

Improving the evidence-base for third sector delivered programs working with high-risk young people

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Young people who engage in multiple risk behaviour (high-risk young people) such as substance abuse, antisocial behaviour, or suicidal ideation are more likely to experience serious harms later in life. Despite these harms, there is very little intervention research available to guide policy makers or service providers to make decisions about investment in effective programs for high-risk young people. One potential reason for this is that the majority of interventions available for vulnerable populations globally, are implemented by Third Sector Organisations (TSOs) who lack the capacity and capability to conduct rigorous evaluation. This thesis aimed to demonstrate a range of methods to support TSOs to conduct better quality evaluations of their activities, so they can better improve outcomes for participants and demonstrate their effectiveness to relevant funding bodies.

To understand what had worked to improve outcomes for high-risk young people, a systematic review of the international peer-reviewed literature was undertaken and the common program components across the methodologically adequate studies identified (Chapter 2). Next, a team of researchers worked with the staff of a TSO to understand, and systematically define, the interventions and activities they implemented as part of their service delivery model. This expertise of TSO service providers was then combined with the effective program components, identified in the systematic review from Chapter 2, to inform development of a standardised program framework (Chapter 3). A novel process for embedding best-evidence outcome measures into the TSOs routine data collection processes was also trialled to enable them to continuously tailor their service delivery model to participant needs, whilst facilitating access to high-quality data for evaluation (Chapter 4). Finally, using this self-report participant data and routinely collected crime data, an evaluation of the program implemented in five communities was conducted using a rigorous evaluation design to determine impact (Chapter 5).

Dissemination of the methods described in this thesis will not only improve the internal capacity and capability of TSO-delivered programs to conduct evaluations but will increase the capacity of governments and policy experts to invest limited resources into effective programs, and ultimately lead to better outcomes for high-risk young people and their communities.

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**Improving the evidence-base for third sector
delivered programs working with high-risk young
people**

Alice Knight

A thesis in fulfilment of the requirements for the degree of
Doctor of Philosophy



National Drug and Alcohol Research Centre
School of Public Health and Community Medicine
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August 2018

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Funding

The author was able to conduct this research thanks to a scholarship funded by a National Health and Medical Research Council (NHMRC) grant (Grant ID: PG1048069). No other contributors to this research received any NHMRC grant funding, nor did the BackTrack program (subject of this research), or any individual associated with the BackTrack program.

Financial contributors to the BackTrack program are provided on their website (<http://www.backtrack.org.au/>).

Conflicts of interest

Two contributors to this research (Anthony Shakeshaft & Bernie Shakeshaft) are brothers. Contributors Bernie Shakeshaft and Myfanwy Maple are, or have been, on the BackTrack Management Advisory Committee (in a voluntary capacity). Contributor Bernie Shakeshaft is the manager of the BackTrack program.

Contributions to this thesis

The author of this thesis conceived the idea for the research based on her experience working with vulnerable young people in Central Australia, and her desire to improve the evaluation capacity of services working tirelessly to support these young people. The authors ideas aligned closely with an existing NHMRC grant (ID: PG1048069), for which contributor Anthony Shakeshaft was Chief Investigator.

Chapter 2. The author conceived of the review topic, designed the search strategy, conducted the literature search and classification of studies, interpreted the data, and drafted the chapter. Contributors Anthony Shakeshaft, Myfanwy Maple, and Alys Havard offered methodological

advice and contributed to the chapter once it was drafted. Contributor Catherine Foley conducted blinded coding of review classifications and reviewed the chapter once it was drafted. Contributor Bernie Shakeshaft reviewed and contributed to the chapter once it was drafted. All contributors read and approved the final chapter.

Chapter 3. The author and contributors Myfanwy Maple and Anthony Shakeshaft conceived the concept for this chapter. The author wrote the first draft of the chapter. Contributors Myfanwy Maple, Anthony Shakeshaft, Tania Pearce, and Bernie Shakeshaft reviewed and contributed to the chapter once it was drafted. All contributors read and approved the final chapter.

Chapter 4. The author and contributor Anthony Shakeshaft conceived the idea for this chapter. The program staff collected the self-report data, and the author designed the study, analysed the data, and wrote the first draft of the chapter. Contributors Alys Havard and Anthony Shakeshaft provided methodological advice, and along with contributors Myfanwy Maple, Mieke Snijder and Bernie Shakeshaft, reviewed and contributed to the chapter once it was drafted. All contributors read and approved the final chapter.

Chapter 5. The author and contributor Anthony Shakeshaft conceived the idea for this chapter and co-designed the methodology for the study. Program staff collected the self-report data and the author applied for, cleaned and coded the routinely collected data. The author analysed the data and wrote the first draft of the chapter. Contributors Alys Havard and Anthony Shakeshaft provided methodological advice, and along with Myfanwy Maple, reviewed and contributed to the chapter once it was drafted. All contributors read and approved the final chapter.

The author drafted *Chapters 1 and 6*. Contributors Anthony Shakeshaft, Alys Havard, and Myfanwy Maple reviewed these chapters and provided feedback.

Ethics approval and consent to participate

Ethics approval was granted for this research by the University of New South Wales, University of New England, James Cook University, the University of Queensland, and the NSW Aboriginal Health and Medical Research Council. BackTrack participants were informed about the research study on entry to the program. They were assured that the inclusion of their data in the research was optional, that only de-identified data would be provided to the researchers from consenting participants, and that choosing not to provide consent would not impact their relationship with program staff, or their ability to attend the program. Only participants who provided signed consent (for participants 18 years or older), or assent and parental consent (for participants 17 years or younger), were eligible to participate in the study.

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I dedicate this thesis to Brandon Williams, a young Aboriginal man who became my friend during my years spent living and working in Alice Springs. My hope is that this work will contribute, if only in a very small way, to supporting the many amazing programs that help young people like Brandon navigate a happy, healthy and fulfilled life.

Presentations arising from this thesis

1. Allan, J., Bamblett, R., Bennet, A., Breen, C., Bliss, D., Byrne, B., Calabria, C., Clifford, A., Dobbins, T., Havard, A., Henderson, N., James, D., **Knight, A.**, O'Neill, J., Shakeshaft, A., Shakeshaft, B., Snijder, M., & Stone, C., Researcher-community partnerships to reduce Aboriginal and Torres Strait Islander drug and alcohol-related harms: Lessons from research with NDARC. Panel presentation at the AIATSIS National Indigenous Research Conference, Canberra, March 2017.
2. **Knight, A.**, Shakeshaft, A., Havard, A., Shakeshaft, B. Improving social, economic and health outcomes for high-risk adolescents in remote communities through a process of transdisciplinary research. Conference presentation. The 22nd International Association for Child and Adolescent Psychiatry and Allied Professions World Congress, Calgary, Canada. September 2016.
3. **Knight, A.**, Shakeshaft, A., Havard, A., Maple, M., Shakeshaft, B. Describing and evaluating an intervention for young people who engage in multiple risk behaviour. Conference Presentation. National Drug and Alcohol Research Centre Symposium, Sydney, September 2016.
4. **Knight, A.**, Shakeshaft, A., Havard, A., Shakeshaft, B. & Stone, C. Preliminary findings from an evaluation of an intervention for high-risk young people. Conference presentation. NSW Rural Health and Research Congress, Armidale, November 2015.
5. **Knight, A.**, Shakeshaft, A., Havard, A., Shakeshaft, B. & Stone, C. Preliminary findings from an evaluation of an intervention for high-risk young people. Conference presentation. National Drug and Alcohol Research Centre Symposium, Sydney, September 2015.
6. **Knight, A.**, Shakeshaft, A., Maple, M. & Havard, A. Embedding research in practice: developing alternative models of research to promote the translation of Indigenous research findings into routine practice. Conference presentation. World Indigenous Health Conference, Cairns, December 2014.
7. Shakeshaft, A., Whittaker, E., **Knight, A.** & Courtney, R. Breakout Session: The social determinants of drug and alcohol use. National Drug and Alcohol Research Centre Symposium, Sydney, September 2014.
8. **Knight, A.**, Shakeshaft, A., Maple, M. & Havard, A. The characteristics of young people with multiple and complex needs attending a community-based intervention. Poster presentation. National Drug and Alcohol Research Centre Symposium, Sydney, September 2014.

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List of abbreviations

ABS: Australian Bureau of Statistics

AIHW: Australian Institute of Health and Welfare

ALSPAC: Avon Longitudinal Study of Parents and Children

ARC: Australian Research Council

ASSIST: Alcohol, Smoking and Substance Involvement Screening Test

AUDIT: Alcohol Use Disorders Identification Test

BE: Best-evidence

BOCSAR: Bureau of Crime Statistics and Research

CD-RISC-10: Connor Davidson Resilience Scale (10-item)

CBT: Cognitive Behaviour Therapy

CCT: Clinical Controlled Trial

CRAFT: Community Restitution Apprenticeship-Focused Training

DALY: Disability Adjusted Life Years

DPCD: Department of Planning and Community Development

EOI: Expression of Interest

FFT: Functional Family Therapy

GDP: Gross Domestic Product

HSI: Heaviness of Smoking Index

ICT: Information and Communications Technology

IQR: Interquartile range

K6: Kessler Psychological Distress Scale (six-item)

MBD: Multiple Baseline Design

MI: Motivational Interviewing

MST: Multisystemic Therapy

MTFC: Multidimensional Treatment Foster Care

N: New item

NDSHS: National Drug Strategy Household Survey

NSW: New South Wales

POI: Person of Interest

PLC: Positive Life Changes

RCT: Randomised Controlled Trial

SCRGSP: Steering Committee for the Review of Government Service Provision

SP: Similar population group

SAK: Suicide Assessment Kit

SES: Socio-Economic Status

TSO: Third Sector Organisation

UK: United Kingdom

UN: United Nations

UNE: University of New England

US: United States

WHO: World Health Organisation

YLL: Years of Life Lost

Abstract

Young people who engage in multiple risk behaviour (high-risk young people) such as substance abuse, antisocial behaviour, or suicidal ideation are more likely to experience serious harms later in life. Despite these harms, there is very little intervention research available to guide policy makers or service providers to make decisions about investment in effective programs for high-risk young people. One potential reason for this is that the majority of interventions available for vulnerable populations globally, are implemented by Third Sector Organisations (TSOs) who lack the capacity and capability to conduct rigorous evaluation. This thesis aimed to demonstrate a range of methods to support TSOs to conduct better quality evaluations of their activities, so they can better improve outcomes for participants and demonstrate their effectiveness to relevant funding bodies.

To understand what had worked to improve outcomes for high-risk young people, a systematic review of the international peer-review literature was undertaken and the common program components across the methodologically adequate studies were identified (Chapter 2). Next, a team of researchers worked with the staff of a TSO to understand, and systematically define, the interventions and activities they implemented as part of their service delivery model. This expertise of TSO service providers was then combined with the effective program components, identified in the systematic review from Chapter 2, to inform the development of a standardised program framework (Chapter 3). A novel process for embedding best-evidence outcome measures into the TSOs

routine data collection processes was also trialled to enable them to continuously tailor their service delivery model to participant needs, whilst facilitating access to high-quality data for evaluation (Chapter 4). Finally, using this self-report participant data and routinely collected crime data, an evaluation of the program implemented in five communities was conducted using a rigorous evaluation design to determine impact (Chapter 5).

Dissemination of the methods described in this thesis will not only improve the internal capacity and capability of TSO-delivered programs to conduct evaluations, but will increase the capacity of governments and public policy experts to invest limited resources into the most effective programs, and ultimately lead to better outcomes for high-risk young people and their communities.

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Chapter 1: Introduction

In 2017, the worldwide population of young people aged between 10 and 24 years was estimated to be more than 1.8 billion, the largest cohort in history, representing 27% of the world's population (U.N., 2017). The size of this population of young people makes their social, health and economic status of interest, not only as determinants of future population health, but also for the future social and economic development of society (National Research Council, 2005; World Bank, 2006). Despite this, systematic, investigation into the health and wellbeing of young people was largely overlooked by researchers and policy-makers in the first half of the twentieth century because it was generally assumed to be the healthiest time of life (WHO, 2009). This predominant view resulted in young people attracting very little intervention investment or research interest (Patton et al., 2016).

1.1 The health burden of young people

Reports describing the global and regional patterns of mortality for young people aged between 10 and 24 years recorded 2.6 million deaths in 2004 from the worldwide population of 1.8 billion individuals in this age group (Gore et al., 2011; Patton et al., 2009). Data for mortality, however, only partly indicate the disease burden because they do not show the impact of morbidity associated with risk behaviours that occur during this period of life, which can lead to immediate and future disability. One key example of this morbidity is the increasing recognition of the large burden of harm associated with mental health disorders, the initiation of which is relatively common in

young people (Patel, Flisher, Hetrick, & McGorry, 2007; Patton et al., 2010). Similarly, the onset of tobacco use and dependence typically occur during this period (Chassin, Presson, Sherman, & Edwards, 1990). These specific examples of mental health and substance use alone suggest that current morbidity and mortality data continue to underestimate the true contribution of this period of life to overall public health.

The standard metric for quantifying the burden of disease from mortality and morbidity is the Disability Adjusted Life Year (DALY), which is calculated as the sum of the Years of Life Lost (YLL) due to premature mortality in the population, and the Years Lost due to Disability (YLD) for people living with the health condition or its consequences (Homedes, 1996). Globally, the total DALYs for young people aged 10–24 years were estimated to be 236 million, representing 15.5% of the total DALY burden for all age groups (Gore et al., 2011). Table 1 summarises the distribution of major causes of DALYs amongst 10–24-year-olds, with mental health disorders, road traffic accidents and chronic disease contributing the greatest burden.

Table 1: Main causes of DALYs for 10–24-year-olds

Cause	Total DALYs (100,000s) (%)
Mental health disorders	377 (16.1)
Road traffic accidents	127 (5.4)
Chronic disease	120 (5.2)
Violence	81 (3.5)
Alcohol use	71 (3.0)
HIV/AIDS	70 (3.0)
Self-inflicted injuries	67 (2.8)

Source: Gore et al., 2011.

By disaggregating global burden of disease estimates into categories based on a country's level of economic development (e.g. low-, middle-, high-income), a recent study showed that young people living in the 92 high-income countries spanning North America, most of western Europe, Latin America, and Australasia, comprise 37% of the world's youth population, and account for a quarter of all DALYs (26.3%) (Patton et al., 2016). This study also found that although these countries showed improvements in the rates of communicable disease experienced by young people, they made little progress in reducing the disease burden from chronic disease, mental ill health and substance use. Indeed, the proportion of the disease burden attributable to these conditions may be increasing.

Burden of disease data for young Indigenous populations are particularly concerning. Indigenous young people aged 15 to 24 in Australia, for example, experience double the rate of DALYs (371.7 per

1000 population) (AIHW, 2016a), compared to their non-Indigenous counterparts (181.5 per 1000 population) (AIHW, 2016b).

1.2 The social and economic burden of young people

The emergence of risk behaviours during this period of life not only impact upon a young person's ability to live a healthy and productive life, but also result in preventable social and economic costs to the wider community (Hale & Viner, 2012; Hawkins, Catalano, & Miller, 1992). Recent studies have shown that the annual cost of poor mental health among young people in Australia alone is estimated to be \$6.3 billion (ReachOut Australia, 2015), whilst the cost of juvenile custodial services in 2010/2011 in one state in Australia (New South Wales) was \$114.5 million. Youth detention costs are similarly high internationally (AIC, 2016). The long-term cost of the confinement of young people in the United States (US), including the cost of recidivism, lost educational opportunities, and lost future earnings and taxes, is estimated to be between US\$8billion and US\$21billion per annum (The Justice Policy Institute, 2014). From a lifetime perspective, the monetary value of a 14-year-old high-risk juvenile avoiding crime over his/her lifetime was estimated to be between US\$3.2 billion and US\$5.8 billion (Cohen & Piquero, 2009), while the economic burden associated with the entire sub-population of disengaged youth was estimated to be US\$4.7 trillion in 2011 (Belfield, Levin, & Rosen, 2012). In the United Kingdom (UK), the average annual cost of detention for one young person is estimated to be £65,000 for Youth Offender Institutions, £178,000 for Secure Training Centres and £212,000 for Secure Children's Homes, while the UK's Youth Justice Board estimated that the cost of

detention for the entire sub-population of detained young offenders was £245 million in 2012/2013 (The Ministry of Justice, 2013).

1.3 Common risk behaviours and harms experienced by young people in Australia

Some of the more common risk behaviours associated with this period of life for Australian young people, and data relating to their prevalence, are summarised below. This section includes a focus on Indigenous young people because, when it comes to Australian youth, they are over-represented in burden of disease data (AIHW, 2016a).

1.3.1 Tobacco, alcohol and illicit substance use

Tobacco use is a major cause of chronic disease later in life, with estimates of the number of deaths every year from tobacco use increasing from 5 million in 2005, to 10 million in 2020 (Tripodi, 2009). Initiation to tobacco use is known to be most prevalent between the ages of 10 to 24 years (Warren, Jones, Eriksen, & Asma, 2006), with the 2016 National Drug Strategy Household Survey finding 16% of the young Australians who were surveyed, used tobacco on a daily basis (Greenhalgh, Bayly, & Winstanley, 2017).

Adolescence is also the period of life when the prevalence of alcohol use increases (Tripodi, 2009). Binge drinking (episodic drinking to intoxication, as opposed to regular, average levels of weekly consumption) is a particular problem amongst young people, with one quarter of young males worldwide reporting at least one occasion of binge drinking in the

last 12 months (Patton et al., 2016). In Australia, the 2013 Australian National Drug Strategy Household Survey (NDSHS) found that 2.6% of 12-17 year-olds had consumed alcohol at a level that put them at increased lifetime risk of harm (more than two standard drinks per day) in the last 12 months, and 8.7% reported single-occasion (binge) drinking (more than five standard drinks on a single drinking occasion) (AIHW, 2015). According to the NDSHS, 18% of 12 – 17 year-olds had used at least one illicit drug in the past year, including (in order of the most to the least often reported): cannabis, ecstasy, methamphetamine and cocaine (AIHW, 2015), with use of opiates being less common (Macleod et al., 2004).

The recent Australian Aboriginal and Torres Strait Island Health Survey found that nearly 18% of 15-17 year-old Aboriginal adolescents were current daily smokers, in comparison to 3.9% of non-Aboriginal adolescents of the same age (ABS, 2013). Across all age groups, Aboriginal Australians were 1.6 times more likely than non-Aboriginal young people to have used illicit drugs in the past 12 months, but there was no difference in either lifetime risk, or single occasion (binge) risk, from alcohol consumption (ABS, 2013).

1.3.2 Mental health disorders

Mental health disorders are one of the leading causes of mortality in young people, with adolescence being identified as a period of heightened risk for suicide (Patel et al., 2007). The recent Australian Child and Adolescent Survey of Mental Health and Wellbeing (Lawrence et al., 2015) found that

one in seven (13.9%) children and adolescents experienced a mental health disorder, the equivalent of nearly 560,000 Australian children and adolescents. The prevalence of mental health disorders was found to vary considerably between males and females, with 16.3% of males and 11.5% of females having had a mental health disorder in the previous 12 months (Lawrence et al., 2015).

The evidence available for Indigenous young people is relatively sparse, but it does suggest that they experience higher levels of mental health-related harm than non-Indigenous young people. For example, alcohol-related suicide rates among 15 - 29 year-old Indigenous Australians are four (males) and five (females) times higher than for non-Indigenous Australians of the same age (Calabria, Doran, Vos, Shakeshaft, & Hall, 2010). These disproportionately high levels of harm in Indigenous young people are linked to their exposure to both the known risk factors for poor mental health that are common to all young people, such as exposure to violence or conflict and parental unemployment (Lawrence et al., 2015), and to the pervasive trauma and grief which continue to be experienced by Indigenous Australians due to the legacy of colonisation, dispossession, racism and widespread economic disadvantage (Dudgeon et al., 2016; Kelly, Dudgeon, Gee, & Glaskin, 2009; Priest, Paradies, Gunthorpe, Cairney, & Sayers, 2011).

