaviour within areas.	Longitudinal analysis	• The definition of smokers and quitting smoking was based on a single question ('Do you smoke cigarettes'). • The quit rate found in this study (over a 10-year period) was larger than the 10% quit rate reported by another study of smoking cessation over a 1-year period, but similar to the proportion currently trying to quit or who had quit smoking (West et al. 2001). • The area size may have been too large to observe the effects of area deprivation on quitting smoking. • The measure of addiction was an index of level of dependence based on the number of

	self-reported cigarette use, which is a crude, although adequate measure of nicotine dependence.

Socioeconomic Disadvantage, Parenting Responsibility, and Women's Smoking in the United States	Hee-Jin Jun, S.V. Subramanian, Steven Gortmaker, and Ichiro Kawachi	N = 61700	• For non-White racial/ethnic groups, the prevalence of smoking among women with small children in the household was lower than that among women without small children. • The results suggest that child care responsibility confers an increased risk of smoking among low-income White women.	Cross-sectional analysis	• The cross-sectional nature of this study limits causal inference relative to prospective observational studies. • The smoking assessment was based on self-report and was not verified by objective measures, resulting in potential bias. • The telephone survey method may include bias with some risk behaviours more common among persons in households without telephones. • The study attempted to measure women's child care responsibilities, but actually measured whether women lived with

children aged 0–4 years.

Socio-metric status as a predictor of onset and progression in adolescent cigarette smoking	Patricia A. Aloise-Young, Christopher J. Kaeppner	N = 1630	• The results indicated that rejected and controversial adolescents were more likely than average adolescents to (a) report lifetime smoking at time 1 (T1) and (b) report onset of smoking at time 2 (T2). However, among adolescents who had already tried cigarettes at T1, rejected and controversial youth were not at increased risk for progression in total lifetime cigarette smoking (i.e., higher levels of total lifetime cigarette use at T2). • The results confirm that controversial youth are similar to rejected youth in their risk for onset of cigarette smoking during adolescence.	Longitudinal analysis	•

Sources and Frequency of Secondhand Smoke Exposure During Pregnancy	Eiden, Rina D. Molnar, Danielle S. Leonard, Kenneth E. Colder, Craig R. Homish, Gregory G. Maiorana, Nicole Schuetze, Pamela Connors, Gerard J.	N = 245	• The most common source of second hand smoke exposure during pregnancy was the partner (n = 245). However, reliance on the partner smoking measure alone would have misclassified a substantial number of women as having no second hand smoke exposure during pregnancy. • The importance of exposure from the general social network was also evident in the finding that among non-smoking women with non-smoking partners, 50% reported some level of second hand smoke exposure in the preceding week. • There were no changes in second hand smoke exposure across the three trimesters of pregnancy (n = 106). • Results highlight the need for treatment plans to target sources of exposure from other members of women's social networks in addition to partners. • It may be unrealistic to expect women's cessation efforts to be successful in the face of consistent and continued second hand smoke exposure through pregnancy	Longitudinal analysis	• Restricted sample size for examination of changes in second hand smoke exposure. • The results may only be generalizable to primarily lower socioeconomic status (SES) smokers with high school or below high school education. • The initial sets of 42 oral fluid samples were assayed using ELISA, a less sensitive assay for cotinine. • The sample included in the analysis of change in second hand smoke exposure over time was limited to 106 women who had completed all three trimester

	interviews. • The measure of second hand smoke exposure was based on number of days of exposure in different contexts, and it is possible that number of hours of exposure is a better indicator of actual exposure. • Individual, group, and social network and organization (work)-level influences on second hand smoke exposure, the study did not examine other sources of influence suggested by social–ecological theory such as community and population contexts.

Sources of Exposure to Smoking and Drinking Friends Among Adolescents: A Behavioral-Genetic Evaluation	H. Harrington Cleveland; Richard P. Wiebe and David C. Rowe	N ≈ 90000	• These results provide evidence of active, evocative, or both types of gene-environment correlations. • Genetic factors can influence the formation of friendships with substance-using peers, thereby contributing to adolescents' exposure to substance use behaviours. • The results of these studies do not provide overwhelming support for genetic contributions to friendship choice; however, it is noteworthy that no one addressed this issue directly.	Longitudinal analysis	• The nominated friends of siblings may be the same individual. This limitation violated the statistical assumption of independence; however, it makes perfect sense that siblings within the same pair could befriend the same person. Removing overlapping individuals from the friendship groups of siblings would artificially deflate the substance use similarity of siblings' friendship groups. • The nomination involves those friends who were nominated, but whose data were not available in the data set. This caveat may have created some bias,

but its direction is unknown.

- The nature of the model itself - the non-shared environment factor comprised several elements, some of which were affected by genes, which should be examined more closely.
- Because genetic factors and environmental factors continually interact, all estimates of genetic and environmental influence are sample, or at least context, specific.

Spousal and Alcohol- Related Predictors of Smoking Cessation: A Longitudinal Study in a Community Sample of Married Couples	Katherine M. Dollar, Gregory G. Homish, Lynn T. Kozlowski, and Kenneth E. Leonard	N = 634	• Spousal and one's own heavy smoking decreased the likelihood of smoking cessation. • Husbands and wives were both more likely to quit smoking if their spouse was a non-smoker. • Many factors that increase the likelihood of smoking cessation (e.g., implementation of a home smoking ban) need involvement of family members to be successful. • Familial cooperative behaviours (e.g., talking the smoker out of smoking) are associated with successful quitting. • Smoking cessation programs might improve quit rates by targeting the systemic influence of spousal behaviour.	Longitudinal analysis	• Drinking and smoking variables were based on self-report. • Attrition of couples across time and the focus on frequency of heavy drinking.
Spousal Concordance for Major Coronary Risk Factors: A Systematic Review and Meta-Analysis	Augusto Di Castelnuovo, Gianni Quacquaruccio, Maria Benedetta Donati, Giovanni de Gaetano, and Licia Iacoviello	71 papers, 207 cohorts of pairs and 424613 correlations in more than 100000 couples.	• This systematic review shows a statistically significant positive spousal concordance for the majority of main coronary risk factors. • The strength of the concordance was markedly different among factors and appeared to be quite modest for all of them. • Interventions to reduce cardiovascular risk factors should be addressed jointly to both members of a marital couple.	Systematic Review	• Only 13 studies related to smoking, though this was the CVD risk factor with highest overall concordance (overall correlation 0.23) • There are many papers on peer influences on adolescent smoking and other

		substance use, a limited number of papers have reported prospective findings. • There was also a paucity of research on social influences among ethnic groups. • More information is needed regarding the circumstances surrounding socialization and selection.

Spousal Concordance in Health Behavior Change	alba TA, Sindelar JL	N = 12652 persons (age-eligible individuals as well as their spouses) N = 6072 individuals who remarried at the time of the initial survey and who remain married and in the sample at the time of the 1996 and 2000 waves.	• When one spouse improves his or her behaviour, the other spouse is likely to do so as well, and persists despite controlling for many other factors. • Simultaneous changes occur in a number of health behaviours. • This has prescriptive implications for developing interventions, treatments, and policies to improve health habits and for evaluating the impact of such measures	Longitudinal analysis	• Self-reported and potential for recall bias, etc. • Changes in behaviour in the time between survey waves are not measured and the data do not show which spouse initiated a change in behaviour or if the changes the spouses made were truly simultaneous. • The data do not include couples that have divorced or separated during the time period.

Spousal influence on smoking behaviors in a US community sample of newly married couples	Gregory G. Homish, Kenneth E. Leonard	N = 537	• Among married couples, partners often have similar characteristics and behaviours. • Among individuals who smoke cigarettes, it is not uncommon for them to have a partner who also smokes. • Having a partner who smokes can influence the spouse's initiation of smoking, or return to smoking after a previous quit attempt. It is possible that a non-smoking partner can influence his/her spouse to stop smoking. • There was some support that a partner's smoking status did influence the other's smoking, although more support was found for spousal influence on relapse than cessation. • There was more support for husband's influence compared to wife's influence. • Non-smoking wives were more likely to resume smoking in the early years of their marriage if their partners were smokers. • Wives' smoking did not predict husband initiation of smoking. • These findings suggest that during the transition into marriage, spouses do influence their partners' behaviours. In particular, women	Longitudinal analysis	• Smoking status was self-reported and the study did not confirm this status using any biochemical methods. • The rates of individuals who either started or stopped smoking during the study period were low. This could have affected the power to detect spousal influence patterns. • The study lacked detailed pregnancy information and could not assess how factors such as pregnancy or breastfeeding may have affected smoking rates.

	are more likely to resume smoking, or return to smoking if their partners smoke

Starting to smoke: a qualitative study of the experiences of Australian indigenous youth	Vanessa Johnston, Darren W Westphal, Cyan Earnshaw and David P Thomas	N = 65	• Future initiatives aimed at preventing smoking uptake in this population need to focus on changing social normative beliefs around smoking, both at a population level and within young peoples' immediate social environment. • Interventions could be effectively delivered in both the school and family environments. • Health practitioners in contact with Indigenous families should be promoting smoke free homes and other anti-smoking socialisation behaviours.	Cross-sectional analysis – qualitative	• The study only included a relatively small sample of non-Indigenous participants, and subsequently a small number of smokers, resulting in limited generalizability, etc. • The study identified few marked differences in the perceptions and reported experiences of smoking by gender, although female participants appeared to be more strongly influenced by peer smoking than boys. • Findings were more representative of the perspectives of youth in school or employment, which restricted the ability to

					explore differences across socioeconomic status, and therefore limit the generalizability of the findings.
Substance Use Among Gang Member Adolescents and Young Adults and Associations With Friends and Family Substance Use	Beth R. Hoffman, Nnenna Weathers, and Bill Sanders	N = 60	• Cigarette use in gang members was strongly associated with cigarette use in friendship networks. • There were no associations for use of alcohol and marijuana. • Few associations emerged between substance use in participants and their friends/family.	Cross-sectional analysis	• The lack of associations could be related to the research methodology. • The small sample size prohibits the use of covariates in examining the relationships between participant and friend or family use, and also limits examining subsets of the sample.

					• The lack of data from the youths' friends and family, including their own reports of substance use, means the study is only measured perceived use of these people.
Substance Use among Middle School Students: Associations with Self-Rated and Peer-Nominated Popularity	Joan S. Tucker, Ph.D., Harold D. Green Jr., Ph.D., Annie J. Zhou, M. S., Jeremy N. V. Miles, Ph.D., Regina A. Shih, Ph.D., and Elizabeth J. D'Amico	N = 2002	• Self-rated popularity and peer-nominated popularity were consistently and positively associated with lifetime cigarette smoking, drinking, and marijuana use. • The associations with self-rated popularity tended to be of stronger magnitude. • In addition to popularity, adolescents were significantly more likely to report lifetime substance use if they were in a higher grade, did not have an intact nuclear family (cigarettes and alcohol only), and earned poorer grades in the past year.	Cross-sectional analysis	• Results are based on a sample of predominantly Hispanic middle school students living in the greater Los Angeles area, and therefore results a not generalizable. • Results are based on cross-sectional data and thus it is not possible to disentangle the temporal association between popularity and substance use. • The study used self-reported

					cigarette, alcohol, and marijuana use, of which the limitations are well-documented, such as recall bias, etc.
Systematic Review of Social Network Analysis in Adolescent Cigarette Smoking Behavior	Dong-Chul Seo, Yan Huang,	10 studies	• Adolescents who are isolates are more likely to smoke than those in other social positions, indicating that peer group isolation is closely related to smoking behaviour among adolescents. • Peer selection and peer influence operate in the initiation and maintenance of cigarette smoking among adolescents, peer selection appears to contribute more to smoking homogeneity among peers	Systematic Review	• The limited number of studies that reported dynamic interactions, this review study might not have captured all the dynamic interplay that characterizes adolescent friendships,

	cigarette smoking among adolescents, peer selection appears to contribute more to smoking homogeneity among peers	especially in the context of peer selection and peer influence. • The results of this review study might not be generalizable to racial/ethnic minority students because the reviewed studies did not report data by race/ethnicity. • Most of the analyses in the reviewed studies were based on moment-in-time reports of friendships rather than dynamic interactions among adolescents.

Testing a conceptual model related to weight perceptions, physical activity and smoking in adolescents	Ronald C. Plotnikoff, Kim Bercovitz, Ryan E. Rhodes, Constantinos A. Loucaides and Nandini Karunamuni	N = 1242 males N = 1446 females	• Large effect sizes for males and females were observed between friends' and adolescents' smoking behaviour, and between perceived body weight and desire to change weight. • Findings of this study point to the need to design programs to motivate adolescent females to adopt healthy weight-control practices and to target young peoples' social networks to promote health behaviours, especially with regard to smoking.	Cross-sectional analysis	• The cross-sectional nature of this study limits causal inference relative to prospective observational studies. • This study reported data from only two provinces in Canada. • The single-item variables may have eliminated the ability to estimate latent variables. • The reliance on self-reports for the surveyed items may include some bias. • The study did not include the assessment of parental influences. • Friends' smoking behaviour did not differentiate between experimental and heavy smoker, and physical activity

	behaviour did not include a time frame or intensity levels.

Testing the Interaction Between Parent–Child Relationship Factors and Parent Smoking to Predict Youth Smoking	Elizabeth C. Tilson, Colleen M. Mcbride, Isaac M. Lipkus, and Richard F. Catalano	N = 2542	• Perceived parental disapproval of smoking was not associated with youth smoking behaviour. • Among youth whose parent did not smoke, those who reported low level of parent–child connectedness were two times more likely to report ever having smoked than those who reported high levels of connectedness. • Among youth whose parent smoked, connectedness was not associated with youth smoking. • The interaction between connectedness and parental smoking status and its relationship to youth smoking remained significant after controlling for covariates. • Overall, high levels of parent–child connectedness are protective against youth smoking. However, family connectedness may not protect children from becoming smokers when parents smoke	Cross-sectional analysis	• Assessment of parental tobacco use was limited to current cigarette smoking. • Parental lifetime smoking or parental use of other forms of tobacco was not assessed. • These data are nearly 10 years old. • The study categories represent heterogeneous groups and did examine characteristics that may differ between ethnic groups, for example whether the parent was U.S. born or not. • The smoking behaviour of siblings was not assessed. • Relationship quality factors, such as

	connectedness, may differ between biologic families and non-biologic families. • The study is unable to examine whether parental use of illicit drugs and heavy alcohol use may have affected the results by impairing parent–child connectedness. • A notable proportion (28%) of the dyad sample was excluded from the analysis owing to missing data. •

The Association of Lone-Motherhood with Smoking Cessation and Relapse: Prospective Results from an Australian National Study	Mohammad Siahpush, Raees A. Shaikh, Melissa Tibbits, Terry T-K Huang, and Gopal K. Singh	N ≈18,000 individuals. The number of observations in the ten waves was a total of 177,938.	• Socioeconomic status, social support, and mental health account for some of the association of lone motherhood and cessation and relapse. • While efforts to reduce the smoking prevalence among lone mothers should focus on their material deprivation, availability of social support, and addressing mental health issues, other factors unique to the lives of lone mothers also need to be taken into account.	Longitudinal analysis	• Smoking was based on self-reported data collection. • Non-participation of a segment of the target sample and attrition. • Employment status and occupation were not included in the models.
The association of smoking with perception of income inequality, relative material well-being, and social capital	Mohammad Siahpusha, Ron Borlanda, Janet Taylor, Gopal K. Singh, Zahid Ansarid, Adrian Serragliod	N = 126	• Being a smoker was associated with a higher level of perceived income inequality, lower perception of relative material well-being and living in a community with a lower degree of trust and safety. • The results imply that smoking is less prevalent in communities that are more egalitarian and have a higher stock of social capital.	Cross-sectional analysis	• The cross-sectional design of the study does not allow causal inferences

The Collective Dynamics of Smoking in a Large Social Network	Nicholas A. Christakis and James H. Fowler	N = 12067	• Discernible clusters of smokers and non-smokers were present in the network, and the clusters extended to three degrees of separation. • Despite the decrease in smoking in the overall population, the size of the clusters of smokers remained the same across time, suggesting that whole groups of people were quitting in concert. • Smokers were also progressively found in the periphery of the social network. • Smoking cessation by a spouse decreased a person's chances of smoking by 67% (95% confidence interval [CI], 59 to 73). • Smoking cessation by a sibling decreased the chances by 25% (95% CI, 14 to 35). • Smoking cessation by a friend decreased the chances by 36% (95% CI, 12 to 55). • Among persons working in small firms, smoking cessation by a co-worker decreased the chances by 34% (95% CI, 5 to 56). • Friends with more education influenced one another more than those with less education. • These effects were not seen among neighbours in the immediate geographic area.	Longitudinal analysis	• There are some limitations with causal estimation with observational data • Self report data

			• Network phenomena appear to be relevant to smoking cessation. • Smoking behaviour spreads through close and distant social ties, groups of interconnected people stop smoking in concert, and smokers are increasingly marginalized socially.		
The conceptualization and assessment of health-related social control	Megan A. Lewis, Rita M. Butterfield, Lynae A. Darbes and Catharine Johnston-Brooks	N = 109	• For men, influence from a spouse or partner predicted being able to cut back on smoking at both two days and four months following a self-defined quit date, whereas for women the association was significant only at the four-month follow-up. • Influence from family and friends predicted greater smoking reduction among men and women at the four month follow-up, although the reductions were greater for men. • These analyses indicate that direct health-related social control may be effective in facilitating change in health behaviours for both men and women, but may be more effective for men. • Thus, gender may be an important factor in the use, receipt, and consequence of health-related	Review - 3 study summary	• The themes regarding the communal interdependent nature of health-related social control, mutual influence, and stress that emerged from the qualitative data need quantitative validation. • Data was based on self-reports and may be subject to bias.

			social control.		
The contribution of lone parenthood and economic difficulties to smoking	Ossi Rahkonena, Mikko Laaksonenb, Sakari Karvonen	N = 6243	• Smoking is associated with social relations. • Social networks seem to encourage smoking so that particularly among lone parents smoking seems to be an important part of social life. • Even though social relations are generally considered positive to health, in some contexts they might also include negative consequences. • Smoking seems to play a part in the accumulation of deprivation so that those who have economic difficulties also have a higher risk of poor health due to smoking.	Cross-sectional analysis	• Findings may not be generalizable as they were based on a sample of low-achieving students from a medium-sized city.

The development and implementation of a peer-led intervention to prevent smoking among secondary school students using their established social networks	Suzanne Audrey, Kathleen Cordall, Laurence Moore, David Cohen and Rona Campbell	N = 10734 all students in trial N = 835 peer supporters N = 5358 year 8 intervention schools	• Retention of peer supporters throughout the ten-week intervention period was high. • Eighty two per cent (687 of 835) of students who consented to act as peer supporters completed the programme and fulfilled the role. • The costs of implementing this programme were sizeable but, if effective, it could yield substantial long-term health gains and contribute to a reduction in health inequalities	Cross-sectional analysis	• Such training programmes are often criticised for lacking reproducibility because these kinds of novel interventions tend to be devised and implemented by charismatic experts with boundless enthusiasm and time, which proves crucial to their success. • Twelve trainers from varied backgrounds and with differing amounts of experience were involved in delivering the ASSIST training programme.

The effect of single motherhood on smoking by socioeconomic status and race/ethnicity	Hee-Jin Juna, Dolores Acevedo-Garcia	N = 57,000 households N = 246,000 individuals aged 15 years and older	• Having children reduces smoking except among single white women, and women with low income. • Single women faced a higher risk of smoking than married women. • Parenting was protective against smoking among married women but not among single women. • Among single women, the associations between parenting and smoking varied by income and race/ethnicity. • Parenting increased the risk of smoking among single women in the lowest income quartile. • The finding that parenting is protective against smoking among single minority women, who presumably experience significant stressors, calls for a more thorough investigation of smoking behaviour among minority women, and suggests the importance of stress buffers such as social support. • Results suggest that some single mothers are unable to cut down on smoking and this may be due to the unique stressors faced by single mothers, such as a lack of regular support from a spouse/ partner. • Parents' social context has both a direct effect on child caregiving, as well as an indirect effect, mediated	Cross-sectional analysis	• The data are cross-sectional and thus it is not possible to ascertain whether the evidence observed is due to the effects of marital status and parenting on smoking, or whether there is simply a correlation between these variables. • The study assumed that living with children is equivalent to raising children, the reality of the situation might vary depending on how much time the women really spend with their children. • There may be systematic differences between socioeconomic status or between

			by parents' psychological functioning.		racial/ethnic groups in patterns of childcare. • Although among single mothers, stress regarding childcare and financial difficulties was associated with smoking, some unmeasured stressors intertwined with single motherhood might be confounding this association. • Self-reported smoking status was not verified by objective measures and may include bias.
The effects of social networks on tobacco use among high-school adolescents in Mexico	Guadalupe Ramírez-Ortiz, Ramiro Caballero-Hoyos, Guadalupe Ramírez-	N = 486 at baseline N = 399 at follow up	• Nominating more friends rather than receiving such nominations was protective for tobacco use. • Popular students, those receiving many nominations, were at higher risk for tobacco use. • Involvement of leaders with capacity to influence might be an	Longitudinal analysis	• Attrition was caused mainly by student dropouts. • Smoking was defined as current tobacco use, while others consider it as smoking at least

	López, Thomas W Valente	efficient strategy for dissemination of preventive messages.	one cigarette every day in the past 30 days.

The Impact of Self-Control Indices on Peer Smoking and Adolescent Smoking Progression	Janet Audrain-McGovern, Daniel Rodriguez, Kenneth P. Tercyak, Geoffrey Neuner, and Howard B. Moss	N = 918	• Youth smoking prevention and intervention program outcomes may potentially improve by addressing self-control behaviours as they appear to have direct effects on smoking and indirect effects through peers who smoke.	Longitudinal analysis	• Indices of self-control were measured at one point and they were treated as time-invariant covariates in the model. It is possible that these variables changed over time. • The indices of self-control accounted for a modest amount of variance in smoking. Thus, skills associated with self-control would only comprise one component of a multicomponent youth smoking prevention effort. • This study does not distinguish between types of peer smoking influence, such as best friend, other friends, or friend's gender. • These data do not

			indicate whether peer selection or peer influence processes were more important for adolescent smoking. • Caution is warranted in generalizing the results of this study, especially in light of the study's consent rate (54%).

The importance of peer effects, cigarette prices and tobacco control policies for youth smoking behaviour	Lisa M. Powell, John A. Tauras, Hana Ross	N= 12705	• The key finding is that peer effects play a significant role in youth smoking decisions: moving a high-school student from a school where no children smoke to a school where one quarter of the youths smoke is found to increase the probability that the youth smokes by about 14.5 percentage points. • The results suggest that there is a potential for social multiplier effects with respect to any exogenous change in cigarette taxes or tobacco control policies.	Cross-sectional analysis	• Self report cross sectional.
The Importance of Social Networks on Smoking: Perspectives of Women Who Quit Smoking During Pregnancy	Stephanie N. Nguyen, Isabelle Von Kohorn, Dena Schulman-Green, Eve R. Colson	N = 24	• Participants reported being embedded in complex social networks with prominent smoking norms; being tempted to smoke by members of their social networks because smoking was pervasive; and changing relationships with smokers in their social networks as a result of their non-smoking status. • As a result of new non-smoking status, many women described significant changes in their relationships with the smokers in their social networks. For example: alteration in how they believed smokers perceived them; loss of a	Cross-sectional analysis - qualitative	• The sample was limited to a single hospital in a single state and may not be generalizable. • The women were interviewed at a single time point and therefore, lack follow-up data on how their social networks influenced eventual smoking behaviour. • The study relied on

	special connection with smokers in their social network; and isolation from smokers in their social network.	self-report data with potential for bias, such as social desirability bias.

The influence of best friends and siblings on adolescent smoking: A longitudinal study	Zeena Harakeh, Rutger C. M. E. Engels, Ad A. Vermulst, Hein De Vries & Ron H. J. Scholte	N = 428	• Our findings showed that adolescents with older siblings who smoked were more likely to smoke one year later. • Older adolescents were not affected by smoking of their younger siblings. • Smoking of the best friend influenced smoking of the younger sibling. • With regard to the specific transition from never smoking to smoking initiation, older and younger siblings with a smoking best friend were more likely to start smoking one year later. • Younger siblings with older siblings who smoked were more likely to initiate smoking one year later. The influence of friends and siblings on adolescent smoking appeared to be small to moderate.	Longitudinal analysis	• It appeared that younger siblings who smoked overestimated the lifetime smoking behaviour of their best friend more than older siblings who smoked, and younger siblings who did not smoke. • The study did not take into account the duration of the friendship. • The study did not take into account whether the best friend also nominated the adolescent as his/her best friend, thus whether there was a reciprocal relationship. • The variability in change in smoking behaviour from the first wave to the second was relatively low. • Adolescents were

	derived from intact biologically related families. • Besides peer influence, there are important predictors of adolescent smoking that are not included in the study. • The study measured best friends' smoking by adolescents' reports of their best friends' smoking rather than by best friends' self-reports.

The influence of parents, siblings and peers on pre- and early-teen smoking: A multilevel model	Adrian B. Kelly, Martin O'flaherty, Jason P. Connor, Ross Homel, Johnw. Toumbourou, George C. Patton & Joanne Williams	N = 7314 individuals N = 231 schools	• Early teenage smoking was best explained by sibling and peer smoking, and individual risks largely accounted for the substantial variation observed across schools and communities. • Findings point to the utility of targeting families in disadvantaged communities.	Cross-sectional analysis	• The cross sectional design prevents conclusions about causality and is potentially limited by instances of non-nested data. • The study relies on self-report data and may contain bias.

The influence of peer norms and popularity on smoking and drinking behavior among college fraternity members: A social network analysis	Joe Phua	N = 34	• Results of this study indicate that smoking and drinking are highly correlated. • Analyses revealed that smokers tend to hang out with other smokers, and non-smokers with other non-smokers in both 2007 and 2010; hence a tendency towards homophily for smoking. • The study found stronger homophily for smoking than for drinking between 2007 and 2010. • Since smoking and drinking are social activities, it is fair to say that members of the fraternity socialize with others like themselves, resulting in a high level of homophily. • The study also found that between 2007 and 2010 smoking and drinking diffused through the network. For smoking, non-smokers who hung out mainly with smokers in 2007 picked up smoking by 2010, and vice versa. • Fraternity members influenced others whom they were directly connected to for both smoking and drinking. Popularity within the network was strongly associated with smoking and drinking. • Conforming to peer norms with regards to smoking and drinking	Longitudinal analysis	• A limitation associated with this study is that since network data collected from a small group of fraternity members was used, results cannot be generalized to the general collegiate population. • Because fraternities attract like-minded students who specifically self-select to live together, the effect of homophily may be much stronger than in the general college student population.

mediates the relationships between popularity and smoking, and popularity and drinking.

- The more an individual smoked, the more he drank, and vice versa.

The Influence of Social Environment and Social Image on Adolescent Smoking	W. Douglas Evans, Anne Powers, James Hersey and Jeanette Renaud	N = 15,038 at baseline N = 35,828 at follow up	• Direct paths from social environment to current smoking increased from middle school to high school. • Indirect paths with social image mediating this relationship revealed a smaller increase. • Social image of smokers mediated the influence of social environment on adolescent smoking. • Social image had a greater effect on smoking among middle schoolboys and high school girls.	Repeated cross-sectional survey analysis	• Our analysis of the social influence model is based upon cross-sectional data from two samples gathered in the fall of 1999 and the spring of 2000. • The cross-sectional data means it is not possible to distinguish independent from dependent variables.

The intergenerational transmission of implicit and explicit attitudes toward smoking: Predicting adolescent smoking initiation	Steven J. Sherman, Laurie Chassin, Clark Presson, Dong-Chul Seo, Jonathan T. Macy	N = 8487	• There was evidence of intergenerational transmission of implicit attitudes. • Mothers who had more positive implicit attitudes had children with more positive implicit attitudes. These positive implicit attitudes of adolescents predicted their smoking initiation 18-months later. • These effects were obtained above and beyond the effects of explicit attitudes. • Findings provide the first evidence that the intergenerational transmission of implicit cognition may play a role in the intergenerational transmission of an addictive behaviour.	Longitudinal analysis	• The sample was largely non-Hispanic Caucasian, and different findings might be produced in more ethnically and racially diverse populations. • The adolescents were young and just beginning smoking initiation with different findings potentially produced at different ages and stages of smoking.
guang	Bindu Kalesan, Joan Stine, Anthony J. Alberg	N = 37244	• The likelihood of youths being current smokers was positively associated with both parental smoking (both versus neither parent smokes: odds ratio [OR] 3.4, 95% confidence interval [CI] 3.1-3.7) and parental concern about smoking (minimal versus strict concern: OR 2.3, 95% CI 2.1-2.4). • Youths with parents who did not smoke and with strict concern had the lowest likelihood of smoking. • In comparison to this group, after adjustment for other social influences the likelihood of being a	Cross-sectional analysis	• The study was cross-sectional, so that the temporal sequence of parental smoking and positive parental concern were not measured prior to the onset of current smoking in youths. • Positive parental concern was closely associated with parental

		current smoker was more than 5 times greater among boys (OR 5.8, 95% CI 4.5-7.4) and girls (OR 5.2, 95% CI 4.1-6.5) whose parents both smoked and were minimally concerned about smoking. • Current smoking in youths was independently associated with both parental smoking and less parental concern. • The results indicate that minimal parental concern about smoking worsens the risk due to parental modelling. • Parental modelling and parental attitudes act synergistically to exacerbate the likelihood of smoking.	smoking behaviour, suggesting that attitudes toward parental concern may follow the same pattern as parental smoking, and therefore, the cross-sectional associations for this variable should not be skewed to a meaningful degree compared to a prospective study design. • A potential source of bias is the possibility for differential misclassification of youth smoking and parental disapproval as true smokers who reported being non-smokers may have been more likely to have perceived parental disapproval. • Parental smoking

	and positive parental concern were measured from reports of the youths and may include bias.

The moderating role of parental smoking on their children's attitudes toward smoking among a predominantly minority sample: a cross-sectional analysis	Anna V Wilkinson, Sanjay Shete and Alexander V Prokhorov	N = 1417	• The odds for smoking increased with the number of parents who currently smoked. • Compared to participants whose parents did not currently smoke, participants who reported that one parent currently smoked had a 1.3 times increased risk for ever smoking, and those who reported that both parents currently smoked had a 2.2 times increased risk. • Among participants whose parents did not currently smoke, children's smoking attitudes were associated with a 1.7 times increased risk for ever smoking, whereas among participants who reported that at least one parent currently smoked, children's smoking attitudes were associated with a 2.5 times increased risk. • Results suggest that parental smoking influences children's attitudes toward smoking, which in turn affect the likelihood of the child smoking. • Ever smoking was associated with being male and older, living with parents' who highest level of education was less than a high school degree, while being black and living with parents who are married were protective.	Cross-sectional analysis	• The analysis is based on self-reported cross-sectional survey and limits the ability to draw causal conclusions and test for moderation. • The data collected did not permit to differentiate the difference between single and two parent families. • The study does not know how long the participants were exposed to parental smoking, which limits the ability to determine if there is a threshold of exposure required to influence children. • The study did not ask the ever smokers where they obtained the cigarettes they

	smoked. Therefore it cannot determine if current parental smoking directly increases access, and it cannot control for its potential influence in the analysis. • Active consent was required of all students to participate in this study; more girls than boys returned their consent form resulting in the differential participation rates and may include bias. • The study did not examine the influence of exposure to a parent who quit smoking while the participant was growing up.

The Myth of Peer Influence in Adolescent Smoking Initiation	Jeffrey Jensen Arnett	Not included in paper.	• This study proposes a new model of the role of peers in smoking initiation with an emphasis on how adolescents' characteristics lead to the selection of their friends, who then provide a peer context that may or may not support smoking.	Critical Literature Review	• Mostly descriptive critique of individual research.
The neighborhood effects of disrupted family processes on adolescent substance use	Jon Gunnar Bernburg, Thorolfur Thorlindsson , Inga D. Sigfusdottir	N = 7430	• The study demonstrates that disrupted family processes influence not only the risk of substance use among adolescents that experience disruption personally; disrupted family processes increase the risk of substance use among other adolescents in the neighbourhood as well. • The findings highlight the importance of community based prevention work, as well as demonstrating the complex interplay of individual- and community-level factors in the social context of adolescent substance use.	Cross-sectional analysis	• The findings cannot be generalized directly to sparsely populated rural areas, as schools from such areas were deleted from the analysis. • The study is observational and not an experiment. Accordingly, although the statistical associations that have reported are consistent with the causal pathways, it should be considered that they are not proof of causation.The study is based on

	cross-sectional data, and hence cannot address developmental changes.

The Peer Context of Adolescent Substance Use: Findings from Social Network Analysis	Susan T. Ennett, Karl E. Bauman, Andrea Hussong, Robert Faris, Vangie A. Foshee, and Li Cai, Robert H. DuRant	N = 55104	• Adolescents had lower odds of substance use when they were in reciprocated friendship dyads and when more of their friends were friends with each other. • Adolescents oriented away from the school network, as indicated by nominating friends not in the school network, had higher odds of substance use. • Adolescents in networks where smoking was more prevalent and in networks that were less densely connected were more likely to smoke and use marijuana. • Across the social embeddedness measures at both the adolescent and network levels, whenever a significant relationship was present, the odds of use were always less for those more rather than less embedded in the school network.	Longitudinal analysis	• The study did not examine interrelationships or interactions among network attributes, social processes or other variables, such as between social status and substance use characteristics of peers. • The study did not examine whether the similarity of substance use among adolescents and their friends resulted from processes of influence or selection, that is, whether network variables were cause or consequence of adolescent substance use.

The People They Know: Links Between Interpersonal Contexts and Adolescent Risky and Health-Promoting Behavior	Lise M. Youngblade & Laura A. Curry	N = 290	• Adolescents engaging in sustained risky behaviour used more health care and had higher expenditures than those youth not engaging in sustained risky behaviour. • Themes emerged from the analyses to highlight predictive relations between activities and resources for youth, interpersonal connections, control, and both risky and health-promoting behaviour.	Longitudinal analysis	• This study included a relatively small sample given the number of predictors and high attrition rate. • This study utilized a more limited measure of health-promoting behaviour. • The telephone survey did not assess all relationship contexts equally; for example, there was only one measure of the sibling relationship.Data was self-reported and may contain bias.

The protective effect of parental expectations against early adolescent smoking initiation	Bruce G. Simons-Morton	N = 1270	• Parental expectations were negatively associated, and increases in attitudes accepting of deviance and affiliation with friends who smoke were positively associated with smoking initiation. • Analysis of interactions indicated that parental expectations and monitoring did not mediate the effect on smoking initiation of attitudes toward deviance or the number of friends who smoke. • Findings provide evidence that parental expectations may protect early adolescents against smoking even in the context of increases in favourable attitudes and friends who smoking.	Longitudinal analysis	• The study was limited by inclusion of only four suburban study schools and a brief follow-up period of about 8 months. • Study attrition (lost to follow-up or excluded) because of baseline smoking behaviour were in ways different from the population finally analysed.

The Relation between Social Cohesion and Smoking Cessation among Black Smokers, and the Potential Role of Psychosocial Mediators	Lorraine R. Reitzela, Darla E. Kendzorb, Yessenia Castroa, Yumei Caoa, Micheal S. Businelleb, Carlos A. Mazasa, Ludmila Cofta-Woerpelc, Yisheng Lid, Paul M. Cinciripinic, Jasjit S. Ahluwaliae, and David W. Wettera	N = 397	• The total effect of social cohesion on continuous abstinence was non-significant. However, social cohesion was associated with social support, positive affect negative affect, and stress, which, in turn, were each associated with smoking abstinence in adjusted models. • Results suggest that social cohesion may facilitate smoking cessation among Black smokers through desirable effects on psychosocial mechanisms that can result from living in a community with strong interpersonal connections.	RCT	• The longitudinal design of the study does not mitigate the possibility that same-source bias in data that calls the legitimacy of the proposed meditational relationship. • The study only examined four of a myriad of possible mediators of the relations between social cohesion and smoking abstinence. • Participants were self-selected, treatment seeking Black smokers from a major metropolitan area and may include some bias. • The findings may not generalize to smokers living in rural areas, or to other metropolitan areas, which may differ from the

study setting.
- The study focused on continuous abstinence since the quit date. This is a conservative outcome that does not account for recovery from smoking lapses or a reduction in smoking rate.

The Relations Between Parents' Smoking, General Parenting, Parental Smoking Communication, and Adolescents' Smoking	Zeena Harakeh, Ron H. J. Scholte and Ad A. Vermulst, Hein de Vries, Rutger C. M. E. Engels	N = 428	• The results of parent and adolescent reports indicated that general parenting practices and parental smoking were associated with parental smoking communication, which was related with adolescent smoking. • The magnitude of the associations between parenting and adolescent smoking did not differ between older and younger siblings. • Supportive parents were generally more likely to engage in a high quality communication about smoking with their adolescent children; this was related to a lower likelihood to smoke. • Parents who exerted psychological control were more likely to talk more frequently with their adolescents on smoking matters, which in turn, relates to a higher likelihood to smoke. • Smoking parents were less likely to have high-quality parent–adolescent communication that relates to higher likelihoods to smoke.	Cross-sectional analysis	• The cross sectional design was used means changes overtime cannot be considered. • Underreporting of smoking may have occurred by the adolescents, because they may have worried that their parents would discover their smoking behaviour. • The findings to the entire Dutch population cannot be representative for all families in the Netherlands. I • Selection bias may have occurred since more families who agreed to participate had middle to high socioeconomic status instead of a low socioeconomic status. • A large number of the variance is still

	unaccounted for, factors other than parenting and parental smoking must play a role as well (e.g., peer influence, personality characteristics, heredity, or other parental actions).

The Relationship Between Spanish Language Use and Substance Use Behaviors Among Latino Youth: A Social Network Approach	Michele L. Allen, Marc N. Elliott, Andrew J. Fuligni, Leo S. Morales, Katrin Hambarsoomian, and Mark A. Schuster	N = 258	• These results suggest that parental monitoring and some characteristics of social networks account for the relationship between Spanish language use and substance use among Latino adolescents. • Clinic- or community-based interventions that enhance protective characteristics of social networks in Latino adolescents may be effective.	Cross-sectional analysis	• The results come from a single school in Los Angeles with a low-income, predominantly Mexican and Central American student body, so results may not apply to all Latino adolescents. • The study is cross-sectional, raising questions about the direction of influence of networks on behaviour. • Additionally, despite the fact that network-level Spanish language use was associated with substance use in a similar manner to other commonly used measures, it has not been previously tested. • Due to confidentiality concerns, identities

	of network members were not used resulting in the inability to adjust for those common to multiple networks.

The Relationship Between Student Smoking in the School Environment and Smoking Onset in Elementary School Students	Scott T. Leatherdale and Steve Manske	N = 6431	• Students are at increased risk for smoking if they often see students smoking near their school; report that students at their school smoke where they are not allowed; and attend a school with a relatively high senior student smoking rate. • Each 1% increase in the smoking rate among grade 8 students increased the odds that a student in grades 6 or 7 was an ever smoker versus never smoker (odds ratio, 1.05; 95% confidence interval, 1.02-1.08). • A low-risk student (no family or friends who smoke) was over twice as likely to try smoking if he/she attended a high-risk school. • Prevention programs should target both at-risk schools and at-risk students, and strongly enforced policies preventing students from smoking on or near school property should be implemented.	Cross-sectional analysis	• The cross-sectional design of this study precludes examination of temporal relationships among variables. • Data were based on self-reports so the validity of the responses may be questioned.

The Relationship of Parental Control to Youth Adjustment: Do Youths' Feelings About Their Parents Play a Role?	Fumiko Kakihara, Lauree Tilton-Weaver, Margaret Kerr and Ha°kan Stattin	N = 1022	• The overall model incorporating youths' feelings showed that restrictions and coldness-rejection were both indirectly linked to increases in norm-breaking and depressive symptoms through increases in youths feeling over-controlled. • Parental rules still independently predicted decreases in norm-breaking and in self-esteem, and coldness- rejection predicted increases in norm-breaking.	Longitudinal analysis	• The reports only come from youths, increasing the probability of common method variance. • The sample did not have sufficient ethnic variation to explicitly focus on culture as a contextual variant in these processes. • Understanding how youths view parental control in different cultural contexts is an important part of understanding how control affects adjustment.

The Relative Contributions of Parental and Sibling Substance Use to Adolescent Tobacco, Alcohol, and other Drug Use	Abigail A. Fagan and Jake M. Najman	N = 8458	• Sibling substance use has a greater effect on adolescent substance use than does smoking or drinking by parents. • The findings indicate the need to include siblings and information regarding sibling relationships in prevention and intervention programs.	Longitudinal analysis	• The data are cross-sectional and cannot identify the temporal sequence whereby transmission of substance use may occur. • The study relies on self-reported information from all parties, each dependent variable was based upon a single item only, and more comprehensive measures would improve the reliability of the variables. • The measures of adolescent substance use do not necessarily indicate continued or serious use of tobacco and alcohol and may be more representative of experimental use.

The role of family factors and school achievement in the progression of adolescents to regular smoking	M. Pennanen, E. Vartiainen and A. Haukkala	N = 1163	• Results suggest that smoking parents and single parents had similar anti-smoking regulations for their children at the baseline but once children became older smoking parents were not able to maintain these rules as successfully as non-smoking parents and families with two parents. • Motivating parents to uphold these anti-smoking regulations offers a prospective intervention opportunity.	Longitudinal analysis	• This study was that self-reports on smoking behaviour could not be biologically validated. • The study was restricted to the use of adolescents' reports and could not include parents' reports according to anti-smoking parenting practices.
The Role of Family Influences on Adolescent Smoking in Different Racial/Ethnic Groups	E. Melinda Mahabee-Gittens, Yang Xiao, Judith S. Gordon, & Jane C. Khoury,	N = 6426	• Higher parental monitoring, higher intention to monitor, and higher connectedness were protective among Hispanics, while higher parental punishment and favourable attitude toward monitoring were protective against smoking among Blacks. • Family influences significantly associated with protection against smoking, consistently greater protection was afforded against recent smoking than against ever smoking. • Higher levels of family influences are protective against smoking among all racial/ethnic groups.	Cross-section analysis	• The examination of a broad range of family factors that were potentially protective against smoking, important factors were not measured. • These data are based entirely on self-report without biochemical validation of smoking status.

	• There are consistencies in family influences on youth smoking; however, there may be specific family influences that should be differentially emphasized within racial/ethnic groups in order to protect against smoking behaviour.	

The Role of Peer E-mail Support As Part of a College Smoking-Cessation Website	Colleen Klatt, Carla J. Berg, Janet L. Thomas, Edward Ehlinger, Jasjit S. Ahluwalia, Lawrence C. An,	N = 25000	• There was a positive relationship between perceived support from the E-pal and the number of e-mail exchanges. • These findings suggest that the benefits of behavioural intervention via e-mail may generalize to a broader range of health behaviours. • Greater peer engagement via e-mail was associated with increased smoking abstinence, and greater perceived support was associated with reduced frequency of smoking. • Findings suggest that online peer support may be an important strategy when delivering Internet-assisted cessation programs to young adults.	Longitudinal analysis	• The distinct benefits of peer e-mail support (i.e., E-pal interaction) cannot be determined in the current study, as the peer-support component was paired with an online magazine intervention. • The majority of participants in this study were occasional smokers. As such, is it not entirely clear whether the outcome reported here (i.e., 30-day abstinence) will translate into a sustained change in smoking behaviour. • The conduct of this study involved substantial financial incentives to encourage weekly visits to the study website ($10

					per week, up to $200 total) and response to peer coach e-mail messages (chance to win $50).
The role of schoolmates' smoking and non-smoking in adolescents' smoking transitions: a longitudinal study	Jonathan B. Bricker, M. Robyn Andersen, K. Bharat Rajan, Irwin G. Sarason& Arthur V. Peterson Jr	N = 4354 for same-age schoolmate analysis N = 1833 for older schoolmate	• No significant evidence that same-age schoolmates' smoking or non-smoking was associated with any of the adolescent smoking transitions at any of the three grade intervals. • The probability that each older schoolmate's smoking was associated with the adolescent making the transition to trying smoking was 1% (95% CI: 0.4%, 1.5%) and with the transition from trying to monthly smoking was also	Longitudinal analysis	• This study represents the general population of Washington residents, it did not include a large percentage of non-Caucasian racial groups. • It is not known to what extent these findings generalize

		1% (95% CI: 0.2%, 2.0%) during the 7th-9th grade (age 12–14) interval. • Each older schoolmate's non-smoking was associated with a 1.001–1.006 (all $P < 0.05$) relative risk of an adolescent not trying smoking or escalating from trying to monthly smoking at several grade intervals. • Interventions should perhaps focus on the influence of both smoking and non-smoking older schoolmates during late childhood and early adolescence	to adolescents in countries other than the United States. • There is also a possibility of selection bias because baseline and follow-up data were not available for all the adolescents and their schoolmates.

The role of self-monitoring in adolescents susceptibility to passive peer pressure	Nicholas E. Perrine, Patricia A. Aloise-Young	N = 359	• Self-monitoring demonstrated a moderating influence on the relationship between passive forms of peer pressure and smoking onset, but did not influence the relationship between active forms of peer pressure and smoking due to the strength of active peer pressure situations (i.e., salient scripts for behavioural responses). • High self-monitors who believed that cigarette smoking was a normative behaviour were more than three and a half times more likely to show progression from complete non-smoker to current smoker over a one year period than were high self-monitors who did not believe that smoking was a normative behaviour. • The rate of onset for low self-monitors was not dependent on normative beliefs. The implications of these findings for the design of adaptive prevention programs are discussed	Longitudinal analysis	• Parental non-consent, missing data and attrition the percentage of students surveyed was lower than one would like. • The study was conducted in a large metropolitan area where the mobility rate is high. • One cohort moved from elementary school to middle school during the study. • The study used self-report measures which raises the possibility that method bias is contributing to the observed relations between the variables.

The role of social support and social networks in smoking behavior among middle and older aged people in rural areas of South Korea: A cross-sectional study	E Hwa Yun, Yoon Hwa Kang, Min Kyung Lim, Jin-Kyoung Oh, Jung Min Son	N = 1057	• There was a protective role of a moderate social network level among women, and a high level of social support was associated with smoking behaviours in rural areas. • Findings suggest the need for a comprehensive understanding of the functions and characteristics of social contextual factors including social support and social networks in order to conduct more effective anti-smoking interventions in rural areas.	Cross-sectional analysis	• Social norms, attitudes, and beliefs about smoking behaviour were not assessed. • The small number of women smoker to make a comparison with the influence of psychosocial factors. • Representativeness of the study subjects and generalization of findings is limited. • Some selection bias could also exist.

The Social Context of Adolescent Smoking: A Systems Perspective	Cynthia M. Lakon, John R. Hipp, and David S. Timberlake	N = 6504	• Findings suggest that networks and neighbourhoods in this system positively affected past-month smoking via flows of emotional support.	Longitudinal analysis	• The network elicitation items were limited in the number of friendship nominations. • Network data were not collected for the full national sample at wave 2 • The study restricted in the types of network variables, social processes, and outcomes available for analysis. • What constitutes a friendship tie is of note here because it is unclear whether there was uniformity in the strength, duration, and frequency of contact in friendship ties.

The social context of change in tobacco consumption following the introduction of 'smokefree' England legislation: A qualitative, longitudinal study	Katrina Hargreaves, Amanda Amos, Gill Highet, Claudia Martin, Stephen Platt, Deborah Ritchie, Martin White	N = 120	• Smoking behaviour was strongly influenced by the social networks in which smokers were embedded, indicating that, while individuals had the power to act, any changes they made were largely shaped by social structural factors. • Observations in a variety of community settings identified reduced smoking in public places post-legislation. • More than half of panel informants reported decreased consumption at one year post-legislation; a minority had quit, maintained or increased their smoking levels. • Findings support the need for a comprehensive tobacco control strategy that takes account of the complex array of contextual factors that constrain and enable smoking.	Longitudinal analysis	• This study was unable to include other geographically distinctive areas, including more rural areas in particular. • The study used purposive sampling strategy which resulted in a sample that failed to tap into some relevant views and behaviours within the population.

The social network, socioeconomic background, and school type of adolescent smokers	Chip Huisman and Jeroen Bruggeman	N = 961	• After controlling for assortative friendship selection, friends' smoking behaviour has a positive effect on the smoking behaviour of focal actors. • This preliminary result indicated that smoking behaviour of friends and previous smoking behaviour are relevant factors to investigate. • After controlling for friendship network effects in SIENA, no direct effects of parental educational level and school type on smoking behaviour.	Longitudinal analysis	• SIENA does not provide a model-fit, such as R2, making it difficult to compare outcomes with those of other statistical approaches, such as regression, in a clear-cut manner. • ''[. . .] the assumption of Markov chains implies that there are no systematic influences on the network and behavioural dynamics other than the influences implied by the effects in the model specification'' (Burk et al., 2007, p. 403). • Data were collected on second grade networks within the school, while it is possible that

			adolescents also pick up smoking habits from higher graders or outside the school. • Self-reported smoking prevalence is significantly underreported by respondents (Wagenknecht, Burke, Perkins, Haley, & Friedman, 1992). • The data is that the categories unknown and missing of the parental educational level variable added up to 37.8%. • Data were gathered in a rural area and in a small town. • Due to the nature of the data used to address this study's research question, the study cannot distinguish

between school location and school type effects appropriately.

The social support and social network characteristics of smokers in methadone-maintenance treatment	de Dios, Marcel Alejandro Stanton, Cassandra A. Caviness, Celeste M. Niaura, Raymond Stein, Michael	N = 193	• The findings characterize the social relationships of methadone-maintained smokers who have demonstrated an interest in quitting by entering a clinical trial. • Participants in the study were found to have relatively small social networks of less than three individuals (mean = 2.59). • Participants were found to have high levels of both general social support and tobacco quitting support within their small networks. • Approximately 57% of participants reported having a spouse/partner who smokes. • The study found a significant association between spouse smoking status and quitting self-efficacy. • Smoking cessation treatment intervention for smokers in methadone maintenance treatment that offer specific behavioural skills related to how to remain abstinent when interacting other smokers have the potential to improve outcomes.	Cross-sectional analysis	• The cross-sectional nature of the study limits the ability to make conclusions regarding causation and the stability of relationships over time. • The study relates to self-report bias regarding tobacco and other substance use. • The findings may not generalize to methadone-maintenance treatment smokers not seeking treatment for tobacco use, to light smokers (less than 10 cigarettes per day), or to opioid users not involved in methadone-maintenance treatment.

The Two Faces of Adolescents' Success With Peers: Adolescent Popularity, Social Adaptation, and Deviant Behavior	Joseph P. Allen, Maryfrances R. Porter, and F. Christy McFarland, Penny Marsh, and Kathleen Boykin McElhaney	N = 185	• Popular adolescents displayed higher concurrent levels of ego development, secure attachment, and more adaptive interactions with mothers and best friends. • Longitudinal analyses supported a popularity-socialization in which popular adolescents were more likely to increase behaviours that receive approval in the peer group (e.g., minor levels of drug use and delinquency) and decrease behaviours unlikely to be well received by peers (e.g., hostile behaviour with peers).	Longitudinal analysis	• Longitudinal change studies help eliminate some causal hypothesis even longitudinal data are not logically sufficient to establish causal relationships. • Popularity is only one marker of social adaptation in adolescence. The study used overall popularity rather than categorizations of young people into popular, neglected, controversial, and rejected groups as studies with younger children have sometimes done. • Although this study focused on a community sample of adolescents, it raises the possibility that youth who are

popular within more narrow and deviant subgroups might also be particularly susceptible to socializing influences by these more deviant peers.

- Although these data are longitudinal and multi-method, the period examined is relatively brief.
- These findings do not imply that popular adolescents are likely to engage in serious levels of deviant behaviour or even to maintain minor levels of deviance over long periods.

Time in the United States, social support and health behaviours during pregnancy among women of Mexican descent	Kim Harley and Brenda Eskenazi	N = 568	• After controlling for age at arrival in the U.S., maternal age, parity, education level, income, and feelings about the pregnancy, increasing social support was associated with decreased likelihood of smoking during pregnancy. • Being married was significantly associated with reduced likelihood of both smoking and drinking alcohol.	Longitudinal analysis	• The findings from an agricultural community may not be generalizable to all women of Mexican descent in California. • Because women receiving late or no prenatal care were not eligible for the study, the women at highest risk of poor pregnancy behaviours may have been excluded.

Time spent with friends who smoke and quit attempts among teen smokers	Daniel N. Jones, Jennifer R. Schroeder, Eric T. Moolchan	N = 98	• Among smokers who had at least one quit attempt, time spent with friends who smoke was inversely associated with the number of prior quit attempts but not with their duration, suggesting a potential relationship between an adolescent's affiliation with smoking peers, smoking identity, and fewer quit attempts.	Cross-sectional analysis	• The findings derive from a cohort of tobacco dependent adolescents enrolled in an outpatient study of smoking cessation treatment, and may not generalize to adolescents who are less dependent or not attempting cessation. • The length of only the first and the longest quit attempts were obtained, therefore, participants reporting two and three or more quit attempts could be reporting quit attempts that may not have reached a full 24-h duration. • These cross-sectional data preclude causal inferences regarding the influence of time

					spent with friends who smoke on frequency of quit attempts.
Tobacco smoking in urban neighborhoods: Exploring social capital as a protective factor in Santiago, Chile	Sapag, Jaime C. Poblete, Fernando C. Eicher, Caitlin Aracena, Marcela Caneo, Constanza Vera, Gloria Martínez, Mayra Hoyos, Rodrigo Villarroel,	N = 781	• The results suggest that people with high levels of trust in neighbours are less likely to smoke in low-income neighbourhoods of Puente Alto in the metropolitan area of Santiago, Chile.	Cross-sectional analysis	• The study used a cross-sectional design which does not allow for the detection of a causal relationship between social capital and tobacco consumption. • The sample means that it is not possible to generalize the results to broader settings, such as

	Luis Bradford, Elizabeth		low-income populations in nonurban areas. • The instrument used to measure social capital includes elements of the most widely utilized measurements for capturing social capital, it was not the objective of the current study to evaluate the validity or reliability of the instrument in this international setting.

Tobacco use among Norwegian adolescents: from cigarettes to snus	Willy Pedersen & Tilmann von Soest	N = 6217	• The SNU group reported the highest level of perceived social acceptance. • Non-daily smoking also decreased, but snus use more than doubled. • Smokers and snus users were characterized by more typical risk factors for substance use than non-users of tobacco in areas such as school grades, truancy, alcohol intoxication, cannabis use and unorganized leisure. • When comparing smokers and snus users, some differences included: snus users were better adjusted at school, they used cannabis less often and they were more often involved in sports.	Cross-sectional analysis	• The study used a cross-sectional design which does not allow for the detection of a causal relationship

Trajectories of Peer Social Influences as Long-term Predictors of Drug Use from Early Through Late Adolescence	Lei Duan, Chih-Ping Chou, Valentina A. Andreeva, Mary Ann Pentz	N = 1040	• Results showed that both perceived peer and friend cigarette use predicted own cigarette use within and across the adolescent years. • For own alcohol and marijuana use, peer and friend influences were limited primarily to middle school. • The findings suggest that strategies for counteracting peer and friend influences should receive early emphasis in prevention programs that are targeted to middle school. • The findings raise the question of whether cigarette use may represent a symbol of peer group identity that is unlike other drug use, and once formed, may have lasting adverse effects through the adolescent years.	Longitudinal analysis	• Data were based on self-reports and may include bias. • The study used weekly drug use, which has a somewhat low prevalence in middle and high school.

Two's up and poncing fags': young women's smoking practices, reciprocity and friendship	Fin Cullen	N = 36	• Notions branded 'cool', popularity and the need to participate in the demanding, reciprocal rules of girls' friendship maintained young women's smoking practices. • The informal trade allowed young women to carve out an exchange network, free from the involvement of the adult world • Girls' risk-taking, through smoking, drinking, drug-taking, sex or socialising, could be viewed as an enactment of newly found 'girl power'	Cross-sectional analysis	• Cross sectional design inhibits the ability to test causal pathways around smoking behaviours and cannot assess how smoking behaviours shift and interact with the community and their peers.

Understanding Latino Adolescent Risk Behaviors: Parental and Peer Influences	Jennifer C. Livaudais; Anna Napoles-Springer; Susan Stewart; Celia Patricia Kaplan	N = 480	• Findings reveal that both parents and peers are important influences on adolescent risk behaviours. • The results suggest that interventions for adolescents to prevent such behaviours should involve peers and parents.	Longitudinal analysis	• The study's limitations include the low response rate at baseline (26%), which may limit the generalizability of findings to other populations. • The data were based on self-report which may include bias. • Outcome were measured as having ''ever'' engaged in risk behaviours eg - smoking. • The analysis was not stratified by those who had engaged in targeted behaviours at baseline vs those who initiated during follow-up.

Understanding maternal smoking during pregnancy: Does residential context matter?	Carla Shoff, Tse-Chuan Yang	N = 3557625	• County social capital was associated with maternal smoking during pregnancy. • After accounting for both county and individual level covariates, strong social capital increased the likelihood of smoking during pregnancy. • The association of social capital and maternal smoking is moderated by rurality i. e.- among women who lived in rural counties, social capital seemed to reduce the risk of smoking during pregnancy.	Cross-sectional analysis	• Several individual-level measures that may be associated with maternal smoking during pregnancy such as employment status, income, and health insurance coverage were not included in the models as these measures were not included in the natality files. • Social capital is a complex concept to define. • The measure of rural status used in the study may only capture the ecological dimensions of rurality. • The causality between maternal smoking during pregnancy and the explanatory variables could not be established, due to the cross-

sectional design.

- The results of this study cannot be generalized to women from California, Hawaii, and Alaska, as well as women with information missing from their infant's birth certificates.
- The validity and reliability of data derived from information on birth certificates could potentially bias the results of this study.

Understanding the Association Between Authoritative Parenting and Adolescent Smoking	Brian C. Castrucci, and Karen K. Gerlach	N = 17287	• Authoritative parenting was associated with a more than three-fold increase (OR: 3.65, 99% CI: 2.87, 4.66) in the odds of believing parents' opinions about smoking are important. • When authoritative parenting is simultaneously considered with believing parents' opinions about smoking are important, authoritative parenting was no longer a significant correlate of adolescent current cigarette smoking, while believing parents' opinions about smoking are important was associated with a 45% reduction in the odds of adolescent current cigarette smoking.	Cross-sectional analysis	• Data used in these analyses were self-reported and smoking was not biologically confirmed. Self-reported data are susceptible to social desirability and recall bias. • Parenting style is one of a limited number of factors associated with adolescent current cigarette smoking solely within the control of parents.
Unraveling Smoking Ties: How Tobacco Use Is Embedded in Couple Interactions	The purpose of this research was to explore couple interactions related to tobacco use prior to pregnancy, as part of a larger grounded theory	N = 28	• Analysis of retrospective accounts of pre-index pregnancy interactions resulted in the identification of tobacco-related routines related to: regulation of smoking; practices related to the acquisition, use and handling of tobacco; communication about tobacco use; and responding to slips and lapses. • Variations in the enactment of routines were captured in three tobacco-related interaction patterns: disengaged; conflictual; and accommodating.	Cross-sectional analysis – qualitative	• The findings of this study are based on retrospective individual accounts of couples' pre-index pregnancy interactions. • The informants in this study were a unique sample of relatively well-educated couples where all dyads included women

	project focused on couple interactions related to tobacco use.	• Findings provide insights into the role tobacco plays in relationships and resistance to behaviour change.	who smoked prior to their index pregnancy. As a result, the findings may not be generalizable.

Variations in network boundary and type: A study of adolescent peer influences	Thomas W. Valentea,∗, Kayo Fujimotob, Jennifer B. Ungera, Daniel W. Sotoa, Daniella Meekerc	N = 1707	• The data indicated high correlations on in-degree and out-degree when the boundary condition varies from classroom to grade thus indicating that a student's position (as measured by degree) in a classroom network is similar to his/her grade level one. • This study indicates that degree centrality in classroom networks is strongly correlated with degree centrality in grade-level networks suggesting that students who are popular in their classrooms are also popular in their grade. • Data were presented on the agreement between perceived and self-reported behaviour which indicated considerable agreement for the approximately 50% of nominations that could be matched. • These data that the least constrained boundaries yield the strongest behavioural associations though the magnitude of such differences may be modest. • The results indicated that the friendship networks were consistently associated with behaviours whereas the other networks (admired, succeed, romantic, and popular) were not. • Naming popular peers at the grade	Cross-sectional analysis	• The study used a cross-sectional design which does not allow for the detection of a causal relationship

level (but not at classroom) who smoke and drink was associated with smoking and drinking.

- These results support using friendship as the most relevant network relationship for understanding adolescent risk behaviour. This suggests that friendships may be avenues of influence whereas other relations are not.
- Adolescents have relationships and may even select relationships, on a complex set of attributes distinct from the risk behaviours measured in this study. For example, students may admire and respect others who are behaviourally heterogeneous.

Why is lone motherhood so strongly associated with smoking?	Siahpush M.	National Health Survey N = 547 lone mothers N = 8218 all mothers National Drug Strategy Survey N = 1,035 lone mothers N 10498 all mothers	• Mental health, proportion of friends who smoke and age of smoking initiation had strong associations with smoking status. After controlling for these factors, the odds of being a smoker among lone mothers were still twice those of mothers with partners (OR 2.1, 95% CI 1.7-2.7). • Improving the socio-economic status, mental health and the social environment of lone mothers could help reduce their high smoking prevalence. However, much of the effect of being a lone mother remains even after controlling for these factors.	Cross-sectional analysis	• The cross-sectional nature of the data limits the ability to make causal inferences. • The data were based on self-report which may include bias.

Why smoking prevention programs sometimes fail: does effectiveness depend on sociocultural context and individual charateristics	Johnson CA, Cen S, Gallaher P, Palmer PH, Xiao L, Ritt-Olson A, Unger JB.	N = 3157	• Prevention program effects can vary by combination of program content, social setting, and individual dispositional characteristics. • The results suggest that prevention program design and implementation should be sensitive to population characteristics at both the individual and sociocultural levels.	Longitudinal analysis	• The nonlinear three-way interactions resulted from relatively new exploratory analytic methods. • These results are based on adolescents' self-reports of their smoking behaviour and may include bias. • These findings may not be generalizable due to students who did not obtain parental consent or attrition.
Why Would Social Networks Be Linked to Affect and Health Practices	Sheldon Cohen, Edward P. Lemay	N = 193	• Between-subjects analyses found that those with more diverse social networks (high in social integration) interacted with more people and smoked and drank less. • Social integration was not, however, associated with affect. In contrast, within-subject analyses found that the more people participants interacted with during a day, the greater their positive affect,	Longitudinal analysis	• Causal inferences are not possible as the analyses were concurrent. • It is also possible that unspecified third (spurious) factors were responsible for changes in both variables, but were

			drinking, and smoking on that day. However, this occurred primarily for persons low in social integration. • High- social integration persons reported high positive affect irrespective of the number of people with whom they interacted, and their smoking and drinking behaviours were less influenced by number of interactants. • Social integration may alter health because it affects responsiveness to the social influences of others.		not accounted for such as age, gender, race, and an array of social and psychological variables.
Willingness of cancer patients to help family members to quit smoking	Yolanda I. Garces, Christi A. Patten, Pamela S. Sinicrope, Paul A. Decker, Kenneth P. Offord, Paul D. Brown, Matthew M. Clark, Teresa A. Rummans, Robert L. Foote and Richard D. Hurt	N = 114	• Over half of the respondents 114 (54%) reported having someone close to them (family member or friend) smoking cigarettes who they thought should quit. Of these respondents (44 females, 70 males) 78% (89/114) reported they were definitely or probably interested in helping a smoker quit. • Nearly all respondents wanted to help a family member (typically an adult child). • Results suggest the potential feasibility of engaging cancer survivors to help family members quit smoking.	Cross-sectional analysis	• Limitations of the study include the small sample size and lack of control group. • The lack of diversity in the sample also means that the study may not be generalizable.

Women and tobacco control policies: Social-structural and psychosocial contributions to vulnerability to tobacco use and exposure	Lorraine Greaves and Natalie Hemsinga	• Gendered roles and responsibilities influence partner dynamics regarding tobacco use, and can result in a double-standard when women, but not men, are expected to quit smoking during pregnancy and postpartum. • Rather than viewing pregnancy as an opportunity for both the female and male partner to reduce or quit smoking, some evidence from focus groups revealed that male partners set a double standard. For example, the male partner continued to smoke. • Partners may use economic and verbal abuse, isolation, intimidation and children as strategies of power and control to influence pregnant or postpartum women's tobacco reduction. • For some couples, tobacco reduction in pregnancy is associated with heightened conflict and increased vulnerability to abuse for women.	Literature Review	• The results of this review study might not be generalizable to racial/ethnic minority students because the reviewed studies did not report data by race/ethnicity. • Analyses reviewed were generally cross sectional and may include bias.

Women's perceptions of support from partners, family members and close friends for smoking cessation during pregnancy-combining quantitative and qualitative findings	K. A. Thompson, K. P. Parahoo, N. McCurry, E. O'Doherty and A. M. Doherty	N = 69 surveys N = 15 interviews	• The interviews revealed that this support was 'potential' rather than 'real' and that the partners mostly made 'token gestures' such as smoking outside. • None of the interviewed respondents reported receiving help in educating their partner/family about the risks of active and passive smoking, thus reducing the potential positive role they could play in smoking cessation. • While health professionals are aware of the important role the partner/family may play in successful smoking cessation interventions, these significant others are generally not involved.	Longitudinal analysis mixed method (qualitative and quantitative)	• The results of this review study might not be generalizable • Self-reported data are susceptible to social desirability and recall bias.
Work factors as predictors of smoking relapse in nurses' aides	Willy Eriksen	N = 1373 at baseline N = 1203 at follow up	• A poor social climate in the work unit and frequent exposure to threats and violence at work may be predictors of smoking relapse in nurses' aides. • It is essential that leaders in the health services put more emphasis on creating a supportive, relaxed, and trustful social climate in the work unit. • It is also important that protective measures against violent patients are implemented, and that occupational health officers offer victims of violence appropriate	Longitudinal analysis	• Response rate in the first data collection was only 62%, attrition between baseline and follow-up was only 12%. • Self-reported data may also include some bias.

support or therapy.

Youth Crowds and Substance Use: The Impact of Perceived Group Norm and Multiple Group Identification	Kirsten T. Verkooijen, Nanne K. de Vries and Gert A. Nielsen	N = 1425 Subgroup 1 N = 895 Subgroup 2 N = 339 Subgroup 3	• The results showed that identification with the pop, skate/hip-hop, techno, and hippie subgroups was associated with higher risks of substance use, whereas identification with the sporty, quiet, computer nerd, and religious subgroups was associated with lower risks. • Perceived group norm mediated the group identity–substance use relationship. • Identification with multiple groups with corresponding norm increased norm consistent substance use, whereas identification with multiple groups with opposing norms reduced normative behaviour.	Cross-sectional analysis	• The study relies on self-report data, and as a result the results may reflect some degree of response bias. • The cross-sectional nature of this study does not permit conclusions about the causal direction of the observed associations.

Appendix iv: Social Networks and Tobacco Use: A Systematic Review — Supplementary Table 2

Title	Author/s	Participants	Interventions	Outcomes
The development and implementation of a peer-led intervention to prevent smoking among secondary school students using their established social networks	Suzanne Audrey, Kathleen Cordall, Laurence Moore, David Cohen and Rona Campbell	N = 10734 all students in trial N = 835 peer supporters N = 5358 year 8 intervention schools	Approximately 15 per cent of students identified by their peers as being influential within the school were trained to intervene in everyday situations and encourage their fellow students not to smoke. Peer supporters received two days of intensive training from a team of trainers led by professional health educators at training venues and four follow-up sessions back at school.	• Retention of peer supporters throughout the ten-week intervention period was high. • Eighty two per cent (687 of 835) of students who consented to act as peer supporters completed the programme and fulfilled the role. • The costs of implementing this programme were sizeable but, if effective, it could yield substantial long-term health gains and contribute to a reduction in health inequalities
Randomized Trial of a Parent Intervention	Bonita Stanton, MD; Matthew Cole, MA; Jennifer Galbraith, PhD; Xiaoming Li, PhD; Sara Pendleton, MD; Lesley Cottrel, PhD; Sharon Marshall, MD; Ying Wu, PhD; Linda Kaljee	N = 817	All youth participated in FOK, an 8-session, theory-based, small group, face-to-face risk reduction intervention. In total, 496 youth and parents received the 1-session ImPACT intervention (a videotape and discussion), and 238 of the ImPACT youth also received four 90-minute FOK boosters delivered in small groups.	• After adjusting for the intraclass correlation coefficient, 6 of 16 risk behaviours were significantly reduced among youth receiving ImPACT compared with youth who only received FOK (respectively, mean number of days suspended, 0.65 vs 1.17; carry a bat as a weapon, 4.1% vs 9.6%; smoked cigarettes, 12.5% vs 22.7%; used marijuana, 18.3% vs 26.8%; used other illicit drugs, 1.4% vs 5.6%; and, asked sexual partner if condom always used, 77.9% vs 64.9%). • Four of the 7 theory-based subscales reflected significant protective changes

	among youth who received ImPACT. • A parent monitoring intervention can significantly broaden and sustain protection beyond that conferred through an adolescent risk-reduction intervention.

Psychosocial predictors of smoking trajectories during middle and high school	Lorien Abroms, Bruce Simons-Morton, Denise L. Haynie & Rusan Chen	N = 1320	Treatment schools were exposed to the Going Places Problem Behavior Prevention Program designed to increase social skills and prevent multiple problem behaviours. This included smoking and substance use.	• Overall, being female, having friends who smoked, deviance acceptance and outcome expectations were associated with an increased likelihood of being an intender, delayed escalator, early experimenter and early user compared to a never smoker. • Comparisons with never smokers revealed unique identifiers for intenders, early experimenters and early users, but not delayed escalators. • There is much heterogeneity in the manner in which middle schoolers progress from having no intention of smoking to becoming smokers.

Proactive recruitment of cancer patients' social networks into a smoking cessation trial	Lori A. Bastian, Laura J. Fish, Bercedis L. Peterson, Andrea K. Biddle, Jennifer Garst, Pauline Lyna, Stephanie Molner, Gerold Bepler, Mike Kelley, Francis J. Keefe and Colleen M. McBride	N = 496	Lung cancer patients from four sites voluntarily complete a survey enumerating their family members and close friends who smoke, and providing permission to contact these potential participants. Family members and close friends identified as smokers were interviewed and offered participation in a smoking cessation intervention.	• Proactive recruitment of smokers in the social networks of lung cancer patients is challenging. • Enlisting immediate female family members and friends, who live close to the patient as agents to proactively recruit other network members into smoking cessation trials could be used to extend reach of cessation interventions to patients' social networks. • Further consideration should be given to the appropriate timing of approaching network smokers to consider cessation.

Peer acceleration - effects of a social network tailored substance abuse prevention program among high-risk adolescents	Thomas W. Valente, Anamara Ritt-Olson, Alan Stacy, Jennifer B. Unger, Janet Okamoto & Steve Sussman	N = 541	A classroom randomized controlled trial comparing control classes with those receiving an evidence-based substance use prevention program: Towards No Drug Abuse; and Towards No Drug Abuse Network - a peer-led interactive version of Towards No Drug Abuse. Towards No Drug Abuse and the Network are both 12-session programs delivered over a 3–4-week period. Sixteen health educators were trained by program staff to teach Towards No Drug Abuse and the Network. The curricula were delivered to 47 classes over a 9-month period to at least 840 students.	• Towards No Drug Abuse Network was effective in reducing substance use. • The program effect interacted with peer influence and was effective mainly for students who had peer networks that did not use substances. • Students with classroom friends who use substances were more likely to increase their use. • A peer-led interactive substance abuse prevention program can accelerate peer influences. • For students with a peer environment that supports non-use, the program was effective and reduced substance use. • For students with a peer environment that supports substance use, an interactive program may have deleterious effects.
Parental and peer influences on teen smoking: Are White and Black families different?	Martie L. Skinner , Kevin P. Haggerty, & Richard F. Catalano	N = 331	Parents Who Care was a preventive intervention to reduce substance abuse in adolescence. Parents Who Care was a family-based primary prevention intervention targeted at establishing guidelines and consequences for smoking and for associating with peers who use substances and are involved in other problem behaviours before they are present.	• Several factors affected both groups: (a) parenting factors reduced association with deviant peers, (b) association with deviant peers increased the risk of smoking in the 10th grade, and (c) teens were more likely to smoke if their parents smoked. • Reduced smoking among Black teens compared with White teens may be due to the protection of clear parental guidelines about substance use and clearly stated consequences for failure to observe those guidelines.

Over time relationships between early adolescent and peer substance use	Bruce Simons-Morton, Rusan S. Chen	N = 2453	Students in the treatment schools were exposed to the Going Places Program. The Program consisted of parent education in the form of materials sent home, school media, and a social skills curriculum designed to increase school engagement and prevent multiple problembehaviours, including: substance use; aggression; and anti-social behaviour. The curriculum consisted of 18 class sessions in the 6th grade, 10 in the 7th grade, and 6 in the 8th age.	• Initial substance use predicted an increase in the number of substance using friends over time, indicating an effect of selection, and the initial number of substance using friends predicted substance use progression, providing evidence of socialization. • The magnitudes of these relationships were similar. Bivariate, lagged autoregressive analyses of the successive relationships from one assessment to the next showed consistent, significant associations from peer use to adolescent substance use. • The association from adolescent to peer use was significant only from 7th to 8th grade. • The findings provide evidence of reciprocal influences, but socialization was a more consistent influence than selection.
Online Social and Professional Support for Smokers Trying to Quit: An Exploration of First Time Posts From 2562 Members	Peter Selby, Trevor van Mierlo, Sabrina C Voci, Danielle Parent, and John A Cunningham,	N = 16764	StopSmokingCenter.net version 5.0, a Web-assisted tobacco interventions (WATIs) equipped with an online social support network moderated by trained program health educators that was operational from November 6, 2004, to May 15, 2007.	• Peer responses to new users were rapid, indicating that online social support networks may be particularly beneficial to smokers requiring more immediate assistance with their cessation attempt. This function maybe especially advantageous for relapse prevention. • Accessing this kind of rapid in-person support from a professional would take an inordinate amount of time and money.

				• Further research regarding the effectiveness of WATIs with online social support networks is required to better understand the contribution of this feature to cessation, for both active users (posters) and passive users ("lurkers") alike.
It's good to talk: Adolescent perspectives of an informal, peer-led intervention to reduce smoking	Suzanne Audrey, , Jo Holliday, Rona Campbell	N = 10730	Influential Year 8 students, nominated by their peers, were trained to intervene informally to reduce smoking levels in their year group.	• The ASSIST peer nomination procedure was successful in recruiting and retaining peer supporters of both genders with a wide range of abilities. • Outcome data at 1-year follow-up indicate that the risk of students who were occasional or experimental smokers at baseline going on to report weekly smoking at 1-year follow-up was 18.2% lower in intervention schools. • Qualitative data from the process evaluation indicate that the majority of peer supporters adopted a pragmatic approach, concentrating their attentions on friends and peers whom they felt could be persuaded not to take up smoking, rather than those they considered to be already 'addicted' or who were members of smoking cliques. • ASSIST demonstrated that a variety of school-based peer educators, who are asked to work informally rather than under the supervision of teaching staff, will engage with the task they have been asked to undertake and can be

				effective in diffusing health-promotion messages.
Increasing support for smoking cessation during pregnancy and postpartum - results of a randomized controlled pilot study	Deborah Hennrikus, Phyllis Pirie, Wendy Hellerstedt, Harry A. Lando, Jeanne Steele, Caroline Dunn	N = 82	The resulting dyads were randomized to either intervention (n=54) or control (n=28) conditions. Supporters of intervention subjects received monthly contacts from a counselor about providing effective support; supporters in the control condition were not contacted. Interviews with subjects and supporters were conducted at baseline, end of pregnancy and three months postpartum. The single counseling session with subjects was completed for 48 (89%) intervention subjects and 24 (86%) control subjects. Session length ranged from 15 to 75 minutes. At least one counseling session was completed with 51 (91%) of the intervention group supporters. For those who had at least one session, the number of sessions ranged from one to six. Intervention contacts with supporters	• Increasing the frequency and quality of support from a woman in the smoker's social network is a promising prenatal smoking cessation strategy. • Increasing support from a female friend or family member is a promising prenatal smoking cessation strategy. • The difference in continued smoking between the intervention and control groups at the end of pregnancy compares well to the difference between groups typically seen in trials of pregnancy smoking interventions (Lumley et al., 2004; Fiore et al., 2008). • 53% of the low-income women eligible for the study consented to participate, confirming that pregnancy is a time when smokers are willing to accept help to quit smoking.

	occurred less frequently than the planned monthly intervals because of difficulties reaching supporters.	

Impacts of a support intervention for low-income women who smoke	Miriam J. Stewart, Kaysi Eastlick Kushner, Lorraine Greaves b, Nicole Letourneau c, Denise Spitzer, Madeline Boscoe	N = 44	Based on the support preferences identified in the initial assessment phase, the intervention was designed to include two components: a facilitated support group; as well as one-to-one support from a mentor. The support group was held once a week fortwo to three hours. The intervention was designed to range from12 to 16 weeks. The groups were facilitated by experienced professionals and peers (former smokers). The groups primarily offered information, affirmation and emotional support. Groups averaged five participants and were conducted in accessible community centers and settings familiar to the women. Childcare and meals were provided at all sessions and transportation was offered. Lack of pressure, non-judgmental attitudes, and holistic and participatory approaches in groups were emphasized. Some participants connected with a buddy in the group who telephoned them or walked them home from group sessions. Education was provided through handouts, DVDs, and verbal information on smoking cessation and alternatives to smoking; stages of	• The intervention exerted positive impacts on smoking reduction/cessation, social networks, coping, and health behaviours. • Participants reported satisfaction with the intervention. Quantitative data revealed significant decreases in temptation to smoke and number of cigarettes smoked, and significant increases in instrumental support seeking, eating breakfast, and breathing exercises. • Moreover, non-significant trends in increased social network size and decreased loneliness were promising. • Findings derived from a participatory approach support the use of the peer/mentor model to deliver a support intervention with low-income women.

	change; and effects of smoking on health. Pack diaries recording the amount smoked weekly were used to increase awareness of smoking habits. The women recorded their smoking experiences and how these affected their life and health. One session devoted to nutrition was facilitated by a nutritionist and included on-site meal preparation and cookbook distribution. Other topics in all groups included self-esteem and emotion management. Relaxation, visualization and breathing exercises were an important component of the program. Moreover, activities preferred by group members and group walks were integrated to promote supportive relationships, alternative coping strategies other than smoking, self-care, and self-esteem. Yoga was practiced in at least one session of all groups. Crafts were used in all groups to facilitate communication and smoking reduction by keeping women's hands busy. At the end of each session, women selected items such as needlepoint, candles, or lotion from a self-care basket. Peers and professionals were screened, selected, and prepared as	

intervention agents.

Enabling Parents Who Smoke to Prevent Their Children From Initiating Smoking	Christine Jackson; Denise Dickinson	N = 873 at baseline N = 776 at follow up (3 years post baseline)	During 3 months, the intervention group (n=371) received 5 printed activity guides, parenting tip sheets, child newsletters, and incentives; this group also received a booster activity guide 1 year later. The control group (n=405) received fact sheets about smoking.	• Children in the pre-initiation phase of smoking who receive antismoking socialization from their parents are less likely to initiate smoking, even if their parents smoke.

Effects of partner smoking status and gender on long term abstinence rates of patients receiving smoking cessation treatment	Paula Manchón Walsh, Paloma Carrillo, Gemma Flores, Cristina Masuet, Sergio Morchon, Josep Maria Ramon	N = 1516	During this period, 2123 smokers visited the unit and received treatment for smoking cessation (70.0% with nicotine patches for nicotine replacement therapy (NRT), 13.5% with nicotine gums for NRT, 6.3% patches plus gums for NRT, 5.3% anxiolytics, 3.6% antidepressants (mainly bupropion, from the year 2000 onwards) and 0.6% antidepressants plus some type of NRT). The treatment was determined in relation to the subject's characteristics and on the basis of cognitive-behavioural counseling and pharmacological therapy. Once treatment was initiated, follow-up visits were arranged every 15days during the first 2months and then at intervals of 3, 6, 9 and 12months. The process of cessation was assessed in every visit (presence of withdrawal symptoms, relapse, adverse effects of pharmacological therapy and exhaled CO).	• Having a smoking partner is a determinant of relapse 1year after the beginning of the cessation program. • Interacting not just with the smoker, but also with his or her partner, could neutralize interpersonal influences making smokers more accessible to behavioural and pharmacological techniques

Dyadic Efficacy for Smoking Cessation: Preliminary Assessment of a New Instrument	Katherine Regan Sterba, Vance Rabius, Matthew J. Carpenter, Pamela Villars, Dawn Wiatrek, & Alfred McAlister	N = 634	The sample was restricted to Quitline callers who were: • living with someone they considered to be their partner; • aged 18 years or older; • currently smoking cigarettes daily (any amount); and • willing to complete a 10-min survey.	• The role of partner relationships in smoking cessation may be better understood through dyadic efficacy.
Childhood friends who smoke: Do they influence adolescents to make smoking transitions	Jonathan B. Bricker, Arthur V. Peterson Jr., M. Robyn Andersen, K. Bharat Rajan, Brian G. Leroux and Irwin G. Sarason	N = 4744	The intervention was an enhanced social-influences (i.e., theory-based) curriculum containing all 15 "essential elements" of school-based and curriculum-driven smoking prevention programs developed by the National Cancer Institute and endorsed as best practices guidelines by the Centers for Disease Control and Prevention. These elements were infused into a curriculum that was developmentally specific for each year from grade 3 through grade 10 and that was intended to address multiple putative stages of smoking acquisition. Consequently, the intervention started early enough (3rd grade) to be	• Results provide new evidence suggesting that childhood close friends who smoke influence not only initiation but also escalation of adolescents' smoking. • Results confirmed the important role of parents' smoking. • Targeting both childhood close friends' and parents' smoking would be valuable in prevention research.

	considered primary prevention. The number of hours of intervention to which students were exposed was 46.75, much more than the 30 hours for Life Skills Training, the curriculum touted as the most effective social-influences program.	

Changes in the influence of parents' and close friends' smoking on adolescent smoking transitions	Jonathan B. Bricker Arthur V. Peterson Jr., Irwin G. Sarason a,c, M. Robyn Andersen, K. Bharat Rajan	N = 6006	The intervention was an enhanced social-influences (i.e., theory-based) curriculum containing all 15 “essential elements” of school-based and curriculum-driven smoking prevention programs developed by the National Cancer Institute and endorsed as best practices guidelines by the Centers for Disease Control and Prevention. These elements were infused into a curriculum that was developmentally specific for each year from grade 3 through grade 10 and that was intended to address multiple putative stages of smoking acquisition. Consequently, the intervention started early enough (3rd grade) to be considered primary prevention. The number of hours of intervention to which students were exposed was 46.75, much more than the 30 hours for Life Skills Training, the curriculum touted as the most effective social-influences program.	• Results showed that the influence of parents' smoking was substantial for all three transitions during most of the grade periods and, for the transition from monthly to daily smoking, increased during adolescence. • The influence of close friends' smoking was strongest for the transition to trying smoking and did not significantly change for any of the smoking transitions as the adolescent became older. • The influence of close friends' smoking on smoking transitions might be stable during adolescence whereas the influence of parents' smoking on the transition to daily smoking might markedly increase across adolescence.

Challenges to the peer influence paradigm - Results for 12–13 year olds from six European countries from the European smoking prevention framework approach study	H de Vries, M Candel, R Engels, L Mercken	N = 7102	Experimental regions would execute the European Smoking prevention Framework Approach (ESFA), while control regions would provide usual care. It included activities on four levels: adolescents, schools, parents and out-of-school activities.	• No support was found for peer smoking as an important predictor of smoking onset in most countries. • Support was found for the selection paradigm, implying that adolescents choose friends with similar smoking behaviour. • Support for the impact of parents on adolescent behaviour and the choice of friends was also found. • Smoking uptake in this age cohort may be more strongly influenced by personal and parental influences than initially believed. • Social inoculation programmes teaching youngsters to resist the pressures to smoke may be less appropriate if youngsters have a positive attitude towards smoking, associate smoking with various advantages and look for peers with similar values.
Actor-based analysis of peer influence in A Stop Smoking In Schools Trial (ASSIST)	Christian Steglicha, Philip Sinclair, Jo Holliday, Laurence Moore	School A: N = 158 (baseline); N = 158 (follow up); and N = 156 (follow up). School B: N = 191 (baseline); N = 189 (follow up); and N = 185	A schoolbased, peer-led intervention, in which a subsample of the students were given (school-external) training on how to use their informal relationships at school to discourage their peers from smoking.	• The co-evolution of friendship and smoking is a time heterogeneous process, and that results are sensitive to specification details. However, the peer influence parameter is not affected by either, but emerges as surprisingly stable over time and robust to model variation. This establishes confidence in the method and encourages detailed future investigations of peer influence in

	(follow up). School C: N = 247 (baseline); N = 244(follow up); and N = 244 (follow up).	ASSIST. • All results demonstrated robust evidence of friends' influence on adolescents' smoking, even after controlling for various sources of friendship selection. This encourages the use of SAB modelling in more detailed further investigations of factors potentially affecting peer influence in the school context

A Network Method of Measuring Affiliation-based Peer Influence: Assessing the Influences of Teammates' Smoking on Adolescent Smoking	Kayo Fujimoto, Jennifer B. Unger, and Thomas W. Valente	N = 3137 baseline N = 2602 remained until the one-year follow-up survey N = 2186 remained until the two-year follow-up survey.	Eight of the 24 schools were randomly assigned to a control condition and did not complete the social network surveys. Social network data were collected from the remaining 16 schools (consent rate was 77%).	• Adolescents may be influenced to smoke by observing their sports teammates smoke and this tendency might be stronger among girls. • Results indicate that being exposed to teammate smokers of the same gender was significant only for girls, and these effects were stronger for girls-only boundary specification. • Results lend additional support for the validity of affiliation exposure.

A Family-Focused Randomized Controlled Trial to Prevent Adolescent Alcohol and Tobacco Use: The Moderating Roles of Positive Parenting and Adolescent Gender	Deborah J.Jones, Ardis L. Olson, Rex Forehand, Cecelia A. Gaffney, J.j. Bau	N = 1235 in substance use group N = 918 in control group	The role of physicians in this study was to educate families about risks associated with substance use (prevention program) or lack of safety (control group), encourage family communication about the risks, and to encourage families to establish policies and engage in activities that would prevent risky behaviour. At the initial visit, participating families agreed to discuss the target risk behaviours and to develop a family policy about those behaviours. Parent, child, and clinician signed a "family contract" which stated that the family would discuss the prevention program at home and develop a family policy regarding the target behaviour (e.g., policy regarding risk behaviour, consequences for violating policy). Depending on the practice's ran domization status, alcohol, smoking, and smokeless tobacco use (substance use prevention group) or bicycle helmet, car seatbelt, and gun safety (safety control group) were the risk behaviours identified and targeted. The prevention program was further supported by three sets of materials mailed to families: brochures focusing on effective communication; annual reminders (e.g., card game, magnets and pens with prevention program	• Findings revealed no main effect of the prevention program. • Positive parenting and adolescent gender were moderators of internalizing problems and adolescent gender was a moderator of externalizing problems.

	messages); and separate quarterly newsletters for parents and adolescents with role-appropriate information and messages. The communication skills emphasized in each newsletter were identical in the prevention and control conditions. Newsletters were mailed quarterly during each of the 3 years of the prevention program.	

Appendix v: Ethics approval documentation

UNIVERSITY OF CANBERRA
AUSTRALIA'S CAPITAL UNIVERSITY

28 September 2012

APPROVED - Project number 12-163

Mr Raglan Maddox
Faculty of Health
University of Canberra
Canberra ACT 2601

Dear Raglan,

The Human Research Ethics Committee has considered your application to conduct research with human subjects for the project **Tobacco Control For Indigenous Australians.**

Approval is granted until 02/12/2014, the anticipated completion date stated in the application.

The following general conditions apply to your approval.

These requirements are determined by University policy and the ***National Statement on Ethical Conduct in Human Research*** (National Health and Medical Research Council, 2007).

Monitoring:	You, in conjunction with your supervisor, must assist the Committee to monitor the conduct of approved research by completing and promptly returning project review forms, which will be sent to you at the end of your project and, in the case of extended research, at least annually during the approval period.
Discontinuation of research:	You, in conjunction with your supervisor, must inform the Committee, giving reasons, if the research is not conducted or is discontinued before the expected date of completion.
Extension of approval:	If your project will not be complete by the expiry date stated above, you must apply in writing for extension of approval. Application should be made before current approval expires; should specify a new completion date; should include reasons for your request.
Retention and storage of data:	University policy states that all research data must be stored securely, on University premises, for a minimum of five years. You must ensure that all records are transferred to the University when the project is complete.
Contact details and notification of changes:	All email contact should use the UC email address. You should advise the Committee of any change of address during or soon after the approval period including, if appropriate, email address(es).

Please add the Contact Complaints form (attached) for distribution with your project.

Yours sincerely
Human Research Ethics Committee

Hendryk Flaegel
Ethics & Compliance Officer
Research Services Office
T (02) 6201 5220 F (02) 6201 5466
E hendryk.flaegel@canberra.edu.au

www.canberra.edu.au
Postal Address:
University of Canberra ACT 2601 Australia
Location:
University Drive Bruce ACT
Australian Government Higher Education Registered Provider Number (CRICOS): 00212K

ACT Government Health Directorate
Human Research Ethics Committee

Mr Raglan Maddox
Innovation Centre
Building 22 Level 2 Room 30
University of Canberra
University Drive
Bruce ACT 2601

Dear Mr Maddox

ETH.10.12.232

The ACT Health Human Research Ethics Committee considered the proposed:

Tobacco Control for Indigenous Australians at its meeting of 5 November 2012.

I am pleased to inform you that, following further correspondence, your application has been approved.

Approval includes:

- Ethics Application
- Focus Group Participant Information and Consent Form – Version Received November 2012
- Survey Participant Information and Consent Form – Version Received October 2012
- Interview Participant Information and Consent Form – Version Received October 2012
- Parent/Guardian Information Sheet – Version Received October 2012
- Survey Parent/Guardian Information Sheet – Version Received October 2012
- Interview Parent/Guardian Information Sheet – Version Received October 2012
- Participant consent form – Version Received October 2012
- Parental/Guardian Consent Form for Participation in Research – Version Received October 2012
- Questionnaire for people who do not smoke – Version Received October 2012
- Questionnaire for people who smoke – Version Received October 2012
- Focus group guide – Non-smokers – Version Received October 2012
- Focus group guide – Smokers – Version Received October 2012
- Key informant interviews: ex-smokers and non-smokers – Version Received October 2012

Appendix vi: The Smoke Ring: preliminary survey results

The Smoke Ring: preliminary survey results

ACT Aboriginal and Torres Strait Islander
Tobacco Control

Raglan Maddox
Centre for Research and Action in Public Health
Faculty of Public Health
University of Canberra
May 2013

Which way - which path will you take?

This artwork is by Lorraine Webb, a Wiradjuri and Ngunnawal woman from Cowra, New South Wales. The artwork represents the community reaching for good health and wellbeing. The footprints pose the question 'Which way – which path will you take?' Questioning attitudes, beliefs and behaviours about smoking and being smoke free. Good health and wellbeing is represented in the center by the community upholding a healthy heart.

www.winnunga.org.au

www.health.act.gov.au

Acknowledgments

I would like to acknowledge and thank *Winnunga Nimmityjah Aboriginal Health Service* the *Aboriginal and Torres Strait Islander community* for their feedback, support, participation, time and willingness to contribute to the process. Behind these preliminary results, is the care, time and effort taken by over 200 participants who have completed a fairly long survey of a personal nature. This personal effort demonstrates community concern and the importance of health and services in the region.

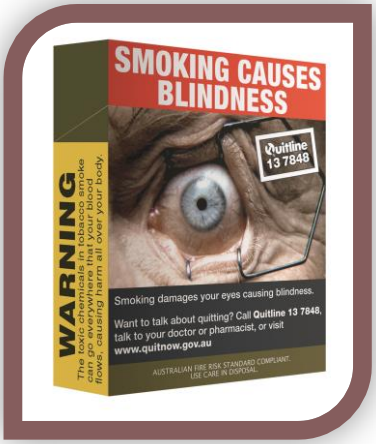
I would also like to acknowledge and thank Lorraine Webb for her time and effort to contribute the artwork titled *'Which way – which path will you take?'*

I would also like to acknowledge and thank Michelle McAulay for her time and effort to contribute her photography and Rachel Davey, Tom Cochrane, Joan Corbett, Ray Lovett, Anke van der Sterren, for their time, input and expert advice.

I also declare that the finding in the Report reflect my own personal views based on the survey findings and relevant evidence. In no way does this report reflect the views of any personal relationships, affiliations or associations that I have which may give rise to any actual or perceived conflict of interest.

The PhD scholarship at the University if Canberra is funded by the *ACT Government* under the ACT Aboriginal and Torres Strait Islander Tobacco Control Strategy.

Executive Summary



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The Smoke Ring – preliminary results have been prepared to inform the community of the preliminary survey findings regarding Aboriginal and Torres Strait Islander tobacco control in the Australian Capital Territory (ACT) region. This report provides an overview of smoking behaviours among the Aboriginal and Torres Strait Islander population in the region in 2012-13.