1.3.3 Educational attainment and attendance

In Australia, performance on national assessments for literacy and numeracy testing have largely plateaued for students since 2008, with

writing the only assessment domain in which scores have decreased between 2011 and 2016 (AIHW, 2017). Compared to major cities, however, lower levels of achievement across all assessment domains (reading, writing, numeracy) persist for young people living in remote communities in Australia and for Indigenous young people, where per capita rates of social and economic disadvantage are also higher. For young people living in major cities, compared to those living in remote areas, the average student scores for the domains of reading, writing and numeracy were 95% and 50% respectively, 90% and 30% respectively, and 98% and 60% respectively (AIHW, 2017).

Data on school attendance and participation for Indigenous young people indicate that per capita attendance is lower, compared to non-Indigenous young people, in all Australian states and territories from Years 1 to 10. Also, whilst attendance rates declined in all jurisdictions from Year 5 to Year 10, for both Indigenous and non-Indigenous young people, the rate of decline was greater for Indigenous young people (SCRGSP, 2014).

1.3.4 Criminal activity

In 2015–16 there were approximately 5500 young people aged 10 - 17 who were under youth justice supervision in Australia, on an average day (AIHW, 2011). This equates to a rate of 21 per 10,000, or about 1 in every 476 young people. Of all young people under supervision on an average day, 4 in 5 (82%) were male, and the majority (79%) were aged between 14 and 17. Indigenous young people made up nearly half (48%) of the young people under supervision on an average day, and over half (59%)

of young people in detention, despite Indigenous Australians comprising an estimated 3% of the population (ABS, 2013).

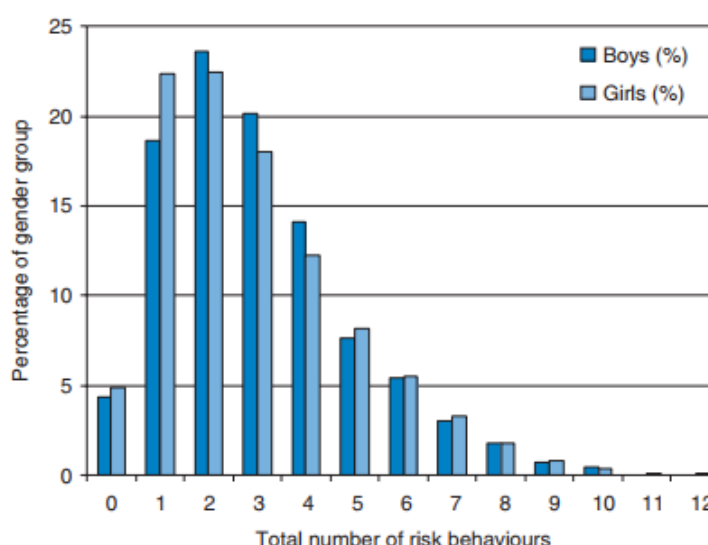
1.4 Multiple-risk behaviour in young people

Although it is essentially self-evident that the burden of harm experienced by young people is likely to accumulate with exposure to increasing numbers of risk behaviours (Gore et al., 2011), descriptive data aimed at detailing the specific characteristics and consequences of multiple-risk behaviours are inconsistent: different studies examine different combinations of behaviours amongst different age cohorts, and use inconsistent measures and language to describe the relevant behaviours (Junger, Stroebe, & Van der Laan, 2001; van Nieuwenhuijzen et al., 2009; Viner et al., 2006). One possible explanation for this lack of adequate descriptive data may be the recent disinvestment in the data systems needed to capture this information (Patton et al., 2016). Nevertheless, improving the accuracy with which researchers and policymakers can identify the specific characteristics of the burden of harm associated with multiple risk behaviour in young people will contribute to the development of cost-effective intervention and policy responses that can target the specific characteristics identified by these high-quality descriptive data.

Although existing descriptive data are generally inadequate, the data that is available indicate that most young people will experiment with one or two risk behaviours, such as substance use and risky sexual behaviour, and still navigate adolescence with relatively few overt long-

term consequences (DEECD & DPCD, 2008; U.N., 2004). A minority of young people, however, are exposed to a greater number of risk behaviours which increases their likelihood of experiencing detrimental outcomes later in life, such as homelessness, incarceration, and premature death (Hawkins, 2009). These general patterns were detailed more specifically by a 2012 UK epidemiological study, which used data from the Avon Longitudinal Study of Parents and Children (ALSPAC) to describe the prevalence of multiple-risk behaviour amongst 2,657 (1,070 male and 1,587 female) young people aged 15 – 16 years. The risk behaviours examined in this study were: physical inactivity, sedentary behaviour, unprotected sex, self-harm, tobacco smoking, hazardous alcohol consumption, cannabis use, antisocial and/or criminal behaviour, illicit (non-cannabis) drug use, and vehicle-related risk. As summarised in Figure 1, the study found that 40% (n=1059) of 15 and 16 year-olds engaged in three to five risk behaviours (42.0% male; 38.4% female), and 6.2% (n=164) engaged in seven or more risk behaviours (6.0% male; 6.3% female). Only 5% (n=125) did not engage in any of the risk behaviours.

Figure 1: Frequency of single- and multiple-risk behaviours by gender in young people aged between 15 and 16



Source: MacArthur et al., 2012.

This study also found that the specific types of risk behaviours varied between males and females aged between 15 and 16: antisocial and criminal behaviours, cannabis use, and vehicle-related risk behaviours were more prevalent among males, but tobacco smoking, self-harm and physical inactivity being more prevalent among females. Whilst the prevalence of individual risk behaviours differed between males and females, there was no evidence of a difference in the median number of behaviours between males and females.

1.5 Sub-populations of high-risk young people

Despite the usefulness of the UK's ALSPAC data for describing risk behaviours among general populations of young people, they do not report on specific sub-populations of high-risk young people. These sub-populations of high-risk young people typically engage in a higher

number of risk behaviours (they are likely to be over-represented, for example, in the 6.2% of the ALSPAC sample who reported exposure to seven or more risk behaviours), and the aetiology of their risk behaviour is usually complicated by their association with a range of adverse childhood experiences (ACEs) and social determinants of poor health including childhood abuse or neglect, exposure to violence at an early age (Anda, Butchart, Felitti, & Brown, 2010), low socio-economic status (SES) and minority cultural identity (Fergusson, Horwood, & Nagin, 2000; Vitaro & Tremblay, 2009).

In the Australian context, which is where the research for this thesis was undertaken, the limited data that are available provide a strong indication that Indigenous young people will be over-represented amongst the sub-population of high-risk young people: rates of alcohol-related suicide among 15 - 29 year old Indigenous young people, for example, are four (males) and five (females) times higher than for non-Indigenous young people (Calabria et al., 2010). In the most recent study assessing the burden of disease among all Indigenous Australians, the major risk behaviours associated with avoidable mortality and morbidity were tobacco use (12%), poor diet (10%), alcohol use (8%), and physical inactivity (8%) (AIHW, 2016a). Alcohol use was the greatest contributor to burden of disease for both males (20.9%) and females (9.3%) aged 15 to 24. As a consequence of these risk behaviours, Indigenous young people aged 15 to 24 were found to experience double the rates of disease compared to their non-Indigenous counterparts (371.7 DALYs per 1000 population, compared

to 181.5 DALYs per 1000 population) (AIHW, 2016a, 2016b), but when broken down by gender, rates of disease were found to be more than double for Indigenous males and seven times greater for Indigenous females, compared to non-Indigenous Australians (Calabria et al., 2010).

For Australia's Indigenous people, the social determinants of their risk behaviours include their recent history of dispossession, racism, oppression and low SES. The more severe outcomes experienced by Australia's Indigenous young people are further compounded by the substantial inequity in access to mainstream primary health care and other health and social services, which has been articulated as a lingering reminder of the institutional racism that is still experienced by Indigenous Australians (Aspin, Brown, Jowsey, Yen, & Leeder, 2012). This highlights the importance of ensuring programs and services for young people exposed to multiple-risk behaviours are designed and implemented with an equity lens, to ensure that any benefits that they provide are readily accessible to the most vulnerable.

For this research, therefore, high-risk young people are defined as those who engage in multiple-risk behaviours that are typically associated with social determinants of poor health.

1.6 The current evidence-base for programs that work with high-risk young people

There are at least three arguments to support the need for adequate investment in programs that are demonstrably effective in improving outcomes for high-risk young people. First, the previous sections of this introduction clearly describe that the poor health, social and economic outcomes experienced by high-risk young people are substantial. Second, it is likely that improving the lifetime health, social and economic trajectories of high-risk young people would provide benefits to both the individual young people, including positive spill-over effects from the improvement in one risk behaviour to others (Beckett, 2008), and to the broader community, including increased productivity, reduced negative impacts on families, and reduced demand and costs on systems, such as healthcare, crime and justice, and welfare (Vining & Weimer, 2009). Third, there is some evidence that the economic benefits of well-implemented programs for young people that are effective in reducing future harms can outweigh the cost of delivering those programs (Aos, Lieb, Mayfield, Miller, & Pennucci, 2004).

Despite these likely benefits, there is very little intervention research available to guide policy makers or service providers to make decisions about investment in effective interventions. Prior to the systematic literature review conducted as part of this thesis (see Chapter 2), only one systematic review, published in 2012, had sought to identify the effectiveness of programs that simultaneously target more than one risk behaviour in young people (Jackson, Geddes, Haw, & Frank, 2012). Whilst this 2012 review examined the evidence for programs targeting two specific risk behaviours (substance use and risky sexual behaviour), there

had been no synthesis of the international peer-review literature of evaluations of programs that simultaneously targeted multiple-risk behaviours more generally in young people. The importance of this evidence gap for how to respond most effectively to young people with multiple-risk behaviour is highlighted by the previously cited ALSPAC data from the UK: approximately half their sample of young people in the general population reported at least three risk behaviours, and more than 10% reported exposure to at least six risk behaviours (MacArthur et al., 2012).

One potential reason for the relative lack of intervention research is that the majority of interventions available for vulnerable populations globally, are implemented by third sector organisations (TSOs) (Bach-Mortensen & Montgomery, 2018). This can be advantageous because TSOs can provide more locally-adapted, accessible, programs compared to universal government public policy initiatives. Nevertheless, the disadvantage is that the focus of TSOs typically limited resources is on the day-to-day delivery of their programs, rather than conducting, and publishing rigorous evidence of program effectiveness. TSOs are usually either voluntary organisations, community-based organisations, non-profits or charities, and can be operationally defined as “...organisations which are formally organised; non-profit distributing; constitutionally independent from the state; self-governing and benefiting from some form of voluntarism” (Hardwick, Anderson, & Cooper, 2015). In Australia, the number of TSOs in operation was most recently estimated at around 600,000, with these employing approximately 890,000 people and contributing a reported \$43

billion to gross domestic product (GDP) (Productivity Commission, 2010). Of its annual income, it has been estimated that the government provides \$25.5 billion in grants to the third sector, with the main beneficiaries of their activities being children and young people, the elderly, and people with a disability (Productivity Commission, 2010).

Recent research from the UK has found that many TSOs implement their activities without adequate evidence of their impact and costs (Breckell, Harrison, & Robert, 2010; Ellis, 2008; Ógáin, Lumley, & Pritchard, 2012). Indeed, an estimated 25% of 1000 surveyed TSOs did not evaluate their work at all (Ógáin et al., 2012). While these studies cannot be assumed to be representative of the full population of TSOs, they seem to mirror a growing body of evidence indicating that the sector struggles to adhere meaningfully to the increasing demand for evaluation of their programs (Carman, 2007; Despard, 2016; Mitchell & Berlan, 2017). This finding has a generally inverse relationship with the increasing pressure that government, and other funding bodies, place on TSOs to report and justify funding decisions made in relation to their activities.

Exacerbating the problem of the lack of evaluations of TSO-delivered programs, is that those that are conducted are often of poor methodological quality (Azzopardi et al., 2013), with many failing to evaluate their activities using rigorous, reproducible and systematic methods, which reduces confidence that outcomes are attributable to their activities. It is not uncommon, for example, for TSOs to fail to incorporate scientific evidence in program design (e.g. incorporating evidence-based

therapies or interventions such as cognitive behaviour therapy (CBT) to assist young people respond to risky situations), or for them to be implemented in a way that inhibits rigorous evaluation (e.g. no control groups and limited data collection that would allow for robust quantitative evaluation). Data may exist (e.g. client records) but it is likely these data will not capture relevant information for evaluation or include scientifically valid measures that would allow empirical determination of program impact (McDavid, Huse, & Hawthorn, 2013). This is in contrast to programs implemented by researchers, or by researchers in partnership with service providers in relatively controlled settings, such as schools or health clinics, and that have been developed so that there is control over data collection, design and implementation timing. The problem with researcher-led programs, however, is that they are rarely, and very slowly, translated into practice, even if they show positive effects (Balas & Boren, 2000).

1.7 Improving the evidence-base for TSO-delivered programs that work with high-risk young people

A recent systematic review aimed to identify the most common barriers and facilitators for the evaluation of programs delivered by third sector practitioners (Bach-Mortensen & Montgomery, 2018). It found that the main barriers related to an organisation's capacity and capability to undertake evaluation, specifically: a lack of financial resources, high staff turnover, a lack of time, a lack of staff expertise in evaluation and/or evaluation design, an absence of integrated systems to collect and analyse data, and challenges in identifying appropriate outcomes, and

outcome measures. Conversely, the greatest facilitator of evaluation was the ability of a TSO to receive appropriate support to undertake evaluation. This again suggests an inequitable situation in which TSOs are faced with growing pressure to demonstrate effectiveness using rigorous methods to secure grants or contracts, but without having access to the necessary support to undertake rigorous evaluation. Taken together, these findings indicate that researcher and TSO partnerships could be a feasible mechanism for building their respective capacities (that is, research skills in TSO staff and service delivery skills in researchers). It also suggests a clear demand for sustainable and pragmatic research methods that are both sufficiently rigorous and feasible for TSOs to utilise, which will assist them to increase the quantity and methodological quality of evaluations of their programs. These evaluations would also allow them to better demonstrate the effectiveness of their programs to relevant funding bodies.

1.7.1 Partnerships between the third sector and researchers

Historically, evaluation has been the domain of academics who would implement an intervention in a controlled setting and then evaluate its effectiveness, before providing rigid guidelines for how it was to be implemented by TSOs in non-controlled, or real-world settings (Groark & McCall, 2009). This model of evaluation was often undertaken without consultation with the organisations who were expected to duplicate the process in real-world settings with very little support, training or technical guidance. Further, the evaluation findings were often not readily

generalisable or applicable to their routine service delivery processes (Green, 2008; Groark & McCall, 2009; Wells & Whitworth, 2007; Westfall, Mold, & Fagnan, 2007).

An alternative model of evaluation involves the inclusion of TSOs in the design, development, and implementation of evaluations of their programs. This partnership approach, which has been called practice-based research, is a possible mechanism to combine the strengths of TSOs (such as access to high-risk young people and expertise in program delivery) with the strengths of researcher-led evaluations (such as sound evaluation expertise) (Green, 2008; Groark & McCall, 2009; Wells & Whitworth, 2007; Westfall et al., 2007). Partnerships have been shown to be more likely to result in an increased number of higher quality evaluations, and the translation and uptake of any evaluation findings into routine service delivery, than if the evaluation were designed, developed and implemented solely by researchers (Green, 2008). It is also a far more efficient process than TSOs and researchers working independently of each other to develop evidence (Jackson & Greenhalgh, 2015).

Researchers working in partnership with the TSOs who routinely interact with program participants, creates an opportunity for evaluation to inform practice in a timely manner and, conversely, for learnings from service delivery to inform the design of the evaluation.

This partnership model is not new and has been successfully applied in the fields of Aboriginal health and community development where researchers, service providers, and Indigenous and non-Indigenous

community members have worked in partnership to design, implement and evaluate new programs with the potential to address negative outcomes, such as the impact of alcohol misuse on Indigenous families and communities (Calabria, Clifford, Rose, & Shakeshaft, 2014). Given its success with TSOs who work with other vulnerable populations, this model has clear potential to be adapted for TSOs and researchers who work with high-risk young people.

1.7.2 Greater consistency in how programs are developed and defined

In order to reduce the heterogeneity of programs being delivered by the third sector, and the different outcome measures used to determine their success (both of which limit the use of rigorous evaluation designs and the ability to pool results in meta-analyses), development of a standardised intervention framework would provide several key benefits. First, it would support TSOs to unambiguously define their programs, their participants, their intervention components and activities, and their intended outcomes. Second, it would help researchers, TSOs and policy makers report on programs more precisely using a shared language and shared outcome measures. Third, it would articulate a model for the development and evaluation of a much greater range of programs than currently exist, and gradually build the evidence-base for TSOs working with high-risk young people.

1.7.3 Greater consistency in the outcomes and outcome measures used to determine program effectiveness

A complementary way to increase the number and quality of evaluations of existing programs for high-risk young people is to improve the consistency of the outcomes and outcome measures used to measure program effect. One way to do this would be to use the researcher-TSO partnership (described above) to help identify a standard set of practically useful, valid and reliable outcome measures for key risk behaviours (e.g. the Alcohol Use Disorders Identification Test [AUDIT] questionnaire for alcohol use) (Fawcett et al., 2004).

To facilitate ease of administration of these outcome measures for TSOs, they could be embedded into existing routine data collection processes, such as a program's intake assessment forms. Additionally, if TSOs were to re-administer these measures at regular time intervals, it would not only facilitate evaluation of effectiveness, but also improve the precision with which they can tailor their program components to more effectively address the specific risk behaviours of participants that prove to be more resistant to change. Replication of this process across TSOs delivering programs to similar cohorts would not only increase the quantity of accurate data on adolescent risk behaviours, but also improve the ability to draw direct comparisons about the effectiveness of programs on risk behaviours over time.

1.7.4 Increasing the rigour of evaluations

To adequately determine the effectiveness of their programs, TSOs that focus on improving outcomes among high-risk young people need to

ensure robust evaluation using pragmatic, yet rigorous evaluation designs and, ideally, to capture changes in outcomes using reliable and valid outcome measures. Conducting rigorous evaluation with TSOs can be challenging, however, because of the requirements of rigorous evaluation designs. The requirement of a randomised controlled trial (RCT) to have a large number of participants involved in the study to achieve sufficient statistical power can, for example, be both prohibitively expensive and impractical for organisations that typically engage with a small number of very high-risk young people. There is also the issue of avoiding contamination of intervention effects. That is, the need to maintain demonstrable separation between participants who are allocated to the control and intervention groups, which is often difficult to achieve in real-world settings. Additionally, the use of RCTs has been identified as unethical in some circumstances because it can involve withholding potentially beneficial programs from participants who already have reduced access to services and experience poorer health and social outcomes as a consequence (Campbell et al., 2007; Minkler, 2004).

Alternative and practical evaluation designs have the potential to address some of these challenges, including stepped wedge designs, such as the multiple baseline design (MBD) (Hawkins, Sanson-Fisher, Shakeshaft, D'Este, & Green, 2007), that can evaluate programs using both pre/post analysis of program participants' self-reported data and interrupted time series analysis of routinely collected administrative data sets, such as police incidents. A MBD, for example, can be used for either retrospective or prospective evaluation, so long as the same program has been

implemented in at least two locations at different points in time. This means MBDs can strike a more pragmatic balance between the demands of both real-world service delivery and methodological rigour. Observation of comparable, statistically significant improvements after each implementation point, at each location, provides sufficiently rigorous evidence that observed changes can be confidently attributed to the intervention, rather than extraneous influences.

1.8 Aims and overview of chapters

This thesis aimed to develop and apply a range of methods that could be adopted by TSOs to support them to construct and deliver evidence-based programs, and to integrate high-quality evaluation into their routine service delivery. In order to determine current best-evidence practice, a systematic review of the international peer-reviewed literature was undertaken, primarily to identify the program components that were common to the services that had previously been evaluated using the most methodologically adequate procedures (Chapter 2).

Next, a team of researchers worked with the staff of a TSO to understand, and systematically define, the interventions and activities they implemented as part of their service delivery model. This expertise of TSO service providers was then combined with the effective program components, identified in the systematic review from Chapter 2, to inform the development of a standardised program framework (Chapter 3). The primary purpose was to create a replicable model for defining existing programs, and constructing new programs, that have three common

characteristics: i) they represent best-evidence practice (defined as existing research evidence combined with service providers' expertise) (Sackett, Rosenberg, Gray, Haynes, & Richardson, 1996); ii) they are standardised so that different services are delivering best-evidence practice; and iii) they have the capacity to be tailored to the individual circumstances in which different programs are delivered.