Tobacco smoking is a significant contributor to poor health outcomes for Aboriginal and Torres Strait Islander people, accounting for approximately 20% of Aboriginal and Torres Strait Islander deaths nationwide (2, 3). The Smoke Ring study includes a survey, key informant interviews and focus groups; providing a mechanism for Aboriginal and Torres Strait Islander people to evaluate and inform programs and services for their needs.

Survey distribution

This report presents the preliminary results from the first wave of a survey targeting Aboriginal and Torres Strait Islander people in the ACT region. To explore a broad cross section of the Aboriginal and Torres Strait Islander community in the ACT, a diverse sample of participants completed the Survey (n = 204). The sample size of 204 participants is sufficient to detect a difference between smoking status and a range of variables presented in this analysis.

Participants ranged in age, gender, marital status, socioeconomic status, household size and smoking status as detailed in the report. The self-reported pen and paper and online smoking survey was piloted in November 2012 and closed on Friday, 31 May 2013. The Survey data collection was undertaken at community events and facilitated through Winnunga Nimmityjah Aboriginal Health Service (Winnunga) where possible and where appropriate. The Survey was widely circulated through numerous Aboriginal and Torres Strait Islander online networks.

Analysis

In describing and examining factors and their associations, data was aggregated and entered in SPSS and Microsoft Excel for statistical analysis. Analysis incorporates common descriptive statistics, and analysis of variance and χ^2 tests to explore significant differences.

Smoking behaviour

- Aboriginal and Torres Strait Islander respondents reported that 36.4% (95% CI, 27.8–44.9) (28.6%; 95% CI, 12.2–45.0 of males and 39.2%; 95% CI, 27.8–50.6) of females) were smokers.
- 95% (95% CI, 91.2–98.1) of participants aged 12 and over find it ‘very easy’ or ‘fairly easy’ to get tobacco.
- Of all respondents, 19% (95% CI, 12.9–24.4) had never ‘tried smoking or other forms of tobacco’ and 8% (95% CI, 3.2–12.1) of participants who had ‘tried smoking or other forms of tobacco’ had never smoked a full cigarette. This included 21% (95% CI, 14.5–28.6) of Aboriginal and Torres Strait Islander respondents who had never ‘tried smoking or other forms of tobacco’ and 8% (95% CI, 3.5–15.9) had never smoked a full cigarette.

- Respondents indicated that 41% of current smokers could not cut back or quit, while 92% (95% CI, 88.3–99.5) of smokers would like to stop smoking.
- There was a significant difference between being a current smoker (62.5%) and completing Year 12 or equivalent (χ^2 = 11.087, p<0.01). An Aboriginal and Torres Strait Islander participant who completed Year 12 or equivalent was 4.6 (95% CI, 2.1–10.2) times more likely[1] to be a non-smoker than a smoker—this may suggest that smoking will decline with increased education and the improving completion rate of Year 12;
- There was generally low levels of nicotine dependence among current smokers in the ACT region based on the Fagerström Test for Nicotine Dependence (FTND):
    - 43.3% (95% CI, 30.0–56.7) of smokers reported low dependence; and
    - 31.7% (95% CI, 19.1–44.3) low-moderate dependence.

Social networks

- About a quarter (23.6%; 95% CI, 17.1–30.1) of participants reported that 80% or more of their five closest friends and family were regular smokers.
- Only 18% (95% CI, 12.1–23.9) of respondents indicated that none of their five closest friends and family smoked.
- There was a significant difference between being a non-smoker (60.3%) and reporting that none of the respondents five closest friends and family smoked (χ^2 = 8.118, p<0.01). A respondent was 5.4 (95% CI, 1.5–19.1) times more likely[1] to be a non-smoker than a smoker if none of their five closest friends and family smoked.
- The findings indicate a significant difference between participants who self-reported as current tobacco users and reported that all of their five closest friends and family were regular tobacco smokers (14.9%) χ^2 = 10.891, p<0.01. Smokers were 4.2 times (95% CI, 1.7–10.0) more likely[1] to have all five of their closest social circle as regular tobacco smokers.
- 46% of participants reported that at least one of their five closest friends and family had become an ex-smoker.
- The majority of participants (57%; 95% CI, 48.5–65.2) reported that a friend or acquaintance supplied them with their first cigarette, followed by:
    - Purchased it myself (14%; 95% CI, 7.8–19.6);
    - Stole it (11%; 95% CI, 6.1–17.2); and
    - Brother or sister (7%; 95% CI, 2.4–11.3).

[1] Based on the odds ratio (OR).

- Female respondents were 2.7 (95% CI, 1.2–5.7) times more likely[1] than male to have been supplied their first cigarette through their close social network (friends, acquaintance, brother, sister, spouse, partner or parent).

Smoke free and quitting behaviours

Encouragingly, 87.2% (95% CI, 74.5–97.6) of Aboriginal and Torres Strait Islander smokers and nearly all non-Indigenous smokers (92.9%; 95% CI, 69.4–100.0) were currently planning on giving up.

A range of reasons resonated with participants as motivation to try giving up, cutting down, changing to a lower tar or nicotine brand or not smoke at all. Main reasons included effects on health and fitness, cost, and health warnings through social marketing.

The leading reasons not to smoke, identified as 'extremely important' or 'very important' included:

- Need money for things other than smoking (67%; 95% CI, 59.6–73.7);
- Smoking may interfere with performance (61%; 95% CI, 53.3–68.0);
- Smoking cause vulnerability and harm (53%; 95% CI, 45.2–60.1);
- Family gets upset (48%; 95% CI, 40.6–55.6); and
- One or both parents do or have smoked (47%; 95% CI, 39.8–54.8).

A significant proportion of participants also reported the following motivating factors in relation to family and friends:

- Family and/or friends (36.3%; 95% CI, 29.4–43.1);
- I was worried it would affect the health of those around me (27.0%; 95% CI, 20.6–33.3); and
- I am pregnant or planning to start a family (21.1%; 95% CI, 15.2–26.9).

Respondents also indicated that:

- 38.3% (95% CI, 23.3–53.3) of Aboriginal and Torres Strait Islander participants and 42.9% (95% CI, 13.4–72.4) of non-Indigenous participants had cut down by 1 to 5 cigarettes per day in the last 12 months;
- 14.9% (95% CI, 3.7–26.1) of Aboriginal and Torres Strait Islander participants and 21.4% (95% CI, 0.0–46.5) and non-Indigenous participants had cut down by about 6 to 10 cigarettes per day respectively;
- 2% (95% CI, 0.0–4.4) of participants were allowed to smoke in an inside smoking area and 8% (95% CI, 3.3–12.0) of participants did not have a smoke free policy; and
- 49% (95% CI, 44.7–59.5) of respondents avoided places where they may be exposed to cigarette smoke.

Conclusion

Addressing tobacco use among Aboriginal and Torres Strait Islander people is complex, but important. Tobacco use is a significant contributor to poor health outcomes (4-8). The results indicated that 36.4% of Aboriginal and Torres Strait Islander participants (28.6% of males and 39.2% of females) were smokers. The results also show generally low levels of nicotine dependence among smokers and that approximately 75% of participants reported that less than four of their five closest friends and family were smokers. The vast majority of smokers were planning on giving up. People want to quit, but social factors such as social networks, are influential in facilitating smoking. More sustained resources are required in this space to shift these social norms. These findings indicate that good work has been undertaken, but more work is still required. The report also highlights the importance of public health programs in preventing uptake of tobacco use and promoting smoking cessation.

What this paper adds?

- This report provides an overview of the smoking behaviours of the Aboriginal and Torres Strait Islander population in the local ACT region, with 36.4% identifying as smokers.
- A range of reasons resonated with participants to try giving up, cutting down, changing to a lower tar or nicotine brand or not smoke at all, including health, cost, family and friends.
- The need to further develop and facilitate community awareness and access to health and medical advice, including tobacco cessation support.
- Public health programs are influential to interrupting nicotine dependence and keeping non-smokers, smoke free.
- People want to quit, but social factors such as social networks, are influential in facilitating smoking. More sustained efforts are required in this space to shift these social norms.

For more information

For more information about smoking please contact your local Aboriginal Medical Service, General Practitioner or Quitline.

WINNUNGA NIMMITYJAH ABORIGINAL HEALTH SERVICE

www.winnunga.org.au

www.quitnow.gov.au

Quitline 13 7848

www.icanquit.com.au

Abbreviations

ACCHS	Aboriginal Community Controlled Health Service
ACT	Australian Capital Territory
AMS	Aboriginal Medical Service
CI	Confidence Interval
COAG	Council of Australian Governments
FTND	Fagerström Test for Nicotine Dependence
GP	General Practitioner
NACCHO	National Aboriginal Community Controlled Health Organisation
NATSIHS	National Aboriginal and Torres Strait Islander Health Survey
NATSISS	National Aboriginal and Torres Strait Islander Social Survey
NPHS	National Preventative Health Strategy
NRT	Nicotine Replacement Therapy
OR	Odd Ratio
PBS	Pharmaceutical Benefits Scheme
Winnunga	Winnunga Nimmityjah Aboriginal Health Service

***please note that throughout the publication, percentages may not add up to 100.00 due to rounding.**

Table of Contents

Acknowledgments 2

Executive Summary 3

Survey distribution 3

Analysis 3

Smoking behaviour 3

Social networks 4

Smoke free and quitting behaviours 5

Conclusion 6

What this paper adds? 6

For more information 6

Abbreviations 7

Figures 11

Tables 14

Introduction 15

Survey distribution and the Sample 16

Survey distribution 16

The Sample 16

Aboriginal and Torres Strait Islander identity 19

Age and gender 19

Marital status 20

Employment status 20

Household income 21

Number of dependents per household, percentage of sample 22

Education 23

Smoking 24

Access to tobacco 25

Smoking 25

Smoking status, age and education 27

Nicotine Dependence 28

Quit attempts by Fagerström Nicotine Dependence categories 29

Number of cigarettes smoked per day 32

Other Fagerström Test for Nicotine Dependence questions 33

Motivation to change 34

Social networks..... 34

Social,..... 34

Number of regular smokers among participants five closest friends and family 34

Social circles and nicotine dependence 38

Closest social circle becoming ex-smokers in the past 5 years 39

First cigarette experience… 42

Supplier of first cigarette 42

Age of first cigarette..... 43

Where do people go for advice? 44

Where do you go to seek health or medical advice and information? 44

Quit advice - where would you go? 45

Smoke free and quitting behaviours 46

Motivations to give up, cut down, change to a lower tar or nicotine brand or not smoke at all 46

Reasons not to smoke..... 47

Exposure to environmental tobacco smoke 48

Smoke free workplace policy 48

..... 50

Prestige and harm of cigarettes 50

Do some cigarette brands have more prestige than others 50

Are some cigarette brands more harmful than others?54

Discussion 57

Smoking 57

Nicotine Dependence 60

Social networks 61

Quitting behaviours 61

Where do people go for advice and information? 62

Smoke free policies 62

Prestige and harm of cigarettes 63

Conclusion 65

Some opportunities… 67

For more information 72

References 73

Figures

Figure 1: Age and gender distribution....17

Figure 2: Proportion of sample by Indigenous status....19

Figure 3: Marital status....20

Figure 4: Employment status....20

Figure 5: The Smoke Ring - Household income....21

Figure 6: Number of people aged 12 and over living in the household....21

Figure 7: Number of dependents per household....22

Figure 8: Highest year of primary or secondary school completed....23

Figure 9: How difficult or easy would it be to get some tobacco....25

Figure 10: Smoking status by Indigenous status....26

Figure 11: Aboriginal and Torres Strait Islander smoking status by age....26

Figure 12: Non-Indigenous smoking status by age....27

Figure 13: Aboriginal smoking rate by gender and age category - above and below 35 years....27

Figure 14: Indigenous smoking rate and education – Year 12 and equivalent....28

Figure 15: Fagerström Test for Nicotine Dependence....29

Figure 16: Proportion of Fagerström Test for Nicotine Dependence category by how soon after you wake up you smoke your first cigarette....31

Figure 17: Number of cigarettes smoked per day, by Indigenous status....32

Figure 18: Number of cigarettes smoked per day....32

Figure 19: In the last 12 months, how much do you think you have cut down on your cigarette smoking....34

Figure 20: Smoking advice and behaviours within the last 12 months....32

Figure 21: Behaviour change, do you plan on giving up?....32

Figure 22: In the last month, how often did you do the following?....33

Figure 23: Number of regular smokers among participants' five closest friends and friends and family 34

Figure 24: Number of regular smokers among participants' five closest friends and friends and family by smoking status....35

Figure 25: Number of regular smokers among 5 closest friends and family, by smoking status 35

Figure 26: Number of regular smokers among participants' 5 closest friends and family, by smoking status 36

Figure 27: Number of regular smokers among participants' five closest friends and family, by smoking status 37

Figure 28: Number of regular smokers among Aboriginal and Torres Strait Islander participants' five closest friends and family, by smoking status and gender.....38

Figure 29: Fagerström Test for Nicotine Dependence category by the number of regular smokers among participants' five closest friends and family.....39

Figure 30: Number of participants' five closest friends and family who became ex-smokers in the past 5 years 39

Figure 31: Number of participants' five closest friends and family who became ex-smokers in the past 5 years 40

Figure 32: Number of participants' five closest friends and family who became ex-smokers in the past 5 years 40

Figure 33: Role models text analysis 41

Figure 34: Supplier of first cigarette.....42

Figure 35: Supplier of first cigarette by gender.....43

Figure 36: Age of first cigarette 43

Figure 37: Quit advice - where would you go?.....45

Figure 38: Do you avoid places where you may be exposed to other people's cigarette smoke.....48

Figure 39: Smoke free workplace policy 49

Figure 40: Do some cigarette brands have more prestige than others 50

Figure 41: Do some cigarette brands have more prestige than others, by education and Indigenous status 51

Figure 42: Do some cigarette brands have more prestige than others, by education 51

Figure 43: Do some cigarette brands have more prestige than others among Aboriginal and Torres Strait Islander participants, by household income.....52

Figure 44: Do some cigarette brands have more prestige than others, by number of cigarettes smoked per day.....53

Figure 45: Do some cigarette brands have more prestige than others, by age 53

Figure 46: Are some cigarette brands more harmful than others 54

Figure 47: Are some cigarette brands more harmful than others, by education 54

Figure 48: Are some cigarette brands more harmful than others by number of cigarettes smoked per day 55

Figure 49: Are some cigarette brands more harmful than others by nicotine dependence 55

Figure 50: Are some cigarette brands more harmful than others by age 56

Figure 51: Are some cigarette brands more harmful than others, by total workplace smoking ban 56

Figure 52: Ottawa Charter for Health Promotion 70

Tables

Table 1: ACT Aboriginal and Torres Strait Islander tobacco control evaluation and the National Aboriginal and Torres Strait Islander Social Survey 2008 – ACT 18

Table 2: Smoking status by gender and Indigenous status 26

Table 3: Quit attempts in the last 12 months by Fagerström nicotine dependence categories.....30

Table 4: Fagerström Test for Nicotine Dependence by gender and Indigenous status 30

Table 5: How soon after you wake up do you smoke your first cigarette?.....30

Table 6: Smoking behaviours within the last 12 months 35

Table 7: Where do you go to seek health or medical advice and information 44

Table 8: If you were seeking advice on quitting smoking, where would you go?.....45

Table 9: Which of the following would motivate you to try giving up, cutting down, changing to a lower tar or nicotine brand or not smoke at all? 47

Introduction

This report presents the preliminary results from the first wave of a survey targeting Aboriginal and Torres Strait Islander people in the Australian Capital Territory and surrounding region. The survey investigated factors that influence smoking behaviours, attitudes, beliefs and social networks. The survey also measured demographic information, smoking status and attitudes, awareness, behavioural intentions and behaviours of smokers, ex-smokers and non-smokers. A diverse sample of participants completed the Survey (n = 204) ranging in age, gender, marital status, socioeconomic status and household size. The research was approved by the University of Canberra's Human Research Ethics Committee (Project number 12163) and the ACT Health Human Research Ethics Committee (ETH10.12.232).

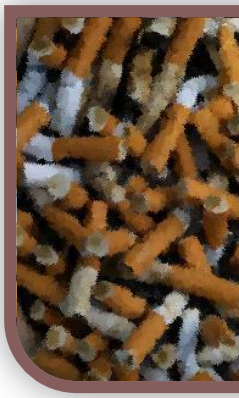
The results from the surveys have been compared to existing benchmark measures where applicable, including information from the National Aboriginal and Torres Strait Islander Social Survey, National Aboriginal and Torres Strait Islander Health Survey, National Drug Strategy Household Survey and the Australian Census. It is acknowldged that there are limitations to such comparsions, and interpretations should be undertaken with caution. For example, it is well documented that there is an under representation of Aborignal and Torres Strait Islander people in the Census, the National Drug Strategy Household Survey, and some other surveys which is partly due to participants not identifying as Aboriginal and/or Torres Strait Islander people (9).

When compared with other jurisdictions, the ACT performs relatively well in outcomes for Aboriginal and Torres Strait Islander people, including health outcomes and tobacco use (10). The ACT Chief Minister's Department and others suggest that this is partly due to the city-centric lifestyle. While this has its own challenges, it is common for urban areas to be sources of social capital, creativity, technology and populations generally are more educated, have higher incomes and are more risk aware (11-13). However, there are still significant gaps in outcomes, including health outcomes, between Aboriginal and Torres Strait Islanders and non-Indigenous people within the ACT. As a result, there is substantial potential for change and improvement (6, 10, 14-18).

The ACT and other jurisdictions committed to the Council of Australian Government (COAG) (15; 3, 19) and the National Healthcare Agreement 2012 (14; A5) targets for 'Closing the Gap':

- Close the life expectancy gap for Indigenous Australians within a generation.
- By 2018, reduce the national smoking rate to 10 per cent of the population and halve the Indigenous smoking rate, over the 2009 baseline.
- Halve the mortality gap for Indigenous children under five by 2018.
- Reduce the age-adjusted prevalence rate for Type 2 diabetes to 2000 levels by 2023.
- By 2018, increase by five percentage points the proportion of Australian adults and Australian children at a healthy body weight, over the 2009 baseline.

This research aims to evaluate tobacco control programs under the ACT Aboriginal and Torres Strait Islander Tobacco Control Strategy 2010-2014. This includes No More Boondah, smoking cessation groups, youth and community health promotion programs and education campaigns.



Survey distribution and the Sample

Survey distribution

The self-reported pen and paper and online smoking (www.surveymonkey.com/s/smokes) survey (the Survey) was piloted at the Gugan Gulwan Youth Aboriginal Organisation Open Day, on Friday, 9 November 2012. Minor readability amendments were made to the Survey to make completion as easy as possible, with no substantial changes made. As a result, piloted surveys (n = 14) have been included in the data collection.

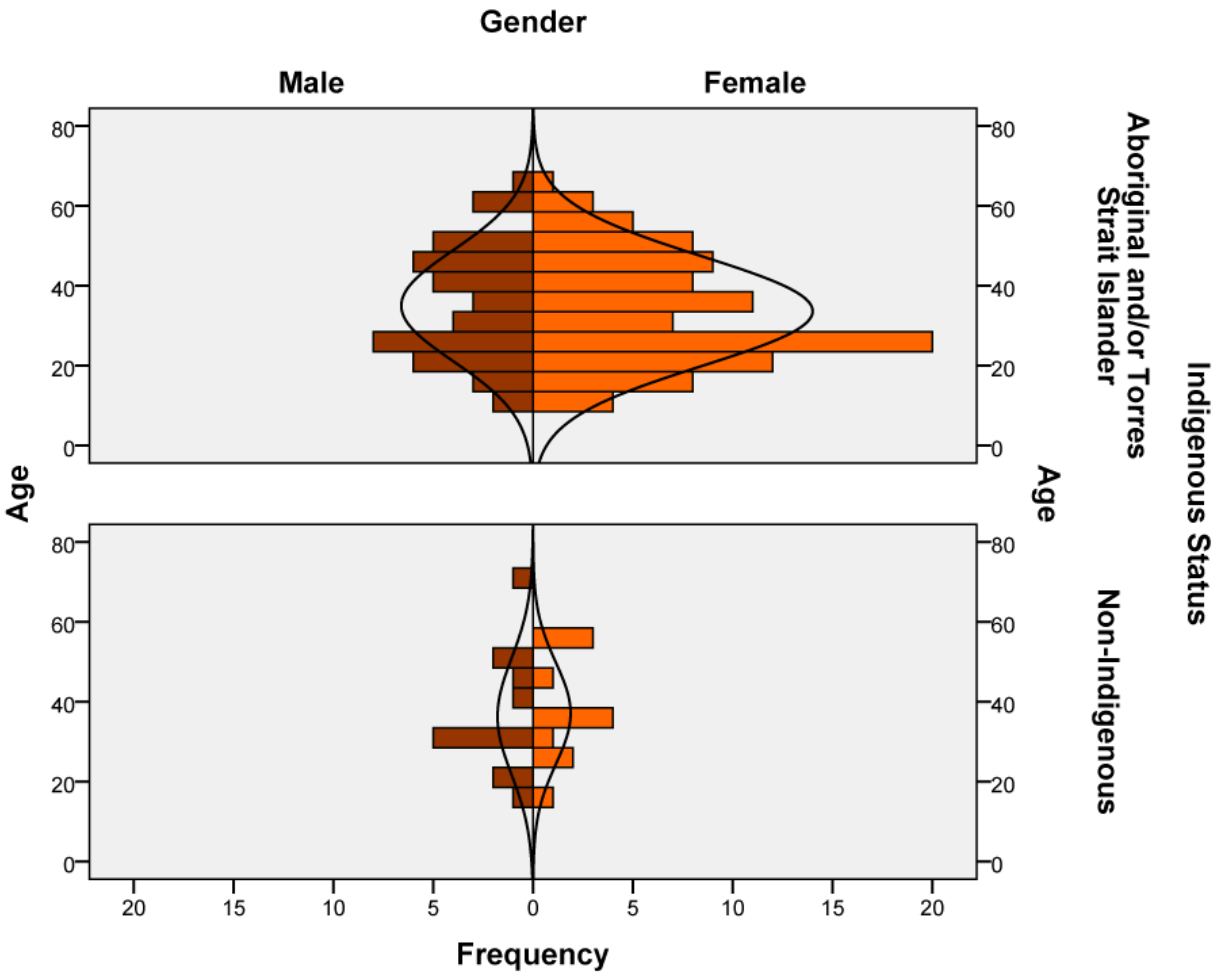
The Survey component of data collection was launched at the Winnunga open day, Wednesday, 12 December 2012 and closed on World No Tobacco Day, 31 May 2013. The Survey data collection was undertaken at community events, including the Multicultural Festival, and facilitated through Winnunga where possible and where appropriate. The Survey was also circulated electronically through:

- the ACT Indigenous Network;
- the Australian Public Service Commission Indigenous Networks;
- the Aboriginal Hostels Limited - ACT network;
- the National Aboriginal Community Controlled Health Organisation;
- the Australian Institute of Aboriginal and Torres Strait Islander Studies;
- the University of Canberra Indigenous Network; and
- Winnunga.

The Sample

To explore a broad cross section of the Aboriginal and Torres Strait Islander community in the ACT, a diverse sample of participants completed the Survey (n = 204). The sample size of 204 participants is sufficient to detect a difference between smoking status and a range of variables presented in this analysis. A minimum sample size of 102 participants was required based on 80% statistical power to detect a 10% detectable difference. Participants ranged in age, gender, marital status, socioeconomic status, household size and smoking status as detailed below. The 2011 Census reported that there 5,185 Aboriginal and Torres Strait Islander people in the ACT and it should be noted as outlined above, the sample frame targeted Aboriginal and Torres Strait Islander people. However, 84% of participants identified as Aboriginal and/or Torres Strait Islander and 16% identified as non-Indigenous. Analysis throughout the report is for the entire sample, unless specified otherwise. For example, 36.4% of participants who identified as *Aboriginal and Torres Strait Islander* reported that they were current smokers. The central reason not to exclude the non-Indigenous participants from all analysis is that non-Indigenous participants have engaged with the Aboriginal and Torres Strait Islander targeted sampling frame to complete the survey, and may have strong ties with Aboriginal and Torres Strait Islander people. This could include friends, family and the Aboriginal and Torres Strait Islander community. As a result, they may also be influenced by the Aboriginal and Torres Strait Islander community, community programs and vice versa.

Figure 1: Age and gender distribution



The majority of participants attended a cultural event in the last 12 month (79.6% of Aboriginal and Torres Strait Islander participants), identified with a tribal group, a language or clan (79.4% of Aboriginal and Torres Strait Islander participants; 69.5% of all participants), recognised an area as their homeland or traditional country (93.9% of Aboriginal and Torres Strait Islander participants; 88.3% of all participants) and 17.9% of the Aboriginal and Torres Strait Islander population (19% of the total sample) reported that they lived in their homeland or traditional country. All participants considered that they spoke English either 'Well' or 'Very well'.

Table 1: ACT Aboriginal and Torres Strait Islander tobacco control evaluation and the National Aboriginal and Torres Strait Islander Social Survey 2008 – ACT

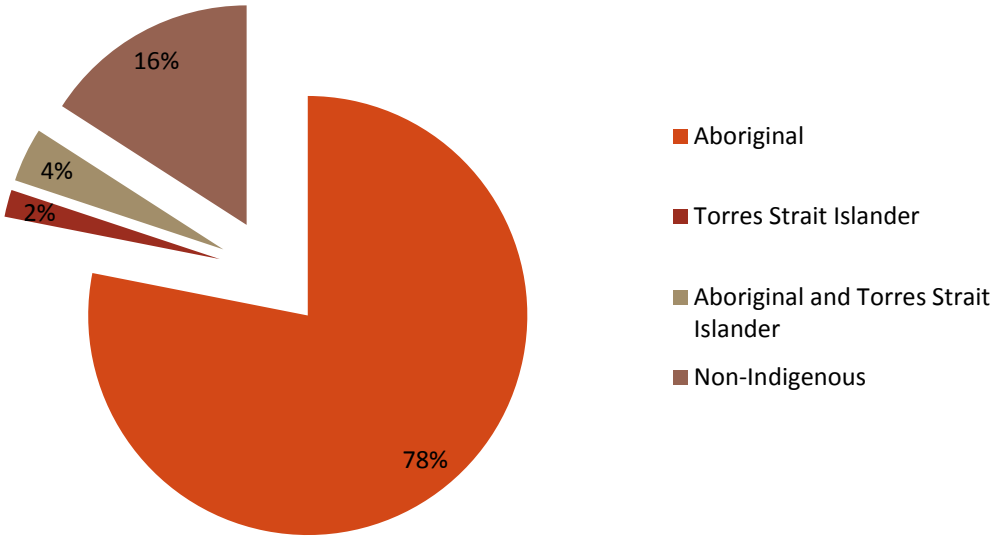
	The Smoke Ring: *Aboriginal and Torres Strait Islander population in the ACT region*	**National Aboriginal and Torres Strait Islander Social Survey 2008:** *ACT Aboriginal and Torres Strait Islander Peoples in the ACT aged 15 Years and over*
Identified with a tribal group, a language or clan	95.6%	70.6%
Recognised an area as their homeland or traditional country	93.9%	72%
Currently lived in their homeland or traditional country	17.9%	8.2%
Attended a cultural event in the last 12 months	79.6%	*n/a*
Involved in cultural events, ceremonies or organisations in last 12 months	*n/a*	72.4%
Unemployed	10.1%	7.5%
Current smoker	36.4%	36.2%
Year 12 or equivalent	47.0%*	38.9%
Currently studying	20.2%*	26.6%

***Noting that the sample includes minors who may not have had the opportunity to complete Year 12 at this stage.**
n/a – Not applicable; not asked in this survey.

Aboriginal and Torres Strait Islander identity

As outlined, 84% of participants identified as having Aboriginal and/or Torres Strait Islander origin, with 16% identifying as non-Indigenous.

Figure 2: Proportion of sample by Indigenous status



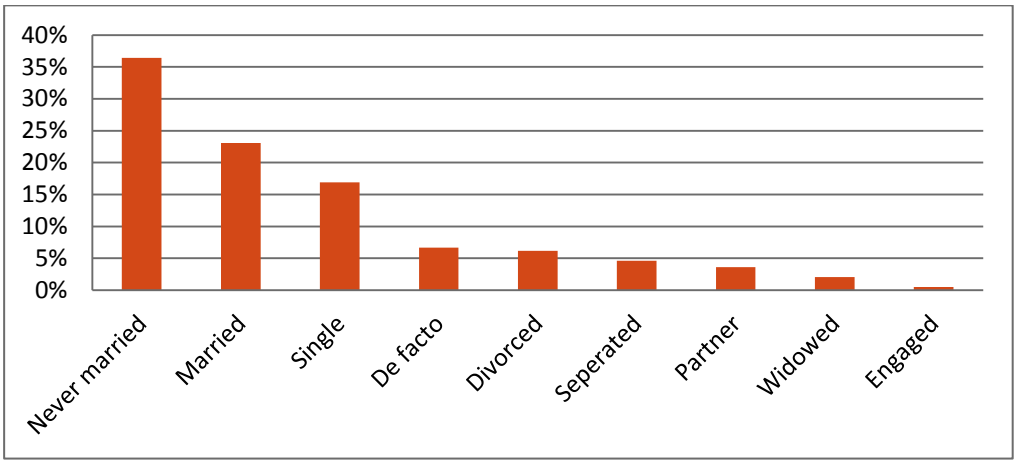
Age and gender

The participants' median age was 34.5 years and participants' ranged from approximately 12 to 75 years. The median age for all Australians in the 2011 Census was 37 years and 21 years for Aboriginal and Torres Strait Islander people (9). Approximately 65% of the participants' identified as female, and the remaining 35% as male. The 2011 Census indicated for all Australians and for Aboriginal and Torres Strait Islander people, that 49% of the population were male and 51% were female (9).

Marital status

Just over one in three participants reported being 'never-married' (36%), with just under a quarter stating they were 'married' (23%) and 17% identifying as 'single'. The 2006 Census indicated that a lower proportion of Aboriginal and Torres Strait Islander people were married across all age groups, except 15-24 year olds where 11.5 per cent of Aboriginal and Torres Strait Islanders listed themselves as married compared to 11.4 per cent for the rest of the population of the same age (20). Furthermore, the 2011 Census data indicated that 49% of all Australians were 'married' and 34% were 'never married' (9). There may be numerous reasons for this difference in marital status, which could include the generally younger profile of Aboriginal and Torres Strait Islander people (9).

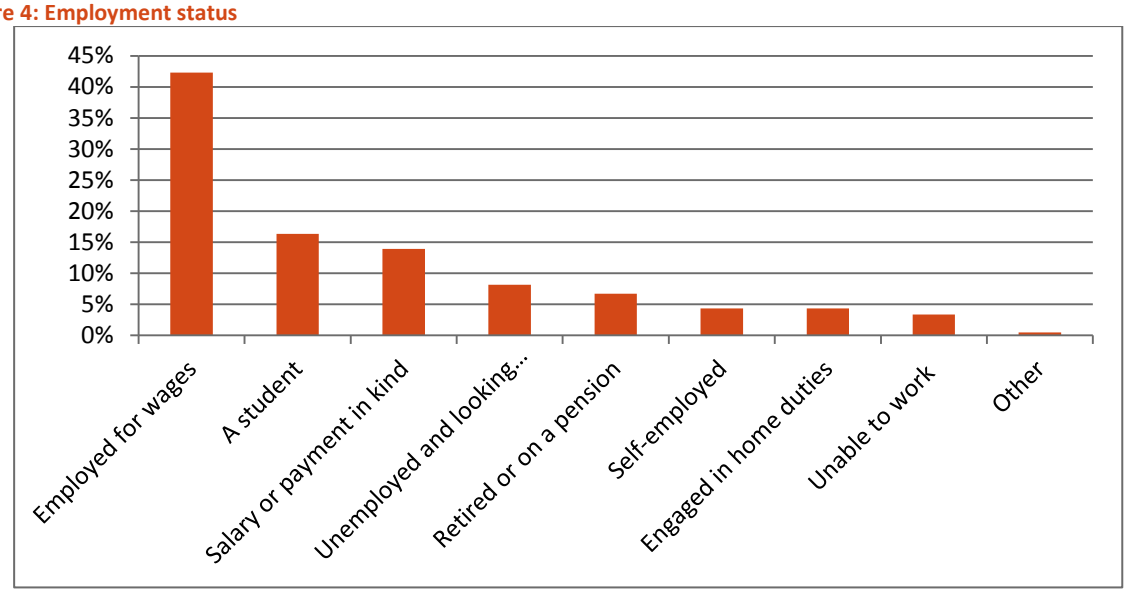
Figure 3: Marital status



Employment status

The majority of participants (56%) were 'Employed for wages' or 'Salary or payment in kind'. This was followed by 'students' (16% or 20.2% of Aboriginal and Torres Strait Islander people), about 8% identifying as 'Unemployed and looking for work' and 7% 'retired or on a pension'.

Figure 4: Employment status



Household income

Participant household size and income varied. A quarter of all participants only had one person aged over 12 living in the household, 30% had two people aged 12 and over, and 34% reported three or four people aged over 12 lived in the household. In addition, 35% of participant households received more than $104,000 per annum or over $2,000 per week from all income sources and from all sources the median household income was $67,600-$83,199 ($1,300-$1,599/week). According to the Australian Bureau of Statistics 2011 Census (9), the average Australian household and ACT Household had 2.6 people and the median weekly household income was $1,234 and $1,920 for Australia and the ACT respectively.

Figure 5: The Smoke Ring - Household income

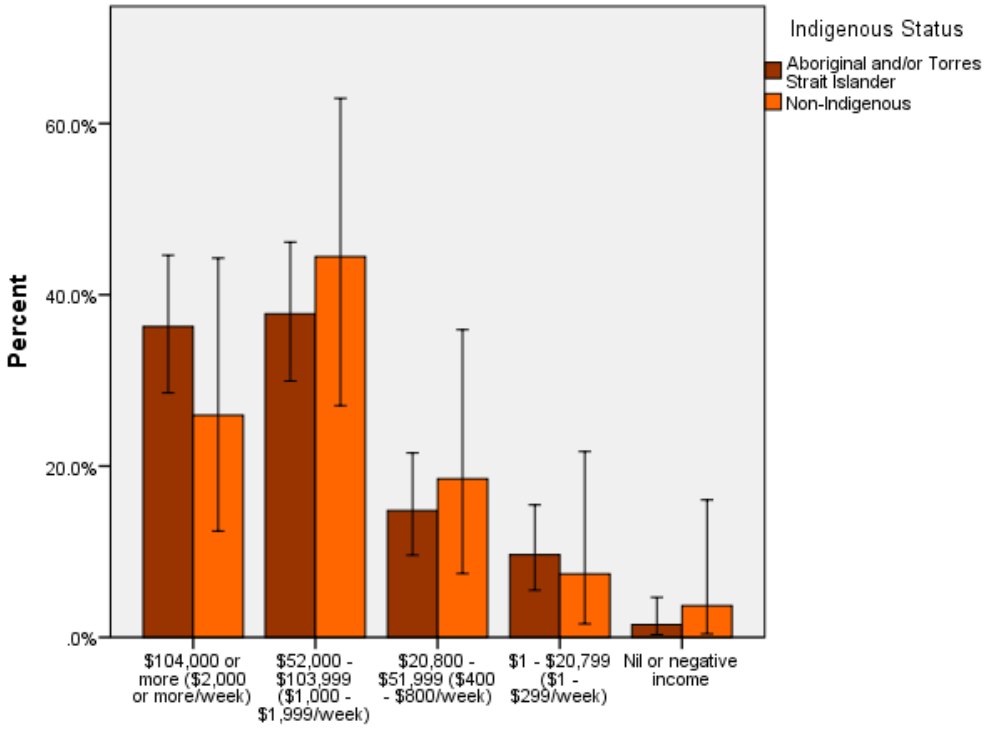
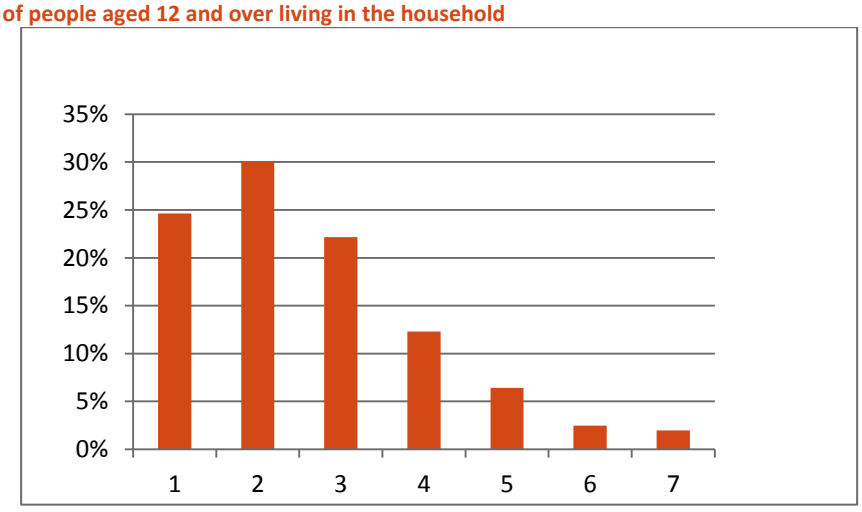


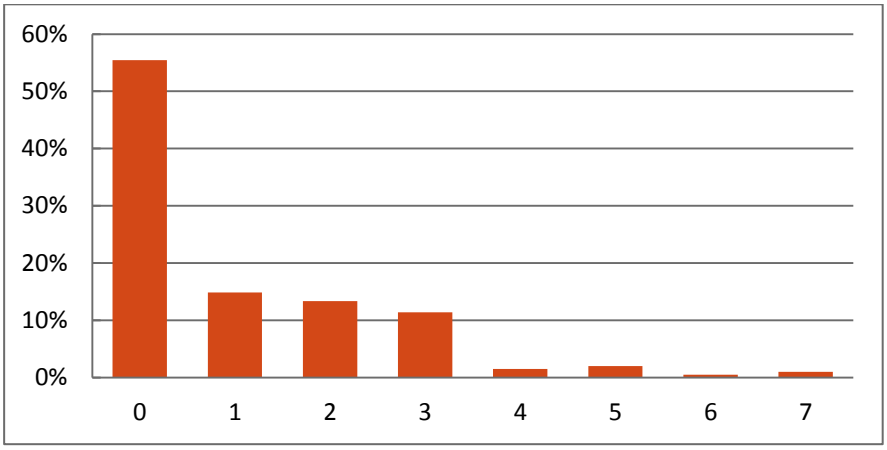
Figure 6: Number of people aged 12 and over living in the household



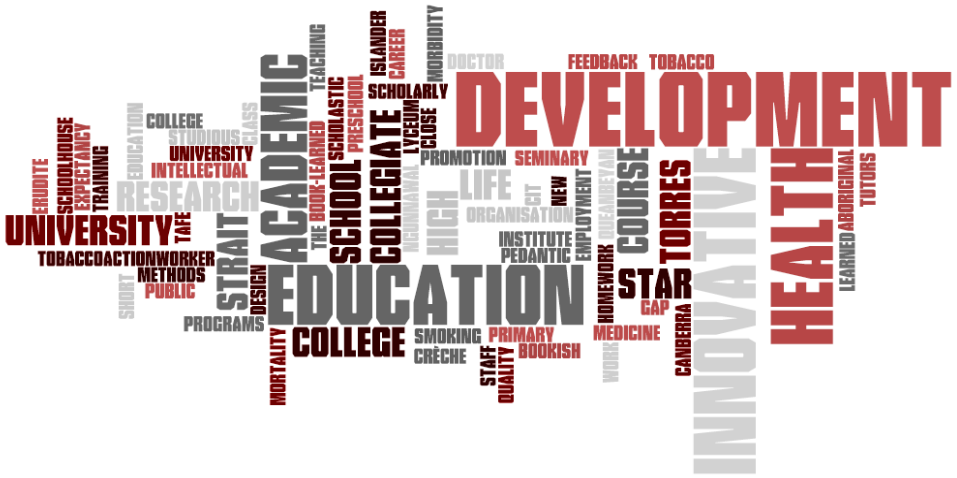
Number of dependents per household, percentage of sample

The significant majority of participants had three or less dependents in their household (96% of respondents); 55% of participants indicated that they had no dependents, 28% had one or two dependents and 11% had three dependents. Notably, four per cent of respondents had four or more dependents in their household.

Figure 7: Number of dependents per household



***Percentages may not add up to 100.0 because of rounding**

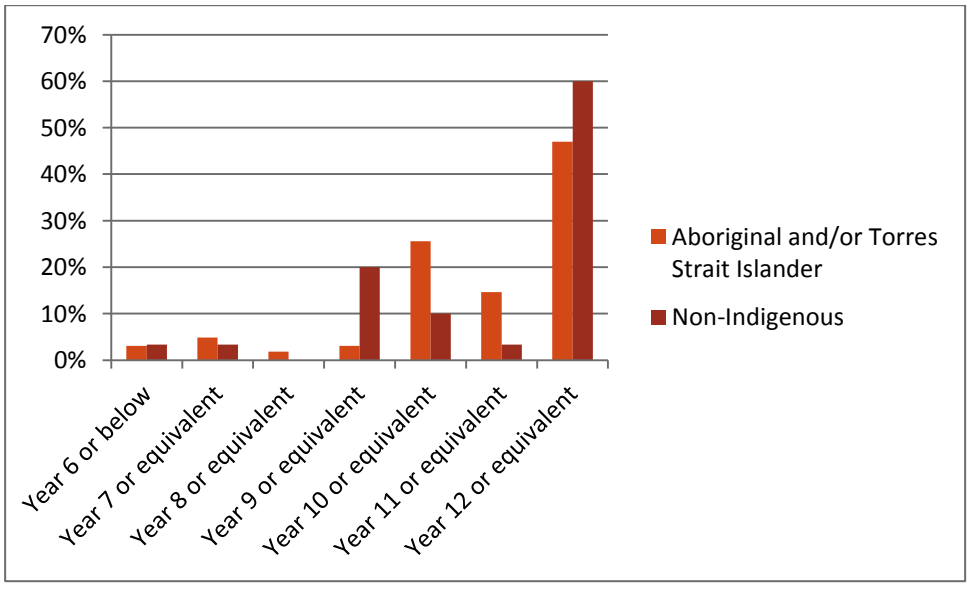


Education

The results from the National Aboriginal and Torres Strait Islander Social Survey 2008 (21) indicated that 38.9% of Aboriginal and Torres Strait Islander people in the ACT had completed Year 12 or equivalent. In comparison, the data collection indicated that 47% of Aboriginal and Torres Strait Islander participants completed Year 12 or equivalent and 71% had completed a trade certificate, diploma, degree or any other educational qualification. It is also worth acknowledging that the sample included minors who may not have had the time or opportunity to complete Year 12 or other educational qualifications.

In addition, 45% of Aboriginal and Torres Strait Islander participants' mothers had completed year 11 or above in contrast to 63% of non-Indigenous respondents. Based on the OR, a participant was 3.1 times more likely to have completed year 12 if their mother had completed Year 11 or above, in comparison to a participant whose mother completed Year 10 or below ($\chi^2 = 7.933$, $p<0.01$).

Figure 8: Highest year of primary or secondary school completed



Smoking

Tobacco use is the largest single preventable cause of death and disease, accounting for over 15,000 deaths in Australia each year (3, 22). There is a disproportionate burden of tobacco related death and disease among Aboriginal and Torres Strait Islander people, with almost half of Aboriginal and Torres Strait Islander people reporting as daily smokers, compared with approximately one in six of all Australians. This burden of death and disease is preventable (23).

Australia is a world leader in comprehensive tobacco control, which has included a number of comprehensive strategies, such as the National Tobacco Strategy 2012-2018, the ACT Alcohol, Tobacco and Other Drug Strategy 2010-2014 and the ACT Aboriginal and Torres Strait Islander Tobacco Control Strategy 2010-2014. These have included a raft of components, such as:

- plain packaging;
- prohibition of smoking in cars when children are present;
- restricted smoking areas, including outdoor eating and drinking areas;
- reduced tobacco promotion through the prohibition of point-of-sale displays, advertising and promotion; and
- smoke-free policies at various locations including the Canberra Hospital, ACT Health facilities, Canberra Stadium, Manuka Oval and ACT schools and colleges (1, 8).

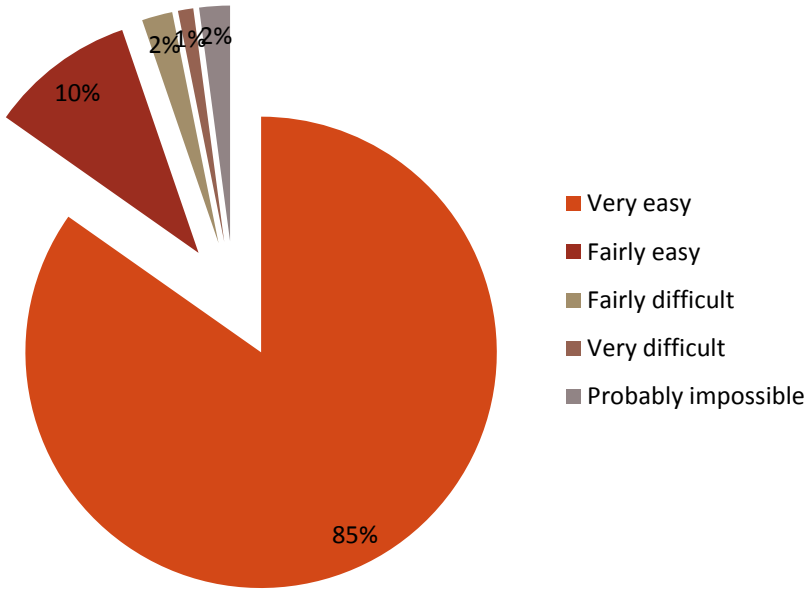
There is room for improvement (7, 23). Tobacco control policies in Australia have resulted in smoking rates declining from approximately 34% in 1980 to 15% in 2010 (7, 23). In the ACT, daily smoking rates for adults have more than halved since 1998 (22.9%) to 11.7% (2013), the lowest in Australia (8). The ACT Government has committed to reducing this daily smoking rates to below 10% by 2018 (1).

However, 46 per cent of Aboriginal and Torres Strait Islander people smoke on a daily basis across Australia and as reported by the Australian Bureau of Statistics, 36.2% in the ACT (21, 23).

Access to tobacco

Respondents indicated that 95.5% would find it 'very easy' or 'fairly easy' to get tobacco, if they wanted some; with 4.5% indicating it would be 'probably impossible', 'very difficult' or 'fairly difficult'. It is worth noting that this includes minors (n = 15 or 7.4%) who may find it more challenging to access tobacco as it is illegal to sell tobacco products to children under the age of 18 years in all states and territories of Australia (4).

Figure 9: How difficult or easy would it be to get some tobacco

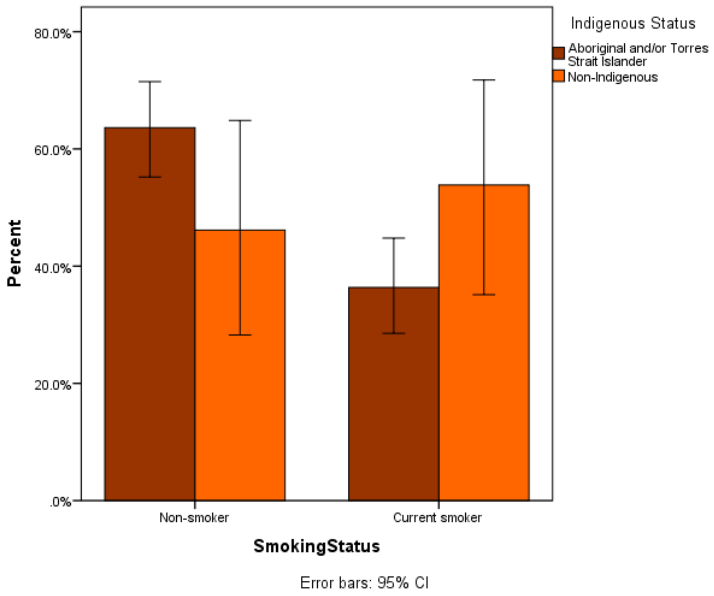


Smoking

The ACT statistics from the National Aboriginal and Torres Strait Islander Social Survey 2008 (21) indicated that 36.2% of Aboriginal and Torres Strait Islander people were current smokers. In comparison, this study indicated that that 36.4% (95% CI, 27.8–44.9) of participants (28.6% (28.6%; 95% CI, 12.2–45.0 of males and 39.2%; 95% CI, 27.8–50.6 of females who identified as Aboriginal and Torres Strait Islander were smokers. In contrast, 59.1% of the non-Indigenous respondents identified as smokers (69.2% of non-Indigenous males and 44.4% of non-Indigenous females). Overall, participants self-reported that 39.7% smoked and 60.3% did not smoke.

Notably, 19% of the sample had never 'tried smoking or other forms of tobacco' and 8% of participants who had 'tried smoking or other forms of tobacco' had never smoked a full cigarette. Participants reported that 80% of those who had smoked a full cigarette had consumed over 100 cigarettes during their life, an indication that they may have been a daily smoker at some stage. Also of note, 41% of participants who reported as current smokers could not cut back or quit. Among participants who identified as current smokers, 92% would like to stop smoking. The majority of those who did not intend to quit, stated that this was because they were 'addicted to nicotine'.

Figure 10: Smoking status by Indigenous status



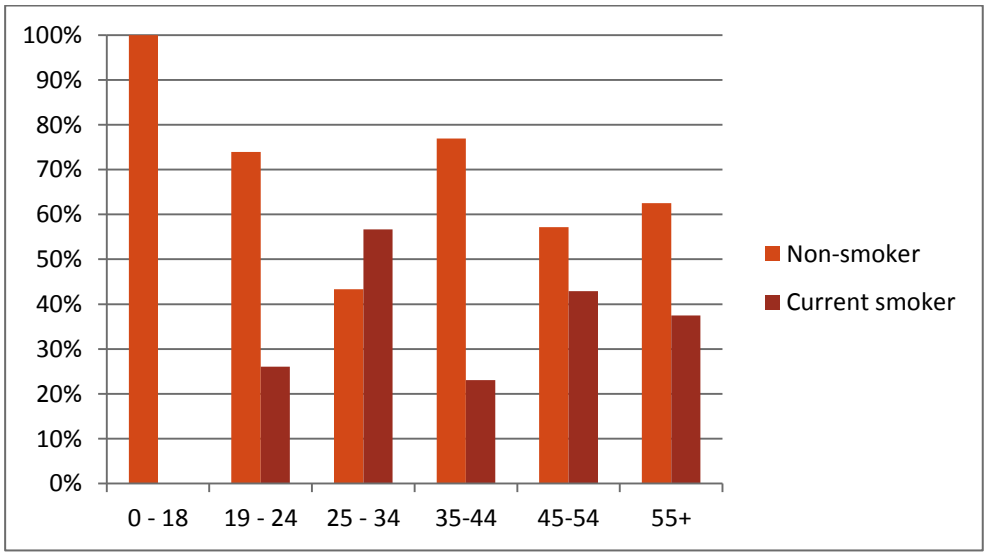
According to the National Aboriginal and Torres Strait Islander Health Survey (10), Aboriginal and Torres Strait Islander males had a slightly higher prevalence of smoking than females (51% compared to 49%). However, the National Aboriginal and Torres Strait Islander Health Survey 2004-05 reported that in the ACT, Aboriginal and Torres Strait Islander males had a lower prevalence of smoking than females (38% compared with 49%) (10).

Table 2: Smoking status by gender and Indigenous status

	Aboriginal and Torres Strait Islander		Non-Indigenous	
	Smoker	**Non-smoker**	**Smoker**	**Non-smoker**
Male	28.6%	71.4%	69.2%	30.8%
Female	39.2%	60.8%	44.4%	55.6%

***There may be some discrepancies between rates due to missing data variables.**

Figure 11: Aboriginal and Torres Strait Islander smoking status by age



***There may be some discrepancies between rates due to missing data variables.**

Figure 12: Non-Indigenous smoking status by age

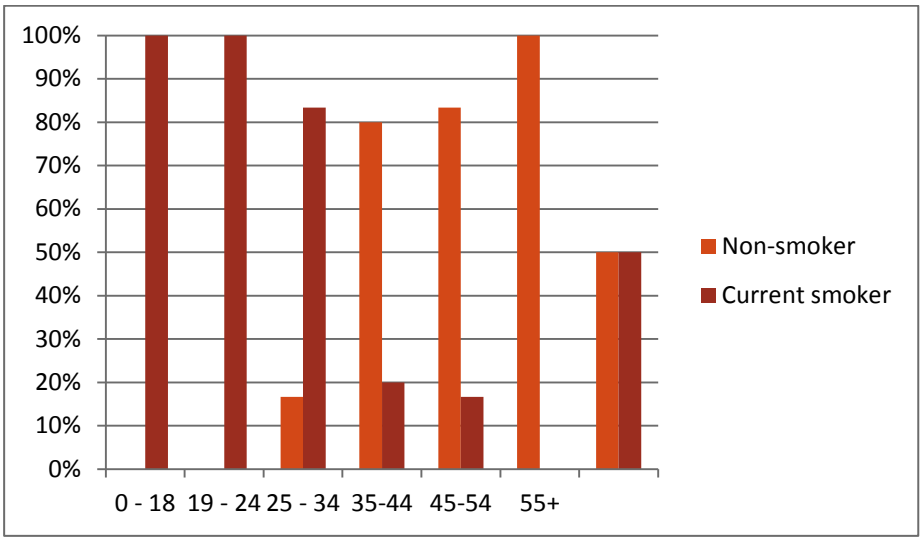
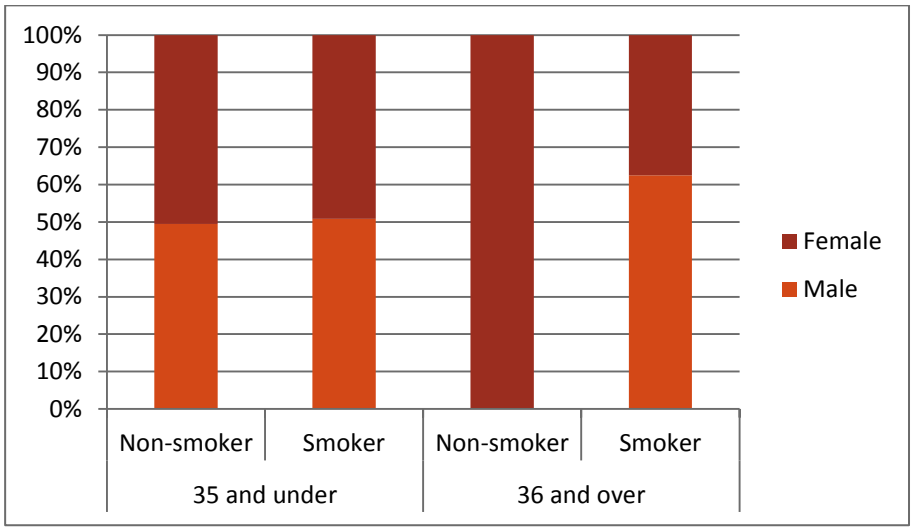


Figure 13: Aboriginal smoking rate by gender and age category - above and below 35 years

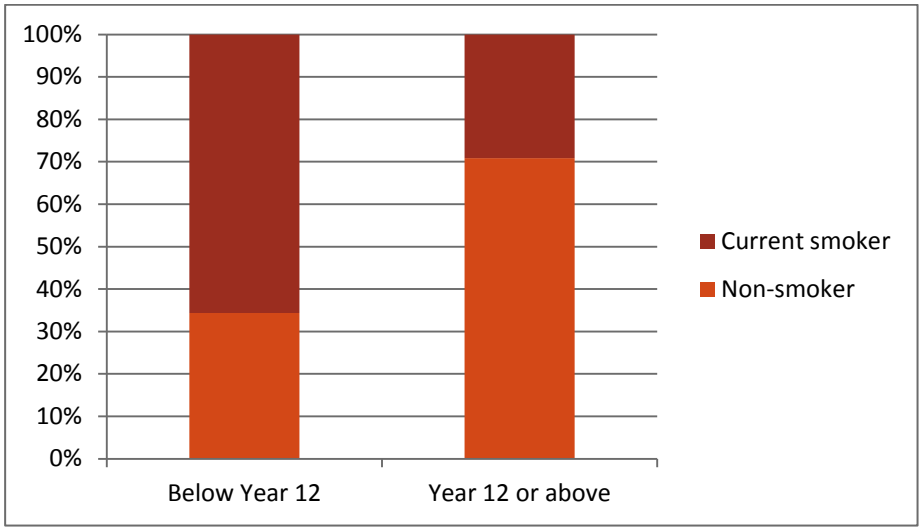


Smoking status, age and education

The mean smoking (35.39 years) and non-smoking (35.67 years) age was 35 years and as demonstrated in *Figure 11*, the difference between being a current smoker (62.5%) and being under 35 years was not statistically significant. However, for non-Indigenous participants there was a statistically significant difference between reporting as a current smoker and being aged 35 years and under (91.7%) χ^2 = 13.594, p<0.01. Non-Indigenous participants aged 35 years and under were 55 times more likely to be a smoker than those aged over 35 years based on the OR.

As illustrated in *Figure 14*, there was a statistically significant difference between being a current smoker and not completing Year 12 or equivalent (67.7%) χ^2 = 11.087, p<0.01. Based on the OR, a participant who completed Year 12 or equivalent was 3.1 (95% CI, 1.57–6.00) times more likely to be a non-smoker than a smoker.

Figure 14: Indigenous smoking rate and education – Year 12 and equivalent



Nicotine Dependence

The FTND was used to assess physical nicotine dependence based on the following six questions (24):

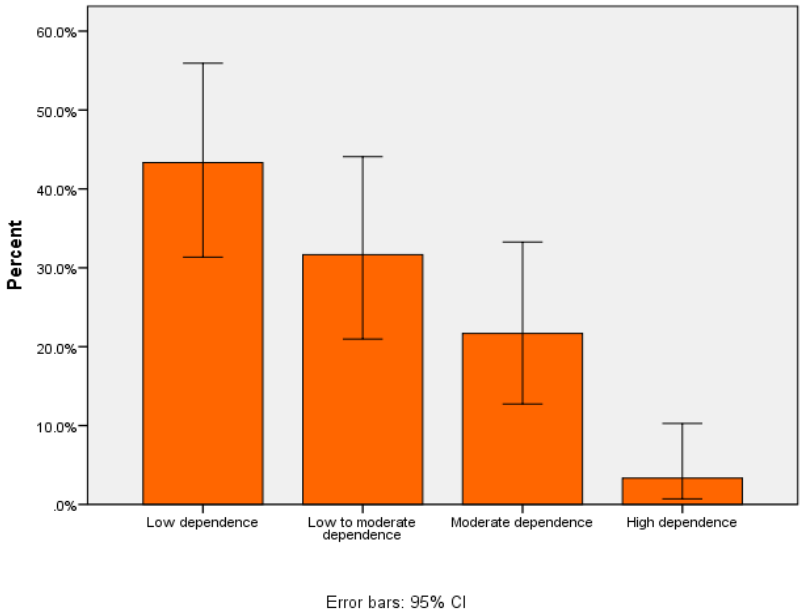
1. How many cigarettes/day do you smoke?
2. How soon after you wake up do you smoke your first cigarette?
3. Do you find it difficult to refrain from smoking in places where it is forbidden (e.g. in church, at the library, cinema, etc.)?
4. Which cigarette would you hate to give up?
5. Do you smoke more frequently during the first hours after waking than during the rest of the day?
6. Do you smoke if you are so ill you are in bed most of the day?

The FTND questions are multifactorial with two items significantly contributing to the variance[2]: 'time to the first cigarette of the day' and 'average daily consumption of cigarettes' (24). There was a significant difference in having your first cigarette for the day within 30 minutes of waking and a low FTND score (45.0%) $\chi^2 = 27.149$, $p<0.01$. Based on the OR, a smoker who consumed their first cigarette of the day after 30 minutes of waking was 29.6 times more likely to report a low FTND score, compared with someone who consumed their first cigarette within 30 minutes. There was also a significant difference in having consuming more than 10 cigarettes per day and a low FTND score (43.3%) $\chi^2 = 22.748$, $p<0.01$. A smoker who consumed less than 10 cigarettes per day was 21.3 times more likely to have a low FTND score than someone who consumed more than 10 cigarettes per day based on the OR.

[2] The FTND questions are multifactorial with two items ('time to the first cigarette of the day' and 'average daily consumption of cigarettes') significantly contributing to the variance due to their potential weighting.

As outlined in *Figure 16*, survey results identified through the FTND that there were generally low levels of nicotine dependence among current smokers in the ACT region (43.3% of smokers reported low dependence and 31.7% low-moderate dependence). In contrast, data from the 2010 National Drug Strategy Household Survey indicated Aboriginal or Torres Strait Islander people generally consumed a high number of cigarettes per day, and therefore high nicotine dependence (7).

Figure 15: Fagerström Test for Nicotine Dependence



Quit attempts by Fagerström Nicotine Dependence categories

Table 3 indicates that the majority of quit attempts among smokers were those with low nicotine dependence, and low to moderate nicotine dependence based on the FTND. The FTND can help to define nicotine dependence (chemical/physical dependence of nicotine) (25); but the importance of habitual (cue-induced or common habits associated with smoking) and emotional/psychological (smoking used to manage/deal with stress and other emotions) aspects of smoking should also be considered (25, 26). John and others (26) concluded that nicotine dependence is just one barrier to decreasing tobacco use and smoking rates.

Table 3: Quit attempts in the last 12 months by Fagerström nicotine dependence categories

	Low dependence	Low to moderate dependence	Moderate dependence	High dependence
No attempts	21%	53%	38%	50%
1 attempt	38%	11%	15%	50%
2 attempts	25%	21%	23%	0%
3 or more attempts	17%	16%	23%	0%

Table 4: Fagerström Test for Nicotine Dependence by gender and Indigenous status

		Low dependence	Low to moderate dependence	Moderate dependence	High dependence
Indigenous Australian	*Male*	20%	50%	20%	10%
	Female	61%	26%	13%	0%
Non-Indigenous	*Male*	33%	33%	33%	0%
	Female	25%	25%	25%	25%
Indigenous Australian and non-Indigenous	*Male*	26.3%	42.1%	26.3%	5.3%
	Female	57.1%	25.7%	14.3%	2.9%

Table 5: How soon after you wake up do you smoke your first cigarette?

Within 5 minutes	6-30 minutes	31-60 minutes	After 60 minutes
20%	30%	20%	30%

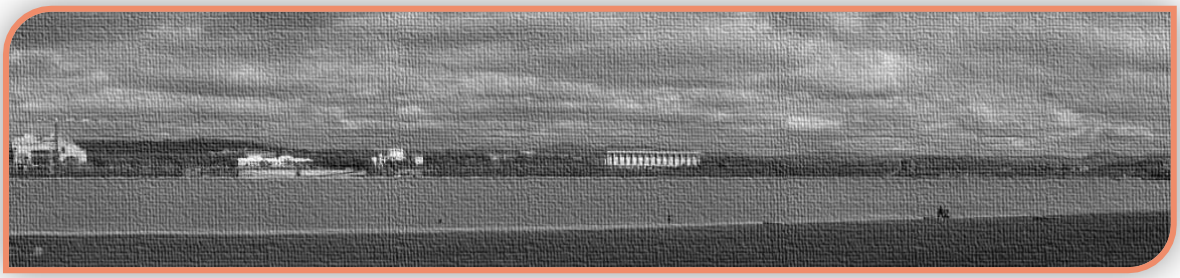
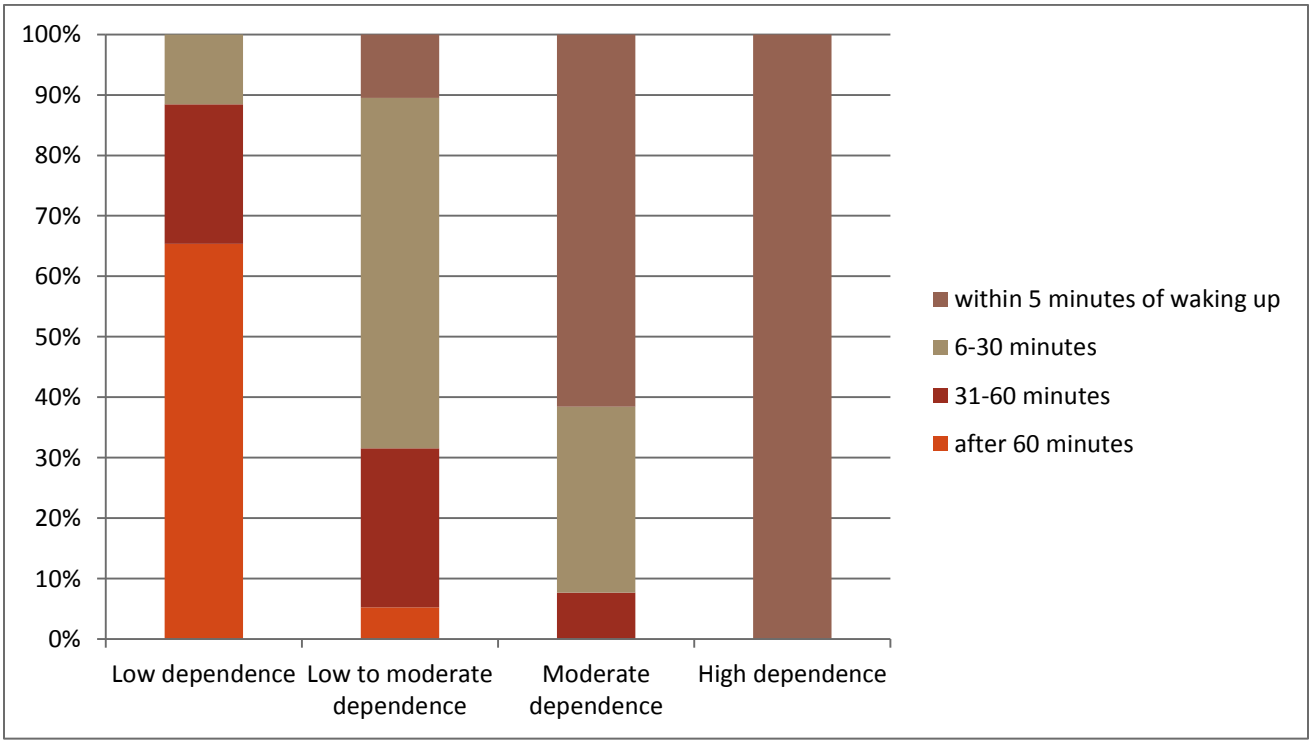


Figure 16: Proportion of Fagerström Test for Nicotine Dependence category by how soon after you wake up you smoke your first cigarette



Number of cigarettes smoked per day

The vast majority of Aboriginal and Torres Strait Islander smokers smoked less than 20 cigarettes per day (61% reported smoking 10 cigarettes or less per day, and 30% smoked 11 – 20 per day). In comparison, non-Indigenous smokers indicated 29% of smokers consumed 10 cigarettes or less per day; 36% smoked 11-20; and 36% smoked 21-30. No participants (Aboriginal and Torres Strait Islander smokers and non-Indigenous smokers) smoked more than 30 cigarettes per day.

Figure 17: Number of cigarettes smoked per day, by Indigenous status

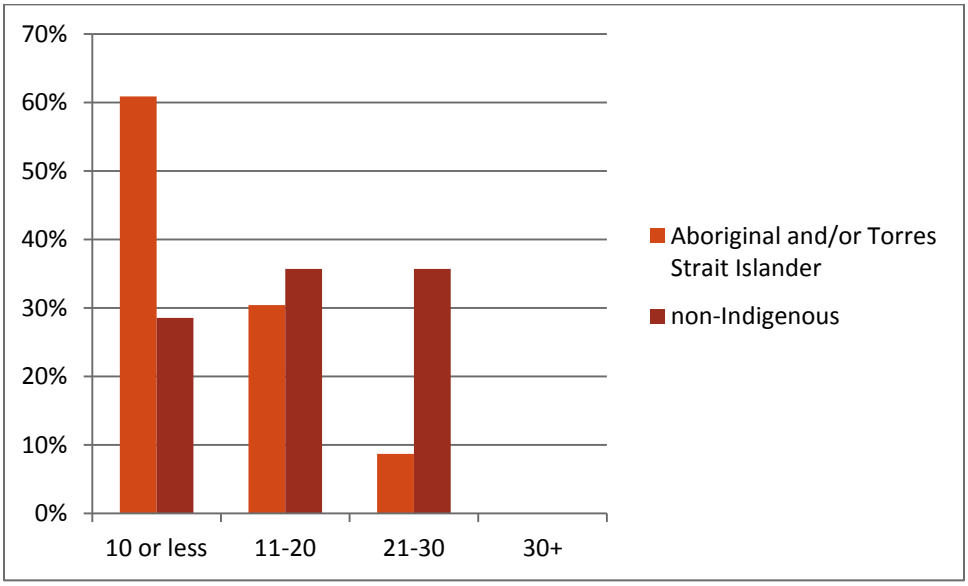
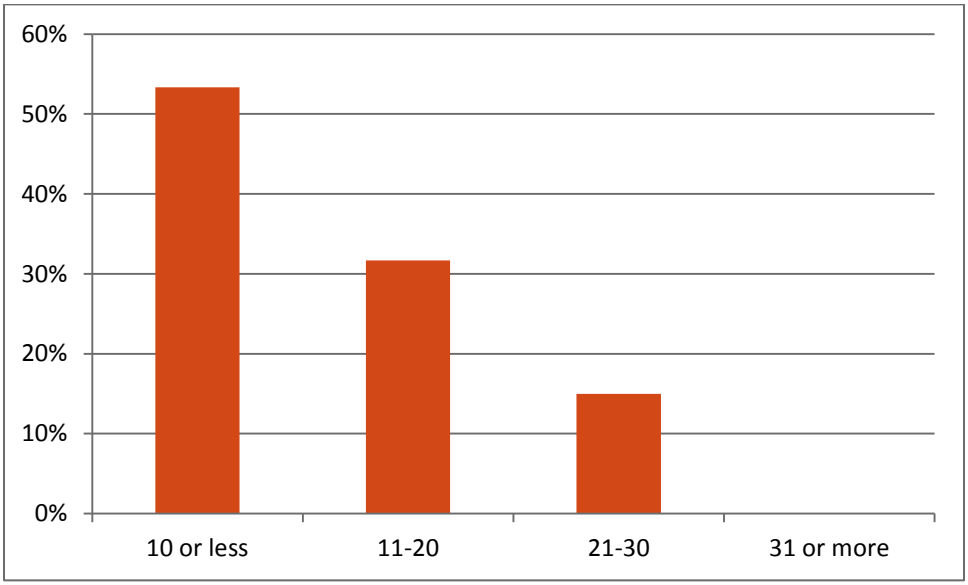


Figure 18: Number of cigarettes smoked per day



Other Fagerström Test for Nicotine Dependence questions

One in five smokers (20%) found it difficult to refrain from smoking in places where it is forbidden (such as a church, library, cinema, shops, etc) and just over a third (37%) of Aboriginal and Torres Strait Islander smokers would hate to give up the first cigarette in the morning. In contrast, 71% of non-Indigenous smokers reported that they would hate to give up their first cigarette in the morning and 45% of all smokers indicated that they would hate to give up their first cigarette in the morning.

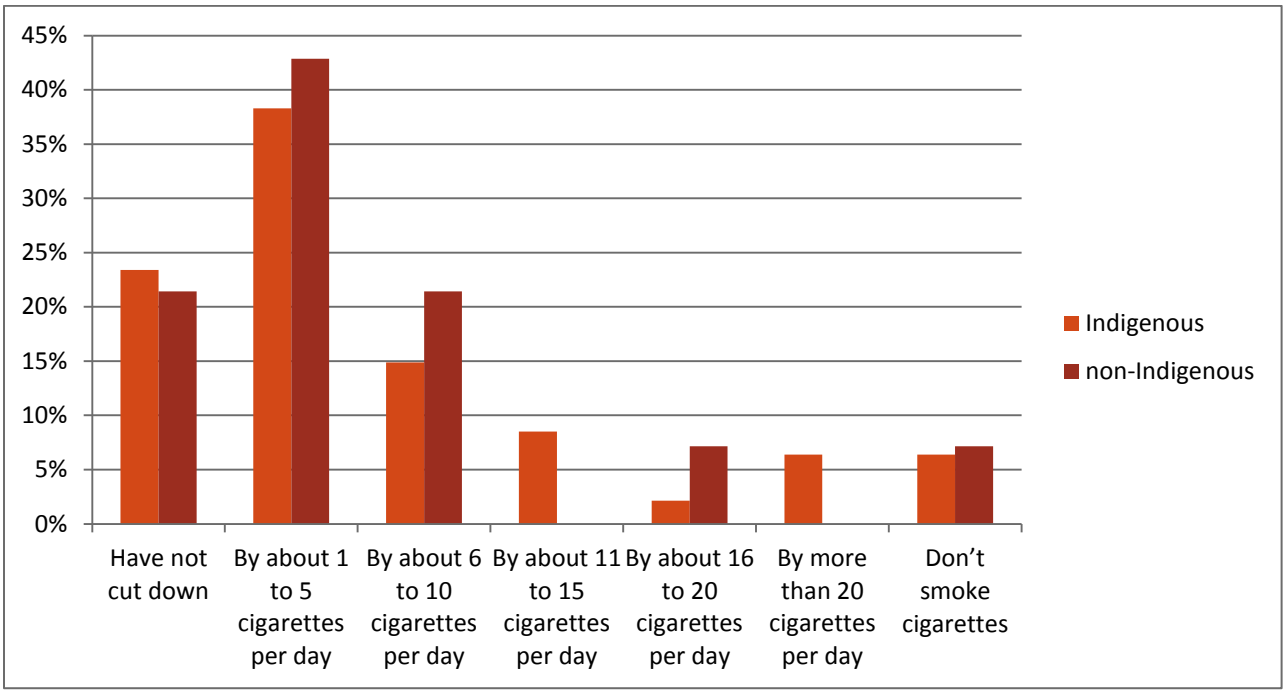
Overall, 32% of smokers used tobacco more frequently in the first hours after waking than during the rest of the day. Similarly, 33% of Aboriginal and Torres Strait Islander smokers and 29% of non-Indigenous smokers smoked more frequently during the first hours after waking. When participants were asked if they smoke when they are so ill they are in bed most of the day, 17% of Aboriginal and Torres Strait Islander smokers and 21% of non-Indigenous smokers reported that they continued to smoke. Overall, 18% of participants who identified as current smokers, smoked if they were so ill they were in bed most of the day.

Motivation to change

Overall, 75% of survey participants cut down their tobacco use within the last 12 months. Notably, 38.3% of Aboriginal and Torres Strait Islander participants and 42.9% of non-Indigenous participants had cut down by 1 to 5 cigarettes per day in the last 12 months; and 14.9% and 21.4% of Aboriginal and Torres Strait Islander and non-Indigenous participants had cut down by about 6 to 10 cigarettes per day respectively. The 2010 National Drug Strategy Household Survey Report indicated shifts in smoking behaviour among both Aboriginal and Torres Strait Islander smokers, and non-Indigneous smokers aged 14 years and older (7). For example, 37.6% of smokers had reduced the amount of tobacco smoked in a day in 2010, with this proportion significantly increasing since 2007 (7).

This high rate of reduction in the ACT region could be due to numerous reasons, with participants indicating that the effects on health or fitness (50%), smoking costs too much (37.7%) and that they want to be fit (36.8%) as motivation to give up, cut down, change to a lower tar or nicotine brand or not smoke at all. More information on reasons to cut down, change to a lower tar or nicotine brand or not smoke from the survey is provided at *Smoke free and quitting behaviours*.

Figure 19: In the last 12 months, how much do you think you have cut down on your cigarette smoking



In contrast, under a quarter (23.4%) of Aboriginal and Torres Strait Islander participants and 21.4% of non-Indigenous participants had not cut down in the last 12 months.

Overall, participants indicated that in the last 12 months, they had:

- successfully given up smoking (for more than a month) (21%)
- tried to give up unsuccessfully (42%)
- changed to a brand with lower tar or nicotine content (15%)
- tried to change to a brand with lower tar or nicotine content, but were unsuccessful (7%)
- reduced the amount of tobacco smoked in a day (52%)
- tried to reduce the amount of tobacco smoked in a day, but were unsuccessful (21%)
- none of these (11%)

A number of changes in smoking behaviour were also identified in the 2010 National Drug Strategy Household Survey Report among both Aboriginal and Torres Strait Islander smokers, and non-Indigneous smokers aged 14 years and older (7). Respondents indicated that 19.1% of smokers had successfully given up smoking for more than a month in 2010 and 25.2% had tried to give up, but did not succeed (7). Furthermore, 37.6% of smokers had reduced the amount of tobacco smoked in a day in 2010 (7).

Table 6: Smoking behaviours within the last 12 months

	Aboriginal and Torres Strait Islander people	Non-Indigenous	Overall	2010 National Drug Strategy Household Survey Report[3]
Reduced the amount of tobacco you smoke in a day	48%	64%	52%	38%
Tried to give up unsuccessfully	38%	57%	42%	25%
Successfully given up smoking (for more than a month)	23%	14%	21%	19%
Tried to reduce the amount of tobacco smoked in a day, but was unsuccessful	19%	29%	21%	16%
None of these	13%	7%	11%	23%
Changed to a brand with lower tar or nicotine content	10%	29%	15%	13%
Tried to change to a brand with lower tar or nicotine content, but was unsuccessful	4%	14%	7%	3%

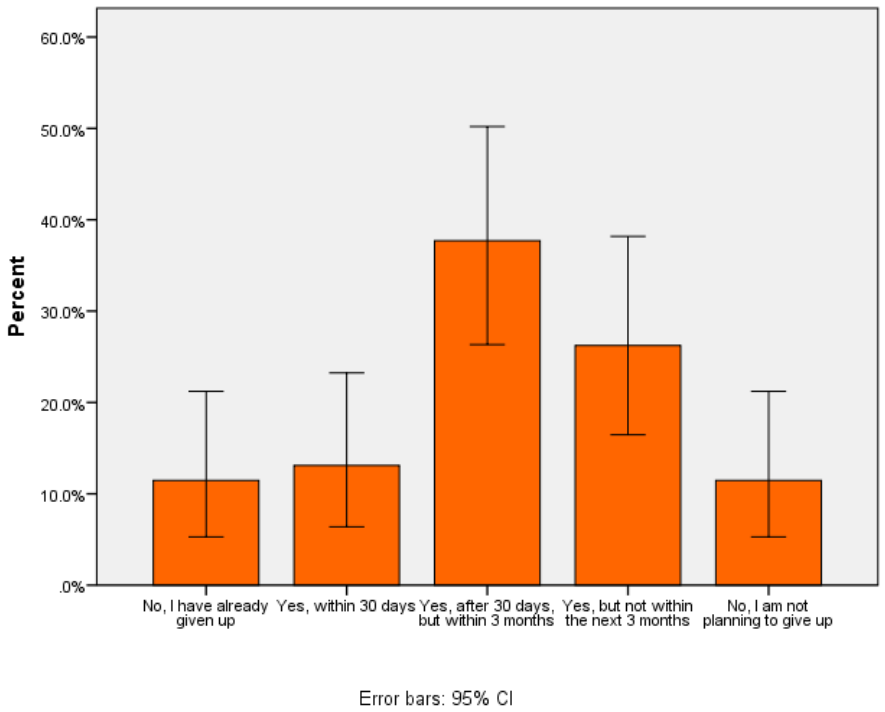
[3] The 2010 National Drug Strategy Household Survey Report for both Aboriginal and Torres Strait Islander smokers, and non-Indigneous smokers aged 14 years and older 7. Australian Institute of Health and Welfare. 2010 National Drug Strategy Household Survey report. 2011.

Figure 20: Smoking advice and behaviours within the last 12 months

	Aboriginal and Torres Strait Islander people	Non-Indigenous
Discussed smoking and health at home	11%	22%
Asked your doctor for help to quit	8%	6%
Used nicotine gum, nicotine patch or nicotine inhaler	8%	3%
Used nicotine gum, nicotine patch or nicotine inhaler	8%	3%
Asked a health professional at Winnunga for help to quit	7%	3%
No More Boondah – one-on-one support	5%	0%
Spoken with a Tobacco Action Worker for help to quit	5%	0%
Read "How to Quit" literature	4%	22%
Used the Internet to help you quit	4%	13%
No More Boondah – group session	4%	0%
Done something else to help you quit	3%	9%
Rung the "QUIT" line	2%	0%
Used a smoking cessation pill (e.g. Zyban)	2%	6%
None of the above	3%	3%

Notably, 87.2% of Aboriginal and Torres Strait Islander smokers and 92.9% of non-Indigenous smokers were planning on giving up. Therefore, only 12.8% and 7.1% of Aboriginal and Torres Strait Islander and non-Indigenous smokers were not planning on giving up respectively.

Figure 21: Behaviour change, do you plan on giving up?



The following figures represent participants' thoughts about smoking. Respondents were asked how often they had the following thoughts in the last month: "you enjoy smoking"; "the harm smoking"; "stopped yourself from having a cigarette when you had an urge to smoke"; and "deliberately cover up or concealed your pack, or put your cigarettes in another container". The response options were never, once or twice, several times, or many times.

As illustrated in *Figure 22*, 37% of respondents did not think about how much they enjoyed smoking in the last month, while 35% had once or twice. When asked if they had stubbed out a cigarette before they had finished, due to thoughts about the harm of smoking, 48% indicated never; 23% once or twice; and 22% several times. Furthermore, 18% of participants had not stopped themselves from having a cigarette when they had an urge to smoke, with 46% and 21% indicating once or twice, and several times respectively. Over half (52%) of respondents had not deliberately covered up or concealed their pack, or put their cigarettes in another container within the last month, with 23%; 10%; and 15% indicating they had once or twice; several times; and many times respectively.

Figure 22: In the last month, how often did you do the following?

In the last month:	Never	Once or twice	Several times	Many times
How often did you think about how much you enjoyed smoking?	37%	35%	23%	5%
How often did you stub out a cigarette before you finished it because you thought about the harm of smoking?	48%	23%	22%	7%
Stop yourself from having a cigarette when you had an urge to smoke?	18%	46%	21%	15%
Deliberately cover up or conceal your pack, or put your cigarettes in another container?	52%	23%	10%	15%

Social networks

Social, family, community, environmental and economic factors all influence health behaviours (27). Evidence suggests that the social network structure can impact health behaviour and that normative behaviour and other peer stimuli transmitted through network ties can shape behaviours, such as tobacco use (28, 29). Roles played by family members and others in the smoking initiation process have been found to be complex and include those of initiator, prompter, accomplice, and inadvertent source of cigarettes (30). Christakis and Fowler (31) found clusters of smokers and non-smokers in social networks, with network phenomena appearing to be applicable to quitting (31). Smoking behaviours can spread through social ties and groups of interconnected people can stop smoking in concert (31). A better understanding of the relationship between Aboriginal and Torres Strait Islander social networks and smoking behaviour is required and may have implications for public health, and possibly clinical, interventions to reduce and prevent smoking (28, 31).

Number of regular smokers among participants five closest friends and family

As illustrated in *Figure 23*, approximately a quarter of participants reported that 80% or over of their five closest friends and family were regular smokers. Just under half of respondents indicated that two or three of their five closest friends and family were regular smokers and approximately a third reported one or less were regular smokers.

Figure 23: Number of regular smokers among participants' five closest friends and friends and family

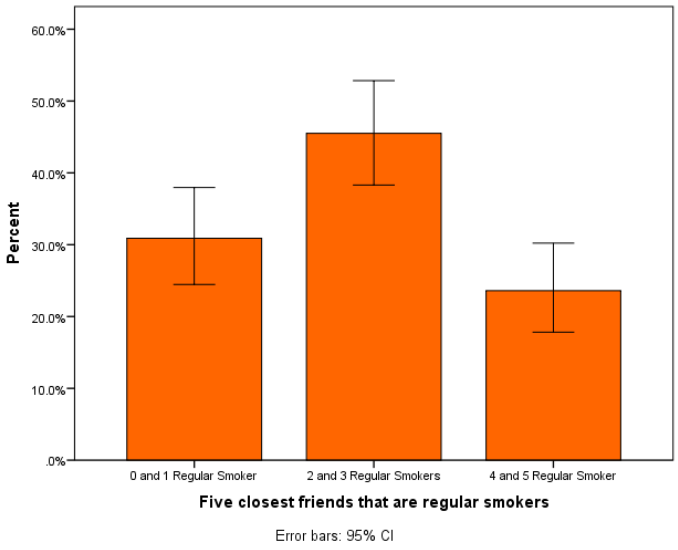
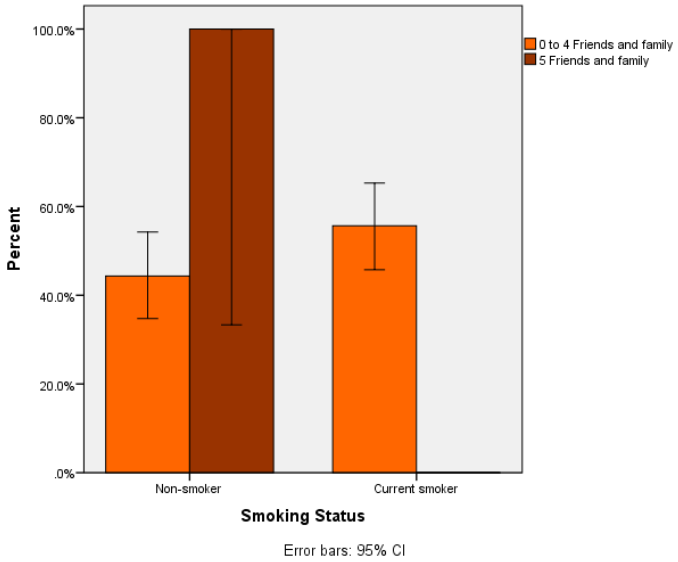


Figure 24: Number of regular smokers among participants' five closest friends and friends and family by smoking status



Approximately a quarter (23.6%) of Aboriginal and Torres Strait Islander participants reported that all five of their closest friends and family were regular smokers, of which 62.1% indicated they were current smokers. The findings indicate a significant difference between participants who self-reported as current tobacco users and reported that all of their five closest friends and family were regular tobacco smokers (14.9%) $\chi^2 = 10.891$, $p<0.01$. Current tobacco smokers were 4.2 times more likely to have all five of their closest social circle as regular tobacco smokers based on the OR. In addition, there was a significant difference between being a current smoker (62.5%) and reporting that none of the respondents five closest friends and family smoked ($\chi^2 = 8.118$, $p<0.05$). A respondent was 5.4 times more likely to be a non-smoker, than a smoker if none of their five closest friends and family smoked based on the OR.

Figure 25: Number of regular smokers among 5 closest friends and family, by smoking status

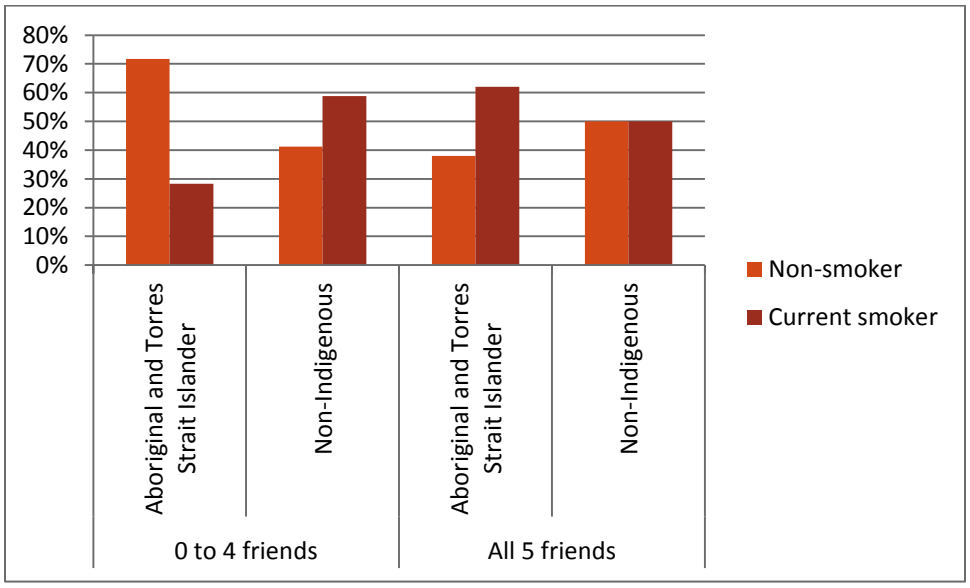
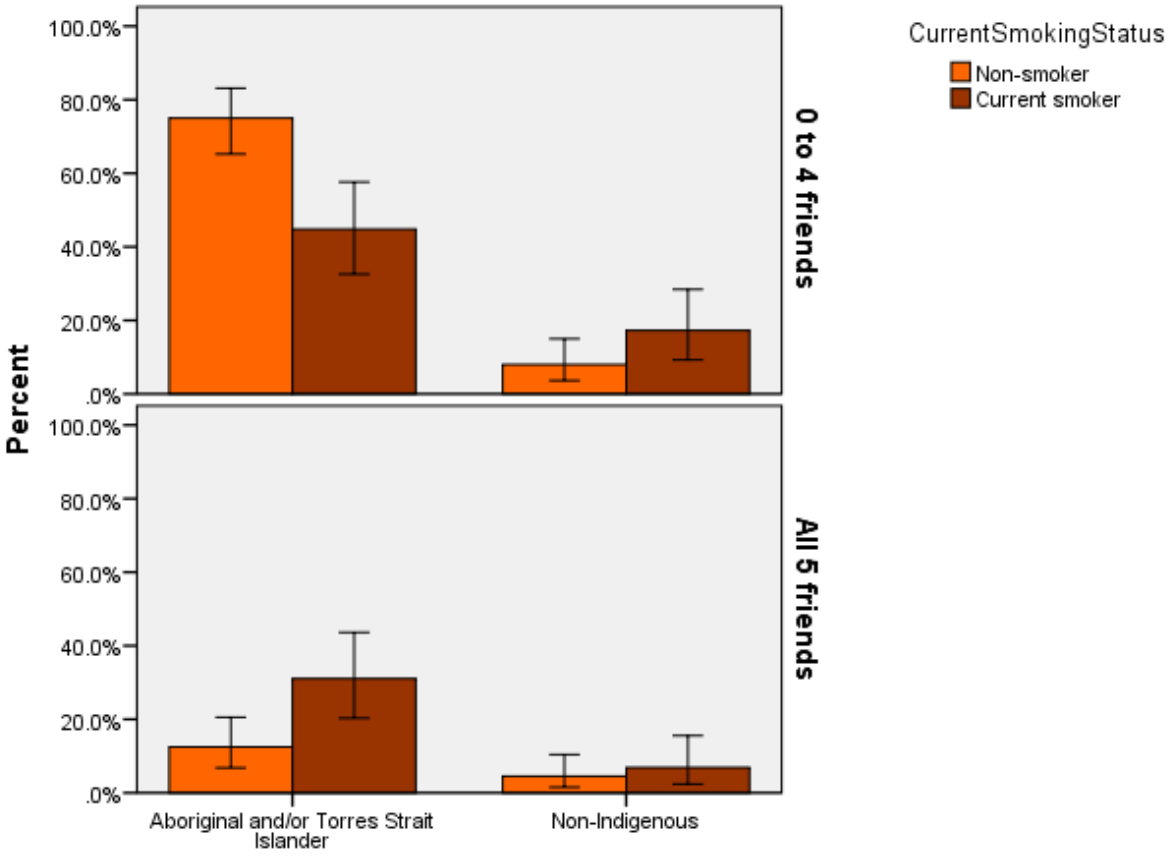


Figure 26: Number of regular smokers among participants' 5 closest friends and family, by smoking status



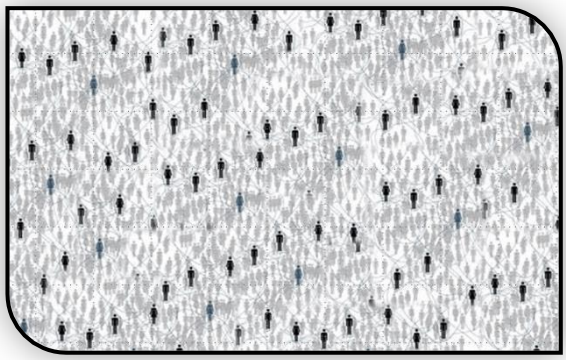
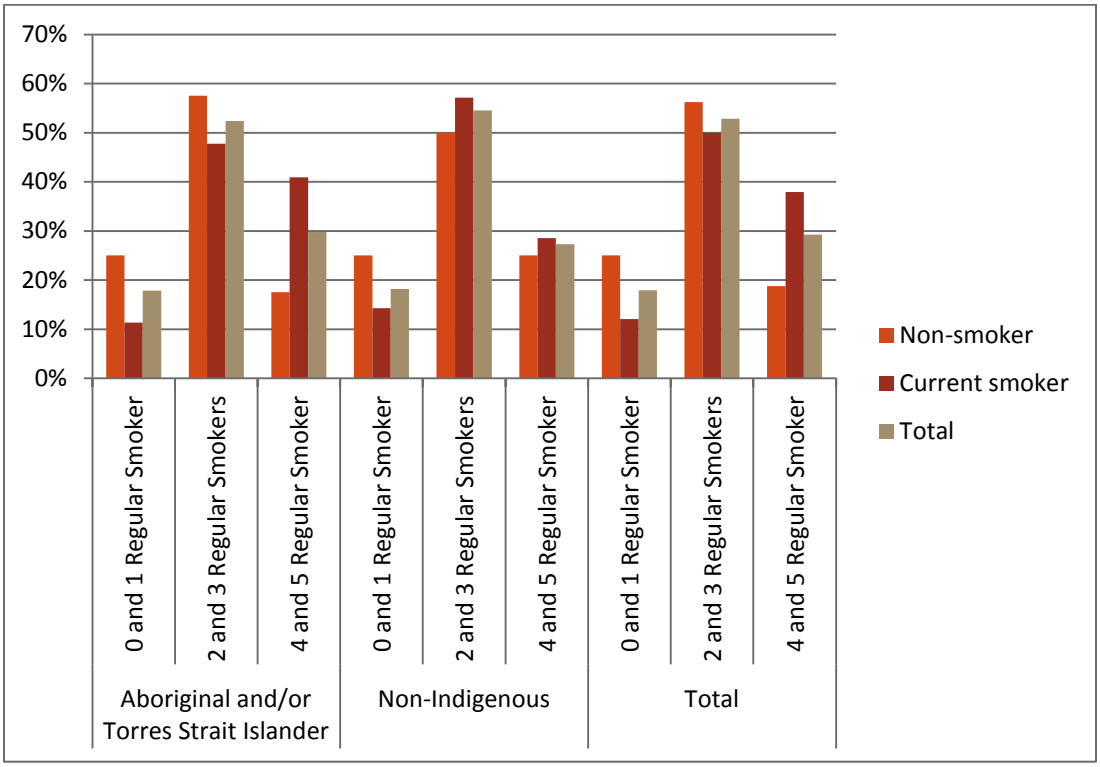


Figure 27: Number of regular smokers among participants' five closest friends and family, by smoking status



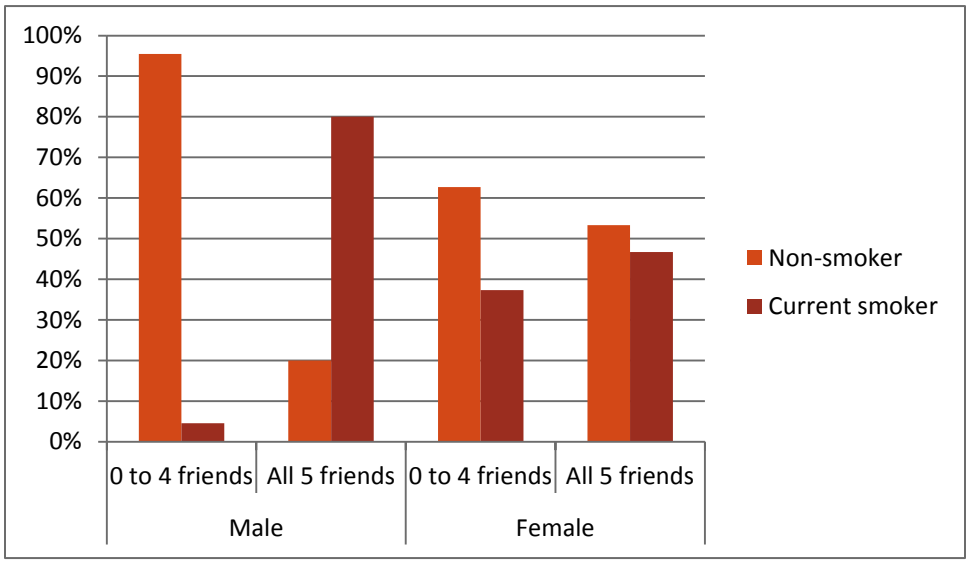
A third (33.3%) of male respondents reported that all five of their closest friends and family were regular smokers, of which 67% were current smokers. The findings indicate a significant difference between male participants who self-reported as current smokers and that all of their five closest friends and family were regular tobacco smokers (33.3%) $\chi^2 = 6.667$, $p<0.05$. Male respondents who indicated that all five of their closest social circle were regular tobacco smokers were 5.5 times more likely to be current tobacco smokers[4].