Having established a best-practice, standardised program framework, a novel process was developed with the TSO for embedding best-evidence outcome measures into their routine data collection processes. The purpose of this process was to enable staff to potentially refine their service delivery model to more effectively meet existing, or emerging, needs of participants, whilst also engendering high-quality data for evaluation (Chapter 4).

Once the best-practice program framework was defined and the data collection processes were established, the impact of the program was evaluated following its introduction into five rural communities in New South Wales (NSW), Australia, using a MBD. Self-report participant data and routinely-collected crime data were used to estimate the impact of the TSO-delivered program (Chapter 5).

In the final chapter (Chapter 6), the implications of the findings from this thesis, and recommendations for future research, are discussed. Of particular note is that, following on from this doctoral research, dissemination of the standardised program framework and the data

collection processes will be trialled nationally and internationally in at least nine locations, which will help demonstrate its feasibility and acceptability for other TSOs working with high-risk young people. A MBD evaluation will also be applied to these services to further improve the accuracy with which the benefits of these programs are estimated. Finally, a cost-benefit analysis undertaken alongside this doctoral research will also be completed and published, which will provide the first published evidence of the economic efficiency with which the outcomes from the best-practice program were achieved (that is, the extent to which these programs provide good value for money).

Chapter 2: The quality and effectiveness of interventions that target multiple-risk behaviours in high-risk young people: a systematic review¹

¹ A version of this chapter has been published (see Appendix A.1):

Knight, A., Shakeshaft, A., Havard, A., Maple, M., Foley, C., Shakeshaft, B. (2017). The quality and effectiveness of interventions that target multiple-risk factors among high-risk young people: a systematic review. *Australian and New Zealand Journal of Public Health*. 41(1) 54-60.

2.1 Introduction

As described in Figure 1 (Chapter1), an estimated half (48%) of young people are exposed to a maximum of two risk behaviours during adolescence, such as substance use and risky sexual behaviour, but they experience relatively few long-term negative consequences (DEECD & DPCD, 2008; U.N., 2004). An estimated 6%, however, are exposed to more than seven risk behaviours, which places them at high-risk of experiencing detrimental outcomes both in the short-term and later in life, such as homelessness, incarceration, or premature death (Hawkins, 2009).

For young people who engage in one or two risk behaviours, such as excessive alcohol consumption, cannabis use or self-harm, single-focus interventions with an established evidence-base, such as cognitive behaviour therapy (CBT) or motivational interviewing (MI), are available (Bruun & Mitchell, 2012; Mitchell, 2011). These interventions are typically delivered in a single, specialised and controlled environment, such as a school, are relatively inexpensive to implement, and have demonstrated benefits for young people (Newton, Vogl, Teesson, & Andrews, 2009). For young people who engage in multiple risk behaviours, especially for the sub-group of these defined as high-risk young people (those who have multiple risk behaviours that are typically associated with social determinants of poor health), however, these interventions have not been shown to be as effective. This most likely reflects that high-risk young people are a difficult cohort to access given they typically do not regularly attend school and there are few formal psychological treatments provided

through the criminal justice system outside formal juvenile detention or jail (Best, Manning, Gossop, Gross, & Strang, 2006; Degenhardt, Stockings, Patton, Hall, & Lynskey, 2016; Stockings et al., 2016).

TSO programs delivered in community-based settings have some promise because they may be more accessible to high-risk young people, and there is some evidence that suggests that they are successful at improving two co-occurring risk behaviours in high-risk young people, particularly if they address those risk behaviours simultaneously rather than in isolation (Jackson et al., 2012). To date, however, as highlighted in Chapter 1, there has been no synthesis of the evidence regarding the quantity or methodological quality of interventions targeting multiple-risk behaviour in high-risk young people.

2.2 Aims

This chapter aims to identify evaluations of programs that target multiple-risk behaviour in high-risk young people, describe the characteristics of the programs and their effectiveness, and critique the methodological quality of the evaluations.

2.3 Method

2.3.1 Search strategy

Figure 2 summarises the databases searched, the exclusion criteria applied and the classification of included articles. Consistent with the methods detailed in the Cochrane Collaboration Handbook on Systematic

Reviews of Health Promotion and Public Health (Jackson, 2007), the search strategy comprised two steps.

First, seven scientific electronic databases were searched: Medline, PsycINFO, Social Work Abstracts, Global Health, CINCH, CINCH-ATSIS, ERIC, and FAMILY. Electronic databases were searched individually so that database-specific search strings could be used, except for the last three, which were searched simultaneously using the Informit online database.

As detailed in Table 2 (below), the search strings were designed to allow for the imprecise definition of the population of young people being searched (i.e. they are variously referred to as, 'high-risk young people', 'young people with multiple and complex needs', or 'at-risk young people') and no age range was specified. The combined searches of all databases located 603 articles, of which 258 duplicates were removed. Searches were limited to the years 2009-2014 for two reasons: first, to ensure a realistic number of articles would be identified for categorisation and critique; and second, to optimise the likelihood that the included studies represent best-evidence practice because they are informed by earlier research findings.

Second, the grey literature was searched to identify articles that were not located by the electronic search. All publications within the 'Adolescent' section of the 'Population Groups' tab on the HealthInfoNet website were searched, and the search terms synonymous with 'high-risk young

people', and 'intervention' were entered together into Google Scholar.
Searching the grey literature identified 51 articles.

Figure 2: PRISMA flow diagram summarising systematic search identifying intervention studies among the published literature relevant to high-risk young people

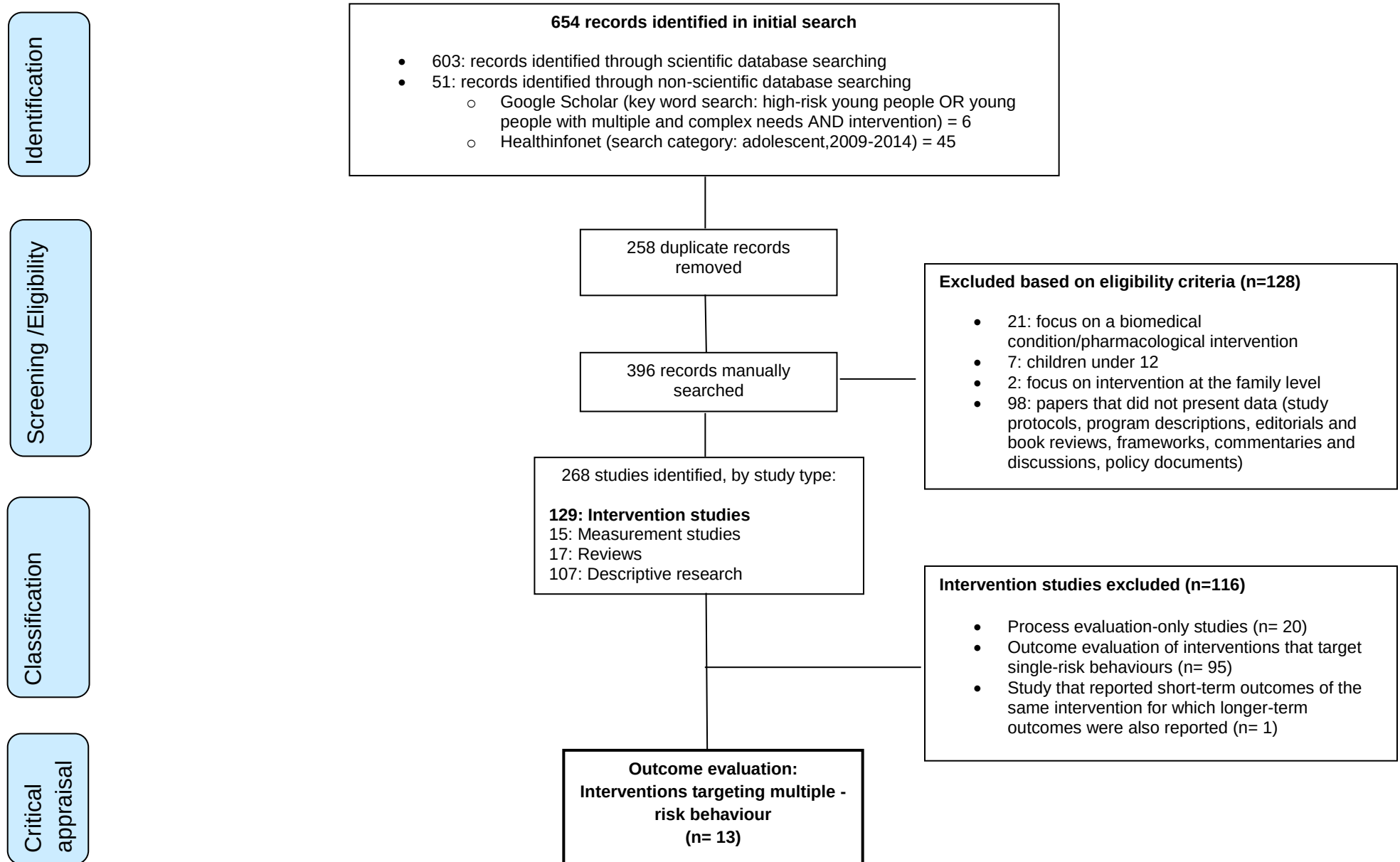


Table 2: Databases and search strings utilised in search strategy

Database and search strings	Number of articles
Medline	228
((high adj risk) or (at adj risk) or (complex adj need\$) or (multiple adj need\$)) adj3 ((young adj adult\$) or (young adj person) or (young adj people) or juvenile or student or adolesce\$ or teen\$).mp intervention.sh. or intervention.ti. or intervention.ab. Limits: human and English language and abstracts and yr="2009 – Current	
PsycInfo	251
((high adj risk) or (at adj risk) or (complex adj need\$) or (multiple adj need\$)) adj3 ((young adj adult\$) or (young adj person) or (young adj people) or juvenile or student or adolesce\$ or teen\$).mp intervention.sh. or intervention.ti. or intervention.ab. Limits: peer reviewed journal and human and English language and abstracts and yr="2009 –Current	
Social Work Abstracts	6
((high adj risk) or (at adj risk) or (complex adj need\$) or (multiple adj need\$)) adj3 ((young adj adult\$) or (young adj person) or (young adj people) or juvenile or student or adolesce\$ or teen\$).mp intervention.sh. or intervention.ti. or intervention.ab. Peer reviewed, 2009-2014	
Global Health	91
((high adj risk) or (at adj risk) or (complex adj need\$) or (multiple adj need\$)) adj3 ((young adj adult\$) or (young adj person) or (young adj people) or juvenile or student or adolesce\$ or teen\$).mp intervention.sh. or intervention.ti. or intervention.ab. Limits: English language, 2009-2014	
CINCH/FAMILY/CINCH – ATIS	22
(("high risk young people" OR "high risk young person" OR "high risk youth" OR "high risk adolescen*" OR "high risk teen*" OR "high risk juvenile*" OR "high risk student*" OR "high risk young adult*") OR (((("high risk") OR ("at risk") OR ("multiple and complex need*") OR ("complex need*") OR ("multiple need*")) AND ("youth*" OR ("young ! people") OR ("young ! adult*" OR "teen*" OR "juvenile*")))) AND intervention Limits: (2009-2014, journal only)	
ERIC	5
("high risk young people" OR ("at risk youth" OR "at risk youth programs") OR ("high risk youth" OR "young people with multiple and complex need*")) AND (yr(2009-Nov 2014) AND Intervention (anywhere) Limits: 1 Jan 2009-1 Nov 2014, peer reviewed, English, journal article	
TOTAL	603

2.3.2 Classification of studies

The title and abstracts of the 396 identified articles were then used to classify articles using a three-step process described below.

Step 1: applying eligibility criteria

Papers were excluded if: (i) the study of interest focused on a biomedical or pharmacological intervention (because they were not the focus of this review) (n=21); (ii) the study focused on young people outside the age range of 12-24 years (this age range was selected because it is the definition of a young person used in national reports in Australia) (AIHW, 2011) (n=7); (iii) the intervention was a family-based intervention with a primary objective of improving outcomes for the parents/carers and not young people (n=2) or; (iv) the study did not present data (study protocols, program descriptions, editorials and book reviews, frameworks, commentaries and discussions, policy documents) (n=98). A total of 128 articles were excluded at this step.

Step 2: identifying intervention studies

The remaining 268 articles were classified by their study type using categories adapted from similar reviews (Calabria, Shakeshaft, & Havard, 2011; Webb, Shakeshaft, Sanson-Fisher, & Havard, 2009): (i) measurement studies, included papers that were primarily concerned with developing measurement instruments that could be used to evaluate interventions (n=15); (ii) reviews, defined as narrative and systematic literature reviews, meta analyses, or rapid evidence syntheses (n=17); (iii) descriptive research, defined as papers that described the characteristics

of potential interventions or young people that the interventions could target (n=107); and (iv) intervention studies, defined as a process evaluation study (any evaluation activity conducted for the purpose of determining the acceptability, dose, fidelity, and/or reach of an intervention) or an outcome evaluation study (reported a quantitative intervention outcome) (n=129). All non-intervention studies (n=139) were excluded at this point.

Step 3: identifying outcome evaluations of interventions targeting multiple-risk behaviours

The full-text versions of the 129 intervention studies were obtained and the articles that only reported a process evaluation were excluded from further analysis (n=20). All outcome evaluation studies (n=109) were read in full and classified according to the number of risk behaviours the intervention sought to impact. For the purposes of this review, the risk behaviours that were targeted were identified from the objective(s) of an intervention, as described in the Introduction, or intervention description section of the Methods in each article. Information on the outcomes measured was not used to identify the risk behaviours targeted. Given the number of risk behaviours reported in the literature, and the different language used to describe these behaviours (e.g. alcohol use or substance use), in an effort to guide the classification process the authors developed a heuristic classification tool (Table 3) that organised risk behaviours into common risk domains: criminal activity, education and employment, mental health and wellbeing, risky sexual behaviour, substance use, and violence. According to this classification tool therefore, if an intervention had the

sole objective of reducing cannabis use, it was classified as targeting a single risk: substance use. Alternatively, if an intervention had the multiple objectives of reducing cannabis use, improving mental health, and reducing violent behaviour, it was classified as targeting multiple risks: substance use, mental health and wellbeing, and violence. The 95 studies that evaluated an intervention targeting a single risk behaviour were excluded, even if outcomes from multiple-risk domains were measured.

Table 3: Classification Tool for risk behaviours

Risk domain	Example behaviours
Criminal activity	Delinquent behaviour; criminal offending; recidivism; frequent contact with police; contact with the juvenile justice system.
Education & employment	Poor school attendance; unexplained school absences; no school attendance; regular truancy; high rates of suspension; poor academic outcomes; misbehaving at school; anti-social behaviour at school; no participation in training and education; no employment.
Mental health & wellbeing	Poor mental health (e.g. depression, low self-esteem, anxiety); self-harm or suicide ideation; poor social and emotional wellbeing; low resilience; feelings of isolation or poor community connectedness; poor quality of life.
Risky sexual behaviour	Having sex while under the influence of alcohol or drugs; infrequent condom use; multiple sexual partners; underage sex; teen pregnancy.
Substance use	Cannabis misuse; alcohol misuse; binge drinking; illicit substance use; cigarette smoking.
Violence	Peer violence; dating violence; aggressive behaviour; threatening behaviour; intimidating behaviour.

Of the remaining 14 outcome evaluations of interventions that targeted multiple-risk behaviour, the outcomes of one intervention were published in two separate articles (Cunningham et al., 2012; Walton et al., 2010) and, consequently, only the paper reporting the longer follow-up period was included. The rationale behind this decision was that the paper reporting the longer follow-up period was more likely to report accurate

change attributable to the intervention. A total of 13 papers were identified for review.

2.3.3 Key characteristics of interventions

Criteria used for data extraction were adapted from the Cochrane Collaboration Handbook for Systematic Reviews of Health Promotion and Public Health Interventions (Jackson, 2007). Information extracted includes: first author, year of publication and country where the intervention was implemented; sample size and setting; age range or mean age of participants and the proportion that was male; intervention description; and the risk behaviours targeted by the intervention.

2.3.4 Critique of the methodological quality of studies

Methodological quality was assessed using the Quality Assessment Tool for Quantitative Studies (Jackson & Waters, 2005). Sections A-F (A, selection bias; B, study design; C, confounders; D, blinding; E, data collection methods; F, withdrawal and dropouts) were coded weak, moderate or strong, as guided by the component rating scale. Section G (intervention integrity) and H (analysis) require a brief description of adequacy rather than coding, the definitions of which are guided by the Tool. Summary ratings comprise weak (studies that receive two or more weak scores), moderate (studies that receive one weak score) or strong (studies that receive no weak scores). In order to quantify the likely extent of classification error, the methodological quality of the studies, as assessed by the doctoral candidate, was re-assessed by a blinded coder.

This resulted in 95% agreement on ratings for components A-F, and 92% agreement on the summary ratings for each study. Where there was disagreement, the doctoral candidate's classifications were used.

2.3.5 Effectiveness of interventions

Given the interventions, populations targeted, and outcomes measured varied substantially across studies, a meta-analysis was not appropriate. Consequently, evidence regarding the effectiveness of interventions that targeted multiple-risk behaviour was summarised by identifying the outcomes on which the intervention had a statistically significant effect (i.e. $p < 0.05$), and whether an economic evaluation was conducted. To reduce duplication of reporting and increase accessibility of the data for the reader, tables 4 and 5 were combined. In addition, to avoid over-interpreting poor quality evidence, only the six studies that received an overall methodological summary rating of moderate or strong were included in the synthesis of intervention effectiveness (summarised in Table 5), although data for methodologically weak studies were included in results tables for comprehensiveness.

2.4 Results

2.4.1 Characteristics of interventions

Six of the 13 interventions that targeted multiple-risk behaviour were delivered in a school setting, two in a health setting (one in a clinic and one in an Emergency Department), and five by Third Sector Organisations (TSOs) in a community setting. For the purpose of this review, a

community setting is defined as any location(s) in a community that is not considered a specialised or controlled environment (e.g. a school or a hospital) (Groark & McCall, 2009). Participants' ages ranged from 10 to 35 years and the proportion that was male ranged from 0% to 83%. This information is summarised in Table 4.

2.4.2 Critique of the methodological quality of outcome evaluations

Two studies obtained an overall classification of strong for methodological quality (Bannink et al., 2014; Rohde, Stice, Gau, & Marti, 2012), four obtained an overall classification of moderate (Cunningham et al., 2012; Mason, Pate, Drapkin, & Sozinho, 2011; Poirier M, 2013; Schaeffer et al., 2014) and seven were classified as weak (Faulkner, Wood, Ivery, & Donovan, 2012; Grace & Gill, 2014; Green et al., 2014; Rhoades, Chamberlain, Roberts, & Leve, 2013; Wiggins et al., 2009; Williamson, Dierkhising, & Guerra, 2013; Wood, Ivery, Donovan, & Lambin, 2013). Only one study of a TSO-delivered community-based intervention received a methodological rating higher than weak (Schaeffer et al., 2014). Further detail on the methodological quality of studies is available in Appendix B.