There was also significant difference between among male Aboriginal and Torres Strait Islander participants who self-reported as current smokers and indicated that all of their five closest friends and family were regular tobacco smokers (25%) $\chi^2 = 19.363$, $p<0.01$. Male Aboriginal and Torres Strait Islander respondents who indicated that all five of their closest social circle were regular tobacco smokers were 84 times more likely to be current tobacco smokers compared to those who reported 80% or less of their closest friends and family were regular smokers[4].

The findings did not indicate a statistically significant difference for females. This aligns with Alexander and others qualitative findings, *Taking a First Puff: cigarette smoking experiences among ethnically diverse adolescents*, that found males were more likely than females to describe experiences involving peers applying messages to conform to smoking behaviors[4] (30).

[4] Based on the OR

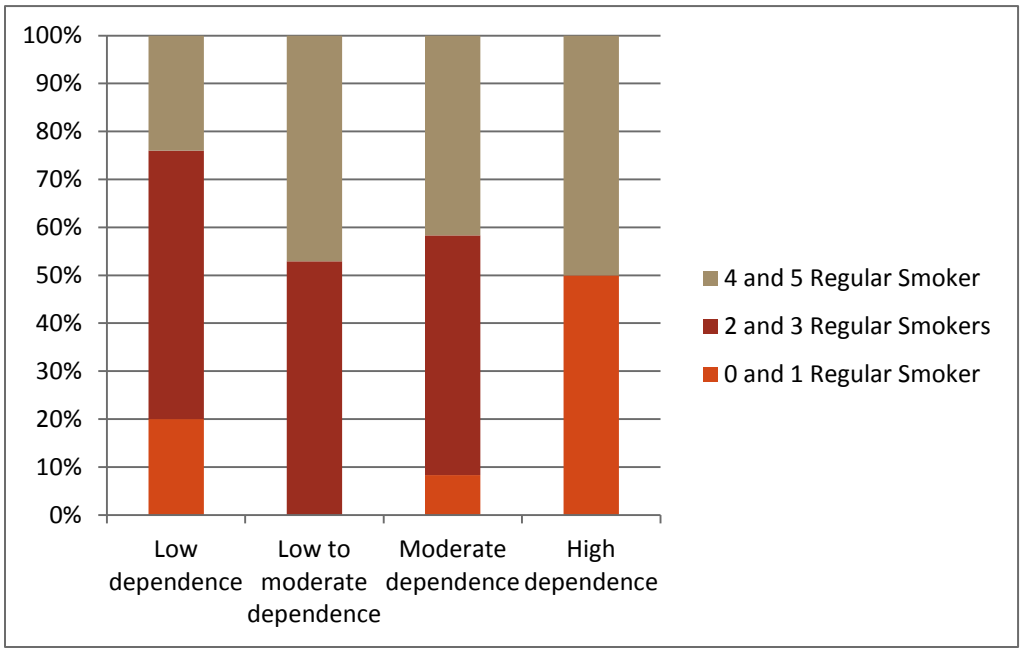
Figure 28: Number of regular smokers among Aboriginal and Torres Strait Islander participants' five closest friends and family, by smoking status and gender



Social circles and nicotine dependence

Among Aboriginal and Torres Strait Islander smokers registering high nicotine dependence; at least 80% of their five closest friends and family were regular smokers. Furthermore, those Aboriginal and Torres Strait Islander smokers with a maximum of one of their closest friends and family as regular smokers, all registered low dependence on the FTND. This was not reflected among the non-Indigenous participants as illustrated in *Figure 29*.

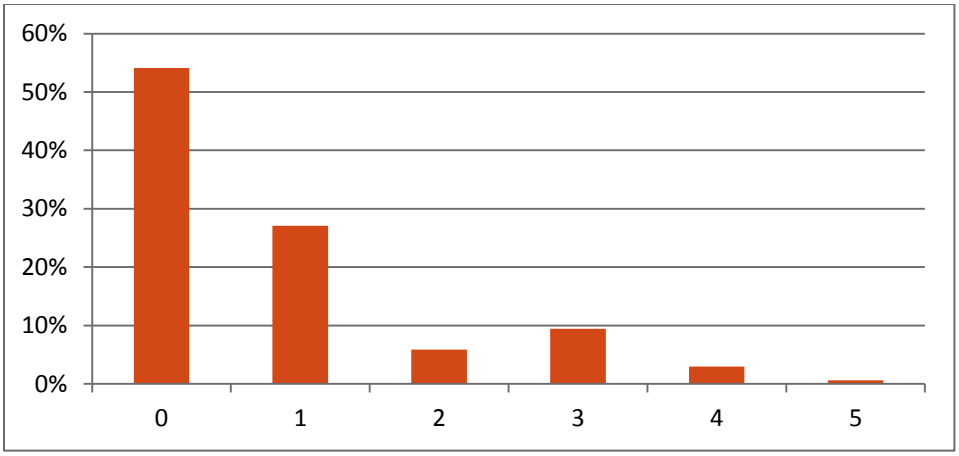
Figure 29: Fagerström Test for Nicotine Dependence category by the number of regular smokers among participants' five closest friends and family



Closest social circle becoming ex-smokers in the past 5 years

Only 18% of respondents indicated that none of their five closest friends and family smoked, but 46% of participants reported that at least one of their five closest friends and family had become an ex-smoker. Furthermore, 19% of participants reported that at least two of their five closest friends and family had become ex-smokers in the past 5 years. Nonetheless, the majority (54%) indicated none of their five closest friends and family had become ex-smokers in the last five year.

Figure 30: Number of participants' five closest friends and family who became ex-smokers in the past 5 years



All participants who reported that 80% or more of their five closest friends and family had become ex-smokers in the past five years were non-smokers.

Figure 31: Number of participants' five closest friends and family who became ex-smokers in the past 5 years

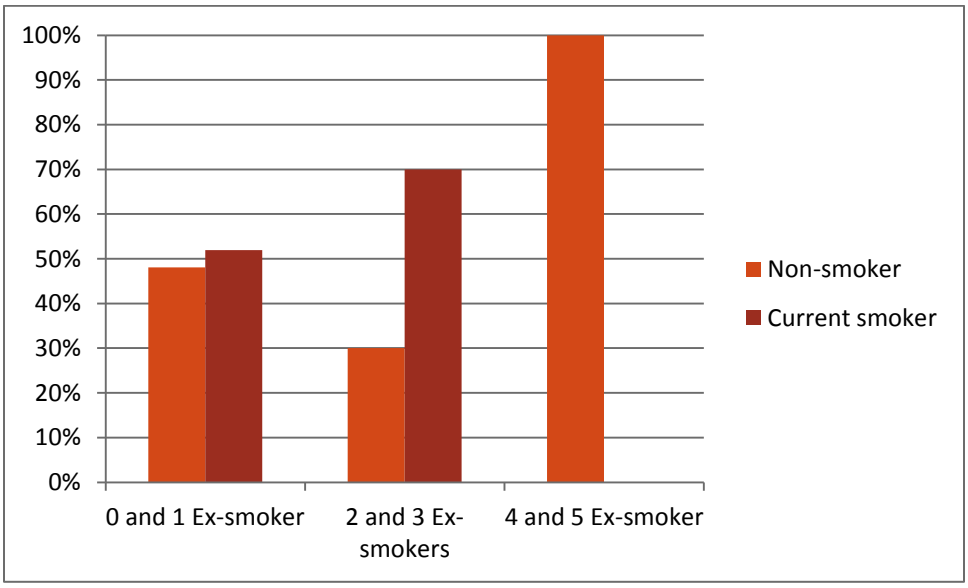
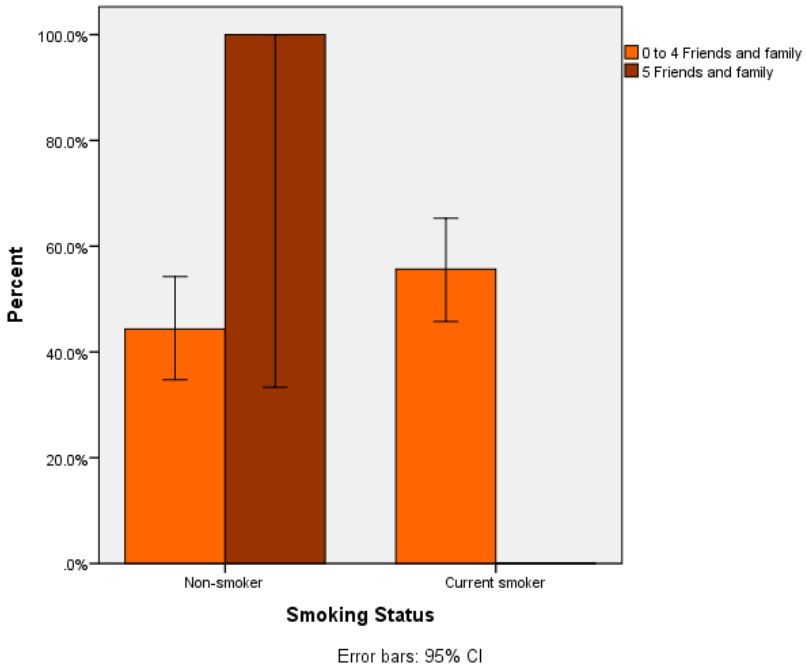
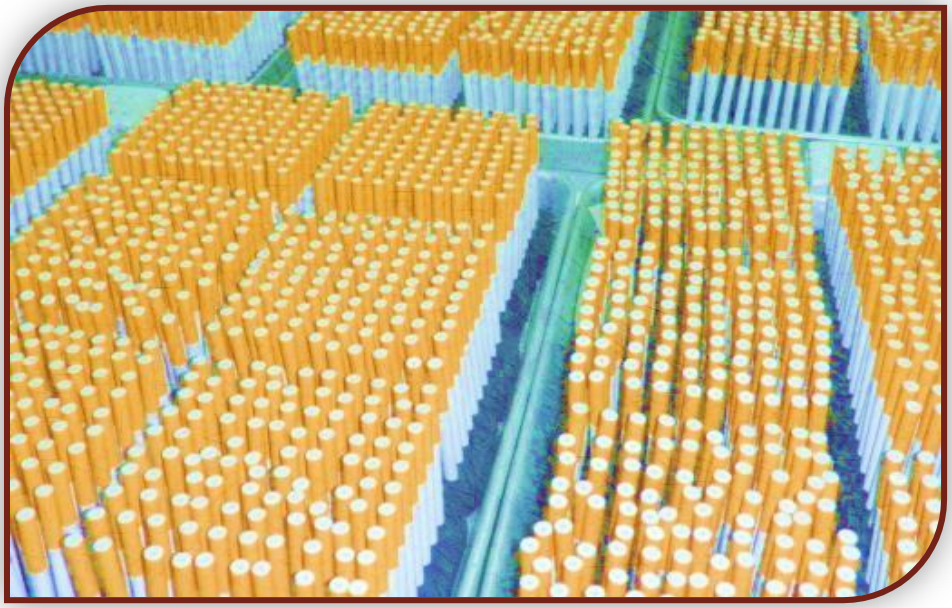


Figure 32: Number of participants' five closest friends and family who became ex-smokers in the past 5 years



As illustrated in *Figure 33*, the importance of family was highlighted when asked to name one of their role models. Respondents indicated that parents, siblings, grandparents, Elders, Uncles, Aunties, rugby leagues players, and sports men and women as their role models.

Figure 33: Role models text analysis

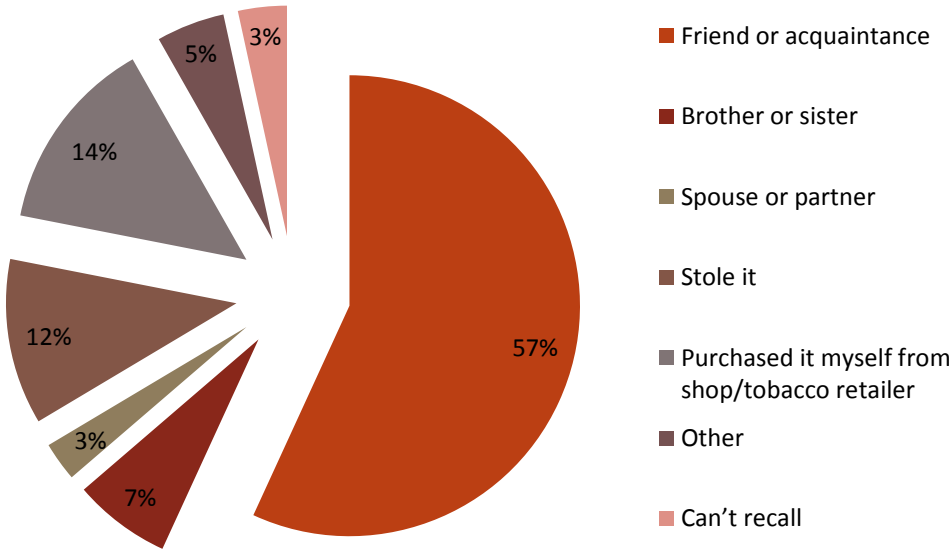


First cigarette experience…

Supplier of first cigarette

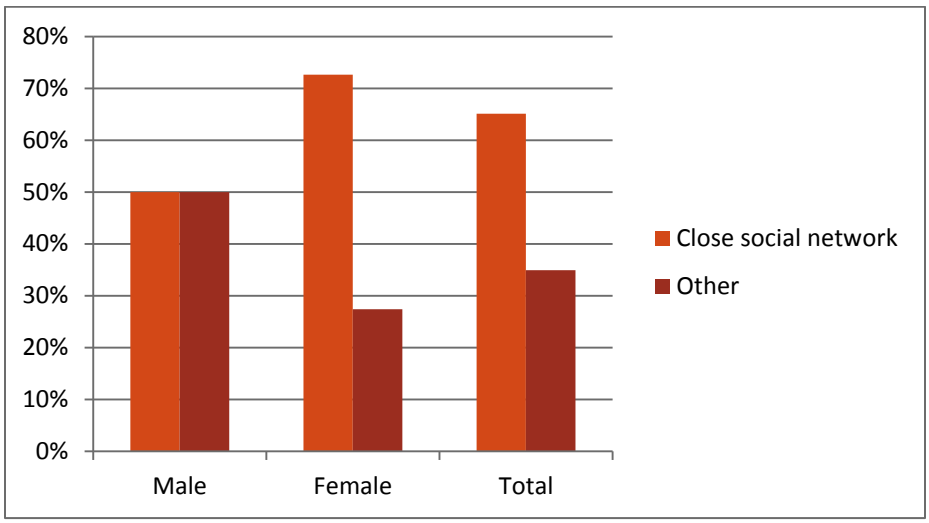
The results demonstrate that respondents' closest social circles may play a role in relation to tobacco use. The majority of participants (57%) were supplied them with their first cigarette from a friend or acquaintance, followed by purchased it myself (14%), stole it (12%), and brother or sister (7%). Similarly, the 2010 National Drug Strategy Household Survey (7) reported a friend or acquaintance (56%) was the most likely source of current and former smokers' first ever cigarette, followed by stole it (12%), purchased it myself (12%), and relative/partner (10%).

Figure 34: Supplier of first cigarette



There was a significant difference among female participants who were supplied their first cigarette through their close social network—friends or acquaintance, brother or sister, spouse or partner, or parent (48.4%) $\chi^2 = 6.303$, $p<0.05$. Female respondents were 2.65 times more likely than male respondents to be supplied their first cigarette through their close social network based on the OR. According to Alexander et al. (30), peers and parents appear to be more influential in relation to smoking behaviors of adolescent girls than adolescent boys (30).

Figure 35: Supplier of first cigarette by gender



Age of first cigarette

The mean age of first use of tobacco for males and females was 15.5 years (mode was 15 years). A comparable mean age of initial tobacco use was among Aboriginal and Torres Strait Islander people was not identified. However, the 2004 National Drug Strategy Household Survey reported that of Australians aged 14 years and older who had ever smoked, males had their first cigarette at the mean age of 15.2 years and females at 16.5 years (32).

Figure 36: Age of first cigarette

Where do people go for advice?

Where do you go to seek health or medical advice and information?

Participants indicated seeking health or medical advice and information from various sources. This included the Local GP (53%), the Aboriginal Medical Service (50%), the internet (35%) and discussion/advice with family or friends (27%). Participants also reported Individual counselling/discussion with health service providers; Accessing books, videos/DVDs or websites; Single class or seminar; Discussion/advice from community elders or traditional medicine woman; and Series of classes or seminars were also used when seeking health and medical advice.

Table 7: Where do you go to seek health or medical advice and information

Source of health or medical advice	%
Local GP	53
Aboriginal Medical Service	50
The internet	35
Discussion/advice with family or friends	27
Individual counselling/discussion with health service providers	8
Accessing books, videos/DVDs or websites	8
Single class or seminar	6
Discussion/advice from community elders or traditional medicine woman	5
Series of classes or seminars	3

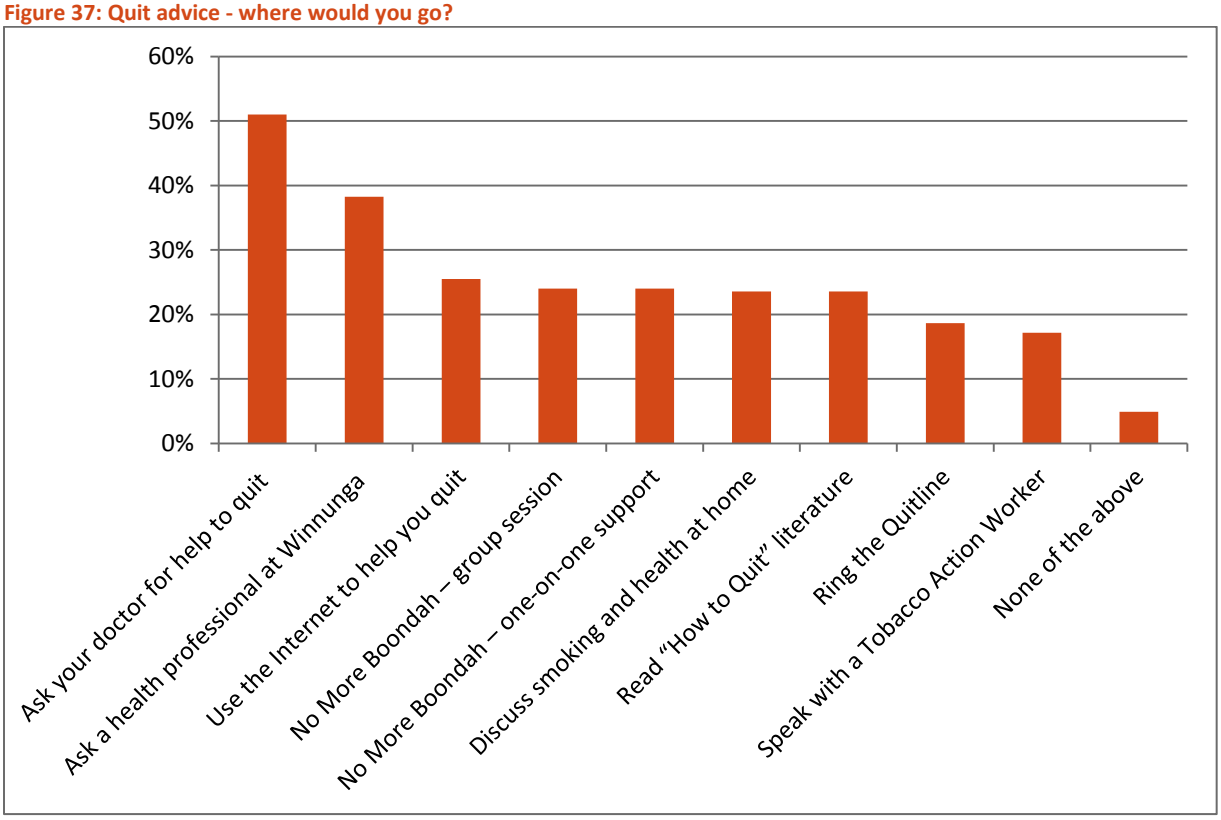
Quit advice - where would you go?

Participants were asked where they would go if they were seeking advice on quitting smoking, with 51% of all participants indicating they would ask their Doctor and 38% indicating they would ask a health professional at Winnunga. Notably, 5% of participants (6% of Aboriginal and Torres Strait Islander participants) indicated they would not seek advice from these sources.

Table 8: If you were seeking advice on quitting smoking, where would you go?

	Aboriginal and Torres Strait Islander people	Non-Indigenous	Total
Ask your doctor for help to quit	49%	66%	51%
Ask a health professional at Winnunga for help to quit	41%	28%	38%
Use the Internet to help you quit	26%	25%	24%
No More Boondah – one-on-one support	24%	28%	24%
No More Boondah – group session	23%	31%	24%
Discuss smoking and health at home	22%	31%	19%
Read "How to Quit" literature	21%	41%	17%
Ring the "Quitline"	18%	25%	17%
Speak with a Tobacco Action Worker for help to quit	16%	25%	25%
Other	10%	3%	9%
Don't know	5%	9%	5%
None of the above	6%	0%	5%

Figure 37: Quit advice - where would you go?



Smoke free and quitting behaviours

Motivations to give up, cut down, change to a lower tar or nicotine brand or not smoke at all

A range of reasons resonated with participants as motivation to try giving up, cutting down, changing to a lower tar or nicotine brand or not smoke at all. This reinforces the evidence around population based tobacco control more broadly, indicating that there is no single solution to reducing or ceasing tobacco use (8, 33-35).

Overall, half of the sample reported the *effects on health or fitness* (50%), over a third reported that *smoking costs too much* (37.7%) and that they *want to be fit* (36.8%) as motivation to give up, cut down, change to a lower tar or nicotine brand or not smoke at all. *No More Boondah' - group session* (14.7%), *No More Boondah' - one-on-one support* (13.7%) and *doctor advised me not to smoke* (16.7%) were also motivating factors. In relation to family and friends, a significant proportion of participants indicated the following motivating factors:

- *Family and/or friends* (36.3%);
- *I was worried it would affect the health of those around me* (27.0%); and
- *I am pregnant or planning to start a family* (21.1%).

Smoking restrictions in public areas (e.g. restaurants, sporting venues, etc) (14.7%) and smoking restrictions in the work place (13.2%) were motivating factors to quitting or staying smoke free. Given that just over one in ten participants (11%) reported their workplace or school had no smoking restrictions or permitted smoking inside, there is room for improvement in this area. Approximately a quarter of participants also reported that health warnings on cigarette packets (26.5%) and government advertisements on television, press or radio (24.0%) were motivating to try giving up, cutting down, changing to a lower tar or nicotine brand or not smoke at all.

Table 9: Which of the following would motivate you to try giving up, cutting down, changing to a lower tar or nicotine brand or not smoke at all?

Motivating factor	Percentage of respondents (%)
The effects on my health or fitness	50.0%
It costs too much	37.7%
I want to be fit	36.8%
Family and/or friends	36.3%
I was worried it would affect the health of those around me	27.0%
Health warnings on cigarette packets	26.5%
Government advertisements on TV, press or radio	24.0%
I am pregnant or planning to start a family	21.1%
My doctor advised me not to smoke	16.7%
No More Boondah - group session	14.7%
Smoking restrictions in public areas (e.g. restaurants, sporting venues, etc)	14.7%
No More Boondah - one-on-one support	13.7%
Smoking restrictions in the work place	13.2%
Advertising for products such as nicotine gum, patches or Zyban.	12.7%
Quitline	11.8%
Plain packaging (plain olive brown coloured packets)	8.8%
Tobacco Information Line (i.e. phone number on cigarette packet)	7.8%
Beyond Today campaign	5.4%

Reasons not to smoke

Participants ranked a wide range of reasons not to smoke on a particular occasion or at all in order of importance, ranging from extremely important to not important. Participants indicated the leading reason not to smoke to be *extremely important* or *very important*:

- I need money for things other than smoking (67%);
- Smoking may interfere with my performance (61%);
- Smoking may make me vulnerable and put me at risk for harm (53%);
- My family gets upset when I smoke (48%);
- One or both of my parents do or have smoked (47%); and
- Smoking impairs peoples' control of themselves, and I like to be in full control (46%).

Participants indicated the following reasons not to smoke as *not important* or *slightly important*:

- My religion does not allow smoking (83%);
- Smoking is against my spiritual and religious beliefs (79%);
- My culture does not allow smoking (74%);
- I have a genetic condition which makes it hard for my body to handle smoking (63%);

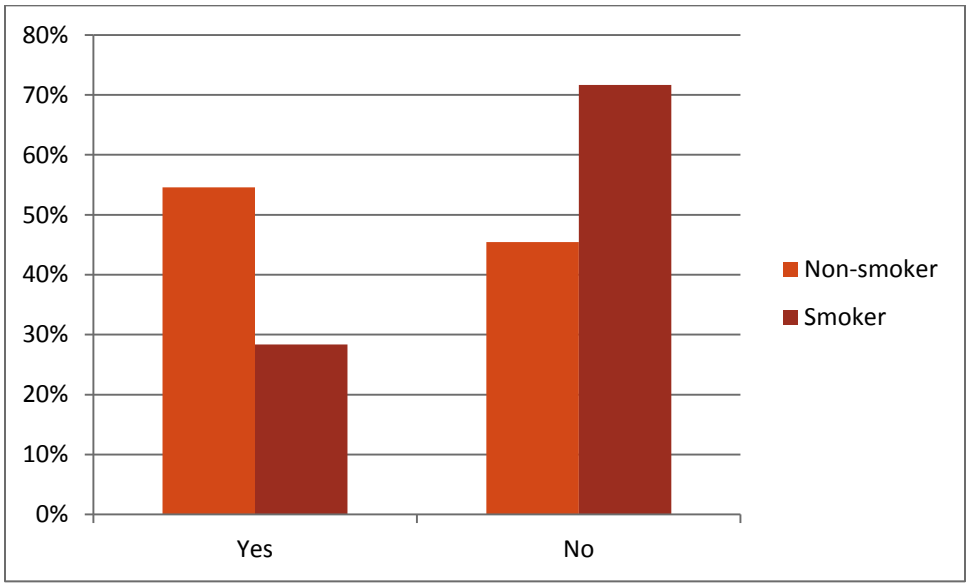
- I was brought up to abstain from smoking (52%);
- I have or used to have a smoking problem (51%); and
- I don't want to act like people I've encountered who smoke (50%).

Exposure to environmental tobacco smoke

Notably, 49% of respondents avoid places where they may be exposed to cigarette smoke. This included 62% of non-smokers and 28% of smokers. Results also indicated a significant difference between smokers and non-smokers (χ^2= 16.783, p<0.01). Based on the OR, a participant who identified as a non-smoker was 4.15 times more likely to avoid places where they may be exposed to tobacco smoke than a smoker.

Approximately a quarter of smokers who avoided places where they may be exposed to other people's cigarette smoke had total smoking bans in their school or workplace. Furthermore, smokers who avoided places where they may be exposed to other people's cigarette smoke indicated that 36% had one or less of their five closest friends as regular smokers.

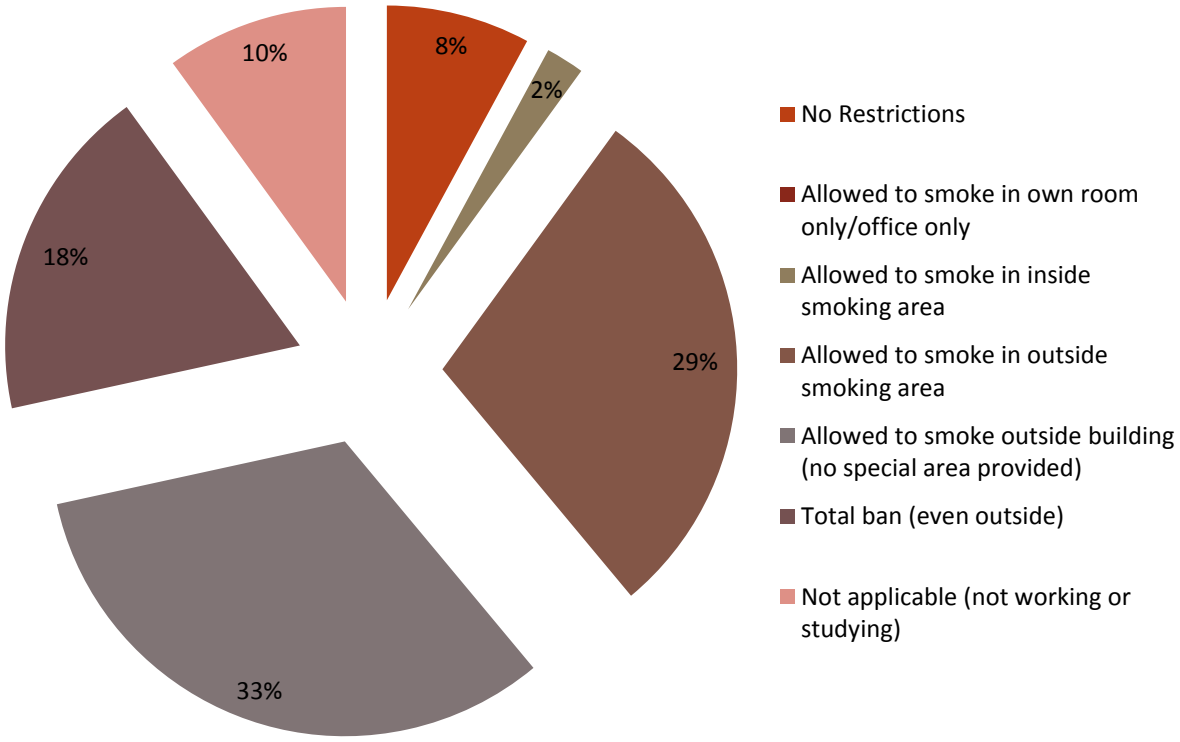
Figure 38: Do you avoid places where you may be exposed to other people's cigarette smoke



Smoke free workplace policy

Respondents generally had smoke free workplace policy in their school or workplace. However, 2% (95% CI, 0.0–4.4) of participants were allowed to smoke in an inside smoking area and 8% (95% CI, 3.3–12.0) of participants did not have a smoke free policy, with 82% of those without a smoke free policy reporting that they were smokers. In contrast, approximately 18% of participants had a total ban on smoking in their school or workplace, of which, 59% were non-smokers and 41% were smokers.

Figure 39: Smoke free workplace policy

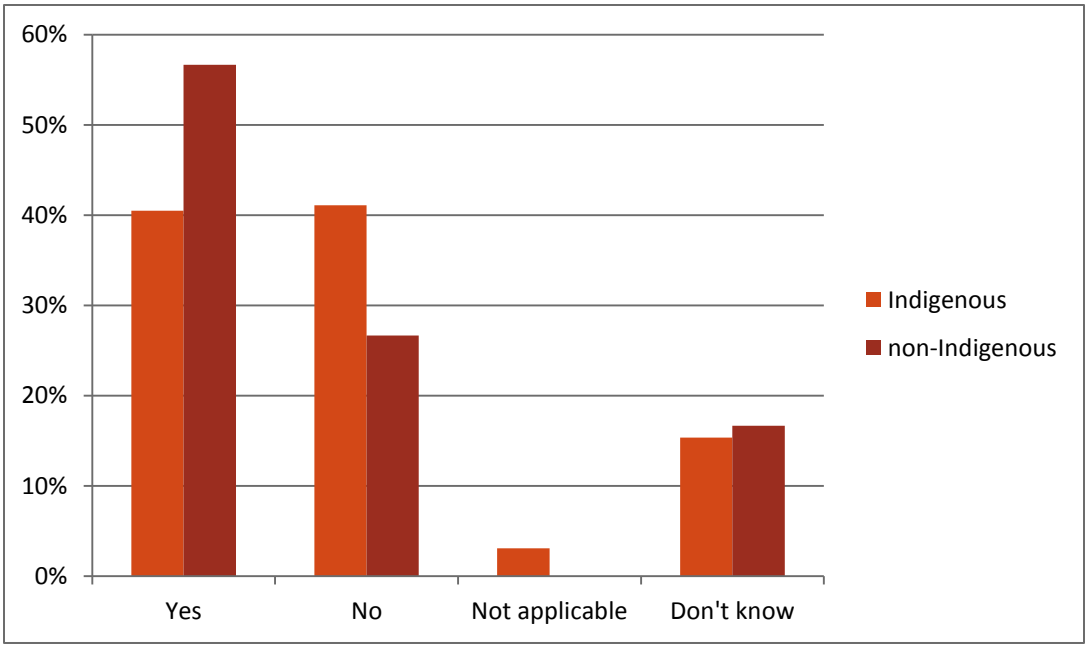


Prestige and harm of cigarettes

Do some cigarette brands have more prestige than others

When asked to think about different brands of cigarettes like Winfield, Benson & Hedges, Longbeach and all the other brands (not the varieties within each individual brand), 43% of respondents indicated that some cigarette brands had more prestige than others. This was followed by 39% of participants who reported that they did not have more prestige than others and 15% didn't know.

Figure 40: Do some cigarette brands have more prestige than others



Overall, the results indicated a significant difference between those who have completed Year 12 (52.5%) and those who had not χ^2= 9.383, p<0.01. All respondents who had completed Year 12 were 2.72 times more likely to report that different brand of cigarettes had more prestige than others based on the OR.

When Aboriginal and Torres Strait Islander participants were asked if some cigarette brands have more prestige than others, a significant difference was found between those who have completed Year 12 (54.7%) and those who had not χ^2= 6.342, p<0.05. Aboriginal and Torres Strait Islander respondents who had completed Year 12 were 2.44 times more likely to report that different brand of cigarettes had more prestige than others based on the OR.

Figure 41: Do some cigarette brands have more prestige than others, by education and Indigenous status

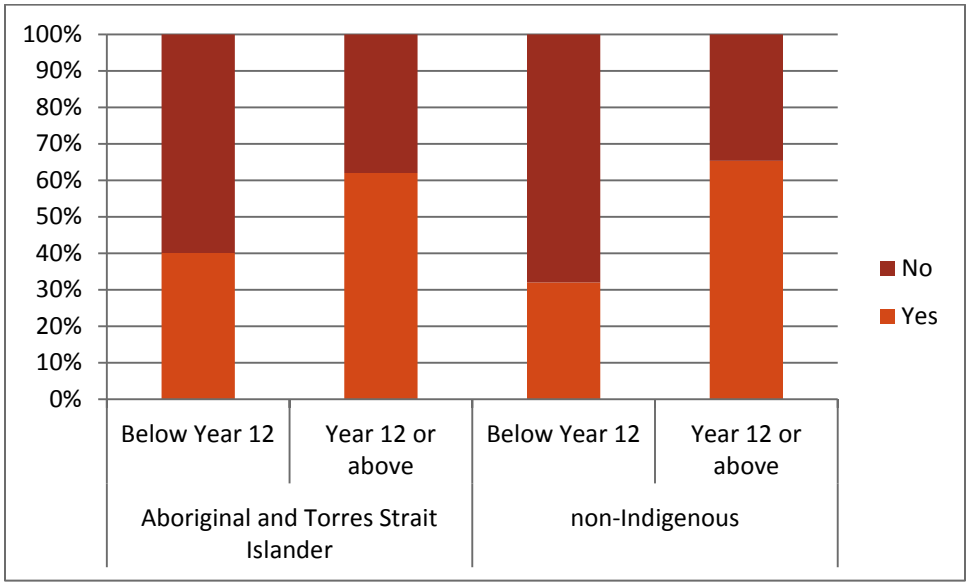
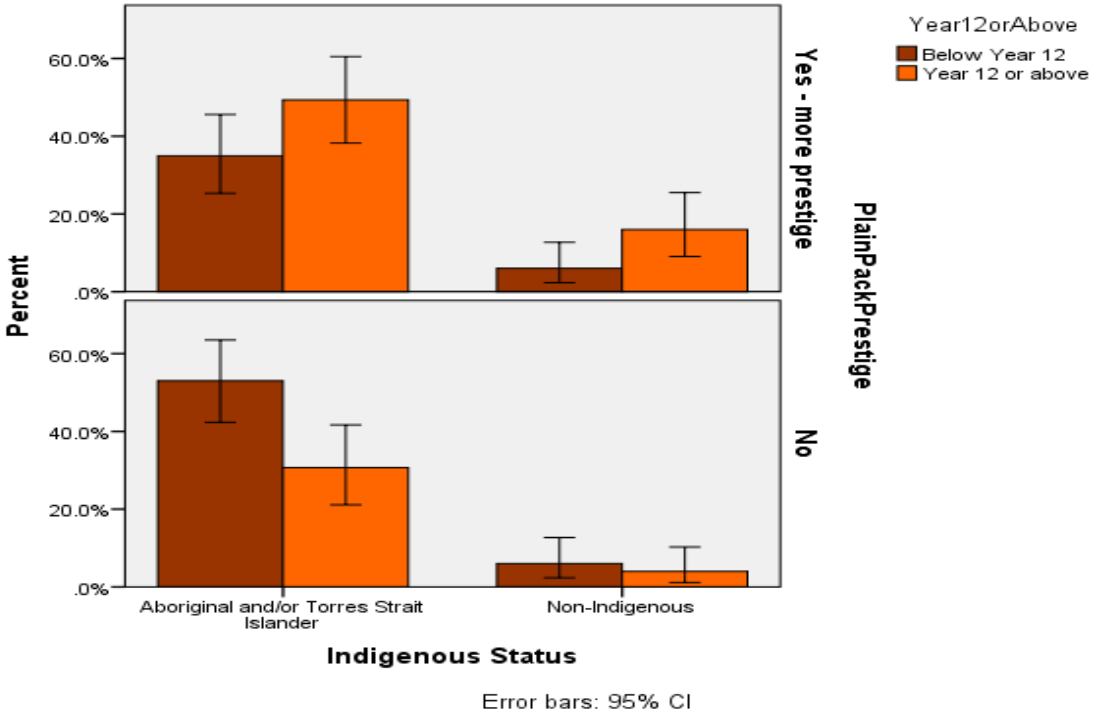


Figure 42: Do some cigarette brands have more prestige than others, by education



When Aboriginal and Torres Strait Islander participants were asked if some cigarette brands have more prestige than others, a significant difference was found between respondents with a household income from all sources of $52,000 per annum or more (34.2%) and those with a household income of less than $52,000 per annum χ^2= 4.822, p<0.05. Aboriginal and Torres Strait Islander respondents from a household with income from all sources of $52,000 per annum or more were 2.46 times more likely to report that different brand of cigarettes had more prestige than others based on the OR.

Figure 43: Do some cigarette brands have more prestige than others among Aboriginal and Torres Strait Islander participants, by household income

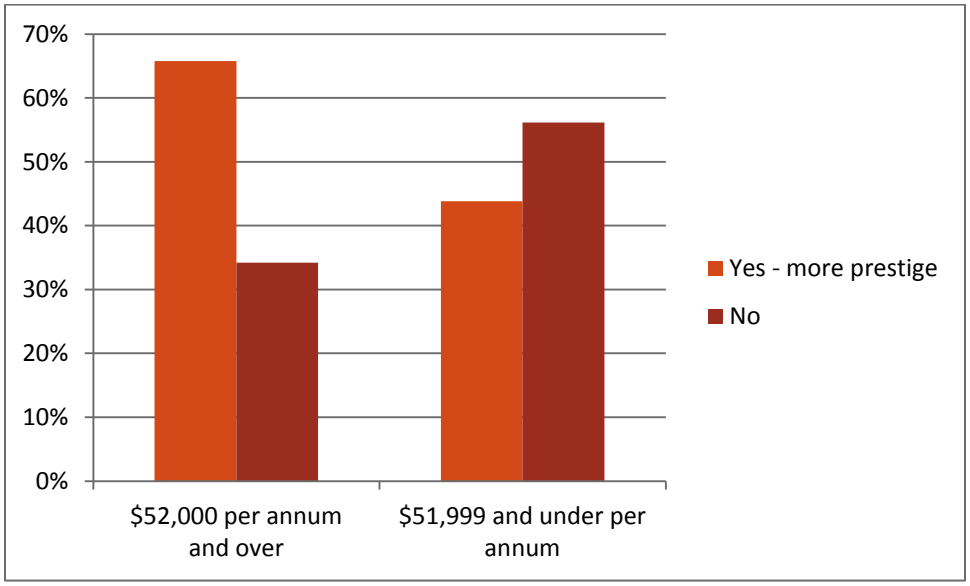


Figure 44 indicates that 40% of Aboriginal and Torres Strait Islander respondents who smoked 10 or less cigarettes per day, and 44% who smoked more than 10 cigarettes per day reported that some cigarette brands have more prestige than others. Notably, a significantly higher proportion of non-Indigenous respondents indicated that some cigarette brands have more prestige than others; 75% and 89% for those who smoked 10 or less cigarettes per day, or more than 10 cigarettes per day respectively.

Figure 45 illustrates that the majority of respondents (59%) who reported that some cigarette brands have more prestige than others were 35 years of age or under. This included 54% of Aboriginal and Torres Strait Islander respondents 35 years of age and under and 83% of their non-Indigenous counterparts.

Figure 44: Do some cigarette brands have more prestige than others, by number of cigarettes smoked per day

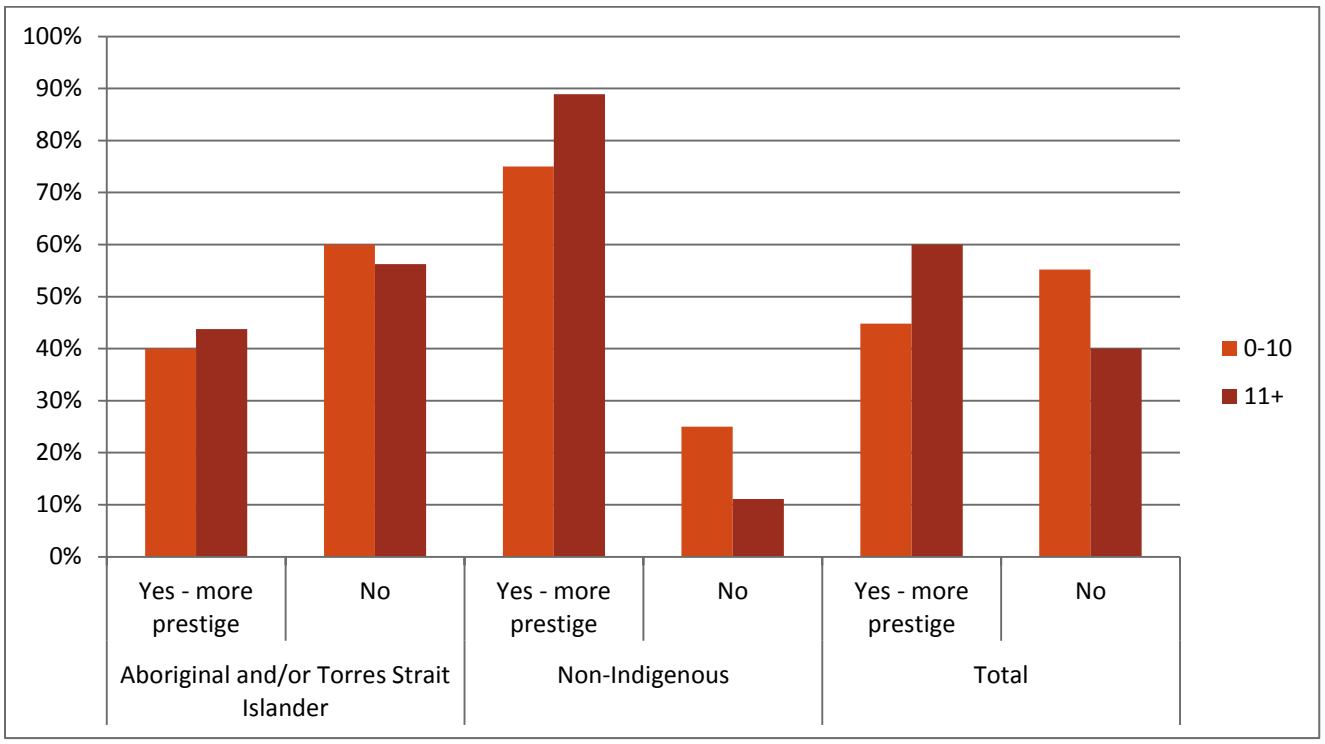
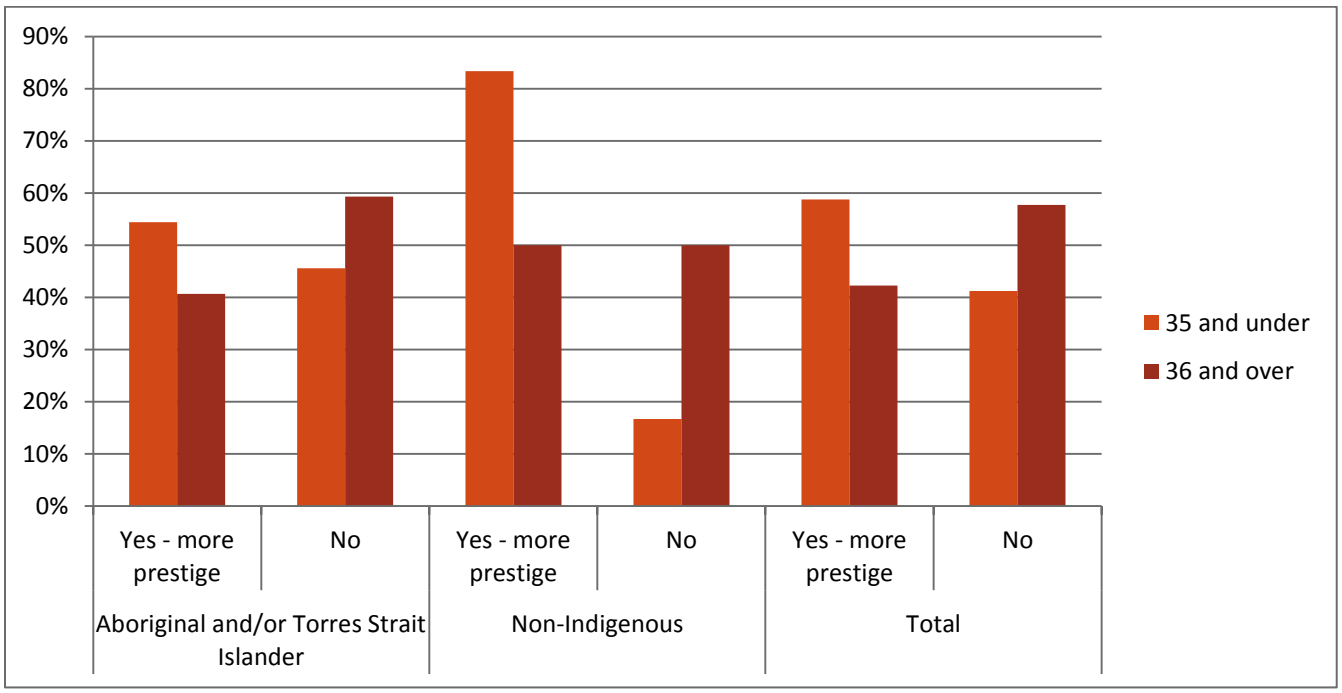


Figure 45: Do some cigarette brands have more prestige than others, by age



Are some cigarette brands more harmful than others?

When asked if some cigarette brands were more harmful than others, 54% of Aboriginal and Torres Strait Islander respondents and 52% of non-Indigenous respondents indicated that different brands were not more harmful than others. Therefore, a significant proportion thought that different cigarette brands were more harmful than others (23% of Aboriginal and Torres Strait Islander respondents; 31% of non-Indigenous respondents) or were unsure (21% of Aboriginal and Torres Strait Islander respondents; 17% of non-Indigenous respondents). Notably, 67% of respondents who reported some cigarette brands more harmful than others had completed Year 12 or above.

Figure 46: Are some cigarette brands more harmful than others

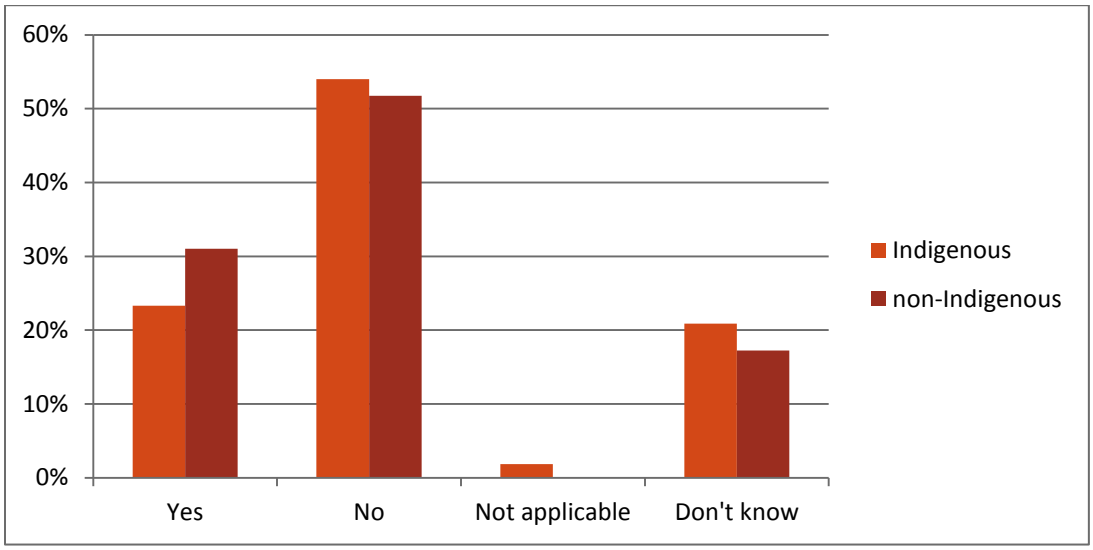


Figure 47: Are some cigarette brands more harmful than others, by education

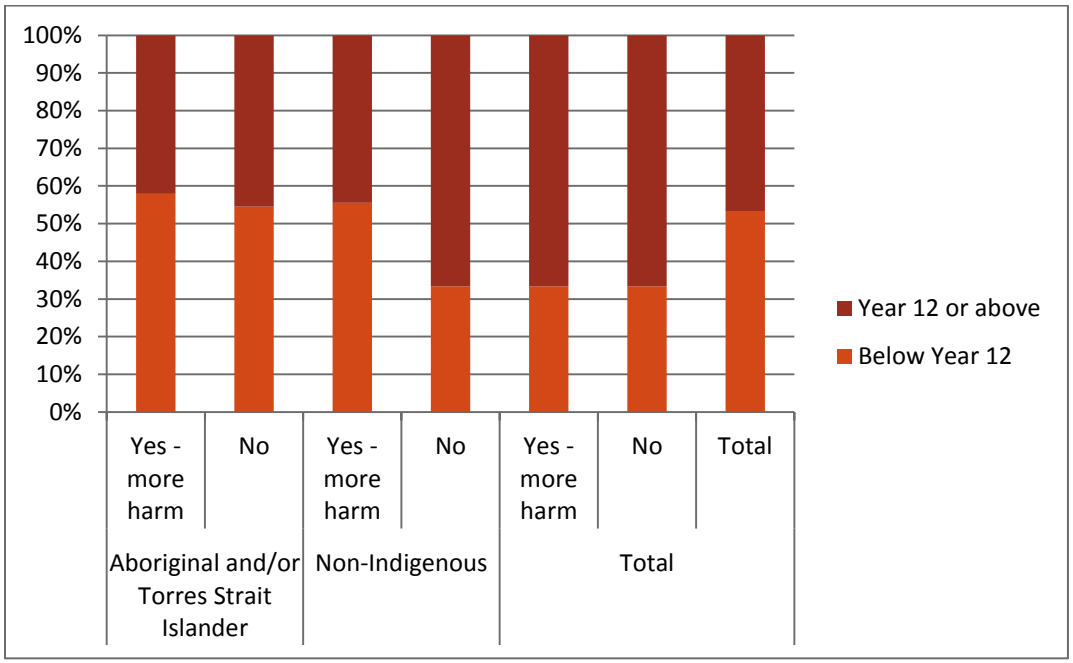


Figure 48 indicates about two thirds of Aboriginal and Torres Strait Islander respondents who reported that some cigarette brands were more harmful than others consumed more than 10 cigarettes per day. Additionally, all non-Indigenous respondents who reported that some cigarette brands were more harmful than others consumed more than 10 cigarettes per day.

Figure 48: Are some cigarette brands more harmful than others by number of cigarettes smoked per day

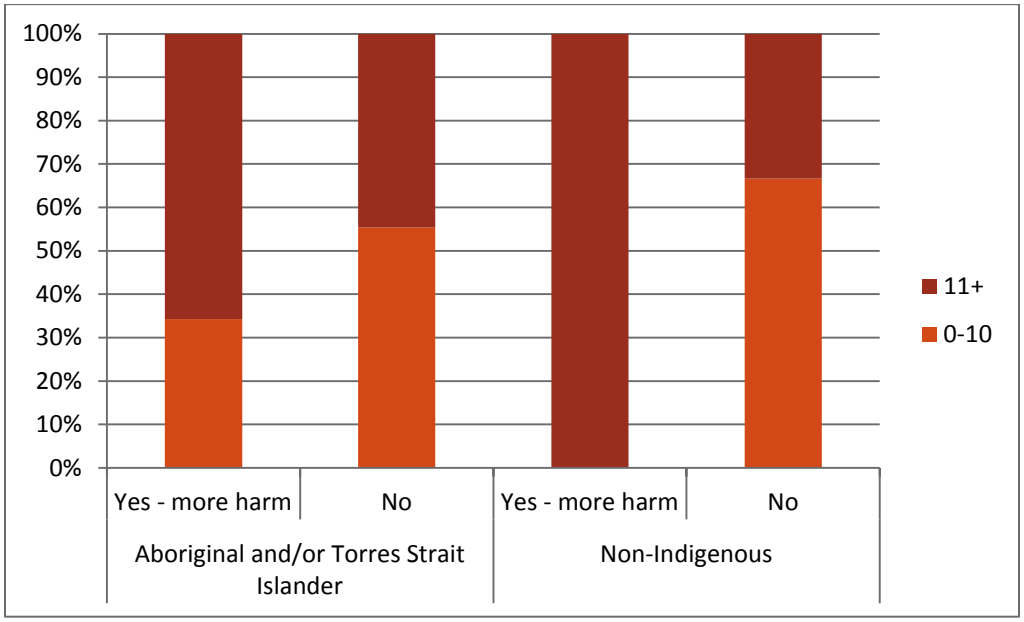


Figure 49: Are some cigarette brands more harmful than others by nicotine dependence

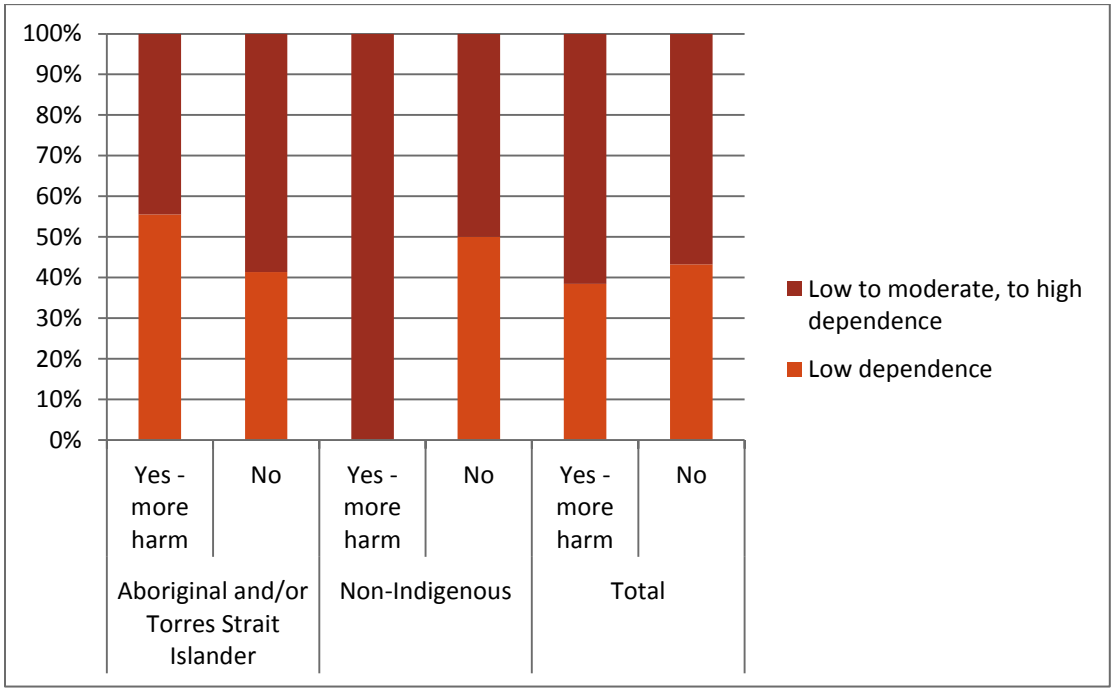


Figure 50: Are some cigarette brands more harmful than others by age

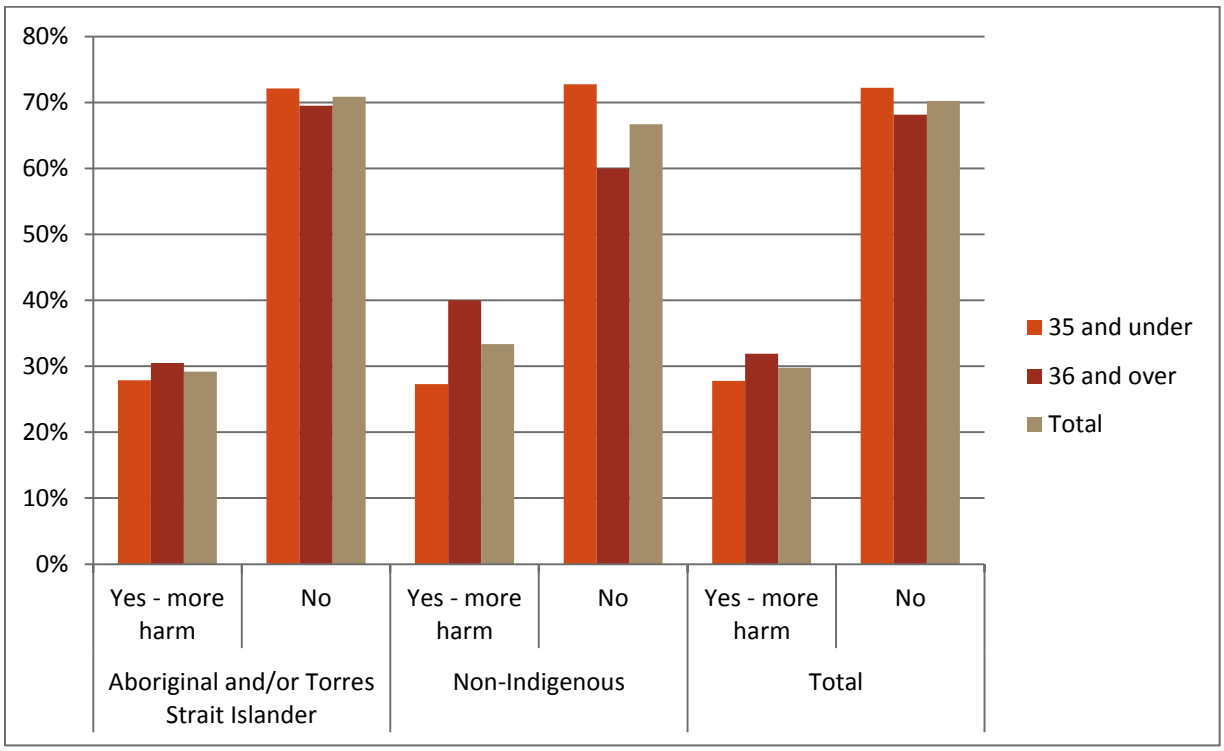
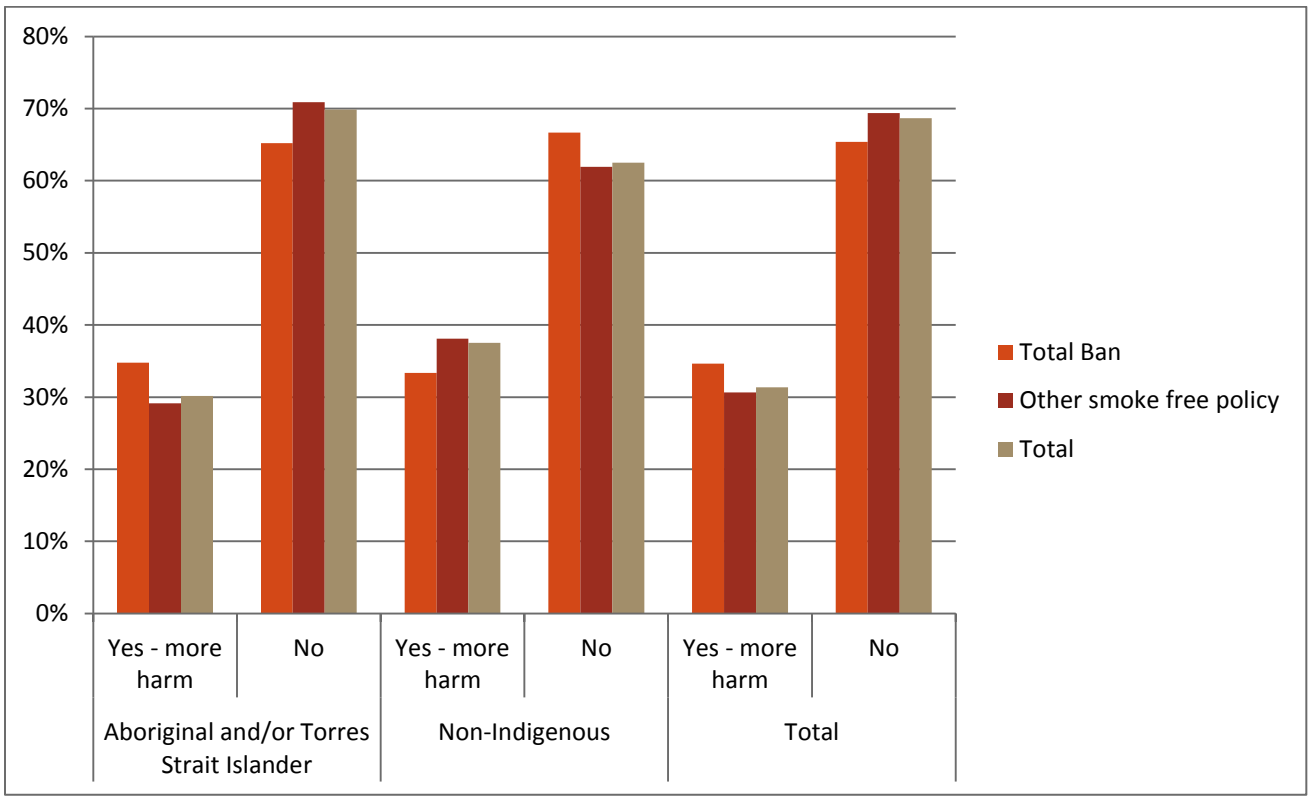
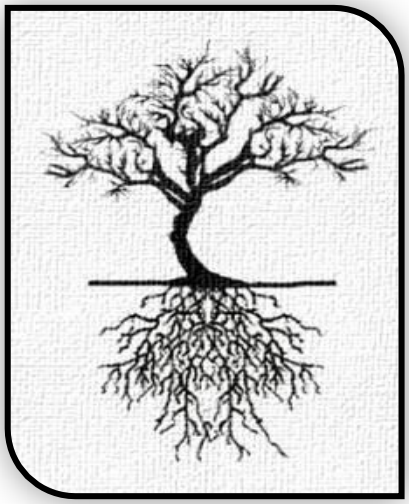


Figure 51: Are some cigarette brands more harmful than others, by total workplace smoking ban



Discussion



As highlighted in the National Aboriginal Community Controlled Health Organisation's (NACCHO) 10 point plan—Investing in Healthy Futures for Generational Change—there is an ongoing need for research and evaluation (17). Research should measure, evaluate and inform the significance of public health interventions relative to local needs and experiences. This component of research forms part of a more comprehensive evaluation of tobacco control programs under the ACT Aboriginal and Torres Strait Islander Tobacco Control Strategy 2010-2014. This includes No More Boondah, smoking cessation groups, youth and community health promotion programs and education campaigns in the local ACT region.

Results and findings from the first wave of the survey targeting Aboriginal and Torres Strait Islander people in the ACT region indicated that while good work has been undertaken, more work is still required. The survey measured demographic information, smoking status and attitudes, awareness, behavioural intentions and behaviours of smokers, ex-smokers and non-smokers. Importantly, the survey highlighted community identified factors that influence smoking behaviours, attitudes and beliefs, providing evidence to further tailor, guide and enhance local smoking programs.

Smoking

Tobacco use is the most preventable cause of morbidity and mortality in Australia (23). In underscoring the importance of addressing tobacco use among Aboriginal and Torres Strait Islander people, tobacco smoking is a significant contributor to poor Aboriginal and Torres Strait Islander health outcomes. The high rates of smoking among the Aboriginal and Torres Strait Islander population (36-39) is the single most significant contributor to premature deaths (20%) (2, 3). Tobacco smoking also contributes significantly to shorter life expectancy when compared with non-Indigenous Australians (2, 40). There are a range of reasons for the high rate of tobacco use, with Aboriginal and Torres Strait Islander people having a notable history with tobacco (41, 42). For example, tobacco was provided as an incentive for labour with many Aboriginal and Torres Strait Islander people receiving rations of tobacco from employers up to the 1960s, prior to full engagement with the cash economy (42-44).

The importance of the ACT Aboriginal and Torres Strait Islander Tobacco Control Strategy, specifically Action Area 1 - development and implementation of a multi-component cessation and reduction programs has been highlighted by these preliminary findings. The preliminary results indicated a range of community identified factors for not smoking or being smoke free. Therefore, the findings emphasise the benefit of using a range of tobacco control measures to address these factors, including cost, education and awareness of the harms of tobacco use.

In addition, the literature suggests that tobacco control programs and policies could include:

- Enhanced smoke free policies;
- Group and individual smoking cessation programs and various supports;
- Provision, education and awareness raising of smoking cessation aids, including the wide range of Nicotine Replacement Therapy (NRT) products as a component of smoking cessation programs;
- Strategic promotion of local 'quit smoking' and 'smoke free' role models and ambassadors;
- Ongoing implementation of anti-smoking social marketing campaigns at national, regional and local levels; and
- Other innovative measures required to help people make informed choices and assist to make quitting and remaining smoke free as easy as possible.

(5, 6, 8, 33-35)

The preliminary findings also emphasised the importance of collaboration and partnerships within and across sectors, particularly with health professionals and others dealing with the social determinants of health and community wellbeing. For example, education, housing, employment, law and justice, health and disability, transport, the effects of colonisation, human rights, and other community supports. Addressing some of these social determinants can assist to alleviate smoking triggers and behaviours, such as life stressors including education, housing, income and employment stressors.

Respondents indicated that 95.5% would find it 'very easy' or 'fairly easy' to get tobacco, if they wanted some; with 4.5% indicating it would be 'probably impossible', 'very difficult' or 'fairly difficult'. It is worth noting that this includes minors (n = 15 or 7.4%) who may find it more challenging to access tobacco as it is illegal to sell tobacco products to children under the age of 18 years in all states and territories of Australia (4). It should be acknowledged that the *Future directions for tobacco reduction in the ACT* states the following options on restricting access to tobacco.

Future directions for tobacco reduction in the ACT

1.1 Reducing the number of tobacco licensees in the ACT through increases to tobacco licensing fees

Increased fees may see a reduction in the number of licensees selling tobacco products. A reduction in licenses [*sic*] should then decrease the public's access to tobacco.

Restricting access to tobacco products may result in a decrease in the number of places that sell tobacco, which may also lead to a decrease in impulsive tobacco purchases.

1.2 Restricting access to tobacco products through amended license [*sic*] *conditions*

Conditional licensing or restricting access to licenses [*sic*] may discourage retailers and wholesalers from selling tobacco products in the ACT. Other licensing initiatives may include:

- putting a cap on the number of tobacco licenses [*sic*] available in the ACT;
- restricting the sale of tobacco to liquor-licensed or restricted premises where children and young people cannot enter.

Source: (1; 2)

Nicotine Dependence

The results from the survey's FTND component highlight the need to assist and shape appropriate tobacco control and prepare tailored quit smoking plans. This includes personalising and managing expectations of pharmacological support, including NRT. NRT aims to reduce withdrawal symptoms associated with quitting by replacing the nicotine from cigarettes.

The vast majority (91%) of Aboriginal and Torres Strait Islander smokers reported smoking less than 20 cigarettes per day. This included 61% of respondents indicating that they smoked 10 cigarettes or less per day and 30% smoked 11 – 20 cigarettes per day. No participants smoked more than 30 cigarettes per day. Furthermore, the FTND results found generally low levels of nicotine dependence among current smokers in the ACT region:

- 43.3% of smokers reported low dependence; and
- 31.7% low-moderate dependence.

Nicotine dependence has been identified as a barrier to decreasing smoking rates (26). The rapid clearance and metabolism of nicotine, including a short half-life in blood and the brain, allows for repeated and frequent use without loss of effect (26, 45). Nicotine also produces a significant "let-down", which is dependent on direct action, such as smoking or use of NRT (45).

The use of the FTND in the community can be used to assist and shape appropriate tobacco control and prepare personalised quit smoking plans, including tailoring and managing expectations of pharmacological support, such as NRT. NRT reduces withdrawal symptoms such as moodiness, sleeplessness, irritability, frustration, anxiety, inability to focus, restlessness and slower heart rate, larger appetite or weight gain (46). A Cochrane Review, *Can nicotine replacement therapy help people quit smoking*, found evidence that all forms of NRT made it more likely that a quit attempt would succeed, noting that heavier smokers may need higher doses of NRT (47).

NRT is not a magic medicine to stop smoking. It helps to stop smoking—making a hard job easier, not easy (46). Some NRT products may be more appropriate in reducing withdrawal symptoms and mitigating smoking triggers when considering an individual's smoking behaviours and physical nicotine dependence levels. A wide range of NRT products are on the market. Community awareness and access to these products could help to facilitate quit attempts and alleviate withdrawal symptoms associated with stopping smoking. Products include, but are not limited to patches, chewing gum, nasal sprays, oral sprays, inhalers, inhalators and lozenges/tablets which all deliver nicotine to help relieve withdrawal symptoms and make quitting as easier (46, 47). In addition, findings from the FTND component of the survey highlight the need for education and awareness of strategies to counter cue-induced, habitual and social smoking and the possibility of quitting 'cold turkey'.

Social networks

Evidence indicates that the social network structure can shape and influence health behaviours (28, 29). Normative and other peer influences can be transmitted through network ties, such as smoking behaviours and intentions (28, 29). A facilitator for smoking is smoking's ability to enhance the capacity of normal people to socialize and does not impair performance (2, 30, 45). Smoking appears to be common in various social circles with the social normalisation considered to foster social cohesion and connectedness (2). There is some research that suggests some Aboriginal and Torres Strait Islander people appear to take up smoking, or are tentative to quit due to the fear of social isolation (2). Furthermore, the role of family, peer and social network factors remains elusive, partly due to the limited evidence devoid of the social and cultural context of Aboriginal and Torres Strait Islander people (30).

Is it observation and modeling of smoking behaviors?
Is it easily accessible cigarettes?
Or another role in the smoking initiation and maintenance process?

The social climate is shifting around smoking behaviours (30, 45). Further research and more work is required to reduce tobacco use among the ACT Aboriginal and Torres Strait Islander community. This includes peer, family and local community cessation support which should include partnering with programs that address peer, family and community wellbeing.

Quitting behaviours

A range of reasons resonated with participants as motivation to give up, cut down, change to a lower tar or nicotine brand or not smoke at all. Overall, 92% of reported current smokers indicated that they would like to stop smoking. In comparison, Cooper, Borland and Yong (48) found that 73% of all Australian smokers intended to quit (48). According to the Smoke Ring survey, the majority of those who did not intend to quit stated that this was because they were 'addicted to nicotine'. Half of the sample reported that the effects on health or fitness (50%), that smoking costs too much (37.7%) and that they want to be fit (36.8%) as motivation to give up, cut down, change to a lower tar or nicotine brand or not smoke at all. No More Boondah - group session (14.7%), No More Boondah - one-on-one support (13.7%) and Doctor advised me not to smoke (16.7%) were also motivating factors. A significant proportion of participants also reported the following motivating factors in relation to family and friends:

- Family and/or friends (36%);
- I was worried it would affect the health of those around me (27%); and
- I am pregnant or planning to start a family (21%).

Respondents indicated that in the last 12 months:

- 52% reduced the amount of tobacco you smoke in a day;
- 41% tried to give up unsuccessfully;
- 21% tried to reduce the amount of tobacco smoked in a day, but were unsuccessful;
- 21% had successfully given up smoking (for more than a month);
- 15% changed to a brand with lower tar or nicotine content;
- 3% tried to change to a brand with lower tar or nicotine content, but were unsuccessful; and
- 11% none of the above.

The challenge remains in taking people from the planning to quit (87.2% of Aboriginal and Torres Strait Islander smokers; 92.9% of non-Indigenous smokers) to being smoke free, and remaining smoke free. These results highlight that quitting is not easy; physical, mental and social withdrawals can make cutting back and quitting extremely hard. The body has physical withdrawal symptoms as it reacts to the absence of nicotine associated with smoking cessation and individuals are faced with the difficult challenge of major behaviour change. Addressing and alleviating these factors can be extremely challenging throughout the quitting journey. There is a need to provide a range of supports to aid quitting and to make maintaining a smoke free lifestyle as easy as possible. In addition, these findings highlight the importance of public health programs in interrupting the establishment of nicotine dependence, and keeping non-smokers smoke free.

Where do people go for advice and information?

Participants indicated they seek health or medical advice and information from various sources, including, the Local GP (53%), the Aboriginal Medical Service (50%), the internet (35%) and discussion/advice with family or friends (27%). Participants also indicated that individual counseling/discussion with health service providers, accessing books, videos/DVDs or websites, single class or seminar, discussion/advice from community elders or traditional medicine woman, and series of classes or seminars were also used to seek health and medical advice.

There is a need to further develop and facilitate community awareness and access to these mechanisms for health and medical advice, including through online and social media. This should include building salient and non-invasive smoke-free and smoking cessation messages into everyday resources. Such advice and information should help people make informed choices and provide support to cut back and quit where possible.

Smoke free policies

The preliminary results indicated that respondents generally have a smoke free workplace policy in their school or workplace. However, 8% of participants did not to have smoke free policy, with 82% of those without a smoke free policy indicating they were smokers. Therefore, there is room to further strengthen smoke free school and workplace policies.

There is strong evidence around smoke-free policies which can build on traditional, culturally important notions of respect, providing salient community messages to shift the norm of tobacco use (37). The principal aim of a smoke-free policy is to provide a safe environment that protects people from second hand smoke—including staff, visitors and clients—and encourage a

smoke free culture. Smoke free policies can prompt and encourage tobacco users to reduce and/or quit; removing social cues and providing a simple, effective and efficient mechanism to increase awareness of tobacco control in a non-confrontational manner (37, 49-53). The development, implementation, acceptance and ongoing management and maintenance of smoke-free workplace policy is particularly important, and should be reviewed systematically.

The literature indicates that smoke-free workplace policies recognise the detrimental effects of smoking and second-hand smoke and generally have three central components:

1. *Background information* - generally provides context and rationale to the development and implementation of a smoke-free workplace policy, such as morbidity, mortality data and smoking rates;
2. *Restrictions* - provide the cornerstone of the policy, outlining general policy details, who the policy affects, which areas and events are covered, when and where smoking can and cannot take place and the time of the policy's establishment; and
3. *Support* details information regarding goods and services that may assist employees to reduce and/or quit smoking, and may be supported by the organisation.

The support role of smoke free policies—including individual and group smoking cessation support—can be particularly important to their success. For example, smoke free policies could detail and promote products, programs and services, such as No More Boondah, Quitlines and other smoking cessation aids. This could help smokers to reduce tobacco consumption, address cue-induced smoking, maintain smoke free policies and promote smoking cessation programs.

Prestige and harm of cigarettes

When participants were asked to think about different brands of cigarettes like Winfield, Benson & Hedges, Longbeach and all the other brands (not the varieties within each individual brand), 43% of respondents indicated that some cigarette brands had more prestige than others, and 39% reported they did not have more prestige than others. A significant difference was found between Aboriginal and Torres Strait Islander participants who completed Year 12 (54.7%) and those who did not complete Year 12 (χ^2= 6.342, p<0.05). Aboriginal and Torres Strait Islander

respondents who had completed Year 12 were 2.44 times more likely to report that different brand of cigarettes had more prestige than others[5]. Furthermore, a significant difference was found between Aboriginal and Torres Strait Islander respondents with a household income from all sources of $52,000 per annum or more (34.2%) and those with a household income of less than $52,000 per annum ($\chi^2$= 4.822, p<0.05). Aboriginal and Torres Strait Islander respondents from a household with income $52,000 per annum or more were 2.46 times more likely to report that different brand of cigarettes had more prestige than others[5].

A logical neoclassical explanation for this phenomenon would be to consider the potential difference between *Willingness to Pay* and *Willingness to Accept*, and the influence of income elasticity. In this case, the acceptance of cigarette brand prestige could be influenced due to the respondents' available choice set of cigarette brands (54).

The influence of education on income is well documented. The Survey findings also identified a significant difference between Aboriginal and Torres Strait Islander respondents who completed Year 12 or equivalent and household income from all sources of $52,000 per annum or more (23.7%) χ^2= 7.562, p<0.01. An Aboriginal and Torres Strait Islander respondent who completed Year 12 or equivalent was 2.74 times more like to indicate that their household income from all sources was $52,000 per annum or more.

Overall, the results also found a significant difference between all participants who completed Year 12 (52.5%) and those who had not (χ^2= 9.383, p<0.01). All respondents who had completed Year 12 were 2.72 times more likely to report that different brand of cigarettes had more prestige than others[5]. In addition, when asked if some cigarette brands were more harmful than others, 54% of Aboriginal and Torres Strait Islander respondents and 52% of non-Indigenous respondents indicated that different brands were not more harmful than others.

[5] Based on the OR

Conclusion

Addressing tobacco use among Aboriginal and Torres Strait Islander people is complex and challenging, but important. Tobacco use is a significant contributor to poor health outcomes (4-8). The origins of health behaviours, including tobacco use, are situated in a complex range of social, economic, family, community, environmental and historical factors (27, 55). The preliminary results of the Smoke Ring provide an indication of smoking and non-smoking behaviours of the local Aboriginal and Torres Strait Islander community. The findings indicated that 36.4% of Aboriginal and Torres Strait Islander respondents (28.6% of males and 39.2% of females) were current smokers. In 2010, the ACT Chief Health Officers report indicated that 11.7% of all ACT residents aged 18 years and over were daily smokers (11). There is substantial potential for change. These findings also highlighted the importance of the social determinants of health, including education and employment. Based on the OR, a respondent who:

- completed Year 12 or equivalent was 3.1 times more likely to be a non-smoker than a respondent who had not completed Year 12 or equivalent; and
- reported being unemployed was 4.6 times more likely to be a current smoker than a respondent who was not unemployed.

Results also identified through the FTND that there were generally low levels of nicotine dependence among Aboriginal and Torres Strait Islander smokers in the region (43.3% of smokers had low nicotine dependence and 31.7% low-moderate nicotine dependence). This highlights the need to shape appropriate tobacco control and tobacco control messaging. For example, raising awareness, tailoring and managing expectations of the wide range of available pharmacological support, including NRT.

Development, implementation and management of tobacco control and smoking cessation programs, services and social marketing is complex. However, there is evidence to support locally tailored programs and services to help meet the needs of the Aboriginal and Torres Strait Islander community in the region (2, 5-8, 56). The findings also identified that programs have been developed and adapted to address the needs of local Aboriginal and Torres Strait Islander people, such as No More Boondah. The preliminary results recognise and somewhat reflect that substantial work has been, and is being undertaken in the Aboriginal and Torres Strait Islander anti-smoking sphere locally and nationally. For example, the majority of participants had cut down in the last 12 months with less than a quarter (23.4%) of Aboriginal and Torres Strait Islander participants, and 21.4% of non-Indigenous participants not cutting down in the last 12 months. Specifically, the results indicated that in the last 12 months:

- 38.3% of Aboriginal and Torres Strait Islander participants and 42.9% of non-Indigenous participants reported that they had cut down by 1 to 5 cigarettes per day; and
- 14.9% and 21.4% of Aboriginal and Torres Strait Islander and non-Indigenous participants had cut down by about 6 to 10 cigarettes per day respectively.

The 2010 National Drug Strategy Household Survey reported that 37.6% of smokers aged 14 years and older had reduced the amount of tobacco smoked in a day in 2010 (7).

Local programs have been developed and adapted to directly address the needs of Aboriginal and Torres Strait Islander people, with some programs customised for individuals to help make quitting as easy as possible. While these preliminary findings are somewhat encouraging, it should be acknowledged that this should form part of a sustained approach to significant behaviour change to ensure a healthy future and a smoke free generational shift.

Tobacco control cessation programs tailored to community needs represents an important step that may be further refined and enhanced to meet the needs of the local community. This includes addressing the social determinants of health and providing outlets for stress, which could include physical activity and art. The findings provide invaluable insight into areas that could be further tailored and improved in addition to a sound baseline for evaluation.

Some opportunities…

These results have highlighted some opportunities to help Aboriginal and Torres Strait Islander people quit or remain smoke free. In alignment with the Close the Gap Statement of Intent, the NACCHO 10 Point Plan, the ACT Aboriginal and Torres Strait Islander Tobacco Control Strategy, the objectives of Winnunga and other relevant strategies and organisations, there is an ongoing need to work in partnership and collaboration to achieve equality in health status between Aboriginal and Torres Strait Islander people and non-Indigenous Australians (15, 17, 19, 57). This is also true in relation to addressing tobacco use.

The survey findings indicated that 36.4% of Aboriginal and Torres Strait Islander respondents (28.6% of males and 39.2% of females) were current smokers. As a result, the findings highlight that while significant work is underway to address smoking, there are a number of opportunities to enhance this work. A more comprehensive understanding of the communities needs in relation to smoking and possible opportunities for refinement is expected after undertaking and analysing the key informant interviews and focus groups. This will further inform any conclusion and recommendations. Opportunities identified through the survey and survey data collection include, but are not limited to the following.

1. *Increasing awareness of the No More Boondah, health promotion activities, group and individual smoking cessation services through more visible branding, strategic marketing and incorporating smoke free messaging into everyday business.*

The findings indicated that 36.4% of Aboriginal and Torres Strait Islander respondents (28.6% of males and 39.2% of females) were current smokers. The survey also found that approximately 50% of respondents would seek health or medical advice and information from Aboriginal Medical Service (50%), yet only 24% would go to No More Boondah (group or individual sessions) for advice. Furthermore, 14.7% and 13.7% indicated that No More Boondah - group session and No More Boondah - one-on-one support were motivating factors to be smoke free. There may be a lack of awareness and branding of the No More Boondah program and its role in smoking cessation. As a result, this area has some potential for improvement.

- Tobacco control social marketing should promote No More Boondah and existing tobacco cessation services. This could include raising awareness and implementing referral systems to the No More Boondah program across the region, targeting

Aboriginal and Torres Strait Islander services and mainstream services, such as General Practitioners, dentists, housing, law and justice, etc. For example, raising awareness among general practitioners across the region about No More Boondah could include the development of a culturally appropriate No More Boondah styled life script or appropriate referral pathways.

- Social media such as Facebook, Instagram, Twitter and YouTube could be utilised to promote No More Boondah and smoke free behaviours. A combination of interpersonal and mass media communication is crucial to influence health behavior, with evidence indicating that it is best to reach people multiple times, in multiple settings and from multiple sources (58, 59). This could reinforce and expand on Winnunga's role as a hub for health information for Aboriginal and Torres Strait Islander communities in the ACT and surrounding regions (56). Social media provides an alternative to traditional methods of mass communication (60) and can empower users by putting more control in their hands, when compared to traditional methods of communication (61). In addition, social media can provide an alternative to receiving health messages from 'experts', which might be inadvertently disempowering for some people (58). Messages can be disseminated through social networks including friends, family members, coworkers or other contacts (59, 62). As a result, aligning with some of the recommendations from Ipsos-Eureka (2, 56), including more personal, positive and locally relevant messaging to improve message effectiveness (58).

  Social media is also worth acknowledging due to the relatively young demographic of the Aboriginal and Torres Strait Islander population and the power of social media. Coyle and Vaughn (63) found that the average college student views their social networking account three times per day. In contrast, the study concluded that most students had never visited a health organisation's website. Thus, increasing social media engagement could increase the likelihood of reaching students and youth by posting on social networks and using social media (58). Children and youth are seen as an important audience for anti-smoking and healthy lifestyle messages, partly due to informing lifelong health behaviours, the potential for intergenerational change and their ability to communicate health messages to parents, carers and other family members (58). A significant advantage of social media is its cost-benefit feature; with the ability to reach an ever increasing number of people with a relatively low budget (59, 64, 65). However, a limitation worth noting is that socially disadvantaged groups do not always have access to new media and social networking due to various barriers (61). Organisations that are successfully using social media in this space include the Nunkuwarrin Yunti (community-controlled service), the Institute of Urban Indigenous Health, the National Aboriginal Community Controlled Health Organisation, the Aboriginal Health and Medical Research Council, Menzies School of Health Research (www.nosmokes.com.au) and the University of Canberra (66).

2. *Increasing awareness of cessation techniques, support tools and their role*

Survey results identified that there were generally low levels of nicotine dependence among current smokers and that approximately a quarter of participants identified four or five of their five closest friends and family as regular smokers. Furthermore, 95.5% of respondents indicated that it would be 'very easy' or 'fairly easy' to get tobacco if they wanted some. However, 87.2% of Aboriginal and Torres Strait Islander smokers and 92.9% of non-Indigenous smokers indicated that they were currently planning on giving up. In comparison, Cooper, Borland and Yong (48) reported that of all Australian smokers, 73% intended to quit (48). As a result, the health sector needs to make it as easy as possible for smokers to seek and receive assistance and support to become, or remain, smoke free.

- Increasing knowledge and understanding of techniques to break all three parts of addiction:
    i. Chemical/physical – physiological addiction to nicotine;
    ii. Habitual – cue-induced or common habits associated with smoking; and
    iii. Emotional/psychological – smoke to manage/deal with stress and other emotions.

- Social marketing to increase community awareness of the wide range of available pharmacotherapies, including NRT and NRT availability through the Pharmaceutical Benefit Scheme (PBS). This should also include increasing community awareness of the role of different pharmacotherapies and managing smokers' expectations of the quitting journey.

- The continued provision of smoking cessation supports, including the wide range of NRT products, as a component of the smoking cessation programs to ensure limited barriers to a quit attempt and the quitting journey (67).

3. *Expanding local health promotion and outreach services addressing Aboriginal and Torres Strait Islander tobacco use.*

The preliminary results highlight a range of community identified factors for not smoking or being smoke free. Therefore, the findings emphasize the importance of actively using a wide range of tobacco control measures to address these community identified factors, including education and awareness of the harms of tobacco use and cost. This could include the expansion of local health promotion and outreach services across all aspects of the Ottawa Charter for Health Promotion (*Figure 64*), particularly strengthening community action, developing personal skills and creating supportive environments.

Figure 52: Ottawa Charter for Health Promotion

Source: (68)

- Proactively assisting schools and workplaces within the region to review, develop, implement and maintain smoke free workplace policies. This could include incorporating No More Boondah, Quitlines and other mechanisms as support services for smokers to cut back or quit within the workplace smoke free policy. The survey findings indicated that 8% of participants did not have a smoke free policy, 2% were allowed to smoke indoors and 33% were allowed to smoke outside with no area provided. A guide and template could be developed or tailored to assist establish, implement and review culturally appropriate and robust smoke free workplace policy, with a particularly focus on Aboriginal and Torres Strait Islander organisations. In addition, this could include providing or facilitating training and education, such as brief intervention training, for those who police smoke free policies such as teachers and security guards;

- Providing and facilitating community groups or schools with education and training, such as education from Tobacco Action Workers and/or brief intervention training to empower the community to promote smoke free lifestyles. This could include Men's groups, Women's Groups, school and university groups. Based on the OR, the survey

indicated that a participant who completed Year 12 or equivalent was 3.1 times more likely to be a non-smoker than a smoker[6]. Additionally, a participant was 3.1 times more likely to have completed year 12 if their mother had completed Year 11 or above. There is a strong evidence base regarding the benefits of education, training, community development and empowerment (69-72).

- This could also include:
    - expanding and increasing recognisable branding of local health promotion and outreach services, including social marketing, and showcasing smoking and non-smoking role models at schools and other facilities;
    - providing and facilitating community groups or schools with assistance in developing their own local anti-smoking social marketing messages. This could include posters, pamphlets, social media, successful quit stories, and anti-smoking artwork on a range of media such as community walls, school/university walls, storm water drains, bus shelters and other innovative mechanisms for communicating smoke free health messages among the target group;
    - share and promote the successes of programs and services, including smoke free role models, quit attempts (promoting the message to not quit, quitting) and successful quitters. This could expand on the Beyond Today campaign and the Digital Story Book;

These recommendations should build upon the success of current programs and other relevant research findings (2, 56). For example, expanding on current programs and harnessing Aboriginal and Torres Strait Islander social cohesion, and group activities to promote smoke free and antismoking messages. This could also include enhancing and expanding on No More Boondah; the Beyond Today campaign; group cessation programs; community workplace initiatives; and building on the essential support that family and community member can provide in aiding cessation and smoke free lifestyles (2, 56).