Table 4: Characteristics of identified interventions

First author & year of publication (Country)	Sample/setting	Age Range or mean age (% male)	Intervention description ^a	Risk behaviours targeted by intervention	Outcomes & effectiveness*
Bannink 2014 (The Netherlands)	Students (n=1256) Schools (n= 12)	15-16 years (54.7%)	Web-based brief intervention: health messages tailored to responses given on a questionnaire, plus feedback compared to normative sample, and the option of MI for young people with poor mental health	1. Mental health and wellbeing 2. Substance use 3. Risky sexual behaviour	- Mental health status* - Health related quality of life* - Alcohol use - Drug use - Smoking - Safe sex*
Cunningham 2012 (US)	Urban adolescents presenting for illness or injury (n=726) Emergency Department (n=1)	14-18 years (43.5%)	Brief intervention based on MI delivered by a therapist with computer assistance	1. Substance use 2. Violence	- Alcohol misuse - Binge drinking - Alcohol related consequences - Peer aggression* - Peer victimisation* - Violence consequences
Mason 2011 (US)	Female adolescent patients (n=28) Health clinic (n=1)	14-18 years (female only)	MI integrated with social network counselling: rapport building, presentation of substance use feedback from baseline assessment, introduction of social network information, developing future plans	1. Substance use 2. Mental health & wellbeing	- Overall substance use - Trouble due to alcohol use* - Substance use before sex* - Offers to use marijuana* - Readiness to start counselling* - Overall social network quality - Social stress*
Poirier 2013 (Canada)	Students (n=53) Schools (n=4)	Mean=14 years (17%)	Pare-Chocs: CBT, problem solving techniques, study skills and schoolwork techniques, and education on depression, positive self-esteem and body-image	1. Mental health & wellbeing 2. Education & employment	- Cognitive distortions* - Problem solving strategies* - Frequency of depressive symptoms - School drop-out risk
Rohde 2012 (US)	Students (n=341) Schools (n=6)	14-19 years (44%)	Group cognitive-behavioural depression prevention program: building group rapport, increasing pleasant activities, learning cognitive restructuring techniques, and developing plans for future stressors	1. Substance use 2. Mental health & wellbeing	- Substance use* - Depressive symptoms*
Schaeffer 2013 (US)	Juvenile offenders (n=97) Community-based	15-18 years (83%)	CRAFT: classroom-based construction skill training, academic skill development, employability skill development, job placement assistance, assistance with job retention, personal development, case management	1. Education & employment 2. Substance use 3. Mental health & wellbeing 4. Criminal activity	- Employment* - Education outcomes* - Substance use - Mental health symptoms - Criminal activity and recidivism
Faulkner 2012 (Australia)	Students (n=60)	Mean=12	DRUMBEAT: Music therapy and CBT	1. Mental health & wellbeing	- Self-esteem - School attendance

Table 5: Effectiveness of identified interventions by methodological strength
(NOTE: Shaded cells represent studies with a methodological rating of weak n=7)

	Schools (n=3)			2.	Education & employment	- Anti-social behaviour at school - Cooperation and collaboration in the classroom
Grace2014 (Australia)	Unemployed, homeless young people in Victoria (n=396) Community-based	10-35 years (73% aged 18 to 24) (65%)	Joined-up case management: intensive client centred case management from one point of contact	1. 2. 3.	Homelessness Mental health & wellbeing Education & employment	- Stability of housing - Affordability of housing - Health & wellbeing - Community connectedness - Income from employment - Participation in education and training
Green 2014 (UK)	Young people in foster care (n=219) Community-based	10-17 years	MTFC: specialist training and support for foster parents, individual and family therapy, social skills training, diversionary activities, case management, and education support	1. 2. 3.	Mental health & wellbeing Education & employment Criminal activity	- Mental health - Social and physical functioning - Scholastic outcomes - Attendance - Offending
Rhoades 2013 (UK)	Adolescent girls in foster care (n=58) Community-based	12-16 years (female only)	MTFC: specialist training and support for foster parents, individual and family therapy, social skills training, diversionary activities, case management, and education support	1. 2. 3. 4. 5. 6.	Violence Criminal activity Substance use Risky sexual behaviour Mental health & wellbeing Education & employment	- Violence* - Offending* - Substance use - Risky sexual behaviour* - Self-harm* - Participation in school activities*
Wiggins 2009 (UK)	Young people at risk of teen pregnancy, substance misuse or exclusion from school. (n=2724) Community-based	13-15 years (60%)	Young Peoples Development Programme: education, training/employment opportunities, life skills, mentoring, volunteering, health education, arts, sports, and advice on accessing services	1. 2. 3. 4. 5.	Risky sexual behaviour Substance use Mental health & wellbeing Education & employment Criminal activity	- Heterosexual sex before 16 (significant increase for women only) * - No. sexual partners - Condom use - Perceived difficulty in initiating condom use - Expectations of being a parent by age 20 (significant increase for women only) * - Cannabis use weekly in past 6months - Drunkenness monthly in past 6months - Worry often in past few weeks - Often angry in past few weeks - Difficulty discussing personal things with close friends - Dislike school - Truancy in past 6 months* - Temporary school exclusion in past 6 months (significant increase for women only)* - Expectation of being in a steady job by age 20 - Contact with police
Williamson 2013 (US)	Students (n=31) Alternative school (n=1)	14-18 years (94%)	PLC program: 10 group sessions of CBT assisted by workbook	1. 2.	Violence Mental health & wellbeing	- Propensity for physical aggression* - Propensity for verbal aggression* - Aggressive behaviour - Sense of self* - Self-control - Decision making* - Moral beliefs* - Prosocial connectedness
Wood 2013 (Australia)	Students (n=180)	Not specified.	DRUMBEAT: music therapy and CBT	1.	Mental health & wellbeing	- Self-esteem* - School behaviour incidents*

Primary schools (n=10) Secondary schools (n=5) Intensive English centres (n=4)	2. Education & employment	- School absences
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^a Key to abbreviations: CBT - Cognitive Behavioural Therapy; CRAFT - Community Restitution Apprenticeship-Focused Training; MI – Motivational Interviewing; MTFC -Multidimensional Treatment Foster Care; PLC - Positive Life Changes

***[bold]** Indicates a statistically significant result (at the level of $p < 0.05$), if a statistical comparison is reported.

2.4.3 Effectiveness of interventions

The effectiveness of interventions is summarised in Table 5, separately for the six studies rated as methodologically strong or moderate, and for the seven studies rated as weak.

Effectiveness by intervention for methodologically strong/moderate studies (n=6)

A school-based, brief, web intervention for students aged 15 - 16 years in the Netherlands statistically significantly improved rates of self-reported safe sex, mental health status, and health related quality of life (Bannink et al., 2014). Similarly, a school-based, group cognitive-behavioural depression prevention program for students aged 14 - 19 years statistically significantly reduced self-reported substance use and improved depressive symptoms (Rohde et al., 2012). A brief intervention delivered in an Emergency Department for young people 14 - 18 years statistically significantly reduced rates of self-reported peer aggression and peer victimisation (Cunningham et al., 2012). An MI intervention, integrated with social networking counselling and delivered in a health clinic for females aged 14 - 18 years, statistically significantly reduced rates of self-reported trouble due to alcohol use, substance use before sex, offers to use marijuana, and improved social stress and readiness to start counselling (Mason et al., 2011). A school-based intervention which combined CBT with relaxation techniques, problem-solving skills, knowledge about depression and positive self-esteem, and study skills and school-work techniques for students, statistically significantly improved rates of self-reported cognitive distortions and problem-solving

strategies amongst young people with an average age of 14 years (Poirier M, 2013). Finally, a TSO-delivered, community-based intervention that involved apprenticeship-focused training for juvenile offenders aged 15 - 18 years statistically significantly improved rates of self-reported employment and educational outcomes (Schaeffer et al., 2014).

Effectiveness by risk behaviour for methodologically strong/moderate studies (n=6)

The most commonly measured outcomes were associated with mental health and wellbeing (n=10) and substance use (n=12). There were three outcomes measured that were associated with education and employment, three outcomes measured that were associated with violent behaviour, and one outcome measured for criminal activity and risky sexual behaviour.

Of the 10 outcomes measured that were associated with mental health and wellbeing, seven (70%) achieved a statistically significant improvement. Of the 12 outcomes measured that were associated with substance use, four (33%) achieved a statistically significant improvement. Of the three outcomes measured that were associated with education and employment, two (66%) achieved a statistically significant improvement, as was the case for violent behaviour. The one outcome measured for risky sexual behaviour achieved a statistically significant improvement, unlike the outcome measured for criminal activity.

Effectiveness by intervention setting for methodologically strong/moderate studies (n=6)

TSO-delivered, community-based interventions targeted a greater number of risk behaviours (mean=4) than both school-based interventions (mean=2) and health-based interventions (mean=3). A higher proportion of the outcomes measured in the evaluations of school-based interventions and health-based interventions were significant (n=7, 44% for both), relative to TSO-delivered, community-based interventions (n=2, 13%).

Cost Analysis for methodologically strong/moderate studies (n=6)

No studies included a cost or economic analysis.

2.5 Discussion

This systematic review found that of the 268 relevant studies identified, only 5% (n=13) were outcome evaluations of interventions targeting multiple risk behaviours in young people, and that half of the 13 identified studies were methodologically weak.

2.5.1 Key characteristics of interventions

The 13 interventions that targeted multiple-risk behaviour in high-risk young people were delivered across multiple geographic regions and in a range of settings, including schools (n=6), hospitals and health clinics (n=2), and in the community more broadly (n=5). Each targeted a different combination of risk behaviours, with an extensive range of intervention activities. Whilst this

lack of homogeneity between interventions reflects a broad spectrum of intervention activity for high-risk young people, it also limits the capacity for direct comparisons about their relative effectiveness.

2.5.2 Critique of the methodological quality of outcome evaluations

More than half the evaluations used either a Randomised Controlled Trial (RCT) or Clinical Controlled Trial (CCT) design, and the majority adequately controlled for confounding influences, utilised valid and reliable self-report measures, and reported adequate descriptions of the withdrawal and dropout of participants. The weakness of most studies was the selection bias generated by their participant selection procedures, and their failure to adequately blind both participants and assessors to the research question. While ethical and practical considerations can often render these two aspects of public health evaluations problematic (Groark & McCall, 2009), these limitations can still reduce the validity of the data collected. Reporting on intervention integrity was also mixed, with only half of the studies measuring the implementation fidelity of the intervention, which limits the transferability of their findings to other communities or settings. Furthermore, although valid and reliable self-report measures were used in the majority of studies that collected self-report data, half of the studies relied solely on self-report measures. Since self-report data can be prone to bias (Hogan, 2003), even where data collection tools are of demonstrated reliability and validity, future intervention studies should consider using a combination of self-report and more objective measures, such as routinely collected crime or health

services data. This would also improve the capacity of studies to capture community-level benefit.

Generally, studies of interventions delivered in a school or health setting were of relatively high methodological quality, whereas only one of the five TSO-delivered, community-based interventions achieved a methodological quality rating higher than weak (Schaeffer et al., 2014). This methodological disparity may reflect that school-or health-based interventions are delivered in more controlled environments, which allows greater consistency in intervention implementation, improved intervention fidelity, higher follow-up rates, and greater statistical power in evaluations, or it may reflect a higher degree of complexity among the high-risk young people who are accessed through TSO-delivered services (e.g. they can be highly transient, which makes adequate follow-up rates harder to achieve).

2.5.3 Effectiveness of interventions

There were far more outcomes measured that were associated with mental health and wellbeing (n=10) and substance use (n=12) than outcomes associated with other risk behaviours. This could indicate that these are the most common risk behaviours among high-risk young people, that interventions target these risk behaviours more frequently, or that there are more readily available outcome measures for these risk behaviours.

Although wide variation in the outcomes measured and the instruments used meant results from different interventions could not be pooled, a simple count

of significant findings suggests that interventions targeting multiple-risk behaviour in high-risk young people are more effective at improving outcomes associated with risky sexual behaviour, mental health and wellbeing, education and employment, and violent behaviour, than substance use. Indeed, this review highlights that outcomes associated with substance use were only statistically significantly reduced about one-third of the time that they were measured. There was no evidence that these interventions had an impact on outcomes associated with criminal activity. In terms of intervention setting, interventions delivered in a school or health setting were associated with a higher proportion of statistically significant results (both $n=7$, 44%), than interventions delivered by TSOs in a community setting ($n=2$, 13%).

Nevertheless, the TSO-delivered, community-based interventions targeted a greater number of risk behaviours simultaneously. Again, this finding is consistent with the proposition that interventions delivered in school- or health-based settings are delivered in a more controlled environment allowing greater consistency of implementation and continuity of care which, in turn, increases the likelihood of achieving statistically significant improvements in risk behaviours. It is also likely that young people still engaged in school are still at least minimally connected with a supportive care-giver, which is also likely to have a protective effect. Conversely, TSO-delivered, community-based interventions are often delivered across multiple settings in the community, and they tend to engage with young people who experience a higher degree of complexity (i.e. they target a greater number

of risk behaviours than other interventions) and have fewer reliable social support structures (Groark & McCall, 2009), all of which increase the difficulty of achieving statistically significant improvements in risk behaviours.

No studies reported on the cost of their interventions, nor conducted an economic analysis to weigh the costs of these interventions against their benefits. Given the high economic costs to society likely to accrue over the lifetimes of high-risk young people, the potential economic benefits from intervening early are likely to be substantial and obtaining such data would help support the case for funding programs for high-risk young people that have been shown to be effective (Cohen, 1998; McGorry, 2007; Pacileo & Fattore, 2009).

2.5.4 Limitations

The lack of an agreed and specific definition for high-risk young people meant a broad combination of search terms was required. Since this requirement led to the identification of a high number of studies, the search was limited to studies published between 2009 and 2014. Although these studies only comprise relatively recently implemented interventions, they are likely to represent best-evidence practice based on the assumption that they are informed by earlier research findings.

The wide variation in interventions, and in the outcomes measured, limits the ability to draw direct comparisons about the effectiveness of different interventions for different populations of high-risk young people. This finding

highlights the need for greater consistency in defining intervention programs. Given the possibility that the wide variability in intervention programs is due to uncertainty about the precise nature of the most important risk behaviours experienced by high-risk young people, one solution is to more precisely define and prioritise those risk behaviours. A complementary solution to improving the comparability of interventions across different settings, while simultaneously allowing interventions to be tailored to available resources and the specific needs of the high-risk young people being targeted, is to design them using the principles of complex interventions (Craig et al., 2008). This approach is yet to be applied to interventions for high-risk young people.

2.6 Conclusions

Outcome evaluation studies of interventions targeting multiple-risk behaviour in high-risk young people comprised only 12% (n=13) of intervention studies published between 2009 and 2014. The methodological quality of half of these evaluations was weak (n=7). Increasing the number of evaluations published, and the proportion of them that are of good methodological quality, seems most likely to be achieved by four key actions: i) more precisely defining the risks experienced by high-risk young people; ii) achieving greater consistency across interventions by utilising the principles of complex interventions; iii) standardising the measures used to evaluate intervention effects; and iv) conducting economic analyses. Given promising evidence from this review that interventions targeting multiple-risk behaviour can improve a range of outcomes for high-risk young people, achieving these four actions would help realise the potential of these interventions.

Chapter 3: Improving the evidence-base for services working with high-risk young people - developing a standardised program framework²

² A version of this chapter has been accepted for publication (see Appendix A.2):

Knight, A., Maple, M., Shakeshaft, A., Pearce T., Shakeshaft, B. Improving the evidence base for services working with youth at-risk of involvement in the criminal justice system: developing a standardised program approach. *Health and Justice*. In press.

3.1 Introduction

Although the poor personal, social, and economic outcomes experienced by high-risk young people discussed in Chapter 1 highlight the need for relevant, high-quality interventions, a recent systematic literature review conducted by the doctoral candidate in Chapter 2 (Knight, Shakeshaft, et al., 2017) found that there are very few published evaluations of programs that simultaneously target multiple-risk behaviour in young people: of the 268 relevant studies published in the international literature between 2009 and 2014, only 13 (5%) were evaluations of programs for young people who engaged in multiple-risk behaviour, and half of these were rated as methodologically weak against standard criteria (n=7). Moreover, of the 13 identified programs, all but one had been implemented in relatively controlled settings (e.g. a school or a health clinic), all used a different model of intervention (e.g. each targeted a different combination of risk behaviours using a different combination of program components), and there was much variation between studies in the outcome measures used.

A key finding of the systematic review in Chapter 2 was that the studies of programs delivered in a school or health setting were of a relatively higher methodological quality than TSO-delivered, community-based intervention programs. This methodological disparity may reflect that school-or health-based interventions are delivered in more controlled environments, which allows for greater consistency in intervention implementation, improved intervention fidelity, higher follow-up rates, and greater statistical power in evaluations. In addition, it may reflect that the high-risk young people

accessed by TSO-delivered programs typically have a higher degree of complexity (e.g. they can be highly transient which makes adequate follow-up rates harder to achieve). It could also signal that there is more capacity and capability in the education and health sectors to conduct quality evaluation, than in the third sector. This finding is consistent with recent studies (Breckell et al., 2010; Ellis, 2008; Ógáin et al., 2012) that have found many evaluations of TSO-delivered programs are often of poor methodological quality, that they fail to provide rigorous evidence to support the implementation of their activities, and that approximately one quarter do not evaluate their work at all (Ógáin et al., 2012).

Nevertheless, the small number of methodologically adequate evaluations of TSO-delivered programs means there is limited high-quality evidence that service providers and policy makers can use to improve the effectiveness of programs for high-risk young people. The lack of homogeneity in programs, outcomes, and outcome measures limits the ability to use rigorous evaluation designs in determination of program effectiveness, pool results in meta-analyses (as a method of increasing the strength of existing evidence) and reduces the generalisability of the results to other populations of high-risk young people. One method for rapidly developing a larger and more rigorous evidence-base for TSO-delivered programs for high-risk young people is to achieve greater standardisation in the way in which programs are defined, implemented and evaluated.

3.2 Aims

This chapter describes the development of a standardised intervention framework that could be used to achieve greater standardisation across programs, outcomes, and outcome measures delivered by TSOs working with high-risk young people. It has two specific aims: first, to describe the development of the framework; second, to apply the framework to an existing TSO-delivered program for high-risk young people to demonstrate how it can be operationalised, and how it might be replicated by other TSOs.

3.3 Methods

3.3.1 The development of a standardised intervention framework

As outlined in Figure 3, the proposed standardised intervention framework adapts a program logic framework to ensure clarity about the proposed program components (part b), why they are likely to be effective (part c – mechanisms of change) (Dalkin, Greenhalgh, Jones, Cunningham, & Lhussier, 2015), and to ensure the program components are strongly aligned with the specific problems being targeted (part a), the outcomes and outcome measures (part d), and the process measures (part e). While the program logic concept *per se* is not new (Bauman & Nutbeam, 2014), this proposed standardised intervention framework incorporates guiding principles from the school of realistic evaluation (Pawson, Tilley, & Tilley, 1997) which seek to identify underlying mechanisms that explain not only if an intervention worked to achieve certain outcomes, but ‘how’ an intervention achieved outcomes. The proposed framework has two key innovations. First, it includes stipulating a mechanism of change (part c) that requires a clear articulation of

the rationale for change: that is, why the proposed program (the core components and flexible activities) would be expected to achieve the proposed outcomes. The primary purpose of the mechanism of change is to challenge those designing new, or refining existing, programs to be clear about exactly what outcomes each program component is attempting to achieve. Second, the development of the proposed program components (part b) allows programs for high-risk young people to be both standardised (the core components) and adaptable to the individual circumstances of different services (the flexible activities), as opposed to the more narrow and rigid way in which some have been typically defined, which limits their generalisability and comparability (Knight, Shakeshaft, et al., 2017). This standardised but flexible approach is aimed at solving the well-established, but as yet difficult to resolve, tension articulated in the complex intervention literature, between the need for standardisation (to provide adequate comparability across programs delivered by different services in different circumstances) and the need for sufficient flexibility to allow tailoring to the resources and circumstances of different settings (Campbell et al., 2007; Craig et al., 2008; Hawe, Shiell, & Riley, 2004). The bolded text in Figure 3 are the core components of the proposed standardised intervention framework (aim 1), while the normal text highlights how these components are tailored to the specific circumstances of one program (aim 2).

Figure 3: The proposed standardised intervention framework components (bold text) and its application to the BackTrack program (normal text)

a. Areas of need	b. Intervention		c. Mechanisms of change	d. Outcomes (outcome measures)	e. Process measures
	Core components	Flexible activities			
- Emerging or established involvement in criminal incidents and the criminal justice system - Tenuous engagement with the education system and/or un-, under-employment - Risky drug and alcohol use - Low self-efficacy and/or emerging mental health issues	1. Engagement	- Paws-Up - Youth forum	1. Successful engagement with participants ensures sufficient exposure to program components	- A reduction in crime/severity of crime (e.g. routinely-collected police incident data; self-reported involvement in crime)	- The extent to which the program was delivered as planned (program fidelity) - Participant attendance and exposure to the different core components of the program (program dose) - Participant satisfaction with the program - Participant acceptability of the program - Contextual facilitators/barriers to program implementation
	2. Case management	- Assist with legal issues (e.g. attend court) - Work-ready preparation - Contingency planning - Inter-agency liaison	2. Prioritising participants' most immediate problems (e.g. legal issues), and developing pragmatic solutions to these problems, allows participants to focus on pro-social activities	- A reduction in substance misuse (e.g. Alcohol Use Disorder Identification Test [AUDIT], the Alcohol, Smoking and Substance Involvement Screening Test [ASSIST], the Heaviness of Smoking Index [HSI])	
	3. Diversionary activities	- Supervised events in town on weekends - Interstate travel on weekends to community events (e.g. Dog jump competitions) - Day-to-day attendance at the program	3. Reducing participants' exposure to high-risk situations (at home and in public), at high-risk times (e.g. the weekend)	- A reduction in suicidal ideation and/or psychological distress (e.g. self-reported suicidal ideation; psychological distress [such as Kessler-6])	
	4. Personal development, identity, and team identity	- Circle Work - Chilling the brain - Counselling - BackTrack shirts	4. Improving participants' capacity to manage when they are in high-risk situations	- Improved employment options (e.g. self-reported employment status; school attendance; formal skills training, work experience)	
	5. Training and skill development	- BackTrack school - Work experience - Vocational training - Volunteer work experience	5. Improving participants' education and life skills to increase their opportunities for active participation in employment	- Improved self-efficacy or resilience (e.g. the Connor-Davidson Resilience Scale)	

The development of this standardised intervention framework required establishing the core, standardised program components that would need to be included in any TSO-delivered program for high-risk young people (whilst the flexible activities [part b] that operationalise these core components are, by definition, flexible and the responsibility of each TSO to articulate). Five standardised, core program components were developed using the central tenet of evidence-based practice (Sackett et al., 1996): that is, by integrating the best-available external evidence with the expertise of individual service providers. The best-available external evidence was distilled from findings of the systematic review in Chapter 2 (Knight, Shakeshaft, et al., 2017), and the expertise of service providers was obtained through the process of applying the initial framework (i.e. the first draft of the model based only on the published literature) to an existing program.

The best-available external evidence

The systematic review in Chapter 2 identified four commonalities across published evaluations of programs. First, the 13 evaluated programs targeted a mean of three risk behaviours, ranging from two to six per program: no program targeted a single-risk behaviour. This highlights the need for programs to comprise multiple components aimed at addressing participants' multiple-risk behaviour. Second, a detailed critique of the six evaluations identified as being of moderate or good methodological quality identified three common core components: i) *case management*, to help young people navigate the pressures of their day-to-day lives; ii) utilising behaviour change techniques to foster *personal development* and assist

the young people to better understand their thoughts and behaviours; and
iii) providing access to *training and/or skill development* to increase their chances of accessing meaningful employment.

More specifically, *case management* requires a high degree of cooperation and communication between different service providers in the community, and highlights the importance of, as far as possible, having the same case worker or case manager. The prioritisation of the most immediate problems being experienced by a young person, and identifying pragmatic solutions for these problems, such as securing crisis accommodation or facilitating access to legal aid for court appearances, were identified as a critical focus for case management. *Personal Development* was fostered through the application of evidence-based behaviour change techniques: of the six programs evaluated, three primarily used motivational interviewing (MI) techniques (Bannink et al., 2014; Cunningham et al., 2012; Mason et al., 2011); two primarily used cognitive behavioural therapy (CBT) (Poirier M, 2013; Rohde et al., 2012), and one primarily used multisystemic therapy (MST), multidimensional family therapy (MDFT) or functional family therapy (FFT) (Schaeffer et al., 2014). *Training and/or skill development* was used to different extents. The three intervention programs that implemented MI techniques, for example, provided tailored information to participants on specific risk behaviours, in an effort to improve their understanding of the risk behaviour and their skills to modify their behaviour. Two programs explicitly provided opportunities for active participation in education or training (e.g. classroom-based skill development, numeracy and literacy

training, employability training, study skills and schoolwork techniques, or work experience) to improve participants' chances of securing employment.

The expertise of individual service providers

The research team facilitated two workshops with staff from an existing program for high-risk young people, the BackTrack program (BackTrack), to obtain their input into the development of the standardised intervention framework. BackTrack was implemented by a Third Sector Organisation (TSO), established in February 2006 in a rural community in the New England region of New South Wales (NSW), Australia.

The two workshops were held at the University of New England (UNE) in March and May 2014. The primary purpose of the first workshop was to report the key findings from the critical review of the literature (the best-available external evidence) and examine their relevance to BackTrack. The primary purpose of the second workshop was to map the current service delivery model of BackTrack to the first version of the standardised intervention framework that was based solely on the findings from the critical review. These workshops identified two additional program components that staff perceived as being critical to their approach to working effectively with high-risk young people. The first, *engagement*, recognises that success in the program is largely determined by the extent to which participants are actively engaged with the program, and to increase the likelihood that they attend for enough time to gain sufficient exposure to the program components. To enhance engagement, staff

emphasised the importance of voluntary participation, and ensuring that young people have the opportunity to choose to participate and take ownership of their decisions. The second additional component, *diversionary activities*, was included after staff highlighted the importance of needing to divert high-risk young people from high-risk activities and peers (e.g. antisocial behaviour in public places) during high-risk times (e.g. late at night or during the weekends), in order to achieve both reduced short-term exposure to high-risk situations and sustained behaviour change.

Further to identifying these additional two core program components, the workshops with the service providers were used to articulate the mechanism of change for each core component: i) effective *engagement* ensures participants are exposed to a sufficient number of intervention components; ii) *case management* ensures participants' most immediate problems are prioritised (e.g. legal issues); iii) *diversionary activities* reduce participants' exposure to high-risk situations at high-risk times (e.g. late at night or on the weekend); iv) *personal development, identity, and team identity* improve participants' capacity to manage when they are in high-risk situations and create a sense of belonging and acceptance; and v) *training and skill development* increase the opportunities for active participation in employment and greater engagement with their communities.

3.3.2 *The application of a standardised intervention framework to an existing TSO-delivered program for high-risk young people*

To demonstrate the feasibility of operationalising the proposed standardised intervention framework outlined in Figure 3, it was applied to an existing TSO-delivered program for high-risk young people called BackTrack.

Overview of the BackTrack program

The BackTrack program was established in Armidale in northern New South Wales (NSW) in 2006 (<http://www.backtrack.org.au>). It is underpinned by six key principles: i) in recognition that its participants engage in multiple-risk behaviour, the program is comprised of multiple components that target different areas of need simultaneously (e.g. personal development, skills training and legal issues); ii) flexibility in the delivery of the program components, which reflects that the focus of young people's needs shifts over time; iii) flexibility in program attendance, so that participants are able to start, leave and re-enter the program as they wish, or as their life circumstances permit; iv) a requirement that young people in the program eventually actively participate in all components of the program; v) active engagement of local businesses, local media, key stakeholders (e.g. police, magistrates), and community members in delivering program elements, resolving bureaucratic problems, providing infrastructure and funds, and facilitating communication about the benefits of the program; and vi) recognition that achieving sustained change among high-risk young people will take a number of years.

Applying the standardised core components to BackTrack

The three common themes identified in the literature, and the additional two components identified by staff in the workshops, became the foundation for the multiple core program components within the standardised intervention framework, and were used to guide the classification of existing BackTrack program activities. For example, where staff described learning activities they implemented with participants to improve their literacy and numeracy skills, these were classified as belonging to the core component of *Training and Skill Development*. A brief description of the BackTrack program activities, as they relate to the five program components, is provided below.

Core component 1: Engagement

The major engagement activity for BackTrack is called 'PawsUp'. It involves participants initially interacting with working dogs, in terms of simple unstructured play and involvement in their care. A second engagement activity is called the 'Youth Forum'. This is led by existing participants, rather than staff, and requires all new participants to agree to the ground rules of BackTrack. It specifies the consequences of failing to meet these ground rules. All participants are encouraged to recognise the difficulties that they each face in their lives and to support each other to make BackTrack work for them, despite coming from a range of different schools, neighbourhoods, communities and cultural backgrounds.

Core component 2: Case management

Case management refers to individually tailored planning for each participant. Generally, the highest priority issues in the first year of

BackTrack participation are typically related to legal and mental health issues. Consequently, staff will work with participants to ensure they meet their obligations (e.g. accessing Legal Aid, attending court on time in clean clothes, advocating to the magistrate on their behalf, and providing formal reports for court), and combine this with group tutorials on how the legal system works, and informal discussions at BackTrack, attended by local police and the local magistrate. Over time, the specific range of case management activities typically shifts from a focus on acute legal issues to improved educational attainment and employability. These activities include: 'work-ready preparation' (e.g. obtaining a Tax File Number, opening and managing bank accounts, arranging appropriate transportation to work); contingency planning (supporting participants to manage challenging situations that occur in their day-to-day lives, such as housing insecurity and health issues); and inter-agency liaison (developing and maintaining relationships with a range of agencies and key stakeholders to minimise risky situations, and optimise opportunities for learning and skill development, personal development, and community integration).

Core component 3: Diversionary activities

Diversionary activities can range from supervised events in town on the weekend or in the evenings, such as trips to the town pool or local football games, to group trips away from town on the weekends, such as camping or to participate in dog-jumping competitions. Day-to-day attendance at the program is also considered an important diversionary activity as participants are engaged in meaningful activity and surrounded by

supportive peers and staff. This reduces the likelihood of them becoming bored and helps reduce their interaction with high-risk peers or family members, during high-risk times (e.g. over weekends or at night).

Core component 4: Personal development, identity, and team identity

Many activities within this component draw on elements of motivational interviewing, cognitive-behavioural therapy, choice theory (participants can choose activities, for example, and not be concerned about being excluded from the program), and mindfulness. One specific activity BackTrack implements is called 'Circle Work', which provides participants with the opportunity to verbalise their feelings, instigate conversations about any issues with which they are having difficulty coping, and express their hopes for the future. Other activities in this component include anger management, role-playing, mindfulness activities and regular meditation (referred to as 'chilling the brain'). These activities are applicable to both individuals and the group and can be integrated into BackTrack's day-to-day activities (e.g. 'chilling the brain' might occur in a mini-bus on the way home from a skills-based activity).

In addition to personal development, activities within this core component provide opportunities for participants to develop a greater sense of belonging to the BackTrack team. One simple activity that operationalises this component is the provision of a distinctive BackTrack shirt, which participants are required to keep clean and wear when they are involved in skills training and community-based activities. For some participants, BackTrack is the only aspect of their lives in which they can develop a

sense of pride, achievement and responsibility for their own behaviour, which can become associated with their BackTrack shirt. Since Indigenous Australians are over-represented in BackTrack (they represent 49% of participants despite comprising only 9% of the local population) (ABS, 2011; Knight, Havard, et al., 2017), cultural awareness is also embedded into all program components, and delivered to both Aboriginal and non-Aboriginal participants. Agricultural work, for example, provides an opportunity for discussion with local Aboriginal Elders about Indigenous and non-Indigenous methods of land management, and how these might become more closely aligned. The non-Indigenous participants are routinely engaged in the cultural awareness activities, which builds their understanding of the long history of Aboriginal stewardship and the unique status of Indigenous Australians as the oldest continuing culture on Earth. In addition, the mutual understanding between participants of different cultural backgrounds reduces tension and potential racism between the two groups.

Core component 5: Learning and skill development

BackTrack has partnered with different agencies to provide a range of skill-learning options. One example is the BackTrack School, which is run in-house by a qualified teacher and focuses on developing basic literacy and numeracy skills in partnership with the local high-school. Although the content of the lessons is fixed because they are legally required to be mapped to the NSW school curriculum, the format of their delivery is flexible to account for participants' concentration capacity: participants determine the length of lessons, the nature of activities that intersperse

lessons (e.g. outdoor exercise or music), and the learning aids that they prefer to use (e.g. participants are encouraged to help each other with tasks and to use the 'PawsUp' dogs as reading partners so they are less threatened by their perceived poor literacy).

To complement the BackTrack School, pragmatic skills-based programs are provided in partnership with formal vocational training organisations so that young people build demonstrable, industry-recognised, qualifications to improve their employability. Although the specific range of programs provided varies depending on the availability of resources and different vocational training partners, the core set of programs focus on agricultural-related skills because BackTrack is located in a rural community and the programs are designed to meet known skill shortages in the region (to optimise the likelihood that program participants will progress into employment). One skills program, called 'AgLads', requires participants to enrol in the Agricultural Certificate I and II courses at the local technical college. Another program, called 'IronMan Welding', uses an on-site, fully-operational welding workshop to develop skills in artistic and functional welding. Art pieces are sold in local markets and at the BackTrack shed location, while the functional components provide metal fabrication products and services for local industry, businesses and individuals. This program requires participant enrolment in the Certificate II in Metals and Engineering course at the local technical college. Other programs have the same structure (i.e. skills-based requiring enrolment in the relevant course at the local technical college) and focus on developing a range of other recognised skills, including first-aid, occupational health and safety,

small motor operation and maintenance (e.g. chainsaws and lawn mowers), and operating heavy machinery. While these activities are more relevant to rural settings, in urban settings, programs could develop skills to meet workforce shortages in other sectors of the economy, such as hospitality, manufacturing, and retail.

To avoid the development of skills in isolation from local farmers, industries, businesses, government and non-government organisations, and to increase the number and strength of connections between participants and their community, BackTrack also actively seeks to create a range of potential job and work experience opportunities for participants. For example, significant flooding in 2012 provided opportunities for BackTrack participants to apply their rural skills on a volunteer basis to assist farmers to repair damage to their properties and minimise their stock losses, while bushfires in 2013 and 2015 provided an opportunity for BackTrack participants to act as refuelling volunteers for fire-fighting helicopters at the local airport. Volunteering for these activities emphasises the importance of contributing to their community, and provides an opportunity to develop participants' interpersonal skills, such as teaching them to look directly at people when being introduced and to shake hands as appropriate ways of interacting with others. They also allow participants to gain these skills as a group, so they can support each other in these unfamiliar situations, which they find extremely challenging. Utilising these opportunities is a clear example of the process of tailoring program activities to local circumstances, while maintaining the core program component of learning and skills development.

3.4 Discussion

This chapter describes the development of a standardised, best-evidence intervention framework that can be used by different services that provide programs for high-risk young people. Given the small number of high-quality evaluations of programs for high-risk young people that have been published in the peer-review literature, and the extent of heterogeneity of both the type of programs available and the outcome measures used to evaluate their effectiveness, increasing the extent of standardisation across programs internationally would build the evidence base by improving the ability to compare seemingly different programs across communities. This option is especially important for these programs, because individually, they typically engage with a relatively small number of high-risk young people. BackTrack, for example, only engaged 61 participants between December 2012 and June 2015 across five communities (Knight, Havard, et al., 2017). The reality of engaging a small number of participants is that it limits the ability to use rigorous evaluation designs, such as a randomised controlled trial (RCT) or the multiple baseline design (MBD) in any determination of program effectiveness, and it reduces the statistical power of outcome analyses that could be achieved in the evaluation of any one program. A further benefit to standardisation is that it would increase the frequency with which participants' outcomes are assessed using best-evidence measures and facilitate the pooling of results across studies in meta-analysis.

This chapter proposes a pragmatic solution for supporting TSOs to overcome these methodological limitations by describing an intervention framework that can be standardised across services, using five common core program components and service-specific activities that operationalise the core components. Built on the principles of complex interventions, this framework does not require that programs adhere to a prescribed set of intervention activities, but provides a common framework, within which different TSOs can develop and implement their preferred program activities. Although this approach does require the adoption of the five core components to achieve adequate standardisation across programs (as summarised in Figure 3), individual programs would still be required to determine their own program activities to operationalise the core components. Programs could even add their own core components beyond those proposed if necessary (so long as they retain the core five). A cultural connectedness or awareness component, for example, might be highly valued by programs delivered in Indigenous-specific settings, or specifically for minority cultural groups.

Adoption of this intervention framework could also help standardise the outcome measures used to assess the impact of different programs. Ideally, these measures would be embedded into the intake assessment procedures of service providers so that high-quality data are collected routinely for all program participants. Programs could augment this standard set of assessment measures with additional measures of relevance to their program. The intake assessment would need to be repeated at agreed time intervals (e.g. three, six and twelve months, then

annually thereafter), and although this may impose a task on staff in addition to their regulatory reporting requirements, it could be used to provide personalised feedback to participants on their progress over time, as well as generating comparable measures of the effectiveness of programs.

At the same time that programs are routinely collecting these self-report data, researchers could develop measures of the community-level benefits of programs (e.g. reduced population rates of crime, which might occur if the high-risk young people in a community are associated with the majority of crime committed by young people in a community), as well as methods for routinely conducting rigorous evaluations of programs.

3.5 Conclusion

As shown in Chapter 2, there is a clear lack of rigorous evidence to support the implementation of TSO-delivered programs for high-risk young people (Knight, Shakeshaft, et al., 2017). This chapter provides a proposed mechanism for improving this evidence-base by increasing standardisation across programs and outcome measures. It proposes a standardised intervention framework comprising five core components that are required to be operationalised by individual TSOs, by tailoring them to their available resources and practical circumstances. The feasibility of this process is demonstrated by its application to an existing TSO-delivered program called BackTrack.

Nevertheless, given staff are likely to have a strong preference for their own existing program, a key issue is the extent to which program providers are willing to adapt their programs to use the same core program components and the same core assessment tools, in order to achieve a substantially improved evidence-base for these programs in a relatively short period of time, through obtaining greater statistical power than could be achieved. The alternative to adopting this standardised but flexible model is likely to be a continuation of the publication of a small number of under-powered evaluations of TSO-delivered programs, of varying methodological quality.

A key next step in improving the evidence-base for TSO-delivered programs for high-risk young people would be to quantify the benefits of at least one program defined using this framework delivered in at least one community (Semczuk, 2015). Given those findings were promising, then the benefits and costs of delivering this model in multiple communities could be estimated, which would strengthen the causal link between the intervention framework and the observed outcomes. Next, this framework could be evaluated when it is delivered by multiple TSOs in multiple communities, which would further strengthen the quality of the evidence-base and the generalisability of the model because it would be informed by the expertise of multiple TSOs. Finally, this larger and more rigorous evidence-base could be used to accelerate the wider uptake of these programs which would, consequently, improve the social, health, and economic outcomes of a greater number of high-risk young people.

Chapter 4: The feasibility of embedding best-evidence measures into the routine data collection processes of a TSO-delivered program for high-risk young people³

³ A version of this chapter has been published (see Appendix A.3):

Knight, A., Havard, A., Shakeshaft, A., Maple, M., Snijder, M., Shakeshaft, B. (2017). The feasibility and utility of embedding best-evidence measures into the routine delivery of services for high-risk young people. *International Journal of Environmental Research and Public Health*. 14(2) 208.

4.1 Introduction

Findings from a systematic review of the international peer-reviewed literature in Chapter 2 (Knight, Shakeshaft, et al., 2017) show that very little is known about ways of effectively intervening with high-risk young people: of the 268 relevant studies published in the literature, only 13 (5%) were evaluations of programs targeting multiple-risk behaviour in high-risk young people (as opposed to single-risk behaviours), and half of these were rated as methodologically weak against standard criteria (n=7). Moreover, of the 13 identified programs, all used a different model of intervention (e.g. each targeted a different combination of risk behaviours using a different combination of program components), and all quantified the effectiveness of their program using a wide variety of outcomes and outcome measures.

The heterogeneity in types of programs delivered to high-risk young people, and the variation in the outcome measures used to evaluate their effectiveness, makes it difficult to draw direct comparisons about the effectiveness of different programs. This is a particularly important limitation for programs working with vulnerable populations that experience behavioural and emotional complexity, such as high-risk young people, because the nature of their harms mean programs can typically only engage with a relatively small number of participants at any one time. In turn, this limits the ability to use rigorous evaluation designs (such as randomised controlled trials) and achieve adequate statistical power in any quantitative determination of their effectiveness.

A further finding of the systematic review in Chapter 2 was that the studies of programs delivered in school or health settings were of a relatively higher methodological quality than TSO-delivered, community-based programs, suggesting that there is more capacity and capability in the education and health sectors to conduct quality evaluation, than in the third sector. This finding is consistent with recent studies that have found many evaluations of TSO-delivered programs are often of poor methodological quality (Breckell et al., 2010; Ellis, 2008; Ógáin et al., 2012). Given the majority of programs available for high-risk young people are implemented by TSOs (Bach-Mortensen & Montgomery, 2018), this signals a need for the development of pragmatic methods to support TSOs to conduct higher quality evaluations of their programs.