[6] based on the OR

For more information

For more information about quitting please contact your local AMS, GP or Quitline

Quitline 13 7848

ACT Health
www.health.act.gov.au
ACT Aboriginal and Torres Strait Islander Tobacco Control Strategy 2010-2014
http://health.act.gov.au/c/health?a=da&policy=1310621880&did=10107160&sid=
Winnunga Nimmityjah Aboriginal Health Service
www.winnunga.org.au
I Can Quit
www.icanquit.com.au
Quit Now
www.quitnow.gov.au
Quit
www.quit.org.au

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Appendix vii: Interview and focus group guide

Interview / focus group guide

1. Why do people use tobacco?
2. What programs and services are available?
3. What are the advantages of these programs?
4. What are the disadvantages of these programs?
5. What else can we do – any power in the world?

The survey results indicated that some people thought peers, friends, family and household members may influence smoking behaviour.

6. Do you think family influences smoking?
    a. If yes, tell me about that? How? Why? Parents, Bros, Sister, Uncles and Aunties?
    b. If no, tell me about how family influences non-smoking?

7. Do you think friends influence smoking?
    a. If yes, tell me about that? How? Why?
    b. If no, tell me about how family influences non-smoking?

8. Do you think household members are influential in smoking?
    a. If yes, tell me about that? How? Why?
    b. If no, tell me about how family influences non-smoking?

9. Do you think men or women are more influential in smoking behaviours?

10. Thinking about family, friends and household members that smoke, how do you think we can assist them to quit?

11. Are you aware of a directory of services for people wanting to reduce or quit smoking?

12. Thinking about pregnant women and young families, how can we support them to become, or remain smoke free?

13. Are you aware of any initiatives targeted towards antenatal and child health, young women and men's groups, sporting groups and those with a chronic disease, such as diabetes in the first instance.

14. How can we pass on our experiences and be good role models to help the youth stay smoke free?

Focus group guide

1. Do you think family influences smoking?
    - If yes, tell me about that? How? Why? Parents, Bros, Sister, Uncles and Aunties?
    - If no, tell me about how family influences non-smoking?

2. Do you think friends influence smoking?
    - If yes, tell me about that? How? Why?
    - If no, tell me about how family influences non-smoking?

3. Do you think household members are influential in smoking?
    - If yes, tell me about that? How? Why?
    - If no, tell me about how family influences non-smoking?

4. The survey results / and the first round of focus groups and interviews indicated that intergenerational, trans-generational & historical reasons, such as payment in tobacco influenced our peers, friends and family, to smoke. How do you think we can break the chain to stop our family and friends smoking?

5. Thinking about family and friends that smoke, how do you think we can assist them to quit?

6. Thinking about pregnant women and young families, how can we support them to become, or remain smoke free?

7. How can we pass on our experiences and be good role models to help the youth stay smoke free?

Appendix viii: Survey for smokers

Title: Aboriginal and Torres Strait Islander Tobacco Control research project—smoking attitudes and behaviours, *Survey for adults who smoke*

Name: Mr Raglan Maddox

Phone: 0402 377 303

Email: Raglan.Maddox@canberra.edu.au

What is the purpose of this form?

The intent of the Aboriginal and Torres Strait Islander Tobacco Control research project is to gain a better understanding of smoking behaviours, beliefs and attitudes. Questions generally revolve around smoking, including the impact of smoking programs on smoking and smoking prevention, reduction and cessation. The project will focus on evaluating tobacco control in the ACT region and will help inform tobacco control and the ACT Aboriginal and Torres Strait Islander Tobacco Control Strategy.

How confidential is the information you give?

Completely confidential. When you have completed this survey, please seal it in the envelope provided and give it back to the fieldworker. The survey is managed by the University of Canberra (UC). Only the survey team will have access to your form and once the survey data is compiled your form will be destroyed. Your name and address will never be linked with any of the information you provide.

Please be as honest and as accurate as possible. If you do not wish to answer any question for any reason, you do not have to do so. Participation in this survey is entirely voluntary.

How to complete this form:

Please complete this form carefully using black or blue pen.

Most questions only require you to answer by marking the appropriate box or boxes with a cross like this: ☒ Please do not mark any areas outside the box.

Other questions will require a numeric answer and can be filled in like this: 21

Other questions will require you to circle an answer and can be completed like this: ④

Other questions will ask you to write your answer on the line provided. Please ensure that you print your answers like this:

. My name is Jack Smith .

If you make a mistake, completely cross out the answer and cross the appropriate one.

If you see an instruction like this (Skip to), you should follow the direction exactly. For example (Skip to question 20) means that you should miss all the questions after the one you have just answered, until you come to the question marked 20. If you do not see the (Skip to), just answer the next question.

Please answer each section and follow the Skips as required.

A note for all, but particularly, for our younger respondents.
The answers you give in this survey will be used by researchers to help in understanding what people think about tobacco and how it is used. You might feel embarrassed about giving honest answers. You might even be afraid that the researchers may be able to identify you, or that the answers may be shown to your parents. This will not, and cannot, happen.

All survey forms have codes entered onto them and the researchers will not know who you are. Your answers will be added to everyone else's. When all the answers are collected, researchers will then be able to report, for example, that 'most young people do not smoke'. Your answers will simply become part of a bigger pool of answers.

Your answers will help in planning health and other services for the community.

Remember, your name and address will never be linked with information you provide.

The Participant

1. First Name: _____ Last Name: _____
2. Date of Birth: _____ / _____ / _____
3. Gender (please circle): Male / Female
4. Address: _____

   _____
5. Email address: _____@_____
6. What is your marital status? _____
   (For example, Never married; Widowed; Divorced; Separated; Married)
7. Are you of Aboriginal or Torres Strait Islander origin?
   Yes, Aboriginal ☐
   Yes, Torres Strait Islander ☐
   No ☐

For participants of both Aboriginal and Torres Strait Islander origin, both 'Yes' boxes should be ticked.

8. Do you identify with a tribal group, a language or clan?
   Yes ☐
   No ☐
9. Have you attended a cultural event in the last 12 months?
   Yes ☐
   No ☐
10. Do you recognise an area as your homeland or traditional country?
    Yes ☐
    No ☐
11. Do you currently live there in an area as your homeland or traditional country?
    Yes ☐
    No ☐
12. What language do you mainly speak at home? _____
13. Do you consider you speak English: (please circle)
    Not at all Not Well Well Very Well

The Household

14. Please complete the below boxes for all the people who live in your household.
(If you don't want to provide names, you can use their initials and if you need more boxes, please ask the researcher)

First Name: _____ Last Name: _____

Relationship _____
(For example, husband, wife, partner, son, daughter, brother, sister, cousin, friend, etc.)

Do they smoke? _____
(For example, daily smoker, occasional smoker, ex-smoker or never-smoker)

7. Are you of Aboriginal or Torres Strait Islander origin?

Yes, Aboriginal ☐
Yes, Torres Strait Islander ☐
No ☐

For participants of both Aboriginal and Torres Strait Islander origin, both 'Yes' boxes should be ticked.

First Name: _____ Last Name: _____

Relationship _____
(For example, husband, wife, partner, son, daughter, brother, sister, cousin, friend, etc.)

Do they smoke? _____
(For example, daily smoker, occasional smoker, ex-smoker or never-smoker)

Are they of Aboriginal or Torres Strait Islander origin?

Yes, Aboriginal ☐
Yes, Torres Strait Islander ☐
No ☐

For participants of both Aboriginal and Torres Strait Islander origin, both 'Yes' boxes should be ticked.

First Name: _____ Last Name: _____

Relationship: _____
(For example, husband, wife, partner, son, daughter, brother, sister, cousin, friend, etc.)

Do they smoke? _____
(For example, daily smoker, occasional smoker, ex-smoker or never-smoker)

Are they of Aboriginal or Torres Strait Islander origin?

Yes, Aboriginal ☐
Yes, Torres Strait Islander ☐
No ☐

For participants of both Aboriginal and Torres Strait Islander origin, both 'Yes' boxes should be ticked.

15. How many people aged 12 and over live in this household, including yourself:_____

16. How many dependent children are in this household? _____
(Dependent children are defined as children aged 0–14, or older children who are still financially dependent, such as full-time students)

Household Income, employment and education

17. Which of the following groups would represent the combined household annual income, before tax, from all sources?

$145,600 or more ($2,800 or more/week)	☐
$104,000–$145,599 ($2,000–$2,799/week)	☐
$83,200–$103,999 ($1,600–$1,999/week)	☐
$67,600–$83,199 ($1,300–$1,599/week)	☐
$52,000–$67,599 ($1,000–$1,299/week)	☐
$41,600–$51,999 ($800–$999/week)	☐
$31,200–$41,599 ($600–$799/week)	☐
$20,800–$31,199 ($400–$599/week)	☐
$13,000–$20,799 ($250–$399/week)	☐
$7,800–$12,999 ($150–$249/week)	☐
$1–$7,799 ($1–$149/week)	☐
Nil Income	☐
Negative Income	☐
Prefer not to say	☐
Don't know	☐

18. Which of the following best describes your current employment status? Are you …?

Self-employed	☐
Employed for wages	☐
Salary or payment in kind	☐
Unemployed and looking for work	☐
Engaged in home duties	☐
A student	☐
Retired or on a pension	☐
Unable to work	☐
Other	☐

19. Are you currently a full time student at a TAFE, university or an educational institution?

Yes	☐
No	☐

20. Are you still attending secondary school?

Yes	☐
No	☐

21. What is the highest year of primary or secondary school that you have completed?
    - Did not go to school ☐
    - Year 6 or below ☐
    - Year 7 or equivalent ☐
    - Year 8 or equivalent ☐
    - Year 9 or equivalent ☐
    - Year 10 or equivalent ☐
    - Year 11 or equivalent ☐
    - Year 12 or equivalent ☐

22. Have you completed a trade certificate, diploma, degree or any other educational qualification?
    - Yes ☐
    - No ☐

23. What is the highest level of education completed by your mother? _____

Tobacco

24. In the last 12 months, have you been offered or had the opportunity to use tobacco?
    - Yes ☐
    - No ☐

25. How difficult or easy would it be for you to get some tobacco, if you wanted some? Please circle one response.

Probably impossible Very difficult Fairly difficult Fairly easy Very easy Don't know

26. Have you personally ever tried smoking cigarettes or other forms of tobacco?
    - Yes ☐
    - No ☐

27. Have you ever smoked a full cigarette?
    - Yes ☐
    - No ☐

28. About what age were you when you smoked your first full cigarette? _____

29. Who supplied you with your first cigarette?
    - Friend or acquaintance ☐
    - Brother or sister ☐
    - Parent ☐
    - Spouse or partner ☐
    - Stole it ☐
    - Purchased it myself from shop/tobacco retailer ☐
    - Other ☐
    - Can't recall ☐

30. Would you have smoked at least 100 cigarettes (manufactured or roll-your-own), or the equivalent amount of tobacco in your life?

Yes ☐
No ☐
Don't know ☐

31. Have you ever smoked on a daily basis?
    Yes ☐
    No ☐ (If no, please skip to question 34.)

32. At what age did you first start smoking daily? _____

33. At the present time, do you consider yourself:
    A non-smoker ☐
    An ex-smoker ☐
    An occasional smoker ☐
    A light smoker ☐
    A social smoker ☐
    A heavy smoker ☐
    A chain smoker ☐

34. What no-smoking policies or restrictions, if any, does your workplace, school or college have in place?
    No restrictions ☐
    Allowed to smoke in own room only/office only ☐
    Allowed to smoke in inside smoking area ☐
    Allowed to smoke in outside smoking area ☐
    Allowed to smoke outside building (no special area provided) ☐
    Total ban (even outside) ☐
    Not applicable (not working or studying) ☐

Tobacco: Fagerstrom test for nicotine dependence

35. How soon after you wake up do you smoke your first cigarette?
    Within 5 minutes ☐
    6–30 minutes ☐
    31–60 minutes ☐
    After 60 minutes ☐

36. Do you find it difficult to refrain from smoking in places where it is forbidden (e.g. in church, at the library, cinema, etc.)?
    Yes ☐
    No ☐

37. Which cigarette would you hate to give up?
    - The first one in the morning ☐
    - All others ☐

38. How many cigarettes/day do you smoke?
    - 10 or less ☐
    - 11–20 ☐
    - 21–30 ☐
    - 31 or more ☐

39. Do you smoke more frequently during the first hours after waking than during the rest of the day?
    - Yes ☐
    - No ☐

40. Do you smoke if you are so ill you are in bed most of the day?
    - Yes ☐
    - No ☐

Quit attempts, behaviours and beliefs

41. How many attempts to quit smoking have you made in the past 12 months that lasted at least 24 hours? _____

42. In the last month, how often did you ...
    a) Think about how much you enjoy smoking?
       - Never ☐
       - Once or twice ☐
       - Several times ☐
       - Many times ☐

    b) Stub out a cigarette before you finished it because you thought about the harm of smoking?
       - Never ☐
       - Once or twice ☐
       - Several times ☐
       - Many times ☐

    c) Stop yourself from having a cigarette when you had an urge to smoke?
       - Never ☐
       - Once or twice ☐
       - Several times ☐
       - Many times ☐

    d) Deliberately cover up or conceal your pack, or put your cigarettes in another container?
       - Never ☐
       - Once or twice ☐
       - Several times ☐
       - Many times ☐

43. During the last 12 months, did you find that you couldn't stop or cut down on your smoking, even though you wanted to or tried to?

Yes ☐

No ☐

44. In the last 12 months, have you ... (Mark all that apply)

Successfully given up smoking (for more than a month) ☐

Tried to give up unsuccessfully ☐

Changed to a brand with lower tar or nicotine content ☐

Tried to change to a brand with lower tar or nicotine content, but were unsuccessful ☐

Reduced the amount of tobacco you smoke in a day ☐

Tried to reduce the amount of tobacco smoked in a day, but were unsuccessful ☐

None of these ☐

45. Thinking about different brands of cigarettes like Winfield, Benson & Hedges, Longbeach and all the other brands (not the varieties within each individual brand). We are interested in your thoughts on how cigarette brands overall compare to each other.

a) In your opinion, do some cigarette brands have more prestige than others?

Yes ☐

No ☐

Not applicable ☐

Don't know ☐

b) And in your opinion, are some cigarette brands more harmful than others?

Yes ☐

No ☐

Not applicable ☐

Don't know ☐

46. Which of the following motivated you to try giving up, cutting down or changing to a lower tar or nicotine brand? (Mark all that apply)

- Health warnings on cigarette packets ☐
- Plain packaging (plain olive brown coloured packets) ☐
- Government advertisements on TV, press or radio ☐
- Advertising for products such as nicotine gum, patches or Zyban ☐
- Tobacco Information Line (i.e. phone number on cigarette packet) ☐
- 'QUIT' line ☐
- I want to be fit ☐
- I am pregnant or planning to start a family ☐
- The effects on my health or fitness ☐
- My doctor advised me not to smoke ☐
- Family and/or friends ☐
- I was worried it would affect the health of those around me ☐
- It costs too much ☐
- Smoking restrictions in public areas (e.g. restaurants, sporting venues, etc.) ☐
- Smoking restrictions in the work place ☐
- No More Boondah—group session ☐
- No More Boondah—one-on-one support ☐
- The Beyond Today campaign ☐
- Speaking with a Tobacco Action Worker ☐
- Subsidies for access to additional therapies and treatments ☐
- Banning smoking in cars where children are present ☐
- Providing access for staff to cessation/reduction programs ☐
- Other ☐

47. In the last 12 months, on average how much do you think you have cut down on your cigarette smoking? (Mark only one response)

- Have not cut down ☐
- By about 1 to 5 cigarettes per day ☐
- By about 6 to 10 cigarettes per day ☐
- By about 11 to 15 cigarettes per day ☐
- By about 16 to 20 cigarettes per day ☐
- By more than 20 cigarettes per day ☐
- Don't smoke cigarettes ☐

48. Would you like to stop smoking?

- Yes ☐
- No ☐

49. Are you planning on giving up smoking?

- No, I have already given up ☐
- Yes, within 30 days ☐
- Yes, after 30 days, but within the next 3 months ☐
- Yes, but not within the next 3 months ☐
- No, I am not planning to give up ☐

50. Why don't you intend to quit?

- I enjoy smoking ☐
- Smoking relaxes me ☐
- I am addicted to nicotine ☐
- Smoking is not as bad for my health as people say ☐
- Smoking helps me manage my weight ☐
- I've tried to quit before but it hasn't worked ☐
- Other (Please write in): _____

_____

_____

51. What factors would motivate you to quit smoking?

- Advice from my doctor ☐
- Family/partner/parents ☐
- Affecting my fitness ☐
- Ill health ☐
- Pregnancy ☐
- Children in the home ☐
- Other (Please write in): _____

_____

_____

52. During the last 12 months, have you done any of the following?

- Discussed smoking and health at home ☐
- Rung the 'QUIT' line ☐
- Asked your doctor for help to quit ☐
- Used nicotine gum, nicotine patch or nicotine inhaler ☐
- Used a smoking cessation pill (e.g. Zyban) ☐
- Bought a product other than nicotine ☐
- Patch, gum or pill to help you quit ☐
- Read 'How to Quit' literature ☐
- Used the Internet to help you quit ☐
- Done something else to help you quit ☐
- Asked a health professional at Winnunga for help to quit ☐
- No More Boondah—group session ☐
- No More Boondah—one-on-one support ☐
- Spoken with a Tobacco Action Worker for help to quit ☐

None of the above ☐
Don't know ☐

53. During the last 12 months, has anybody at your house been trying to get you to quit smoking?

Yes—Parent ☐
Yes—Child ☐
Yes—Sibling (brother or sister) ☐
Yes—Partner/spouse ☐
Yes—Friend/flatmate ☐
Yes—Other person ☐
No one trying to get me to quit ☐
Not applicable (live alone) ☐

54. If you were seeking advice on quitting smoking, where would you go? (Mark all that apply)

Discuss smoking and health at home ☐
Ring the 'QUIT' line ☐
Ask your doctor for help to quit ☐
Ask a health professional at Winnunga for help to quit ☐
No More Boondah—group session ☐
No More Boondah—one-on-one support ☐
Speak with a Tobacco Action Worker for help to quit ☐
Read 'How to Quit' literature ☐
Use the Internet to help you quit ☐
None of the above ☐
Don't know ☐
Other (please specify) _____

_____
_____
_____
_____
_____

55. The following items are reasons given by people for not smoking on a particular occasion or for not smoking at all. Please indicate how important each statement is to you personally as a reason for not smoking by circling the appropriate response.

a. smoking may interfere with my performance

not important slightly important moderately important very important extremely important

b. smoking impairs peoples' control of themselves, and I like to be in full control

not important slightly important moderately important very important extremely important

c. I need my money for things other than smoking

extremely important very important moderately important slightly important not important

d. I don't want to act like people I've encountered who smoke

extremely important very important moderately important slightly important not important

e. Smoking may make me vulnerable and put me at risk for harm

not important slightly important moderately important very important extremely important

f. Smoking may affect my work or studies

not important slightly important moderately important very important extremely important

g. I have a medical condition that is made worse by smoking

extremely important very important moderately important slightly important not important

h. I have or used to have a smoking problem

extremely important very important moderately important slightly important not important

i. I have a genetic condition which makes it hard for my body to handle smoking

not important slightly important moderately important very important extremely important

j. My doctor told me not to smoke

not important slightly important moderately important very important extremely important

k. One or both of my parents do or have smoked

not important slightly important moderately important very important extremely important

l. My family gets upset when I smoke

extremely important very important moderately important slightly important not important

m. I was brought up to abstain from smoking

extremely important very important moderately important slightly important not important

n. My family disapproves of smoking

not important slightly important moderately important very important extremely important

o. I was taught not to smoke

not important slightly important moderately important very important extremely important

p. My religion does not allow smoking

extremely important very important moderately important slightly important not important

q. Smoking is against my spiritual and religious beliefs

extremely important very important moderately important slightly important not important

r. My culture does not allow smoking

not important slightly important moderately important very important extremely important

s. Smoking is against my cultural beliefs

not important slightly important moderately important very important extremely important

t. I have no desire to smoke

extremely important very important moderately important slightly important not important

u. I do not like the taste or smell of smoke

extremely important very important moderately important slightly important not important

56. If you were seeking advice on quitting smoking, where would you go?

(Mark all that apply)

Discuss smoking and health at home	☐
Ring the 'QUIT' line	☐
Ask your doctor for help to quit	☐
Ask a health professional at Winnunga for help to quit	☐
No More Boondah—group session	☐
No More Boondah—one-on-one support	☐
Speak with a Tobacco Action Worker for help to quit	☐
Read 'How to Quit' literature	☐
Use the Internet to help you quit	☐
None of the above	☐
Don't know	☐

Other (please specify) _____

57. Do you avoid places where you may be exposed to other people's cigarette smoke?

Yes ☐

No ☐

58. Thinking about your friends, who are your BEST FRIENDS? Please compete the below questions, starting with your best friend. (If you need more boxes, please ask the researcher)

First Name: _____ Last Name: _____

Relationship _____

Do they smoke? _____

(For example, daily smoker, occasional smoker, ex-smoker or never-smoker)

Are they of Aboriginal or Torres Strait Islander origin?

Yes, Aboriginal ☐

Yes, Torres Strait Islander ☐
No ☐
For participants of both Aboriginal and Torres Strait Islander origin, both 'Yes' boxes should be ticked.

First Name: _____ Last Name: _____

Relationship _____

Do they smoke? _____

(For example, daily smoker, occasional smoker, ex-smoker or never-smoker)

Are they of Aboriginal or Torres Strait Islander origin?
Yes, Aboriginal ☐
Yes, Torres Strait Islander ☐
No ☐
For participants of both Aboriginal and Torres Strait Islander origin, both 'Yes' boxes should be ticked.

First Name: _____ Last Name: _____

Relationship: _____

Do they smoke? _____

(For example, daily smoker, occasional smoker, ex-smoker or never-smoker)

Are they of Aboriginal or Torres Strait Islander origin?
Yes, Aboriginal ☐
Yes, Torres Strait Islander ☐
No ☐
For participants of both Aboriginal and Torres Strait Islander origin, both 'Yes' boxes should be ticked.

First Name: _____ Last Name: _____

Relationship _____

Do they smoke? _____

(For example, daily smoker, occasional smoker, ex-smoker or never-smoker)

Are they of Aboriginal or Torres Strait Islander origin?
Yes, Aboriginal ☐
Yes, Torres Strait Islander ☐
No ☐

59. About what proportion of your friends and acquaintances use tobacco? _____%

60. Thinking about your five closest friends and family, how many of these five are regular smokers? Please circle your response

0 1 2 3 4 5

61. And how many of them became ex-smokers in the past 5 years? Please circle your response

0 1 2 3 4 5

62. Where do you go to seek health or medical advice and information? Mark all that apply

The Internet ☐
Single class or seminar (presentation, talk) ☐
Series of classes or group sessions (more than one attended) ☐
Individual counselling/discussion with health service provider ☐

Local GP ☐
Aboriginal Medical Service ☐
Accessing books, videos/DVDs or websites ☐
Discussion/advice from family or friends ☐
Discussion/advice from community elders or traditional medicine woman ☐
Other (please specify) _____

63. Who do you speak to when seeking medical/health advice and information?
(If you don't want to provide names, you can use their initials and if you need more boxes, please ask the researcher)

Title: ____ First Name: _____ Last Name: _____

Role: _____

Do they smoke? _____
(For example, daily smoker, occasional smoker, ex-smoker or never-smoker)

Are they of Aboriginal or Torres Strait Islander origin?
Yes, Aboriginal ☐
Yes, Torres Strait Islander ☐
No ☐
For participants of both Aboriginal and Torres Strait Islander origin, both 'Yes' boxes should be ticked.

Title: ____ First Name: _____ Last Name: _____

Role: _____

Do they smoke? _____
(For example, daily smoker, occasional smoker, ex-smoker or never-smoker)

Are they of Aboriginal or Torres Strait Islander origin?
Yes, Aboriginal ☐
Yes, Torres Strait Islander ☐
No ☐
For participants of both Aboriginal and Torres Strait Islander origin, both 'Yes' boxes should be ticked.

64. Who are your best ROLE MODELS?

Think about the people who would make the best role models. Please compete the below boxes, starting with the best role model in the first box.
(If you don't want to provide names, you can use their initials and if you need more boxes, please ask the researcher)

Title: ____ First Name: _____ Last Name: _____

Role: _____

Do they smoke? _____
(For example, daily smoker, occasional smoker, ex-smoker or never-smoker)

Are they of Aboriginal or Torres Strait Islander origin?
Yes, Aboriginal ☐
Yes, Torres Strait Islander ☐
No ☐
For participants of both Aboriginal and Torres Strait Islander origin, both 'Yes' boxes should be ticked.

Title: ____ First Name: _____ Last Name: _____

Role: _____

Do they smoke? _____
(For example, daily smoker, occasional smoker, ex-smoker or never-smoker)

Are they of Aboriginal or Torres Strait Islander origin?
Yes, Aboriginal ☐
Yes, Torres Strait Islander ☐
No ☐
For participants of both Aboriginal and Torres Strait Islander origin, both 'Yes' boxes should be ticked.

THANKS FOR COMPLETING THIS SURVEY!

THE RESULTS FROM THE COLLECTED INFORMATION WILL HELP TO INFORM THE SERVICES THAT ARE PROVIDED IN THE ACT.

If you would like to enter in the prize draw, please enter a valid email address or phone number. Please ensure your contact details are valid at the time of the prize draw:

_____

Details provided below will not be linked to the survey to ensure you are not identified in any way

Appendix ix: Survey for non-smokers

Title: Aboriginal and Torres Strait Islander Tobacco Control research project – attitudes and behaviours in relation to smoking, *A questionnaire for adults who do not smoke*

Name: Mr Raglan Maddox

Phone: 0402 377 303

Email: Raglan.Maddox@canberra.edu.au

What is the purpose of this form?

The intent of the Aboriginal and Torres Strait Islander Tobacco Control research project is to gain a better understanding of smoking behaviours, beliefs and attitudes. Questions generally revolve around smoking, including the impact of smoking programs on smoking and smoking prevention, reduction and cessation. The project will focus on evaluating tobacco control in the ACT region and will help inform tobacco control and the ACT Aboriginal and Torres Strait Islander Tobacco Control Strategy.

How confidential is the information you give?

Completely confidential. When you have completed this survey, please seal it in the envelope provided and give it back to the fieldworker. The survey is managed by the University of Canberra (UC). Only the survey team will have access to your form and once the survey data is compiled your form will be destroyed. Your name and address will never be linked with any of the information you provide.

Please be as honest and as accurate as possible. If you do not wish to answer any question for any reason, you do not have to do so. Participation in this survey is entirely voluntary.

How to complete this form:

Please complete this form carefully using black or blue pen.

Most questions only require you to answer by marking the appropriate box or boxes with a cross like this: ☒ Please do not mark any areas outside the box.

Other questions will require a numeric answer and can be filled in like this: 21

Other questions will require you to circle an answer and can be completed like this: ④

Other questions will ask you to write your answer on the line provided. Please ensure that you print your answers like this:

My name is Jack Smith

If you make a mistake, completely cross out the answer and cross the appropriate one.

If you see an instruction like this (Skip to), you should follow the direction exactly. For example (Skip to question 20) means that you should miss all the questions after the one you have just answered, until you come to the question marked 20. If you do not see the (Skip to), just answer the next question. Please answer each section and follow the Skips as required.

A note for all, but particularly, for our younger respondents.
The answers you give in this survey will be used by researchers to help in understanding what people think about tobacco and how it is used. You might feel embarrassed about giving honest answers. You might even be afraid that the researchers may be able to identify you, or that the answers may be shown to your parents. This will not, and cannot, happen.

All survey forms have codes entered onto them and the researchers will not know who you are. Your answers will be added to everyone else's. When all the answers are collected, researchers will be able to report, for example, that 'most young people do not smoke' or that 'less than half of all women smoke'. Your answers will simply become part of a bigger pool of answers.

Your answers will help in planning health and other services for the community.

Remember, your name and address will never be linked with information you provide.

The Participant

65. First Name: _____ Last Name: _____
66. Date of Birth: _____ / _____ / _____
67. Sex/Gender: Male / Female (please circle)
68. Address: _____

    _____
69. Email address: _____@_____
70. What is your marital status? _____
    (For example, Never married; Widowed; Divorced; Separated; Married)
71. Are you of Aboriginal or Torres Strait Islander origin?
    Yes, Aboriginal ☐
    Yes, Torres Strait Islander ☐
    No ☐

For participants of both Aboriginal and Torres Strait Islander origin, both 'Yes' boxes should be ticked.

72. Do you identify with a tribal group, a language or clan?
    Yes ☐
    No ☐
73. Have you attended a cultural event in the last 12 months?
    Yes ☐
    No ☐
74. Do you recognise an area as your homeland or traditional country?
    Yes ☐
    No ☐
75. Do you currently live there in an area as your homeland or traditional country?
    Yes ☐
    No ☐
76. What language do you mainly speak at home? _____
77. Do you consider you speak English (please circle)
    Not at all Not Well Well Very Well

The Household

78. Please complete the below table for all the people who live in your household?
(If you don't want to provide names, you can use their initials and if you need more boxes, please ask the researcher)

First Name: _____ Last Name: _____

Relationship _____
(For example, husband, wife, partner, son, daughter, brother, sister, cousin, friend, etc.)

Do they smoke? _____
(For example, daily smoker, occasional smoker, ex-smoker or never-smoker)

Are they of Aboriginal or Torres Strait Islander origin?
Yes, Aboriginal ☐
Yes, Torres Strait Islander ☐
No ☐
For participants of both Aboriginal and Torres Strait Islander origin, both 'Yes' boxes should be ticked.

First Name: _____ Last Name: _____

Relationship _____
(For example, husband, wife, partner, son, daughter, brother, sister, cousin, friend, etc.)

Do they smoke? _____
(For example, daily smoker, occasional smoker, ex-smoker or never-smoker)

Are they of Aboriginal or Torres Strait Islander origin?
Yes, Aboriginal ☐
Yes, Torres Strait Islander ☐
No ☐
For participants of both Aboriginal and Torres Strait Islander origin, both 'Yes' boxes should be ticked.

First Name: _____ Last Name: _____

Relationship: _____
(For example, husband, wife, partner, son, daughter, brother, sister, cousin, friend, etc)

Do they smoke? _____
(For example, daily smoker, occasional smoker, ex-smoker or never-smoker)

Are they of Aboriginal or Torres Strait Islander origin?
Yes, Aboriginal ☐
Yes, Torres Strait Islander ☐
No ☐
For participants of both Aboriginal and Torres Strait Islander origin, both 'Yes' boxes should be ticked.

79. How many people aged 12 and over live in this household, including yourself _____

80. How many dependent children are in this household? _____
(Dependent children are defined as children aged 0–14, or older children who are still financially dependent, such as full-time students)

Household Income, employment and education

81. Which of the following groups would represent the combined household annual income, before tax, from all sources?

- $145,600 or more ($2,800 or more/week) ☐
- $104,000–$145,599 ($2,000–$2,799/week) ☐
- $83,200–$103,999 ($1,600–$1,999/week) ☐
- $67,600–$83,199 ($1,300–$1,599/week) ☐
- $52,000–$67,599 ($1,000–$1,299/week) ☐
- $41,600–$51,999 ($800–$999/week) ☐
- $31,200–$41,599 ($600–$799/week) ☐
- $20,800–$31,199 ($400–$599/week) ☐
- $13,000–$20,799 ($250–$399/week) ☐
- $7,800–$12,999 ($150–$249/week) ☐
- $1–$7,799 ($1–$149/week) ☐
- Nil Income ☐
- Negative Income ☐
- Prefer not to say ☐
- Don't know ☐

82. Which of the following best describes your current employment status? Are you …?

- Self-employed ☐
- Employed for wages ☐
- Salary or payment in kind ☐
- Unemployed and looking for work ☐
- Engaged in home duties ☐
- A student ☐
- Retired or on a pension ☐
- Unable to work ☐
- Other ☐

83. Are you currently a full time student at a TAFE, university or an educational institution?

- Yes ☐
- No ☐

84. Are you still attending secondary school?

- Yes ☐
- No ☐

85. What is the highest year of primary or secondary school that you have completed?

- Did not go to school ☐
- Year 6 or below ☐
- Year 7 or equivalent ☐
- Year 8 or equivalent ☐
- Year 9 or equivalent ☐

Year 10 or equivalent ☐
Year 11 or equivalent ☐
Year 12 or equivalent ☐

86. Have you completed a trade certificate, diploma, degree or any other educational qualification?
    Yes ☐
    No ☐

87. What is the highest level of education completed by your mother? _____

Tobacco

88. In the last 12 months, have you been offered or had the opportunity to use tobacco?
    Yes ☐
    No ☐

89. How difficult or easy would it be for you to get some tobacco, if you wanted some? Please circle one response.

Probably impossible Very difficult Fairly difficult Fairly easy Very easy Don't know

90. Have you personally ever tried smoking cigarettes or other forms of tobacco?
    Yes ☐
    No ☐

91. Have you ever smoked a full cigarette?
    Yes ☐
    No ☐ (If no, skip to question 36)

92. About what age were you when you smoked your first full cigarette? _____

93. Who supplied you with your first cigarette?
    Friend or acquaintance ☐
    Brother or sister ☐
    Parent ☐
    Spouse or partner ☐
    Stole it ☐
    Purchased it myself from shop/tobacco retailer ☐
    Other ☐
    Can't recall ☐

94. Would you have smoked at least 100 cigarettes (manufactured or roll-your-own), or the equivalent amount of tobacco in your life?
    - Yes ☐
    - No ☐
    - Don't know ☐

95. Have you ever smoked on a daily basis?
    - Yes ☐
    - No ☐ (If no, please skip to question 34)

96. At what age did you first start smoking daily? _____

97. About what age were you when you stopped smoking daily? _____

98. At the present time, do you consider yourself?
    - A non-smoker ☐
    - An ex-smoker ☐
    - An occasional smoker ☐
    - A light smoker ☐
    - A social smoker ☐
    - A heavy smoker ☐
    - A chain smoker ☐

99. About what age were you when you last smoked? _____

100. What no-smoking policies or restrictions, if any, does your workplace, school or college have in place?
    - No restrictions ☐
    - Allowed to smoke in own room only/office only ☐
    - Allowed to smoke in inside smoking area ☐
    - Allowed to smoke in outside smoking area ☐
    - Allowed to smoke outside building (no special area provided) ☐
    - Total ban (even outside) ☐
    - Not applicable (not working or studying) ☐

Behaviours, beliefs and quit attempts

101. Thinking about different brands of cigarettes like Winfield, Benson & Hedges, Longbeach and all the other brands (not the varieties within each individual brand). We are interested in your thoughts on how cigarette brands overall compare to each other.

    c) In your opinion, do some cigarette brands have more prestige than others?
    - Yes ☐
    - No ☐
    - Not applicable ☐
    - Don't know ☐

    d) And in your opinion, are some cigarette brands more harmful than others?

Yes ☐
No ☐
Not applicable ☐
Don't know ☐

102. Which of the following motivate you not to smoke? (Mark all that apply)

Health warnings on cigarette packets ☐
Plain packaging (plain olive brown coloured packets) ☐
Government advertisements on TV, press or radio ☐
Advertising for products such as nicotine gum, patches or Zyban ☐
Tobacco Information Line (i.e. phone number on cigarette packet) ☐
'QUIT' line ☐
I want to be fit ☐
I am pregnant or planning to start a family ☐
The effects on my health or fitness ☐
My doctor advised me not to smoke ☐
Family and/or friends ☐
I was worried it would affect the health of those around me ☐
It costs too much ☐
Smoking restrictions in public areas (e.g. restaurants, sporting venues, etc.) ☐
Smoking restrictions in the work place ☐
Beyond Today campaign ☐
No More Boondah ☐
Other ☐

103. The following items are reasons given by people for not smoking on a particular occasion or for not smoking at all. Please indicate how important each statement is to you personally as a reason for not smoking by circling the appropriate response.

a. smoking may interfere with my performance

not important slightly important moderately important very important extremely important

b. smoking impairs peoples' control of themselves, and I like to be in full control

not important slightly important moderately important very important extremely important

c. I need my money for things other than smoking

extremely important very important moderately important slightly important not important

d. I don't want to act like people I've encountered who smoke

extremely important very important moderately important slightly important not important

e. Smoking may make me vulnerable and put me at risk for harm

not important slightly important moderately important very important extremely important

f. Smoking may affect my work or studies

not important slightly important moderately important very important extremely important

g. I have a medical condition that is made worse by smoking

extremely important very important moderately important slightly important not important

h. I have or used to have a smoking problem

extremely important very important moderately important slightly important not important

i. I have a genetic condition which makes it hard for my body to handle smoking

not important slightly important moderately important very important extremely important

j. My doctor told me not to smoke

not important slightly important moderately important very important extremely important

k. One or both of my parents do or have smoked

extremely important very important moderately important slightly important not important

l. My family gets upset when I smoke

extremely important very important moderately important slightly important not important

m. I was brought up to abstain from smoking

not important slightly important moderately important very important extremely important

n. My family disapproves of smoking

not important slightly important moderately important very important extremely important

o. I was taught not to smoke

extremely important very important moderately important slightly important not important

p. My religion does not allow smoking

extremely important very important moderately important slightly important not important

q. Smoking is against my spiritual and religious beliefs

not important slightly important moderately important very important extremely important

r. My culture does not allow smoking

not important slightly important moderately important very important extremely important

s. Smoking is against my cultural beliefs

not important slightly important moderately important very important extremely important

t. I have no desire to smoke

not important slightly important moderately important very important extremely important

u. I do not like the taste or smell of smoke

extremely important very important moderately important slightly important not important

104. If you were seeking advice on quitting smoking, where would you go?

(Mark all that apply)

Discuss smoking and health at home ☐
Ring the 'QUIT' line ☐
Ask your doctor for help to quit ☐
Ask a health professional at Winnunga for help to quit ☐
No More Boondah—group session ☐
No More Boondah—one-on-one support ☐
Speak with a Tobacco Action Worker for help to quit ☐
Read 'How to Quit' literature ☐
Use the Internet to help you quit ☐
None of the above ☐
Don't know ☐
Other (please specify) _____

105. Are you planning on taking up smoking?

Yes ☐
No ☐
Don't know ☐

106. Why would you intend to smoke?

_____

107. What factors would motivate you to continue being a non-smoker?

_____

_____

108. During the last 12 months, has anybody at your house been trying to get you to start smoking?

Yes ☐
No ☐

109. Do you avoid places where you may be exposed to other people's cigarette smoke?

Yes ☐
No ☐

110. Thinking about your friends, who are your BEST FRIENDS? Please compete the below questions, starting with your best friend.

(If you don't want to provide names, you can use their initials and if you need more boxes, please ask the researcher)

First Name: _____ Last Name: _____

Relationship _____

Do they smoke? _____

(For example, daily smoker, occasional smoker, ex-smoker or never-smoker)

Are they of Aboriginal or Torres Strait Islander origin?

Yes, Aboriginal ☐

Yes, Torres Strait Islander ☐

No ☐

For participants of both Aboriginal and Torres Strait Islander origin, both 'Yes' boxes should be ticked.

First Name: _____ Last Name: _____

Relationship _____

Do they smoke? _____

(For example, daily smoker, occasional smoker, ex-smoker or never-smoker)

Are they of Aboriginal or Torres Strait Islander origin?

Yes, Aboriginal ☐

Yes, Torres Strait Islander ☐

No ☐

For participants of both Aboriginal and Torres Strait Islander origin, both 'Yes' boxes should be ticked.

First Name: _____ Last Name: _____

Relationship: _____

Do they smoke? _____

(For example, daily smoker, occasional smoker, ex-smoker or never-smoker)

Are they of Aboriginal or Torres Strait Islander origin?

Yes, Aboriginal ☐

Yes, Torres Strait Islander ☐

No ☐

For participants of both Aboriginal and Torres Strait Islander origin, both 'Yes' boxes should be ticked.

First Name: _____ Last Name: _____

Relationship _____

Do they smoke? _____

(For example, daily smoker, occasional smoker, ex-smoker or never-smoker)

Are they of Aboriginal or Torres Strait Islander origin?

Yes, Aboriginal ☐

Yes, Torres Strait Islander ☐

No ☐

For participants of both Aboriginal and Torres Strait Islander origin, both 'Yes' boxes should be ticked.

111. About what proportion of your friends and acquaintances use tobacco?

_____%

112. Thinking about your five closest friends and family, how many of these five are regular smokers? Please circle your response

0 1 2 3 4 5

113. And how many of them became ex-smokers in the past 5 years? Please circle your response

0 1 2 3 4 5

114. Where do you go to seek health or medical advice and information? Mark all that apply.

The Internet ☐
Single class or seminar (presentation, talk) ☐
Series of classes or group sessions (more than one attended) ☐
Individual counselling/discussion with health service provider ☐
Local GP ☐
Aboriginal Medical Service ☐
Accessing books, videos/DVDs or websites ☐
Discussion/advice from family or friends ☐
Discussion/advice from community elders or traditional medicine woman ☐
Other (please specify) _____

115. Who do you speak to when seeking medical/health advice and information? (If you don't want to provide names, you can use their initials and if you need more boxes, please ask the researcher)

Title: ____ First Name: _____ Last Name: _____

Role: _____

Do they smoke? _____

(For example, daily smoker, occasional smoker, ex-smoker or never-smoker)

Are they of Aboriginal or Torres Strait Islander origin?

Yes, Aboriginal ☐
Yes, Torres Strait Islander ☐
No ☐

Title: ____ First Name: _____ Last Name: _____

Role: _____

Do they smoke? _____

(For example, daily smoker, occasional smoker, ex-smoker or never-smoker)

Are they of Aboriginal or Torres Strait Islander origin?

Yes, Aboriginal ☐
Yes, Torres Strait Islander ☐
No ☐

For participants of both Aboriginal and Torres Strait Islander origin, both 'Yes' boxes should be ticked.

116. Who are your best ROLE MODELS?

Think about the people who would make the best role models. Please compete the below boxes, starting with the best role model in the first box. (If you don't want to provide names, you can use their initials and if you need more boxes, please ask the researcher)

Title: _____ First Name: _____ Last Name: _____

Role: _____

Do they smoke? _____
(For example, daily smoker, occasional smoker, ex-smoker or never-smoker)

Are they of Aboriginal or Torres Strait Islander origin?
Yes, Aboriginal ☐
Yes, Torres Strait Islander ☐
No ☐
For participants of both Aboriginal and Torres Strait Islander origin, both 'Yes' boxes should be ticked.

Title: _____ First Name: _____ Last Name: _____

Role: _____

Do they smoke? _____
(For example, daily smoker, occasional smoker, ex-smoker or never-smoker)

Are they of Aboriginal or Torres Strait Islander origin?
Yes, Aboriginal ☐
Yes, Torres Strait Islander ☐
No ☐
For participants of both Aboriginal and Torres Strait Islander origin, both 'Yes' boxes should be ticked.

THANKS FOR COMPLETING THIS SURVEY!

THE RESULTS FROM THE COLLECTED INFORMATION WILL HELP TO INFORM THE SERVICES THAT ARE PROVIDED IN THE ACT REGION.

If you would like to enter in the prize draw, please enter a valid email address or phone number. Please ensure your contact details are valid at the time of the prize draw:

_____

Details provided below will not be linked to the survey to ensure you are not identified in any way

Appendix x: Information and consent form

Participant Information and Consent Form

Title	Aboriginal and Torres Strait Islander Tobacco Control Research Project
Principal Investigator	Mr Raglan Maddox
Location	Centre for Research and Action in Public Health
	University of Canberra
Protocol	TBC

PART I—WHAT DOES MY PARTICIPATION IN THE STUDY INVOLVE?

1. INTRODUCTION

You are invited to take part in the Aboriginal and Torres Strait Islander Tobacco Control Research Project because we value your opinion about smoking attitudes and behaviours.

This Participant Information Sheet and Consent Form tells you about the study. It explains what is involved to help you decide if you want to take part in the study.

Please read this information carefully and ask questions about anything that you do not understand or want to know more about. Before deciding whether to take part, you might want to talk about it with a relative, friend or local staff member.

2. WHAT IS THE PURPOSE OF THIS RESEARCH?

The aim of the study is to find out what factors may help reduce tobacco use. The intent of this research is to gain an understanding of smoking behaviours and attitudes, including the impact and effectiveness of tobacco control programs. Questions generally revolve around smoking behaviour and attitudes, including impacts on smoking and smoking prevention, reduction and cessation. The project will focus on evaluating tobacco control in the ACT region and will help inform tobacco control and the ACT Aboriginal and Torres Strait Islander Tobacco Control Strategy.

3. WHY HAVE I BEEN CHOSEN?

You have been invited to participate in this study because we value your opinion and you are resident in the ACT region. Potential participants have been invited to participate to represent the range of people that access different services, you may have visited Winnunga Nimmityjah Aboriginal Health Service, Gugan Gulwan Youth Aboriginal Corporation, been referred to by another organisation or by a friend. If you volunteer for the study, we will invite you to complete a survey questionnaire. More information about the date, time, duration and location these surveys will be provided should you complete the attached consent form.

DO I HAVE TO TAKE PART IN THE RESEARCH?

It is up to you whether or not you take part in this research. If you do decide to take part you will be given this Participant Information Sheet and Consent Form to sign and you will be given a copy to keep. Participation in the survey is voluntary and you can choose not to participate in part or all of the survey without prejudice.

4. OTHER RELEVANT INFORMATION

It is expected that this survey will take no longer than 30 minutes to complete. Surveys will be de-identified and coded (with no names) to ensure confidentiality of the provided information and stored in a secure location. The surveys will be anonymised for analysis and to ensure confidentiality. No quotes or attributed opinions will be used without explicit permission by the participant. The coded information and surveys will only be accessible to the Research Team. The data will be destroyed after a five-year period unless consent is received to use the data in future research.

5. WHAT WILL HAPPEN TO ME IF I TAKE PART IN THE STUDY?

If you join to take part in the study, you will be provided with a consent form to sign prior to commencing. You will then be given a survey to complete. After 6 months, you will be sent another survey to complete. These surveys should take no longer than 30 minutes to complete and the second survey should be returned by post or electronically. Further information will be provided in due course.

The project supervisory panel and the ACT Aboriginal and Torres Strait Islander Tobacco Control Strategy Advisory Group will monitor the progress of the research.

There are no costs associated with participating in this study, nor will you be paid.

6. WHAT ARE THE POSSIBLE BENEFITS OF TAKING PART IN THE STUDY?

Smoking is the most preventable cause of illness and mortality within Australia. Aboriginal and Torres Strait Islander also carry a large burden of substance use related morbidity and mortality when compared to non-Indigenous Australians. Evidence indicates that closing the gap in life expectancy will need significant improvements in various areas, including reducing smoking. This research will contribute to the advancement of the health and wellbeing of participants and the community by investigating smoking behaviours and attitudes, evaluating tobacco control within the region.

The research is not likely to benefit you as a participant immediately. However, research will be used to assess the effectiveness of tobacco control and identify strengths and areas for improvement to reduce tobacco use and subsequently the associated illness and mortality. It is expected that the research will have benefits for the health sector and the community in terms of evidence-based tobacco control. Therefore, it will be beneficial to the community and health sector, contributing to tobacco control with the health benefits expected to filter down to the community and individual level in due course.