Chapter 3 offered one solution for overcoming these methodological limitations, by describing an intervention framework that could be standardised across seemingly different programs, using five common core program components and service-specific activities that operationalise these core components. A complementary solution for increasing the number and quality of evaluations of TSO-delivered programs for high-risk young people is to have researchers and service providers collaborate on developing assessment tools that can be embedded into the routine delivery of services, so that program delivery and data collection for evaluation occur simultaneously. These embedded assessment tools would ideally integrate best-evidence outcome measures into the routine data collection processes of services, which would improve the accuracy with which risks experienced by high-risk

young people accessing services are identified, whilst also facilitating evaluation of effectiveness. Repeated application of best-evidence measures would have the added benefit of providing services with the ability to monitor the changing needs of their participants over time, so they can modify their programs accordingly.

Despite the potential benefits of embedding best-evidence measures into the routine data collection processes of programs, services for high-risk young people do not appear to be using this process as a means of collecting better quality data. The systematic review in Chapter 2 found that the outcome data for all 13 evaluations were collected by members of an external research team, as opposed to being embedded into the routine internal data collection processes of the service (Knight, Shakeshaft, et al., 2017).

4.2 Aims

In order to encourage the collection of high-quality data that is embedded into the routine delivery of services by TSOs, this chapter aims to demonstrate the feasibility of integrating best-evidence measures into the routine data collection processes of a program for high-risk young people, and identify the number and nature of risk behaviours experienced by the program's participants.

4.3 Methods

4.3.1 Service and setting

The program, called BackTrack, is a TSO established in 2006 in a rural community in the New England region of New South Wales (NSW), Australia. Its broad objective is to provide alternative and positive pathways into adulthood for high-risk young people by providing a multi-component program that can target multiple-risk behaviours simultaneously. Described in more detail in Chapter 3, this objective is operationalised through a number of flexible activities, organised into five standardised core program components: i) *engagement*, to optimise participation in the program; ii) *case management*, to address participants' immediate and practical needs, such as attending court or homelessness; iii) *diversionary activities*, to reduce participants' exposure to high-risk situations, such as night-time encounters with police in public places or volatile situations at home; iv) *personal development, identity, and team identity*, to improve participants' personal coping strategies when they are in high-risk situations and their sense of connection to their peers and community; and v) *training and skill development*, to increase their opportunities for active participation in education or training likely to lead to employment.

The model of standardisation (the five core program components) with built-in flexibility (the specific activities that operationalise each component) provides a mechanism to both standardise the BackTrack program across multiple communities and tailor it to the resources available in different communities. BackTrack has been implemented in different formats for high-risk young people in five distinct communities. For the first community, the service was delivered in a previously disused

shed donated by the local council. For the second and third communities, services were provided as an outreach model through a combination of young people attending the shed in the first community, and staff from the first community providing additional outreach activities in the second and third communities. For the fourth and fifth communities, high-risk young people accessed the service on a working, but largely disused, farm.

For the purpose of this study, the five communities were clustered into three groups based on the different service delivery models: on-site based in a shed (community one); outreach (communities two and three); and on-site based on a farm (communities four and five).

4.3.2 Participants of the service

Young people are eligible to participate in BackTrack if they: i) reside in a community where it is available; ii) are aged 14-21 years; and iii) are currently experiencing more than one of the following behavioural risks: involvement in criminal activity; substance use; violent behaviour; homelessness; poor mental health and wellbeing; poor engagement with school (including suspensions and unexplained absences); and un- or under-employment.

Potential participants are referred from: individuals (self-referral, family members/primary caregivers, or a community member); local schools (because they are at risk of becoming completely and permanently disconnected from mainstream education); or another government or non-government agency (e.g. police, magistrate, NSW Department of Family

and Community Services). Each referral is made online via a secure link to an expression of interest (EOI) form on the BackTrack website. The EOI comprises questions about the young person's status in relation to the eligibility criteria (above). The EOI is reviewed by the BackTrack manager and at least two senior staff, each of whom provide a recommendation. The manager makes the final decision on placement. Young people who meet the inclusion criteria, and are recommended for placement, are then interviewed by senior staff. Those who demonstrate a commitment to personal growth and appear genuinely self-motivated to participate are invited to attend the program for one week on a trial basis. If the number of suitable referrals is greater than the places currently available in the program, they are placed on a waiting list. Those who do not meet the inclusion criteria, or are not invited for a trial placement, have this decision explained to them and their referring agent by a senior staff member in a face-to-face meeting, and they are given the option of being referred to a more appropriate agency.

Trial participants become program participants if they successfully complete their trial week and attend at least four days in the first month. Participants who leave the program are welcome to recommence when it suits them, and the program manager ensures there are vacancies in the program for this eventuality. This flexibility is designed to foster ownership of decisions and personal responsibility.

4.3.3 Measures

Prior to establishing the TSO and researcher partnership, BackTrack's intake procedure comprised the completion of a basic administrative form (e.g. emergency contact details), and the setting of priorities and goals for participants. Collaboration between staff and the researchers resulted in the development of a new, practically-relevant, and scientifically-rigorous routine assessment tool⁴ that was embedded into the existing intake procedure to measure participants' risk behaviours. Acknowledging the dearth of appropriate measures of risk with published evidence for their reliability and validity amongst young people, let alone high-risk young people, this collaboration achieved a compromise between pragmatism and scientific rigor by, using 'best-evidence' (BE) measures of risk. These are psychometrically tested measures with published evidence for their reliability or validity amongst a similar youth population, or where this is not possible, a normative adult population. Where these were unavailable, but staff required the information nonetheless for program design or monitoring of participant risk behaviours, non-psychometrically tested assessment items were sourced from surveys that targeted a similar population (SP) group (e.g. the NSW Schools Students Health Behaviours Survey) (Centre for Evidence and Epidemiology, 2013). Where BE or SP assessment items could not be identified, new (N) items were developed by the researchers in partnership with staff. Assessment items were organised into demographic characteristics and four domains of risk sourced from a classification developed by the doctoral candidate in Chapter 2, and are described below:

⁴ The intake survey can be found in the paper version of the 'Participant Intake Package' Appendix C.1 & C2

Demographic characteristics (SP).

Gender, date of birth, Aboriginal and/or Torres Strait Islander status, and community of residence.

Education and employment (SP).

Items for this domain were sourced from the NSW Schools Students Health Behaviours Survey (Centre for Evidence and Epidemiology, 2013), and measured: i) if the participant had ever been suspended from school and if so, how many times; ii) frequency of school attendance; iii) employment status; iv) and receipt of a government financial benefit.

Mental health and wellbeing (BE, SP, N).

In line with previous research, a summary measure of recent suicidal ideation was based on positive endorsement of one or more of five yes/no items from the Psychiatric Symptom Frequency Scale (Lindelow, Hardy, & Rodgers, 1997): “have you felt that life is hardly worth living?”; “have you thought that you would be better off dead?”; “have you thought about taking your own life?”; “have you made plans to take your own life?”; and “have you attempted to take your own life?”. Given the fact that staff highlighted the importance of this measure as a screening tool to identify participants experiencing current suicidal ideation, the time period from the original scale, which assesses suicidal ideation ‘in the past year’, was modified to assess suicidal ideation ‘in the past four weeks’.

Resilience was measured using a brief 10-item version (CD-RISC-10) of the original 25-item Connor-Davidson resilience scale (Campbell-Sills & Stein, 2007; Connor & Davidson, 2003). This reliable and valid scale assesses respondents' perceptions of their ability to adapt to change, to deal with unexpected events, to cope with illness, injury, unpleasant feelings or obstacles, and to remain positive in stressful situations. The CD-RISC-10 was favoured by staff, over the original version, because it has been administered to youth samples (Campbell-Sills, Forde, & Stein, 2009; Hartley, 2012) and its brevity reduces its response burden. Items are scored on a scale from 0 (not true at all) to 4 (true nearly all the time) and summed to a total score ranging from 0-40. Higher scores reflect greater resilience.

Psychological distress was measured using the six-item Kessler Psychological Distress Scale (K6), where each item was again rated on a five-point scale from 0 (none of the time) to 4 (all of the time) and summed to a total score from 0-24 (Furukawa, Kessler, Slade, & Andrews, 2003; Kessler et al., 2010). A score of ≥ 5 indicates moderate psychological distress and a score of ≥ 19 indicates serious psychological distress.

General health and wellbeing items relating to frequency of fast-food consumption in the past week and frequency of physical activity in the past week were sourced from the NSW Schools Students Health Behaviours Survey (Centre for Evidence and Epidemiology, 2013), and a new item was added that captured frequency of health service utilisation.

Substance use (BE & SP).

Risky drinking was measured using the AUDIT-C comprising the first three items of the Alcohol Use Disorders Identification Test [AUDIT] (Babor, 2001), which has demonstrable evidence for its reliability and validity and performs well as an abbreviated alcohol screening measure in integrated health-risk surveys delivered in non-medical, community settings (Reinert & Allen, 2007). Given a high proportion of participants were Indigenous and that there was a general lack of understanding amongst participants about standard drink sizes, a modified version of the original AUDIT-C wording was used, which has proven to be acceptable to Indigenous Australians (Calabria, Clifford, Shakeshaft, et al., 2014; Conigrave et al., 2012). The third item of the AUDIT-C, which refers to heavy drinking, was also modified to reflect the Australian Alcohol Guidelines (NHMRC, 2009) in place at the time of this study (see Table 6 for relevant modifications). Responses were scored as 0 to 4 and summed to a total ranging from 0 to 12. Risky drinking was measured using the validated Indigenous-specific AUDIT-C cut-off scores and defined as a score of ≥ 5 (Calabria, Clifford, Shakeshaft, et al., 2014).

To capture cigarette smoking status an item was used from the NSW Schools Students Health Behaviours Survey that asked if participants were current, occasional, ex-, or non-smokers (SP item) (Centre for Evidence and Epidemiology, 2013). Current smokers were also asked the two-item Heaviness of Smoking Index (HSI) (Etter, Duc, & Perneger, 1999): “How many cigarettes per day do you smoke?”; and “How soon

after waking do you smoke your first cigarette?”. Using the standard classifications, a HSI score of 5 or more indicated high dependence.

To measure illicit drug use, an abbreviated version of the illicit drug use questions in the Alcohol, Smoking and Substance Involvement Screening Test (ASSIST) questionnaire (Ali, Meena, Eastwood, Richards, & Marsden, 2013) was developed to achieve a balance between standardisation and response burden. The eight ASSIST illicit drug questions (which ask about specific drug use) were summarised into five: “Have you ever used cannabis?”, and if yes, “How often did you use cannabis in the past three months?”, “Have you ever used an illicit substance (that was not cannabis)?”, and if yes, “How often did you use

Table 6: AUDIT-C – adapted wording for Indigenous Australians

Adapted AUDIT-C item	Original AUDIT-C item	Response	Score
1. How often do you have a drink of alcohol?	How often do you have a drink containing alcohol?	Never	0
		Monthly or less	1
		2-4 times a month	2
		2-3 times a week	3
		4 or more times a week	4
2. When you have a drink of alcohol, how many drinks do you usually have?	How many standard drinks containing alcohol do you have on a typical day when drinking?	1 or 2	0
		3 or 4	1
		5 or 6	2
		7 to 9	3
		10 or more	4
3. How often do you have five or more drinks all in one go?	How often do you have six or more drinks on one occasion?	Never	0
		Less than monthly	1
		Monthly	2
		Weekly	3
		Daily or almost daily	4

Source: Calabria, 2014.

an illicit substance in the past three months that was not cannabis?”, and “Which illicit substance did you use that was not cannabis?”.

Crime (N).

Respondents were asked if they had ever committed a crime, had ever been a victim of crime, had a high risk of exposure to crime in the home (defined as having lived with someone who had ever been to prison, or having lived with someone who had been released from prison in the past six months), and if they had ever been involved with the juvenile justice system (defined as ever having to appear in court as the person of interest, or ever having been detained in a juvenile facility).

4.3.4 Procedure to optimise the feasibility of applying best-evidence measures

The new best-evidence assessment tool was designed with several practical features to facilitate flexible implementation in a dynamic program environment. First, it was developed to be delivered by staff in electronic format via tablet or laptop. These electronic devices pique participants’ interest in the assessment tool and allow staff to implement it across all three modes of service delivery. Second, it was designed so that it could be delivered in four discrete sections rather than requiring participants to complete the full assessment in one sitting, acknowledging that staff needed to develop rapport with the participant while not overwhelming them with lengthy questions of a sensitive nature. Third, a bespoke database was developed into which assessment responses are automatically downloaded and from which pre-formatted reports can be

generated. This allows staff to easily track participants' progress over time and modify program activities to their changing needs. This process also allows researchers efficient access to de-identified data from consenting participants. Fourth, to ensure the ongoing utility of the assessment tool, electronic automatic reminders were built into the database to remind senior staff when follow-up assessments were due. This replicates computerised clinical decision support systems used in health care services that have improved the performance of health practitioners (Garg et al., 2005). The program manager attended a one-day training session, facilitated by the researchers, on the new data collection procedures and management of the database. The manager then communicated this information to staff through their usual organisational processes.

The intake procedure is initiated at the discretion of service staff, but it must occur within one month of the participant's trial week to ensure risk behaviours are defined before behaviour change commences. Prior to commencing the intake procedure, participants are assured by staff that their responses are confidential⁵. For young people who leave before qualifying as a participant, but return at a later date, the intake procedure is re-initiated.

4.3.5 Statistical methods

All analyses were performed using SPSS version 22. The feasibility of integrating best-evidence measures into the routine data collection system

⁵ The Participant Information Sheet and Assent form (for 17years and younger) and Consent form (for 18 years and older) can be found in the paper versions of the 'Participant Intake Package' at Appendix C.1 & C2

of the program was determined by the proportion of participants who completed the intake assessment and provided research consent. The proportion of missing data for each survey item was also measured. Frequencies and percentages for participants' demographic characteristics and the different types of risk behaviours they report are presented as appropriate, except for participant resilience which is presented as a mean and median score. Median age and the interquartile range for age were also reported. To calculate the number of risks experienced by each participant, a summary variable was created for each of the four domains of risk, based on positive endorsement of one or more of the risk behaviours within that domain. A simple count of the summary risk variables was calculated to represent the number of co-occurring risks experienced by each participant.

4.4 Results

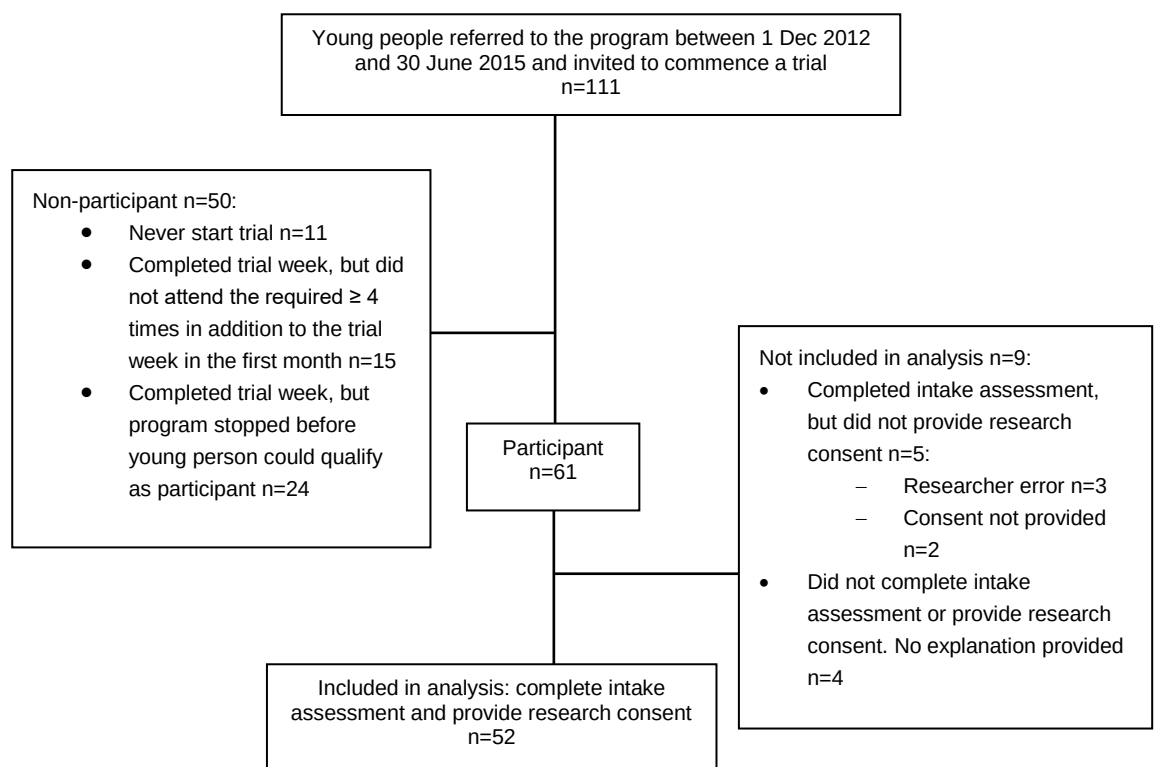
4.4.1 The feasibility of embedding data collection in the routine processes of a TSO-delivered program for high-risk young people

As shown in Figure 4, 111 young people were referred to the program between 1 December 2012 and 30 June 2015 and invited to commence a trial of the program. Of these, 50 (45%) did not go on to qualify as a participant: 11 (10%) did not accept the invitation to trial the program; 15 (14%) completed their trial week but did not attend the required four or more days in the first month; and 24 (22%) completed their trial week but could not attend the required four or more days in the first month because the program was stopped in their community. Of the participants (n=61), nine were excluded from the analysis: three because, although completing the intake assessment, the correct research consent was not obtained due

to researcher error; two because, although completing the intake assessment, they did not provide their research consent; and four, because they did not complete the intake assessment or provide their research consent. The final study sample size was 52 (85%) of the 61 participants.

Of the 19 items relating to risk behaviours in the intake assessment, five items (26%) were completed by all 52 participants, and 16 items (84%) were completed by at least 80% (42 or more) of participants. Three measures of risk were completed by less than 80% of participants: i) “How often have you used an illicit substance in the past three months?”; ii) “Have you ever committed a crime?”; and, iii) “Have you ever been a victim of crime?”.

Figure 4: Flow-chart of referral to a program for high-risk young people



4.4.2 Demographic characteristics and risk behaviours of program participants

Demographic characteristics: As reported in Table 7, 89% of program participants were male, with the majority (91%) aged 15 to 18 years. The median age was 17 years. Indigenous young people were over-represented (49%) given the Indigenous population in the New England region of NSW is 9% (ABS, 2011). A similar proportion of participants received the program in each of the three formats: onsite shed (33%); outreach (25%); and, onsite farm (42%).

Education and employment: Eighty-one percent of participants had been suspended from school three or more times, 23% reported that they did not usually attend school, 76% were unemployed, and 19% reported that they were receiving government financial benefits.

Mental health and wellbeing: Fifty-five percent of respondents responded positively to at least one of the five suicide questions, placing them at-risk of suicidal ideation, and the same proportion reported experiencing moderate psychological distress in the past four weeks, whilst 10% reported serious psychological distress. The mean and median resilience score was 24 out of a possible 40 (a recent study reported an average resilience score of 30 for US youth populations (Hartley, 2012)). Twenty-seven percent of participants reported eating fast-food three or more times in the past week, 24% reported doing no exercise in the past week, and 79% had not visited a health professional for more than one year.