7. WHAT ARE THE RISKS OF TAKING PART?

There are no risks in taking part in the survey.

8. WHAT DO I DO IF I WISH TO WITHDRAW FROM THE RESEARCH?

Participation in this research is voluntary. If you do not wish to take part in all or part of the survey, you do not have to. If you decide to take part and later change your mind, you are free to withdraw from the project. If you do not wish for the research to include your information, you must inform the researcher at the time of withdrawal of consent. The researcher will inform you of any other procedures that are required to ensure that your information is not included in the project.

9. WHAT HAPPENS WHEN THE STUDY ENDS?

After you have participated in the research, you will be able to monitor research updates and reports through the Centre for Research and Action in Public Health website (http://www.canberra.edu.au/faculties/health/CeRAPH). It is anticipated that publications will be produced on the report and widely distributed.

PART II—HOW IS THE STUDY BEING CONDUCTED?

10. WHAT WILL HAPPEN TO THE INFORMATION ABOUT ME?

By signing the consent form, you consent to research staff collecting and using information about you for this research project. Any information obtained in connection with this study project that can identify you will remain confidential. The information about you will be de-identified and coded to ensure confidentiality of the provided information and stored in a secure location. The survey data will be anonymised with a reference code to ensure confidentiality. The coded information and surveys will only be accessible to the Research Team with the data destroyed after a five-year period, unless consent is received to use the data in future research.

It is expected that results of this study will be published and or presented in a variety of formats. In any publications and/or presentations, information will be provided in such a way that you cannot be identified.

In accordance with relevant Australian privacy and other relevant laws, you have the right to request access to the information collected and stored by the study team about you. You also have the right to request that any information about you with which you disagree be corrected. Please contact the research team if you have any questions.

11. WHAT IF SOMETHING GOES WRONG?

If you suffer any distress as a result of the study, please speak to the person administering the survey or contact the research team as soon as possible who will assist in seeking appropriate support.

12. WHO IS ORGANISING AND FUNDING THE RESEARCH?

The research is being undertaken by the University of Canberra, Centre for Research and Action in Public Health (CeRAPH) and is being funded by the ACT Government Health Directorate.

13. WHO HAS REVIEWED THE STUDY?

All research in Australia involving humans is reviewed by an independent group, called the Human Research Ethics Committee (HREC). The *Aboriginal and Torres Strait Islander Tobacco Control* research project was reviewed by the University of Canberra Human Research Ethics Committee (Project number 12163) on 28 September 2012 and from the ACT Health Human Research Ethics Committee (ETH10.12.232) on 14 November 2012.

The ACT Aboriginal and Torres Strait Islander Tobacco Control Strategy Advisory Group and the *Aboriginal and Torres Strait Islander Tobacco Control* research project supervisory panel have also provided advice regarding various components of the research.

14. FURTHER INFORMATION AND WHO TO CONTACT?

For more information on the *Aboriginal and Torres Strait Islander Tobacco Control* research project, please contact the Principal Investigator, Mr Raglan Maddox, via email at Raglan.Maddox@canberra.edu.au or on 02 6201 5506.

Research Team

Raglan Maddox

Principal Investigator

Centre for Research and Action in Public Health

Faculty of Health

University of Canberra

Ph: 0402 377 303

Email: Raglan.Maddox@canberra.edu.au

Rachel Davey

Supervisor

Professor Health Research

Director, Centre for Research and Action in Public Health

Faculty of Health

University of Canberra

Ph: 02 6201 5403

Email: Rachel.Davey@canberra.edu.au

PARTICIPANT CONSENT FORM

Title: *Aboriginal and Torres Strait Islander Tobacco Control* research project

Protocol Number: UC HREC (Project number 12163); ACT HREC (ETH10.12.232)

Location: Winnunga Nimmityjah Aboriginal Health Service or Gugan Gulwan Youth Aboriginal Corporation

Principal Investigator: Mr Raglan Maddox

1. I have read the attached Participant Information Sheet outlining the nature and purpose of the research and I understand what I am being asked to do.
2. I have had the opportunity to ask questions and I am satisfied with the information I have received.
3. I have been informed about the possible risks of taking part in this study.
4. I understand that my participation is voluntary, that I can choose not to participate in part or all of the project, and that I can withdraw at any stage of the project without prejudice.
5. I understand that any data that the researcher extracts from the survey for use in reports or published findings will not, under any circumstances, contain names or identifying characteristics.
6. I understand that any information I provide is confidential, and that no information that could lead to the identification of any individual will be disclosed in any reports on the project, or to any other party without my explicit permission.
7. I understand that data from the interview/recording/transcript will be kept in a secure storage and accessible to the research team. I also understand that the data will be destroyed after a five-year period unless I consent to it being used in future research.
8. I agree to participate in the study as outlined in the Participant Information Sheet.
9. I agree to be contacted for follow- up in the future.

Participant: _____

Signature: _____

Date : _____/_____/_____

Participant will be provided with a copy of the Participant Information Sheet and Consent Form

For more information on the *Aboriginal and Torres Strait Islander Tobacco Control* research project, please contact the Principal Investigator, Mr Raglan Maddox, via email at Raglan.Maddox@canberra.edu.au or by phone on 02 6201 5506.

ABORIGINAL AND TORRES STRAIT ISLANDER TOBACCO CONTROL

PARTICIPANT CONSENT FORM

Title: *Aboriginal and Torres Strait Islander Tobacco Control* research project
Protocol Number: TBC #### and *University of Canberra Protocol #12-163*
Location: Winnunga / Gugan Gulwan
Principal Investigator: Mr Raglan Maddox

I, _____ (*name*) of _____ (*address*) have been asked to participate in the *Aboriginal and Torres Strait Islander Tobacco Control* research project.

1. I have read the attached Participant Information Sheet outlining the nature and purpose of the research and I understand what I am being asked to do and the following points:
   - Ethics approval has been given for this project
   - The aim of the study is to gain an understanding of smoking behaviours and attitudes
   - The study procedure will involve completing a survey, interview or focus group
   - Should I have any problems or queries about the way in which the study was conducted, and I do not feel comfortable contacting the study staff, I am aware that I may contact the ACT Health Directorate Human Research Ethics Committee Secretariat, on 02 6205 0846 via acthealth-hrec@act.gov.au or the University of Canberra Human Research Ethics Committee
2. I have had the opportunity to ask questions and I am satisfied with the information I have received.
3. I have been informed about the possible risks of taking part in this study.
4. I understand that my participation is voluntary, that I can choose not to participate in part or all of the project, and that I can withdraw at any stage of the project without prejudice.
5. I understand that any data that the researcher extracts for use in reports or published findings will not, under any circumstances, contain names or identifying characteristics.
6. I understand that any information I provide is confidential, and that no information that could lead to the identification of any individual will be disclosed in any reports on the project, or to any other party without my explicit permission.
7. I understand that data from the interview/recording/transcript will be kept in a secure storage and accessible to the research team. I also understand that the data will be destroyed after a five-years period unless I consent to it being used in future research.
8. I agree to participate in the study as outlined in the Participant Information Sheet.
9. I agree to be contacted for follow up in the future.

Participant: _____ **Witness:** _____

Signature: _____ **Signature:** _____

Date : _____/_____/_____ **Date :** _____/_____/_____

Investigator: _____

Participant will be provided with a copy of the Participant Information Sheet and Consent Form

For more information on the *Aboriginal and Torres Strait Islander Tobacco Control* research project, please contact the Principal Investigator, Mr Raglan Maddox, via email at Raglan.Maddox@canberra.edu.au or by phone on 0402 377 303 or contact the principal supervisor, Professor Rachel Davey on 02 6201 5403 or at Rachel.Davey@canberra.edu.au.

Consent form:
Aboriginal and Torres Strait Islander Tobacco Control

Appendix xi: Winnunga Letter of Support and Project Agreement

WINNUNGA NIMMITYJAH
ABORIGINAL HEALTH CLINIC/HEALTH SERVICE
(ACT) INC. – ABN 33 612 033 770

AGPAL Accredited

To whom it may concern

RE: Support for the Indigenous Australian Tobacco Control research project

I fully support the proposed project, *Indigenous Australian Tobacco Control research project*, being undertaken by the University of Canberra. It is expected that the project will contribute to the evidence-base on tobacco control for Aboriginal and Torres Strait Islander people, highlighting what works to reduce smoking and providing invaluable information regarding tobacco control within the region.

I am pleased that Winnunga Nimmityjah Aboriginal Health Service can be involved in this project. Winnunga will work with the University of Canberra to, inter alia, help facilitate access to staff, clients and the Aboriginal and Torres Strait Islander community for relevant data collection, assist with access to de-identified data such as service use patterns and will work with the University in good faith to meet the aims and objectives of the Project.

Established in 1988, Winnunga has a history of playing a key role in the Aboriginal and Torres Strait Islander community in the ACT as a community controlled primary health care service. As a result, this project which will investigate and evaluate tobacco control aligns with our core business as a community controlled health organisation, aiming to improve the health and wellbeing of the Aboriginal and Torres Strait Islander community within the region.

The University of Canberra and Winnunga will work closely together throughout the project, focusing on evaluating tobacco control in the region and also informing the ACT Aboriginal and Torres Strait Islander Tobacco Control strategy. This project will try to understand successes of addressing smoking in the Aboriginal and Torres Strait Islander community.

It is expected that this project will provide invaluable insight into tobacco control within the region. Given that tobacco smoking is the most preventable cause of morbidity and mortality within Australia and the high rates of tobacco use among the Aboriginal and Torres Strait Islander population, we eagerly await the results and finding from the Project. Results from this project will help develop and design initiatives that reduce smoking in the Aboriginal and Torres Strait Islander community in the ACT region.

Yours truly,

Julie Tongs OAM
Chief Executive Officer

22 June 2012

63 Boolimba Crescent NARRABUNDAH ACT 2604
Telephone: (02) 6284 6222 Facsimile: (02) 6284 6200 www.winnunga.org.au

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Project agreement between
Winnunga Nimmityjah Aboriginal Health Service
and Raglan Maddox

This is a project agreement between Winnunga Nimmityjah Aboriginal Health Service (Winnunga) and Raglan Maddox, University of Canberra Student, relating to a research project which will lead to a Doctor of Philosophy (PhD) at the University of Canberra. This project will involve working with Winnunga to undertake research that contributes to the evidence-base on tobacco control interventions for Aboriginal and Torres Strait Islander people, focusing on evaluating tobacco control interventions in Canberra. This information will help Winnunga to develop ways in which it can best support the community through tobacco control interventions.

1. The Student (Raglan Maddox) will:
   a) conduct research with the aim of contributing to the evidence-base on tobacco control interventions for Aboriginal and Torres Strait Islander people.
   b) work with Winnunga, attending relevant meetings and events and under the ethical principal of reciprocity, assist Winnunga with other work that does not impact significantly on the conduct of the PhD work.
   c) abide by the policies and procedures of Winnunga.
   d) undertake the project to meet the following objectives:
      - synthesis of the current evidence base of effective interventions, strategies and policies for tobacco control and smoking cessation interventions for Indigenous Australians;
      - gaining a deeper understanding of the factors that influence smoking behaviours in Indigenous Australians; and
      - evaluate effectiveness of Tobacco Control Strategies for Indigenous Australians in the ACT.

2. Winnunga will:
   a) assist and support the Student to evaluate Winnunga's tobacco control programs for Aboriginal and Torres Stralt Islander people in the ACT.
   b) help facilitate access to staff, clients and families for surveys, semi-structured interviews, focus groups or other relevant data collection methods.
   c) assist with access to anonymous data related to client smoking status, smoking cessation programs, health and other relevant information.
   d) assist with access to de-identified service use patterns for MBS and PBS.
   e) provide access to anonymous data from the International Tobacco Control Policy Evaluation Project – 'Talking about the Smokes'.
   f) work with the Student and in good faith to allow him to meet set deadlines and requirements of the University, the scholarship funding bodies and submission of PhD papers for examination.

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3. Monitoring and reporting
   a) the project is being monitored by the Aboriginal and Torres Strait Islander Tobacco Control Strategy Advisory Group and the Students' PhD Supervisory Panel.
   b) the CEO of Winnunga, Julie Tongs, is invited to be a part of the Students' PhD Supervisory Panel.
   c) The Student will provide information to Winnunga in regards to relevant findings.
   d) the project is also being monitored through reports to the University of Canberra Research Centre as standard practice.

4. Publications and other outcomes
   a) The PhD is being undertaken by publication based largely on supervised research projects, and examined on the basis of peer-reviewed academic papers which have been published or accepted for publication.
   b) The Student will be able to publish as recommended by the Supervisory Panel and with permission of Julie Tongs, CEO of Winnunga.
   c) PhD publications are required to be submitted to the University of Canberra, with copies also to be provided to Winnunga.
   d) Winnunga recognises that the Student is working to set deadlines to meet reporting requirements of the University, the scholarship funding bodies and submission of a PhD papers for examination, and with good faith, Winnunga will enable these deadlines to be met.

.....

Julie Tongs OAM
22 June 2012
Chief Executive Officer
Winnunga Nimmityjah Aboriginal Health Service

.....

Raglan Maddox
25 June 2012
PhD Student
University of Canberra

Appendix xii: Dangerous consumption: tobacco and alcohol use seminar outline

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AUSTRALIA'S CAPITAL UNIVERSITY

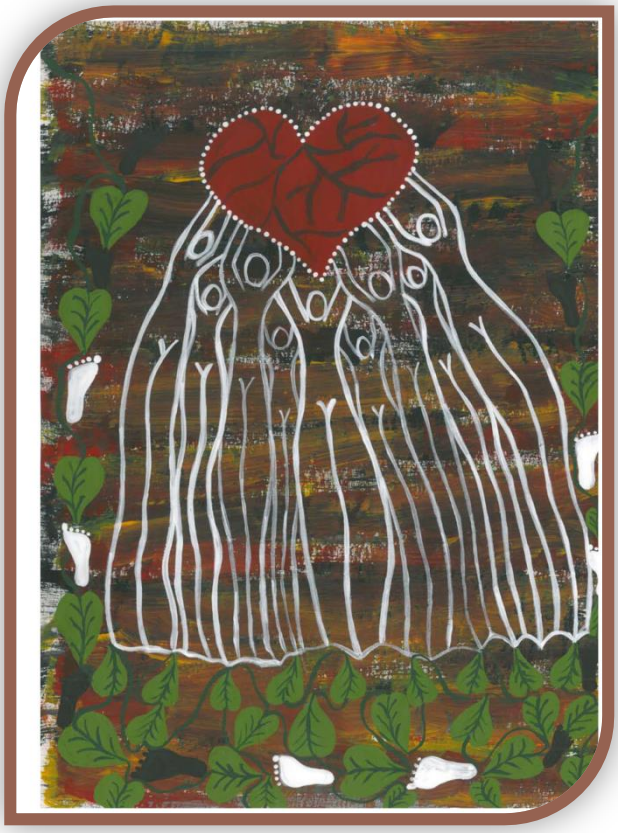
AIATSIS
AUSTRALIAN INSTITUTE OF ABORIGINAL AND TORRES STRAIT ISLANDER STUDIES

Dangerous consumption: Aboriginal and Torres Strait Islander tobacco and alcohol use Seminar

Our aim

To share research findings from our alcohol and tobacco smoking research conducted with Aboriginal populations in Australia.

We will be conducting seminars across the U.K and Canada culminating with presentations at the *International Conference on Health, Wellness and Society* held at the University of British Columbia, Vancouver from March 13-15, 2014.



Dr Ray Lovett PhD, MAE
Australian Institute of Aboriginal and Torres Strait Islander Studies

Raglan Maddox MPH
Centre for Research and Action in Public Health
University of Canberra

Background

There are more than 300 million Indigenous People across 70 countries, from the South Pacific to the Arctic (The World Bank 2012). Distinct Indigenous populations include:

- Australia—Aboriginal and Torres Strait Islander people;
- New Zealand—Maori;
- Northern Europe—the Sami;
- the Americas—the Lakota in the USA, the Mayas in Guatemala and the Aymaras in Bolivia; and
- the circumpolar region—First Nations, Inuit and Aleutians.

(Cunningham and Stanley 2003; Ministry of Health 2010; Australian Institute of Health and Welfare 2011b; The World Bank 2012).

National Coordinator Tackling Indigenous Smoking and 2013 ACT Australian of the Year, Dr Tom Calma (*right*) with football star Preston Campbell (*left*).

Despite differences in the circumstances of Indigenous People globally, many issues—including persistent inequity in health—are shared (Indigenous Health Group 2007). Despite this, Indigenous People globally demonstrate remarkable resilience in the face of many challenges (Cornell and Kalt n.d; Indigenous Health Group 2007; Sullivan 2006).

One notable commonality among Indigenous populations worldwide is the disproportionate morbidity and mortality associated with substance use. The social determinants of health including Indigenous experiences of marginalisation, family dislocation, racism, disconnection from land, loss of traditional diet and lifestyle, and the shift to Western lifestyles have contributed to the uptake of tobacco and risky alcohol use and the consequent poor health (Gracey, Williams, and Smith 2000; Foliaki and Pearce 2003; Cunningham and Stanley 2003).

Tobacco

The rate of tobacco use amongst Indigenous populations is significantly higher than the associated non-Indigenous population, with some 46 per cent of Indigenous Australians smoking tobacco on a daily basis (Australian Institute of Health and Welfare 2010; Gould, McEwen, and Munn 2011).

Tobacco has played a role in the cultural and spiritual context of many Indigenous populations (Brady 2002; Brady and Long 2003; Baezconde-Garbanati, Beebe, and Perez-Stable 2007). Indigenous Australians used tobacco in ceremonial, religious and medicinal functions, such as a gifting, burial offerings and for spiritual protection (Baezconde-Garbanati, Beebe, and Perez-Stable 2007; Daley et al. 2011; Eichner et al. 2010; Ivers 2004, 2003). Tobacco use is entrenched in many Indigenous settings, however the current health inequalities do not exist due to traditional tobacco use, but rather through ingrained tobacco use (Australian Institute of Health and Welfare 2011c; Eichner et al. 2005).

Speaker: Raglan Maddox MPH

CENTRE FOR RESEARCH AND ACTION IN PUBLIC HEALTH, UNIVERSITY OF CANBERRA

Raglan Maddox has a public health background with a variety of experiences and roles both domestically and abroad. These include numerous roles with the Australian Government, including working with Dr Tom Calma AO (National Coordinator Tackling Indigenous Smoking and 2013 ACT Australian of the Year) over

the last three years at the Department of Health on Tackling Indigenous Smoking; lecturing and tutoring on Aboriginal and Torres Strait Islander studies; interning at the World Health Organization headquarters in Geneva, Switzerland; and volunteering as a Health Promotion Field Officer at the Columbia Asia Medical Centre in Miri, Malaysia. Raglan is a member of the ACT Government's Aboriginal and Torres Strait Islander Tobacco Control Advisory Group and a PhD Candidate with a Master of Public Health. Raglan's research is exploring the effectiveness of tobacco control among Aboriginal and Torres Strait Islander people in the ACT region. This will help evaluate, inform and improve community health programs at the grass roots level.

Tobacco seminar abstract

Background: Australia's history of comprehensive tobacco control has assisted in reducing smoking rates from approximately 34 per cent in 1980 to less than 20 per cent in 2007. However, 46 per cent of Aboriginal and Torres Strait Islander people smoke daily.

Aim: To investigate social influences on tobacco smoking behaviours among Aboriginal and Torres Strait Islander people aged from 12 years.

Methods: The research used a mixed-methods approach, including a two-wave survey, key informant interviews and focus groups. Participants were recruited from an Aboriginal primary health care clinic in a major urban centre.

Results: Of the 204 participants, just over 36 per cent were smokers (28 per cent of males and 39 per cent of females). Despite the high rates of smoking there were generally low levels of nicotine dependence among smokers (74 per cent of smokers reported low or moderate to low nicotine dependence).

Among participants, tobacco smokers were 2.9 times more likely than non-smokers to have all five of their closest family and friends as tobacco smokers. Social determinants were important in smoking status: a non-smoker was 3.7 times more likely to have completed year 12 in comparison to a smoker and unemployed participants were 4.6 times more likely to be a current smoker than employed participants.

Implications: These results highlight improvements in the social determinants of health should contribute to reduction of smoking behaviour. Social influences on smoking behaviour are also strong within the group and an emphasis on influential figures (for targeting of tobacco control) within these networks may be a way forward. Regardless, the results also highlight the continuing need for tobacco control, evaluation of tobacco control programs and customization of tobacco control programs.

Alcohol

The degree of alcohol consumption and the problems related to it vary widely around the world, but the burden of disease and death remains significant in most countries. Alcohol is a causal factor in many diseases and injuries and a component cause in 200 others (World Health Organization, 2011). Four per cent of all deaths worldwide (2.25 million) are attributed to alcohol, greater than the proportion of deaths caused by HIV/AIDS, violence or tuberculosis (World Health Organization, 2009). In addition, alcohol is associated with a number of serious social issues, including violence, child neglect and abuse, and absenteeism in the workplace (World Health Organization, 2011).

Morbidity and mortality associated with alcohol is higher in developed than developing countries (World Health Organization, 2011). In Australia in 2003 alcohol consumption was associated with 3.3 per cent of the total burden of disease and injury (Begg et al., 2007; Roche et al., 2009). Among Aboriginal and Torres Strait

Islander Australians, six per cent of the total burden of disease and injury and seven per cent of all deaths are associated with alcohol consumption (Vos et al., 2003; Begg et al., 2007). It has also been found that:

- Aboriginal and Torres Strait Islander men are nine times and Aboriginal and Torres Strait Islander women are four times more likely to be hospitalised due to excessive alcohol use than non-Indigenous men and women respectively (Roche et al., 2009).
- Between 2000 and 2004, 1,145 Indigenous Australians (out of a total of 400,000–500,000 people) died from alcohol-related injury and disease.
- Alcohol-related deaths occur at the rate of 4.85 people per 10,000 population, which is double that for the non-Indigenous population.
- Alcohol-related death rates were between five and 19 times higher for Indigenous Australians than for non-Indigenous Australians in Queensland, South Australia, Western Australia and the Northern Territory (Begg et al., 2007).
- Starkly, the average age of death from alcohol-related causes for Aboriginal and Torres Strait Islander People is estimated at 35 years (Chikritzhs et al., 2007).

Speaker: Dr Ray Lovett PhD, MAE, BHSc, BN.

AUSTRALIAN INSTITUTE OF ABORIGINAL AND TORRES STRAIT ISLANDER STUDIES

Ray Lovett is a descendant of the Wongaibon Peoples from far west New South Wales and is the first Aboriginal person to graduate with a PhD in epidemiology from the National Centre for Epidemiology and Population Health in the College of Medicine, Biology and Environment at The Australian National University. Ray has held numerous positions aimed at advancing the health of Indigenous populations in both academia, community based health settings and in Government. Ray is a member of both the Commonwealth Department of Health (DoH) and Australian Capital Territories Human Research Ethics Committees (ACTHREC). In addition to his full time work at AIATSIS Ray is an Adjunct Fellow at the Centre for Research and Action in Public Health at the University of Canberra and a Post-Doctoral fellow at the National Centre for Epidemiology and Population Health at The ANU.

In 2012 Ray received the prestigious Aboriginal and Torres Strait Islander Student Award at Congress Lowitja, Australia's National Institute for Aboriginal and Torres Strait Islander Health research. More recently in 2013, Ray was awarded The Australian National University's student of the year. Ray is an active member of the Alcohol, Tobacco and Other Drugs Association of the ACT.

Alcohol seminar abstract

Background: Alcohol problems are a major cause of death and disability among Aboriginal and Torres Strait Islanders. Identifying alcohol misuse is fundamental to addressing these problems. At present, few screening instruments have been validated for use among the Indigenous Australian populations and are often administered in a way that fails to elicit accurate health information.

Mob and country are important cultural constructs for Aboriginal and Torres Strait Islander people and plays an important role in identity. Culturally appropriate care is important in the way health care services are delivered.

Aim: This study aimed to assess the impact of a cultural mediation approach, delivered by non-Indigenous physicians working in an Aboriginal primary care.

Methods: Clinicians at an urban Aboriginal primary health care centre were trained to use a culturally appropriate map of Aboriginal Australia with clients. This assisted to identify the clients 'mob and country' when they commenced a clinical interview. Participants allocated into one of two groups upon presentation to the clinic (mob-ask v control). The mob-ask group were asked about their 'mob and country'. The physician then proceeded to ask the client about their alcohol use and levels of stress. The control group was simply asked about their alcohol use and level of stress at the commencement of the session.

The proportion of participants drinking at single occasion risk and lifetime risky was assessed using the Alcohol Use Disorder Identification Test (AUDIT). Both single occasion and lifetime risk exceeded current National Health and Medical research Council Guidelines, if the AUDIT score was above eight (possible range is 0-40). Psychological distress was measured using the Kessler 10 scale, which has had extensive validation studies confirming its applicability for the study population.

Data analysis were performed using SPSS and involved first, examining associations between socio-demographic variables and drinking and stress outcomes. Then differences between the mob-ask and control group concerning AUDIT and K10 mean scores, were assessed using ANOVA.

Results: Of 266 participants with completed alcohol screens, 34 per cent were consuming alcohol above recommended guidelines. Fifty seven per cent of participants recorded moderate to severe psychological distress. Higher levels of psychological distress were associated with higher AUDIT scores.

No differences in AUDIT scores between the mob ask (M=7.35, SD = 7.54) and control group were observed (M=7.71, SD = 8.60; t (264) =-.36, p =0.7, two-tailed). Those in the mob ask group (M = 23.57, SD 10.19) on average scored 1.85 points higher on the Kessler 10 scale than the control group (M = 21.72, SD = 8.98; t (177) = 1.28, p=.19, two-tailed), although this difference was not significant. There were wide variations between clinicians and screening results in the mob ask group.

Implications: There has been limited use of important cultural constructs in Indigenous primary health care in Australia. Further research is needed to identify the factors associated with improved alcohol screening scores attained by some clinicians. This research could have major implications for traditional western based approaches to screening for alcohol and mental health in primary health care settings.

Appendix xiii: Publication—Plain Packaging Implementation: Perceptions of Risk and Prestige of Cigarette Brands among Aboriginal and Torres Strait Islander People

Title: Plain packaging implementation: perceptions of risk and prestige of cigarette brands among Aboriginal and Torres Strait Islander people

Authors: Raglan Maddox[1], Sarah Durkin[2], Ray Lovett[3]

[1] Centre for Research and Action in Public Health, Faculty of Health, University of Canberra, Canberra, Australia

[2] Centre for Behavioral Research in Cancer, The Cancer Council Victoria, Melbourne, Australia

[3] National Centre for Epidemiology and Population Health, Australian National University, Canberra, Australia

Institution: Centre for Research and Action in Public Health.

University of Canberra

Locked Bag 1

Canberra ACT 2601 Australia

University Drive

Canberra ACT 2606 Australia

Email: raglan.maddox@canberra.edu.au

Ph: +61 (0)402 377 303

HREC: University of Canberra HREC (Project number 12163)

ACT Health HREC (ETH10.12.232).

Keywords: Aboriginal; health warnings; packaging; smoking; tobacco policy; product labelling.

Word count: 2,353

Abstract

Objectives

To assess the impact of the introduction of plain packaging with larger graphic health warnings on perceptions of risk and prestige related to different cigarette brands, among Aboriginal and Torres Strait Islander people in the Australian Capital Territory. We hypothesised that the changes would decrease perceptions that 'some cigarette brands are more harmful than others', and that 'some brands are more prestigious than others', and this would be stronger among participants aged 35 years and under, and among smokers when compared with non-smokers.

Methods

Aboriginal and Torres Strait Islander people aged 12 years and over completed the baseline survey prior to packaging changes, and were followed up 12 months later (N=98). Repeated measures MANCOVAs assessed perception changes.

Results

Following the introduction of plain packaging, there was a reduction in Aboriginal and Torres Strait Islander participants who reported the incorrect perception that 'some cigarette brands are more harmful than others' ($F(1,84)=4.75$, $p<.05$). We found an interaction with age for changes in the perception of prestige ($F(1,87)=5.69$, $p<.05$); indicating that reductions prestige were limited to those aged 35 years or younger. We found no significant interactions between smoking status and packaging changes.

Conclusions

These findings provide support for the packaging changes.

Keywords

Aboriginal; packaging; smoking; tobacco policy; product labelling.

(Word Count 200)

Background

Tobacco use is the most preventable cause of morbidity and mortality within Australia, and is a significant contributor to poor health outcomes of Aboriginal and Torres Strait Islander people (1, 2). In 2013, approximately 42% of Aboriginal and Torres Strait Islander people in Australia reported as current smokers, substantially more than the rate of the general population (1, 3). Tobacco related morbidity and mortality is reflected through a range of smoking-related diseases, including cardiovascular disease, chronic respiratory disease and various forms of cancer, such as lung cancer (1, 4). Awareness of the health risks of smoking has an important influence on smokers' behaviour and is the most common motivation to quit (5-7). Those who perceive greater risks are more likely to attempt to quit and to remain smoke free (5-7).

Even though Australia has banned tobacco advertising and sponsorship across all media (8), perceptions of consumer risk can be influenced by brand imagery, including colours, symbols, shapes and graphics used in packaging (8-10). For example, many health-concerned smokers have been encouraged to switch to so-called 'low tar' cigarettes, which are typically packaged in light or white colours, rather than abstaining from tobacco use (11, 12). Internal tobacco industry documents illustrate this was a deliberate strategy to reduce perceptions of health risks through the use of different colours:

> *'Lower delivery products tend to be featured in blue packs. Indeed, as one moves down the delivery sector, then the closer to white a pack tends to become. This is because white is generally held to convey a clean healthy association'* (13).

Experimental studies examining the potential effect of plain packaging (PP) and health warnings have found high levels of misperceptions due to descriptors, such as 'slim', 'light', and 'mild', and brand elements such as colour, fonts and imagery (9, 14-17). Studies have

consistently found that many smokers incorrectly believe that tobacco products labelled as 'light' actually deliver less tar to smokers and/or are less harmful, and are therefore a 'healthier' product than regular cigarettes (18-20). Evidence also indicates that the removal of descriptive terms and elements of package design could result in reductions in false beliefs about the harm of different cigarette brands (9, 15, 16, 21, 22). Recent research suggests that changes in the elements of package design could shift perceptions of the prestige, image and quality associated with tobacco products (9, 16, 20, 23-26). For example pack colour can give the appearance of 'low prestige budget packaging' (9; 56), and as colour and branding were removed from packaging, ratings of the pack being 'lower class' became stronger and positive perceptions declined (9, 16).

Tobacco Plain Packaging

In Australia, the Tobacco Plain Packaging Act 2011 and the Tobacco Plain Packaging Regulations 2011 established the requirements for PP (27). The legislation prohibits the use of: brand imagery; logos; and promotional text on tobacco products and packaging, and includes restrictions on colour, format, size and materials of packaging, as well as brand and variant names (27). From 1 October 2012, all tobacco products manufactured or packaged in Australia, for the Australian market, had to be in PP (*Figure 1*) and as of 1 December 2012, all tobacco products sold, offered for sale or otherwise supplied in Australia had to be in PP and labelled with the expanded health warnings (27). The implementation of PP and expanded health warning complements the established suite of comprehensive tobacco control measures, including the Tackling Indigenous Smoking Programme and the ACT Aboriginal and Torres Strait Islander Tobacco Control Strategy 2010-14 (27, 28).

Figure 1: An example of plain packaging in Australia

Aims

Drawing on previous experimental research and theory (8, 9, 15-25, 29), we hypothesize that in conjunction with the suite of tobacco control measures, when all tobacco products sold, offered for sale or otherwise supplied in Australia must be in PP and labelled with new and expanded health warnings, there would be a decrease in participants' misperception that some cigarette brands are more harmful than others, and that some cigarette brands are more prestigious than others.

Due to tobacco control measures such as the *Tobacco Advertising Prohibition Act (1992)*, we expect younger participants (aged 35 years and under) to have had less exposure to tobacco advertising, sponsorship and marketing and consequently, less entrenched brand loyalty and associations of harm and prestige compared with their older counterparts (participants aged over 35 years). We also expect the implementation of PP and expanded health warnings to influence smokers more than non-smokers, due to the direct relevance of these changes, and more frequent exposure to PP. Evidence suggests that particular cigarette brands are used as a 'badge product', and can reinforce one's own self-image and personal characteristics (8). Therefore, we expect the removal of the design elements of branding so that all tobacco packs look very similar would result in minimising smokers ability to use their tobacco pack as a 'badge product' and reduce the belief that tobacco brands differ in levels of prestige (8). Smokers may also believe their particular cigarette brand is less harmful than other cigarette brands, thereby the branding may act as a form of reassurance (9, 16). As a result, we expect the implementation of PP would lead to reduced perceptions that there are differences in harm and/or prestige between brands. Therefore, we hypothesised that this impact would be stronger:

- among participants aged 35 years and under when compared with those aged over 35 years; and
- among smokers when compared with non-smokers.

Methods

Procedure and sample

Quantitative data were from the baseline and follow-up Smoke Ring Study survey. A full description of the Smoke Ring Study protocol can be found in Maddox et al. (30). The study used a mixed-method approach to explore factors influencing smoking behaviours and beliefs. Participants completed the survey using pen and paper, online or face-to-face. Participants were Aboriginal and Torres Strait Islander people aged 12 years and over residing in the ACT, but participants from the surrounding regions (for example, Queanbeyan and Jerrabomberra in New South Wales) were also included (30). Baseline survey participants (n=204) were recruited in the pre-PP phase in November 2012 using a purposive sampling framework, while 103 participants were followed-up approximately one year later, in the post-PP phase. This resulted in a follow-up survey rate of 50.5%. Participants lost to follow up were mainly non-responsive due to the inability to make contact (41.7% of baseline participants were unable to be re-contacted). This was predominantly due to changes in email addresses, physical addresses and phone numbers and may reflect the mobility of the Aboriginal and Torres Strait Islander population (31).

Measures

All questions were asked within the context of a survey exploring the social and cultural context underlying Aboriginal and Torres Strait Islander tobacco use, taking no longer than 30 minutes to complete. Smokers and non-smokers were identified as participants reported

‘At the present time, do you consider yourself? a non-smokers; an ex-smoker; an occasional smoker; a light smoker; a social smoker; a heavy smoker; a chain smoker’. In addition, participants were asked the standard *Fagerström Test for Nicotine Dependence* (32) questions, which were used to ascertain nicotine dependence. Quit attempts were examined by asking: ‘How many attempts to quit smoking have you made in the past 12 months that lasted at least 24 hours?’ Opinions about how cigarette brands compared with each other were determined by asking participants the following:

> Thinking about different brands of cigarettes like Winfield, Benson & Hedges, Longbeach and all the other brands (not the varieties within each individual brand). We are interested in your thoughts on how cigarette brands overall compare to each other.
>
> a) In your opinion, do some cigarette brands have more prestige than others?
>
> b) And in your opinion, are some cigarette brands more harmful than others?

Available responses were: Yes; No; Not applicable; and Don’t know.

Covariates

Data on age, sex, total household income, household size, dependents and educational attainment were ascertained.

Responses were used in various ways for analysis, including collapsing responses for each item into a variable; or averaging the responses for analysis where appropriate.

Ethical review

This research was informed by, and complies with, the World Medical Association Declaration of Helsinki, the National Statement on Ethical Conduct in Human Research, Values and Ethics—Guidelines for Ethical Conduct in Aboriginal and Torres Strait Islander

Health Research and the Guidelines for Ethical Research in Australian Indigenous Studies (33-35). Ethics approval was received from the ACT Health Human Research Ethics Committee (ETH10.12.232) and the University of Canberra Human Research Ethics Committee (Project number 12163).

Statistical analysis

Data was entered in SPSS version 21.0 for statistical analysis. Preliminary inspection of the data indicated some missing data on the smoking status and two main outcome variables (perceptions of differences between cigarette brands on prestige and harm). As there was no justifiable basis on which to impute missing data on these important variables, subsequent analyses were conducted on the remaining baseline sample (n=192, 94% of original sample).

A set of preliminary analyses was conducted to examine if there were any differences between respondents who were followed up, and those who were not followed-up. Repeated measures ANCOVAs were undertaken to determine the effect of PP and the new and expanded health warnings on post-intervention perceptions that some cigarette brands are more harmful than others, or are more prestigious than others after controlling for pre-intervention perceptions. As described above, covariates included in all analyses were gender, household income per annum, number of dependents in the household, and smoking status.

Results

Preliminary analyses

Sample characteristics of those in the baseline-only (n=94) and baseline + follow-up (n=98) samples *are* provided in *Table 1*. These preliminary analyses indicated respondents who were followed-up were significantly more likely to have a higher household income ($p<.01$), to have one to two dependents in the household ($p<.05$), and were slightly more likely to be

non-smokers (p=.058) and female (p=.090), while there were no significant differences between these groups in education level (p>.10). Among the smokers (n=63), those followed-up were similar to those who only completed the baseline survey in terms of addiction level (p>.10) and the number of past year quit attempts (p>.10). Each of the demographic variables that differed between those followed-up and those lost to follow-up at p<.10 were included in all subsequent analyses as covariates.

Table 1: Summary of the study participants.

Main analyses

A repeated measures MANCOVA indicated there was an overall significant reduction in perceptions that 'some cigarette brands are more harmful than others' after the implementation of PP and the new and expanded health warnings (*Table 2*). Analyses indicated no interaction effects for packaging phase by age or smoking status.

In contrast, there was no overall change in perceptions that 'some cigarette brands are more prestigious than others' after the implementation of PP and the new and expanded health warnings (*Table 2*). The analyses indicated a significant interaction effect for packaging phase and age. Post-hoc analyses conducted separately among each age group indicated a reduction in perceptions of difference in prestige among younger respondents (p=.05), whereas there was no change among older respondents (p>.20). There was no interaction for packaging phase and smoking status for perceptions of prestige differences.

Table 2: Adjusted percentages, and results of repeated measures MANCOVAs of Aboriginal and Torres Strait Islander's Perceptions of whether Brands Differ in Prestige and Harm before and after Australia's packaging changes.

Discussion

These research findings partially supported our hypotheses, finding an overall reduction in Aboriginal and Torres Strait Islanders' perception that 'some cigarette brands are more harmful than others'. There was also a reduction in the perception that some cigarette brands were more prestigious than others among those aged 35 years or younger, following the implementation of PP and the new and expanded health warnings in Australia on 1 December 2012. The results provide support for our hypotheses that the changes in perceptions would be stronger among younger participants, but did not support our hypothesis of greater change in perceptions among smokers when compared with non-smokers.

This study adds to the literature indicating the world's first implementation of mandatory PP of tobacco products across Australia has been associated with increased quitting thoughts (22), increased calls to a state cessation helpline (36) and an increase in the proportion of smokers strongly disagreeing that the look of their cigarette pack: is attractive; influences the brand they buy; is fashionable; makes their pack stand out; matches their style; says something good about them (37). These finding provide further support for PP and health warnings, in alignment with Article 11, 12 and 13 of the Framework Convention on Tobacco Control (FCTC) (38), these findings extend the benefits and utility of PP and expanded health warnings, to the Aboriginal and Torres Strait Islander population.

More time may be required for PP and expanded health warnings, complementing established tobacco control measures, to help correct misperceptions of prestige that have been established over time. Our findings indicate these misperceptions may be particularly difficult to correct among those who are older and who may have had longer and more intense exposure to the marketing of these brands. Changes to perceptions that brands differ in prestige may be harder to achieve among older participants, whose more entrenched brand

associations may be triggered more easily by the brand name, which is still present on the bottom of the pack face in a standardized font and size.

The absence of differences in the effect of the packaging changes on perceptions of harm and prestige between smokers and non-smokers in this sample may be partially explained by the somewhat normative nature of tobacco use in the Aboriginal and Torres Strait Islander population. With 42% of Aboriginal and Torres Strait Islander people smoking (3), and in 2008, 63% of Aboriginal and Torres Strait Islander children aged 0–14 years reportedly living in a household with members who were current daily smokers (39), most Aboriginal and Torres Strait Islander people—smokers and non-smokers alike—would have been regularly exposed to tobacco packages both before and after the packaging changes. This normative exposure is set to begin to diminish along with recent reductions in smoking rates among Aboriginal and Torres Strait Islander people (3, 40).

Preventing uptake of tobacco use among the Aboriginal and Torres Strait Islander population is central to addressing the disproportionate burden of tobacco-related death and disease, and consequently improving the health and life expectancy of Aboriginal and Torres Strait Islander people (1). The Aboriginal and Torres Strait Islander population has a younger age profile than the general population, so the potential benefit to Aboriginal and Torres Strait Islander youth by reducing perceptions of differences between brands in harm and prestige is particularly important (41). Given evidence suggesting that, if people do not commence tobacco use by the age of 26 they will almost certainly never smoke (42), any measures that can reduce the influence of brand associations built up by tobacco industry marketing—where packaging is considered to have an instrumental role in marketing tobacco products (8-11, 16, 17, 20, 25, 43-47) and tobacco industry marketing is found to predict youth uptake (41, 42)—is welcome.

Strengths and limitations

While there was a diverse cross-sample of the Aboriginal and Torres Strait Islander population in the ACT region, the study sample had a greater proportion of females; had a smaller proportion of participants aged over 45 years; and was slightly more educated and with a higher median household income than the originally recruited sample of the Aboriginal and Torres Strait Islander population in the ACT. The preliminary analyses identified and main analyses accounted for differences between those who were followed-up and those lost to follow-up by adjusting for gender, number of dependents in the household, smoking status and household income. Future research should further examine perceptions of brand differences in harm and prestige among Aboriginal and Torres Strait Islander smokers over time to determine whether perceptions of differences in harm and prestige between brands diminish.

Strengths of this research include input and participation by Aboriginal and Torres Strait Islander people in all stages of the research process, sampling a diverse cross-section of the community, and the ability to build on limited published literature regarding tobacco control in relation to the Aboriginal and Torres Strait Islander population.

This research provides evidence of an increase in the understanding that all tobacco use is harmful, with the research outcomes partially aligning with previous experimental research findings on PP and health warning labels. For example, experimental evidence suggested that expanded health warnings and PP could result in reductions in false beliefs about the harm, prestige, image and quality associated with tobacco products of different cigarette brands (8, 9, 15-17, 20-26, 29). However, evidence also suggested that expanded health warnings and PP could result in greater reductions in perceptions among smokers when compared with non-smokers (8, 9, 15-17, 20-26, 29). The high exposure as a result of high proportions of the population smoking may help explain this non-significant result, noting both smokers and

non-smokers alike, may have had long and intense exposure to the marketing of cigarette brands (3, 39).

Policy implications

These findings align with the specific objectives of PP and affirm the policy change in Australia to PP, with extended health warnings to help address public misperceptions about the harm of tobacco use. It is fundamentally deceptive and misleading to allow a continuation in the perception that some cigarettes are less hazardous than others, including so-called 'additive free', 'natural' or 'lower tar' cigarettes, given the evidence that conventional cigarette brands present the same level of risk (48, 49). Other government agencies committed to tobacco control should investigate regulating the use of brand imagery, logos and promotional text on tobacco products and packaging, including restrictions on colour, format, size and materials of packaging in addition to brand and variant names, to complement tobacco control measures, including those outlined in the FCTC (38).

Conclusion

Mistaken perceptions about differential levels of harm of different brands of cigarettes are still relatively common in many countries. Following Australia's 2012 policy of PP and larger pictorial health warnings on cigarette and tobacco packs, there was a significant reduction in the number of Aboriginal and Torres Strait Islander people reporting the incorrect perception that 'some cigarette brands are more harmful than others'. In addition, there was a decrease in the number of younger Aboriginal and Torres Strait Islander's indicating that 'some cigarette brands are more prestigious than others'. These results provide support for regulatory measures to prohibit the use of misleading package imagery in product marketing, as prescribed in Articles 11, 12 and 13 of the FCTC (38) among high smoking prevalence groups, such as the Aboriginal and Torres Strait Islander population of Australia.

(Word count 3,586)

Competing Interest

The first author (RM) declares that he has a part time role with the Australian Government, noting he was not involved with the implementation of PP or expanded health warnings.

The second author (SD) also wishes to advise that she was part of a Cancer Council Victoria research team that investigated the early effects of implementation of PP with larger graphic health warnings on cigarette smokers, using a national tracking survey funded by the Australian Government. SD also holds competitive grant funding from the National Health and Medical Research Council.

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Table 1: Summary of the study participants

	Completed Baseline-only 2012 (N=94) %	**Completed Baseline + Follow-up 2013 (N=98) %**	**Pearson χ^2 (df), p-level**
Male	38.3	26.8	2.88 (1), p=.090
Female	61.7	73.2	
Education level			1.21 (1), p=.271
Below Year 12	55.4	47.4	
Completed Year 12 or equivalent	44.6	52.6	
Age			1.95 (1), p=.162
≤ 35 years	60.5	50.0	
≥ 36 and over years	39.5	50.0	
Household income per annum			12.32 (3), p=.006
Prefer not to say or Don't know	12.0	9.3	
Nil to $51,999	29.3	14.4	
$52,000 to $103,999	38.0	34.0	
$104,000 or more	20.7	42.3	
Number of Dependents			7.63 (2), p=.022
None	61.7	44.9	
1-2	20.2	37.8	
3 or more	18.1	17.3	
Smoking Status			3.58 (1), p=.058
Non-smokers	60.6	73.5	
Smokers	39.4	26.5	
Smoker baseline characteristics	**(n=37)** %	**(n=26)** %	**Pearson χ^2 (df), p-level**
Addiction level			3.99 (2), p=.136
Low dependence	51.4	26.9	
Low to Mod dependence	27.0	46.2	
Mod to High dependence	21.6	26.9	
Quit attempts in past year			4.70 (3), p=.195
None	37.8	23.1	
One	13.5	34.6	
Two or more	40.5	30.8	
No response	8.1	11.5	

Table 2: Adjusted percentages, and results of repeated measures MANCOVAs of Aboriginal and Torres Strait Islander's Perceptions of whether Brands Differ in Prestige and Harm before and after Australia's packaging changes.

	Differences in Prestige (n=93)				**Differences in Harm (n=91)**			
	Baseline Adj^ %	**Follow-up Adj^ %**	**F (df), partial eta**	***p***	**Baseline Adj^ %**	**Follow-up Adj^ %**	**F (df), partial eta**	***p***
Packaging Changes (PC)	44.4	41.4	0.75 (1,87), .009	.389	25.1	13.4	4.75 (1,84), .054	**.032**
PC x Age			5.69 (1,87), .061	**.019**			1.41 (1,84), .016	.239
Younger	54.4	37.9			26.9	0.1		
Older	34.3	44.9			23.2	17.5		
PC x Smoking Status			0.01 (1,87), .000	.905			0.91 (1,84), .011	.344
Non-smoker	39.8	36.0			21.6	15.3		
Smoker	48.9	46.7			28.5	11.6		

^Adjusted for gender, household income, and number of dependents in household at baseline.