Table 7: Demographic characteristics and risk behaviour of participants

Characteristics	Participants (N=52)		
	N	Total	%
Demographics			
Sex: Male	46	52	89
Age (years):			
15-18	41	45	91
Median(IQR)	17 (2)		
Identify as Indigenous	23	47	49
Communities of residence clustered by the service delivery site:			
Community 1 (on-site program based in shed)	17	52	33
Communities 2 and 3 (outreach program)	13	52	25
Communities 4 and 5 (on-site program based on farm)	22	52	42
Risk domain 1: Education and employment			
Suspended ≥ 3 times	39	48	81
Don't usually attend school	10	43	23
Unemployed	39	51	76
Receive government financial benefit	10	52	19
Risk domain 2: Mental health and wellbeing			
Experienced suicidal ideation in past 4 wks	26	47	55
Experienced moderate psych. distress in past 4 wks	28	51	55
Experienced serious psych. distress in past 4 wks	5	51	10
Resilience: Mean (Median)	24 (24)	48	
Ate fast-food ≥ 3 times in past week	14	52	27
Did not exercise in past week	12	51	24
Last visit to health professional ≥ 1 year	38	48	79
Risk domain 3: Substance use			
Risky drinker	33	51	65
Current smoker	39	52	75
HSI: High tobacco dependence	9	51	18
Have tried illicit substances (including cannabis)	38	50	76
At least weekly illicit substance use in past 3 mths	15	40	38
Risk domain 4: Crime			
Have ever committed a crime	23	37	62
Have ever been a victim of crime	13	34	38
High risk of exposure to crime in the home	20	46	43
Have been involved with the juvenile justice system	17	43	40

Substance use: Approximately two-thirds of respondents (65%) reported risky drinking according to the Indigenous specific AUDIT-C cut-off scores. Seventy-five percent of respondents reported being a current cigarette smoker and 18% were highly tobacco dependent. Three quarters of respondents had tried an illicit substance (67% had only ever tried cannabis), and 38% reported at least weekly use of an illicit substance (including cannabis) in the past three months. Of these, approximately four times as many respondents reported using cannabis (34%) compared to any other illicit substance (9%). Of the respondents who did report using an illicit substance other than cannabis in the past three months, use of speed and prescription medications was reported.

Crime: Sixty-two percent of respondents reported having ever committed a crime, 38% reported ever being the victim of a crime, 43% reported exposure to crime in the home, and 40% reported having been involved with the juvenile justice system.

Co-occurring risk. Ninety-eight percent (n=51) of participants experienced two or more co-occurring domains of risk, the median number of domains of risk experienced by participants was four, and 58% of participants experienced co-occurring risk across all four domains.

4.5 Discussion

4.5.1 The feasibility of embedding data collection in the routine processes of a TSO-delivered program for high-risk young people

This study demonstrates that standardised, methodologically rigorous data on participant risk behaviours can feasibly be collected by embedding a best-evidence assessment tool into the routine data collection processes of a program for high-risk young people: of the 61 program participants in a 19-month period, 52 (85%) completed the intake assessment, and the majority (84%) of survey items were completed by 80% of participants. The majority of program participants were male and aged 15 to 18 years, and Indigenous participants (49%) were clearly over-represented relative to their population (9%) (ABS, 2011). All but one participant experienced at least two co-occurring domains of risk, and the majority of participants (58%) experienced co-occurring risk across all four domains. The most prevalent risks were frequent school absence (whether voluntarily or because they had been suspended), unemployment, a propensity towards suicidality, high levels of psychological distress, weekly illicit substance use, risky drinking, smoking, low levels of physical activity, low utilisation of health services, involvement in crime, exposure to household members with a history of incarceration, and involvement with the juvenile justice system.

4.5.2 The utility of embedding data collection in the routine processes of a TSO-delivered program for high-risk young people

The results from this study have a number of implications surrounding the utility of the data, particularly in relation to service delivery. First, given the benefits of tailoring interventions to the specific risk behaviours of participants, by demonstrating that it is feasible for services to collect rigorous data on risks experienced by their participants, services are

provided with an opportunity to tailor their current activities to improve the precision with which they target the most prevalent risk behaviours experienced by participants. For example, some of the more serious risks identified among participants of this particular program, such as psychological distress and suicidal ideation, suggest that providing access to evidence-based therapies such as cognitive behaviour therapy (CBT) and motivational interviewing (MI), as well as a suicide-specific risk assessment and response tools, such as the Suicide Assessment Kit (SAK) (Ross, Darke, Kelly, & Hetherington, 2012), should be a priority across all program components. Similarly, as substance use, crime, and exposure to incarceration among household members were found to be problematic, the core program component that focuses on diversionary activities could be expanded to offer emergency accommodation that is safe and secure, with ready access to highly qualified staff. This would further reduce participants' exposure to high-risk people and situations, and may reduce their levels of psychological distress.

In addition to poor mental health and wellbeing, participants were found to experience risks associated with poor physical health. A tailored health and wellbeing component, which includes activities emphasising the importance of accessing and preparing nutritious food, engaging in regular exercise, and having access to health professionals could be an important addition to the program. These activities could include cooking demonstrations, shopping tours that provide guidance on how to obtain relatively inexpensive, nutritious food, group exercise classes or dedicated personal training sessions, and on-site health checks delivered in

partnership with local general practitioners and/or Aboriginal Medical Services. Given the finding that 75% of participants were current cigarette smokers, two-thirds were risky drinkers, and 38% used illicit substances on a weekly basis, on-site health checks would also provide opportunities for substance use cessation intervention. The over-representation of Indigenous young people in these data also suggests that all program components should include activities that emphasise the importance of, and facilitate meaningful access to, Indigenous culture, elders and traditional country.

Second, in addition to facilitating tailoring when participants commence a service, these high-quality program-specific data allow staff to monitor participant risk behaviours through re-administration of the assessment tool at regular time intervals, ensuring a mechanism for the program to adapt to the changing needs of participants, whilst also providing an opportunity for staff to provide personalised feedback to participants to motivate them to maintain their change in risk behaviour.

Third, these regularly collected data provide an opportunity for services to measure the effectiveness of their programs whilst adjusting for baseline risk. This could be readily undertaken by research partners based in local, regional universities or in major metropolitan universities. Alternatively, the program could hire the services of a statistician, or employ administrative staff to conduct basic analyses in Microsoft Excel, which would impose minimum expense to the program.

A complementary benefit of having identified a best-evidence assessment tool that can be feasibly integrated into the routine processes of a TSO-delivered program for high-risk young people, is that if adopted by similar programs, it is likely to improve the consistency with which they measure outcomes, increasing opportunities to pool results to draw conclusions about the effectiveness of other TSO-delivered programs for high-risk young people.

4.5.3 Other implications of this study

The finding that nearly one quarter of participants are usually absent from school (23%) highlights the need for community-based programs that can effectively engage with this small number of vulnerable young people, given they are unlikely to access programs offered through schools or other educational institutions. This finding also reinforces the importance of the skills and learning core component of this program in ensuring young people achieve at least a basic level of education.

These results also show that despite participants representing only 0.5% of young people in the region where this study was conducted, they contribute to a high proportion of crime in their communities: 62% report having committed a crime; 43% report being exposed to crime in the home; and 40% report having been involved with the juvenile justice system. This finding suggests there is scope for future studies to examine routinely-collected, unit-level crime data to determine whether programs for high-risk young people have an impact at the community level through reducing the incidence of youth crime and anti-social behaviour.

Finally, this study points to the utility of a strict referral procedure into the service (detailed in the Methods section), which ensures a replicable and largely objective process of referral into the program and minimises inefficient allocation of resources to young people who are unlikely to benefit from participation in the program. For this program, the well-defined referral procedure meant only 61 of the 111 young people referred accessed a substantial part of the program, 85% of whom completed the assessment and engaged for at least four weeks. Future evaluation of this and similar programs could establish retention rates after three, six or 12 months to further gauge the success of the intake procedure in specifically engaging with those young people who are most likely to benefit from these types of community-based programs.

4.5.4 Limitations

Although it is possible that not all risks relevant to high-risk young people have been captured in this assessment tool, it does reflect the combined knowledge of the program staff and researchers. Nevertheless, it may need to be revised to ensure it is relevant to other programs for high-risk young people delivered in different settings. As was done for the intervention itself, the tension between standardising and tailoring measures could be resolved by establishing a toolbox of core measures for particular risk behaviours, which all services working with high-risk young people could utilise for their intake assessments. This standardised intake assessment could then be augmented with tailored measures that are of particular interest to service staff.

As the assessment tool was developed as part of a collaborative effort with program staff, trade-offs were made to reduce reporting burden on participants and to ensure that it was feasible to deliver for staff. This meant that evidence-based assessment items were selected where available, but that it was necessary for items with no evidence-base, or with no evidence-base for young people, were developed where required. Future research could usefully establish the reliability and validity of these new assessment items for this particular sub-population of young people. Additionally, in some cases, modifications were made to existing evidence-based measures to reduce respondent burden. The ASSIST is one such example. Although this appears to have been appropriate for BackTrack, given the small proportion of participants who reported using illicit substances other than cannabis, it may not be appropriate for other programs as it could result in the under-reporting of particular types of illicit substance use. Given the current concern surrounding methamphetamine use in Australia, for example, and evidence to suggest that the number of regular and dependent users in recent years has risen, particularly among young people aged 15 to 34 years (Degenhardt, Larney, et al., 2016), the full version of the ASSIST might be more suitable for future iterations of this assessment tool. Similarly, despite using the modified wording of the AUDIT-C, which has proven acceptable to Indigenous people, further study is required to establish the reliability and validity of these questions for high-risk young people. There is also value in determining whether using open-ended responses for the AUDIT-C questions provides a measure of alcohol risk status that has comparable reliability and validity

to the standard categorical responses in AUDIT-C that are based on the concept of standard drinks, particularly as Indigenous Australians are unlikely to conceptualise their drinking in those terms (Lee, Dawson, & Conigrave, 2013). In practical terms, this is also an important consideration because open-ended questions would eliminate the need to modify the assessment tool when national guidelines are updated (Fawcett et al., 2004).

The measures of risk that were completed by less than 80% of participants, specifically those relating to illicit substance use in the past three months, participation in crime, and being a victim of crime, could have led to an under-, or over-representation of risk in the domains of substance use and/or crime. It also signals that participants might have been uncomfortable responding to these items. In future, instead of using a self-report intake assessment to collect baseline data on these risk behaviours, perhaps objective measures would be more appropriate (e.g. gaining permission to access participants' routinely-collected, de-identified, police incident data). Obtaining this type of data would require safeguarding the identity of participants to ensure analysis was not conducted by someone with intimate knowledge of participants' histories (because this would allow re-identification even without names), such as the research partner or the statistician. This would limit the ability to use these data for tailoring program activities to individual participant needs, but it would still be useful for overall program evaluation and identification of program priorities for future planning.

Finally, given BackTrack staff anecdotally reported that the intake assessment took some time to complete and was usually not their priority when faced with participants exhibiting difficult behaviour, an abbreviated version of the assessment tool could be developed using standard psychometric methods to further improve the feasibility of integrating best-evidence measures into the routine data collection processes of the program. Leveraging the TSO-researcher partnership, a further solution could be to have researchers deliver basic training to program staff in research methods to improve their understanding of the importance and benefits of rigorous and systematic data collection.

4.6 Conclusion

As highlighted in Chapter 2 (Knight, Shakeshaft, et al., 2017), this is the first study to demonstrate that best-evidence measures can feasibly be embedded into the routine data collection processes of a TSO-delivered program for high-risk young people. Replication of this process in other programs would not only improve the quality of the available data that can be used to evaluate the impact of these programs, but it would also create an opportunity to improve the quality of the program activities provided by TSOs, by facilitating the addition of feedback to program participants that is tailored to their specific risk behaviours and their progress through a program.

Chapter 5: The impact of a TSO-delivered program for high-risk young people

5.1 Introduction

Despite international recognition of the need for effective responses for high-risk young people (Patton et al., 2016), a systematic review of the international literature conducted in Chapter 2 (Knight, Shakeshaft, et al., 2017) identified only 13 evaluations of programs that targeted multiple-risk behaviour in high-risk young people, and only six were rated as methodologically moderate or strong. Moreover, of the 13 evaluated programs identified, all but one had been implemented in relatively controlled settings (e.g. a school or a health clinic), all used a different model of intervention (e.g. each targeted a different combination of risk behaviours using a different combination of program components), and all quantified their effectiveness using a wide variety of outcome measures. The six methodologically adequate evaluations showed that programs for high-risk young people can improve self-reported outcomes for participants. To date however, there have been no attempts to measure the impact of these programs at a population-level using routinely collected, administrative datasets.

Compared to self-report data, routinely-collected data are relatively inexpensive, they are less likely to be biased by non-consent (as their use does not necessarily require individual consent, provided anonymity can be protected), and they can be used retrospectively (Treno & Holder, 1997). In addition to these advantages, objective evidence of population-level effectiveness is important for guiding policy makers towards funding programs that can have measurable social and economic benefit for whole communities, and when coupled with participant self-report data, can

provide a more comprehensive estimation of the impact of programs (WHO, 2000). In addition, if both data sources lead to the same conclusions, it increases confidence in these conclusions.

That only one of the six studies classified as methodologically adequate in Chapter 2 were delivered by a Third Sector Organisation (TSO), despite the majority of programs for high-risk young people being delivered by TSOs (Bach-Mortensen & Montgomery, 2018), is consistent with recent research that found relatively few evaluations of TSO-delivered programs, and that those evaluated are typically of poor methodological quality (Breckell et al., 2010; Ellis, 2008; Ógáin et al., 2012). This suggests a need for the development of pragmatic solutions that can support higher quality evaluations of TSO-delivered programs and, in turn, contribute much needed evidence to inform the development of programs focused on improving outcomes among high-risk young people.

Chapters 3 and 4 demonstrated two such practical solutions for improving the capacity and capability of the third sector to conduct methodologically rigorous evaluations. Chapter 3 described the development of a standardised intervention framework for TSO-delivered programs for high-risk young people, that could be used to achieve greater standardisation across their programs, outcomes, and outcome measures. Chapter 4 demonstrated the feasibility of integrating best-evidence outcome measures into the routine data collection processes of a TSO to improve the quality of outcome data available for evaluation. To adequately determine the effectiveness of their programs, however, TSOs also need

to ensure robust evaluation using pragmatic, yet rigorous evaluation designs.

Although it is generally accepted that cluster randomised controlled trials (RCTs) produce quantitative evidence of community-level impact that is least susceptible to bias, researchers have identified challenges in applying cluster RCTs in non-clinical settings (Shakeshaft et al., 2014). These challenges relate to the difficulty of replicating the same program across multiple settings, the need for a large number of settings and participants to achieve sufficient statistical power in analyses, the implementation costs involved in delivering the intervention in multiple settings, the potential for contamination between experimental and control settings, and the ethics of randomisation (whereby a potentially beneficial program may not be able to be accessed by the control participants in a reasonable timeframe).

Given the challenges of using cluster RCTs in non-clinical settings, quasi-experimental designs that are more practical to implement could be preferable, provided they are of adequate methodological rigour. Such designs include stepped-wedge designs, of which there are a number of different variants including the multiple baseline design (MBD) (Hawkins et al., 2007). In a MBD, the implementation of an intervention is staggered over time in different communities. Observation of comparable, statistically significant changes in the same direction, for the same outcome measures after an intervention has commenced in different communities, at different points in time, provides methodologically adequate evidence that the

intervention is effective, and that the observed changes are a consequence of the intervention (Hawkins et al., 2007). Moreover, the method described in Chapter 3 for standardising program definitions, provides a mechanism for different TSOs to align their activities across multiple communities, making the MBD a feasible option for the evaluation of seemingly different programs for high-risk young people. The MBD also overcomes some of the practical challenges of the RCT described above. For example, they can include as few as two communities, which reduces the time and cost of the evaluation, and they are generally more acceptable to participants because each community receives the potentially beneficial program. Despite the benefits of MBDs, no published evaluations of community-based, TSO-delivered services have used this pragmatic design (Knight, Shakeshaft, et al., 2017).

5.2 Aims

This study will report the impact of a TSO-delivered community-based program for high-risk young people using participant self-reported and population-level data. The hypotheses are that the program will achieve a statistically significant: i) reduction in the number of young males involved in crime as a person of interest (POI) at the community-level; ii) reduction in the number of incidents of crime involving young male POIs at the community-level; and iii) short-term improvements in self-reported outcomes related to participants' mental health and substance use.

5.3 Methods

5.3.1 Study design and ethics

The population-level data were analysed using a MBD. Self-report data were analysed using a pre/post evaluation design, with participants from the program in different communities treated as a single group to maximise the power of the statistical analysis. Ethics approval was granted for this study by the Human Research Ethics Committees of the University of New South Wales, University of New England, James Cook University, the University of Queensland, and the NSW Aboriginal Health and Medical Research Council.

5.3.2 Settings

The BackTrack program (the program) was designed and implemented by a Third Sector Organisation (TSO), established in February 2006 in a rural community in the New England region of New South Wales (NSW), Australia. The program was implemented in another two communities in November 2012, and a further two communities in June 2013. All four additional communities are located within the New England region of NSW. The population in each community ranged in size from an estimated 8,573 to 56,089 (ABS, 2011).

5.3.3 Intervention program

In a collaboration between program staff and researchers, the program was carefully examined to determine: i) the extent to which it could be defined in a way that would capture the precise nature of the existing program; ii) its alignment with existing research evidence; and, iii) whether

it could be defined using a standardised intervention framework. This approach is described in detail in Chapter 3. In brief, the program is organised into five core, standardised program components. These core components are operationalised by program staff into flexible, program-specific activities. The five core components are: i) *engagement*, to optimise participation in the program; ii) *case management*, to address participants' immediate and practical needs, such as attending court or finding secure housing; iii) *diversionary activities*, to reduce participants' exposure to high-risk situations, such as night-time encounters with police in public places or volatile situations at home; iv) *personal development, identity and team identity*, to improve participants' social and emotional (or psychological) wellbeing, increase their range of personal coping strategies (especially for use in high-risk situations) and to enhance their sense of connection to their peers and community; and v) *training and skill development*, to increase their opportunities for active participation in education or training likely to lead to employment.

Mode of program delivery and its duration in communities

For the first community (commenced February 2006), the program was delivered in a previously disused shed donated by the local council. For the second and third communities (commenced November 2012), services were provided as an outreach model; young people attended the shed in the first community, and staff from the first community provided activities in the second and third communities. For the fourth and fifth communities (commenced June 2013), young people accessed the program on a working, but largely disused, farm. Due to the discontinuation of a program

grant, the program ceased to be available to communities two and three in December 2013 and communities four and five in July 2014. The program is ongoing in community one.

Procedures for accessing the program

The eligibility criteria and the procedure for referral and acceptance into the program are detailed in Chapter 4 (Knight, Havard, et al., 2017).

Briefly, of the 111 young people referred to the program between 1 December 2012 and 30 June 2015, 46 (41%) attended the program from community one, 13 (12%) attended the program from communities two and three, and 52 (47%) attended the program from communities four and five. Referrals could be made by individuals (self-referral, family members/primary caregivers, or a community member), local schools, or another government or non-government agency (e.g. police, magistrate, NSW Department of Family and Community Services).

Those referred are determined to be either ineligible for the program or are invited to commence a one-week trial. Young people not deemed eligible for the program have this decision explained to them and their referring agent by a senior staff member in a face-to-face meeting, and they are given the option of being referred to a more appropriate service.

Participants who leave the program are welcome to recommence when it suits them, and the program manager ensures there are vacancies in the program for this eventuality. For the purpose of this study, however, young people who exit and re-enter the program sporadically were not defined as a program participant and were excluded from the analysis (this was to

ensure a participant had at least minimal exposure to the program). A program participant, therefore, is a young person who is eligible for the program, successfully completes a one-week trial and attends at least four times in the first month. A study participant is defined as a program participant who provides informed consent or assent to take part in the research, and completes an intake assessment.

5.3.4 Program participants

The majority of study participants (n=52) were male (89%), aged 15 to 18 years (91%) (with a median of 17 years), and engaged in risk behaviours associated with two or more domains of risk (98%). Aboriginal participants (49%) were substantially over-represented, relative to their population in the region (9%) (ABS, 2011). Their risk behaviours on entry to the program are detailed in Chapter 4 (Knight, Havard, et al., 2017), but in brief: only four participants (8%) had not been suspended prior to commencing the program, with the majority (81%) being suspended three or more times; the average resilience score was 24 (out of a possible 40); 55% of participants had experienced suicidal ideation, and the same proportion were experiencing moderate psychological distress; approximately two-thirds of participants (65%) reported risky drinking according to the cut-off scores for the Indigenous specific AUDIT-C, 70% reported binge drinking; 18% reported high tobacco dependence; 38% reported at least weekly use of illicit substances; 62% reported that they had committed a crime; and 40% reported that they were, or have been, involved in the juvenile justice system.

5.3.5 Data sources

Population-level data

Routinely-collected, de-identified unit record data were obtained from the NSW Bureau of Crime Statistics and Research (BOCSAR) for all criminal incidents in NSW between 1999 and 2015 (inclusive) involving males aged 15 to 18 years.

Self-report data

On entry to the program, participant self-report data were collected by program staff. The assessment tools were designed collaboratively between program staff and researchers, and embedded into the program's existing administrative procedures. For ease of administration, the assessment tools were developed in electronic format, so they could be delivered via tablet or laptop across all modes of program delivery. Responses are automatically stored in a secure database for later analysis and reporting. Given the chaotic nature of participants' lives, and the flexible nature of their attendance, automatic electronic reminders were built into the database to remind staff when follow-up assessments were due. The follow-up assessment could be administered within one month of this automatic reminder.

Intake assessment⁶

For each participant, the intake procedure was administered at the discretion of program staff within their first month of participation. Given

⁶ The intake survey can be found in the paper version of the 'Participant Intake Package' Appendix C.1 & C2

that participants often experience low levels of trust and other mental health issues when they are first referred to the program, flexibility of baseline data collection provides participants with an opportunity to get to know and trust program staff, whilst also ensuring risk behaviours are defined before possible behaviour changes commence. Intake assessment items have been described in detail in Chapter 4, but in brief, they comprise the below items and were organised into demographic characteristics and four domains of risk sourced from the classification developed by the author in Chapter 2: i) Education and Employment; ii) Mental Health and Wellbeing; iii) Substance Use; and iv) Crime.

Demographic characteristics.

Gender, date of birth, Aboriginal or Torres Strait Islander status, and community of residence.

Education and Employment.

Items for this domain were sourced from the NSW Schools Students Health Behaviours Survey (Centre for Evidence and Epidemiology, 2013), and measured: i) if the participant had ever been suspended from school and if so, how many times; ii) frequency of school attendance; iii) employment status; iv) and receipt of a government financial benefit.

Mental Health and Wellbeing.

A summary measure of recent suicidal ideation was based on positive endorsement of one or more of five yes/no items from the Psychiatric Symptom Frequency Scale (Lindelow et al., 1997): “have you felt that life

is hardly worth living?"; "have you thought that you would be better off dead?"; "have you thought about taking your own life?"; "have you made plans to take your own life?"; and "have you attempted to take your own life?". The time period from the original scale, which assesses suicidal ideation 'in the past year', was modified to assess suicidal ideation 'in the past four weeks'.

Resilience was measured at baseline using the 10-item version (CD-RISC-10) of the original 25-item Connor-Davidson resilience scale (Campbell-Sills & Stein, 2007; Connor & Davidson, 2003). Items are scored on a scale from 0 (not true at all) to 4 (true nearly all the time) and summed to a total score ranging from 0-40. Higher scores reflect greater resilience.

Psychological distress in the past four weeks was measured using the six-item Kessler Psychological Distress Scale (K6) (Furukawa et al., 2003; Kessler et al., 2010), where each item was rated on a five-point scale from 0 (none of the time) to 4 (all of the time) and summed to a total score from 0-24. A score of ≥ 5 indicates moderate psychological distress and a score of ≥ 13 indicates serious psychological distress.

General health and wellbeing items were sourced from the NSW Schools Students Health Behaviours Survey (Centre for Evidence and Epidemiology, 2013) and measured frequency of fast-food consumption, frequency of physical activity. A new item was created to capture frequency of health service utilisation.

Substance use.

Risky drinking was measured using the AUDIT-C (comprising the first three items of the Alcohol Use Disorders Identification Test [AUDIT] (Babor, 2001)). Responses were scored as 0 to 4 and summed to a total ranging from 0 to 12, with a score of ≥ 5 indicating the presence of risky drinking. Lifetime risk of harm (more than two standard drinks per day) and single-occasion (binge) drinking (more than five standard drinks on a single drinking occasion) were also measured.

Cigarette smoking status was assessed (current, occasional, ex-, or non-smokers) using an item from the NSW Schools Students Health Behaviours Survey (Centre for Evidence and Epidemiology, 2013), and current smokers were asked the two-item Heaviness of Smoking Index (HSI) (Etter et al., 1999). Both items were scored on a scale of 0 to 3, with a possible overall score of 6, and a score of 5 or more indicating high dependence.

Illicit drug use was measured using an abbreviated version of the Alcohol, Smoking and Substance Involvement Screening Test (ASSIST) questionnaire (Ali et al., 2013): “Have you ever used cannabis?”, and if yes, “How often did you use cannabis in the past three months?”, “Have you ever used an illicit substance (that was not cannabis)?”, and if yes, “How often did you use an illicit substance in the past three months that was not cannabis?”, and “which illicit substance did you use that was not cannabis?”.

Crime.

Participants were asked if they had ever committed a crime, had ever been a victim of crime, had a high risk of exposure to crime in the home (defined as having lived with someone who had ever been to prison, or having lived with someone who had been released from prison in the past 6 months), and had ever been involved with the juvenile justice system (defined as having to appear in court as the person of interest, or having been detained in a juvenile facility).

Three-month follow-up assessment⁷

As staff prioritised the identification of early changes on the most serious risks experienced by participants, the follow-up assessment was administered by program staff three months from the date of completion of the intake assessment and comprised a sub-set of items from the intake assessment: number of suspensions in the past three months, suicidal ideation, resilience (measured at follow-up using the 2-item CD-RISC2) (Vaishnavi, Connor, & Davidson, 2007), psychological distress, risky drinking, lifetime risk of alcohol harm and single-occasion (binge) drinking, high tobacco dependence, at least weekly illicit substance use, participation in crime, being a victim of crime, and being exposed to crime in the home in the past three months.

5.3.6 Outcome measures

⁷ A paper version of the three-month follow-up survey can be found in Appendix C.3

Population-level data

Two population-level outcome measures were specified to capture both the number of individuals involved in crime (or Persons of Interest [POI]) per month, and the number of crimes recorded by police, irrespective of the number of POIs involved in each incident, per month. The first of these outcome measures was defined as the number of young males, per month, involved in crime as a POI, where a POI is defined as a suspected offender recorded by police in connection with a criminal incident, where the offender is not necessarily proceeded against. For this measure, males aged 15 to 18 years with a postcode of residence in a community with access to the program, and who were involved as a POI in at least one incident in the month of interest, were counted. POIs who were involved in more than one incident in the month of interest were counted only once, and where an incident involved more than one eligible male, all were counted as POIs. The second outcome was defined as the number of criminal incidents in the month of interest involving at least one male POI aged 15 to 18 years with a postcode of residence in a community with access to the program. As a criminal incident is defined as an activity detected by, or reported to, police that involved the same offender(s) and the same victim(s), occurred at the one location, during one uninterrupted period of time, falls into one offence category (e.g. assault, offensive conduct, theft) and one incident type (e.g. actual, attempted, conspiracy), each criminal event can involve more than one incident. All incidents were included in the count, and where more than one POI was involved, the incident was counted for each POI.

For both population-level outcomes, analysis was restricted to males aged 15 to 18 years because program data indicated that the majority (87%) of participants were male. Furthermore, driving offences were not considered eligible incidents as program staff indicated that the majority of participants did not hold a license on entry to the program.

Self-report data

Self-report outcomes hypothesised by staff as the most serious, and the most likely to change in a short timeframe, were prioritised as outcome measures:

Mental health and wellbeing.

The number of participants who had experienced any suicidal ideation (defined as positive endorsement of any of the five suicidal ideation items from the Psychiatric Symptom Frequency Scale) in the past four weeks, psychological distress scores recorded by participants, the number of participants who experienced severe or moderate levels of psychological distress, and the number of participants who reported an improvement in their average resilience score from intake to follow-up.

Substance use.

The number of participants who report overall levels of risky drinking (defined as an AUDIT-C score of 5 or more), the number of participants who reported lifetime risk of alcohol harm (more than two standard drinks per day) and single-occasion (binge) drinking risk for alcohol harm, and

the number of participants who report at least monthly use of cannabis use.

5.3.7 Statistical methods

All analyses were conducted using SPSS version 23 and the level of statistical significance was set at $p \leq 0.05$.

Population-level data

For this analysis, the five communities were grouped into three program sites (based on the date when they first had access to the program) to maximise statistical power for analysis: the original community that commenced in February 2006 (site one, approximate population of 24,700); the two communities that commenced in 2012 (site two, approximate combined population of 15,300); and the two communities that commenced in 2013 (site three, approximate combined population of 68,000). For each site, data were aggregated into months, to optimise the number of data points, and plotted over time.

Changes in both the level and trend of each time series were estimated using three segmented linear regression models (one for each site), with both level and trend indicator terms representing the status of the intervention. The level indicator variable was defined as zero for each month prior to the introduction of the intervention, one for each subsequent month the intervention was active, and two for the period of time after the intervention ended. In site one, the program began in February 2006 and is still active at the time of writing. In sites two and

three the program was active from November 2012 to December 2013 and from June 2013 to July 2014 respectively. Given that previous research (Shakeshaft et al., 2014) has found that more criminal incidents occur in summer months amongst at-risk populations, seasonality was added as a variable to account for this seasonal variation in crime.

For each model, assumptions were tested to assess the appropriateness of linear regression for the data. The assumption of normality was assessed using histograms and probability plots. Homogeneity of variance was assessed by plotting the standard and predicted residuals using a dot-plot. Linearity was assessed by plotting the observed values and inspecting the trends. The assumption of independence, and the extent to which the data were autocorrelated, was assessed using the Durbin-Watson Statistic.

Self-report data

To gauge the extent of bias due to loss to follow-up, the demographic characteristics of participants who completed the intake assessment and were followed-up at three months, were compared with the characteristics of participants who completed the intake assessment, but were lost to follow-up at three months. To enhance statistical power, pre/post analyses were based on all participants, without grouping them by site. Change over time was assessed with repeated measures t-tests for continuous variables, and McNemar's test statistic for categorical variables.

5.4 Results

5.4.1 Population-level data

Descriptive statistics for the population-level crime data

As summarised in Table 8, between 1 January 1999 and 31 December 2015, a total of 3153 male POIs aged 15 to 18 years were recorded by police as being involved in a criminal incident in site one, 1558 in site two and 6866 in site three. The monthly mean of male POIs aged 15 to 18 years involved in a criminal incident ranged from 7.64 in site two to 33.66 in site three. There were 4142 criminal incidents involving male POIs aged 15 to 18 years recorded by police between 1 January 1999 and 31 December 2015 in site one, 2178 in site two, and 9619 in site three. The monthly mean of criminal incidents involving male POIs aged 15 to 18 years ranged from 10.73 in site two to 47.15 in site three.

Table 8: Number of POIs and incidents of crimes in each site, for males aged 15 to 18 years, 1999-2015

Site	Total population	POIs				Incidents			
		Total	Mean	Min	Max	Total	Mean	Min	Max
1	24,797	3153	15.46	5	33	4142	20.30	4	50
2	15,310	1558	7.64	1	20	2178	10.73	1	37
3	68,292	6866	33.66	14	69	9619	47.15	18	124

For all linear regression models, the residuals were uncorrelated and normally distributed, and all other assumptions were met, which indicates that linear regression was an appropriate model for the data. Durbin-Watson statistics ranged from 1.162 to 1.939 for the different models,

which indicates that the extent of autocorrelation in the time series data for this study was acceptable for their use in estimating linear regression models⁸.

The relationship between the program and number of male POIs involved in crime

Figure 5 shows the time series representing the number of male POIs aged 15 to 18 years involved in crime per month, between January 1999 and December 2015, separately for each of the three sites.

Table 9 shows that there was a statistically significant upward trend in the monthly numbers of male POIs aged 15 to 18 years involved in a criminal incident in all sites in the period prior to the commencement of the program: site one ($\beta = 0.122$, $p = <.001$), site two ($\beta = 0.015$, $p = 0.017$), and site three ($\beta = 0.129$, $p \leq 0.001$). In the period following the commencement of the program, there was a statistically significant downward change in the trend in sites one ($\beta = -0.194$, $p <.001$) and three ($\beta = -1.395$, $p = 0.012$). In the period after the intervention ended, there was a statistically significant upward change in trend in the number of male POIs aged 15 to 18 years in site three only ($\beta = 3.473$, $p = 0.01$). There were no significant changes in the level of the time series when the program commenced in any of the sites (the level represents the immediate effect of the introduction of the intervention).

⁸ Refer to Appendix D for the results of the assumptions testing.

Figure 5: Program impact on the number of male POIs aged 15 to 18 years participating in crime pre/post intervention

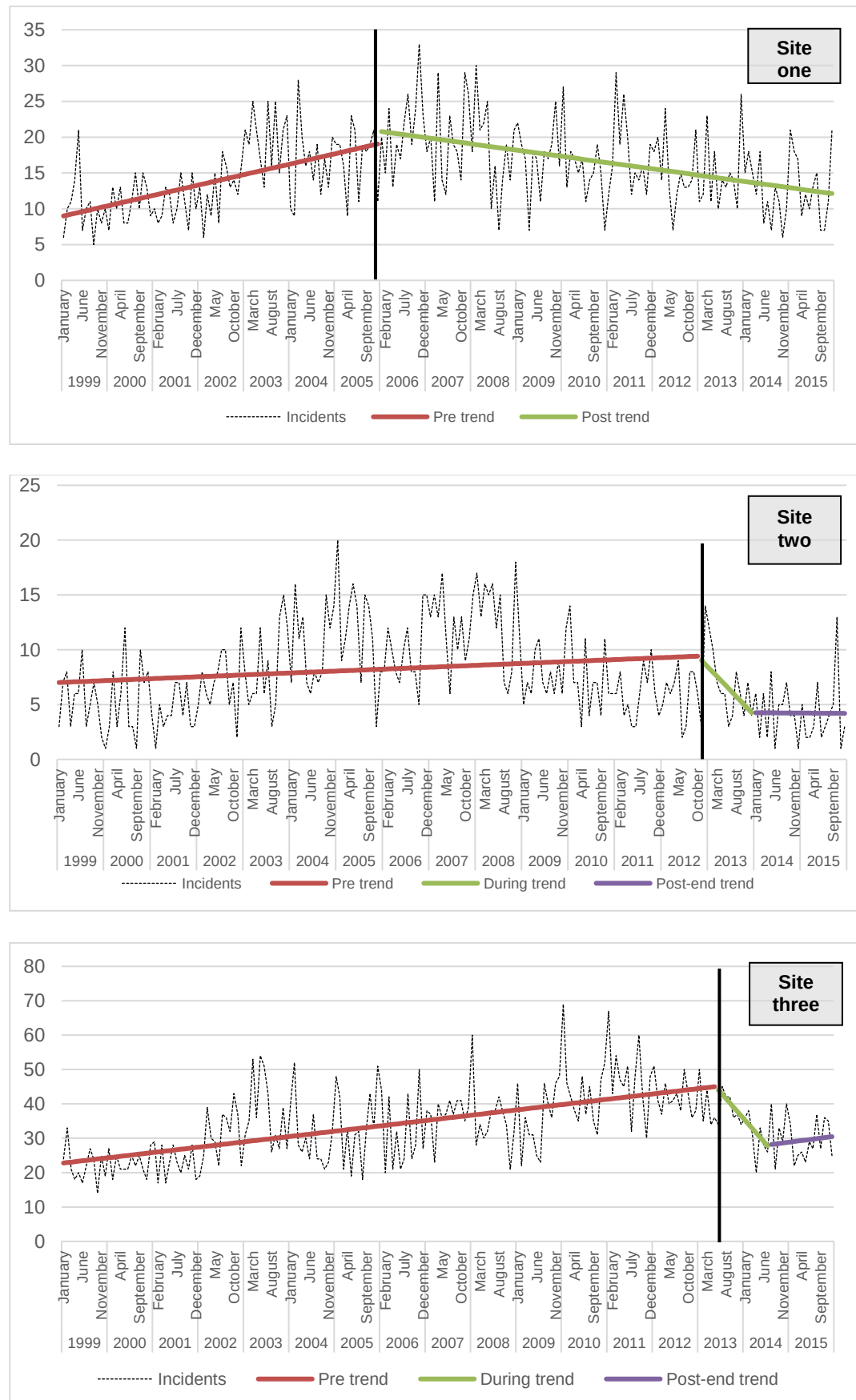


Table 9: Program impact on the number of male POIs aged 15 to 18 years participating in crime per month and the number of incidents of crime per month involving male POIs aged 15 to 18 years, pre/post intervention

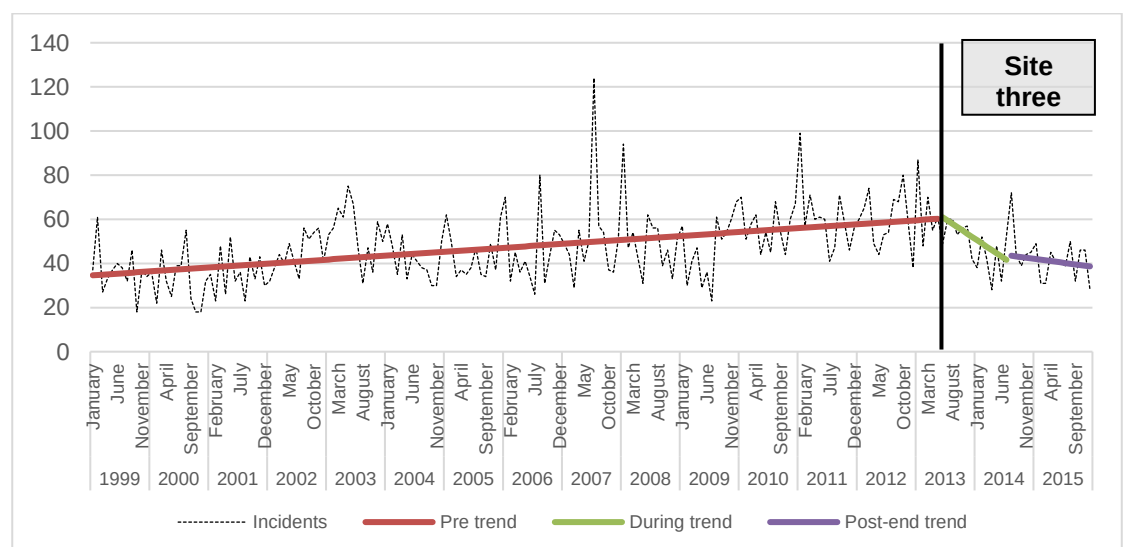
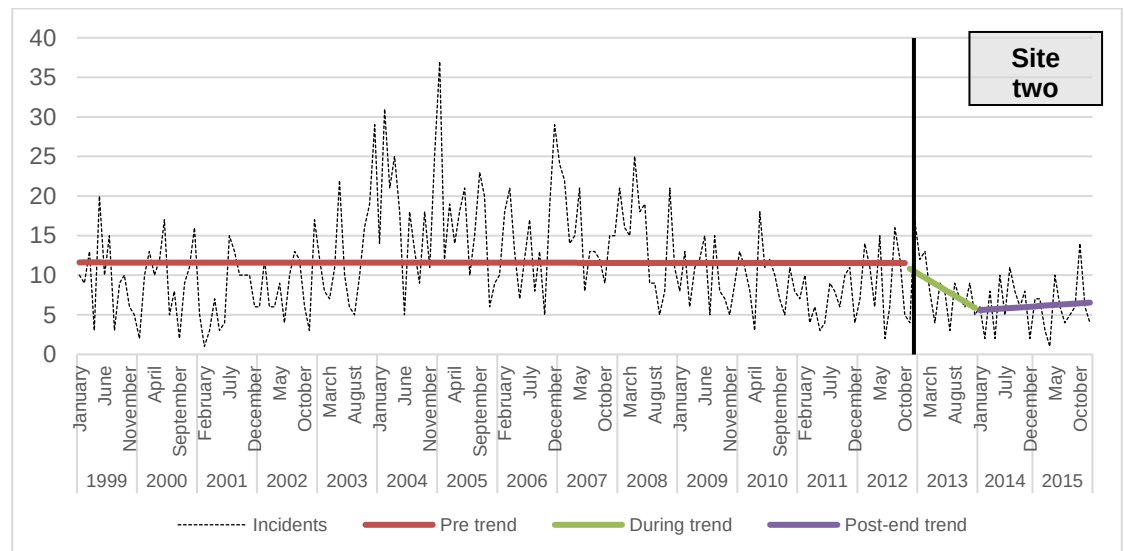
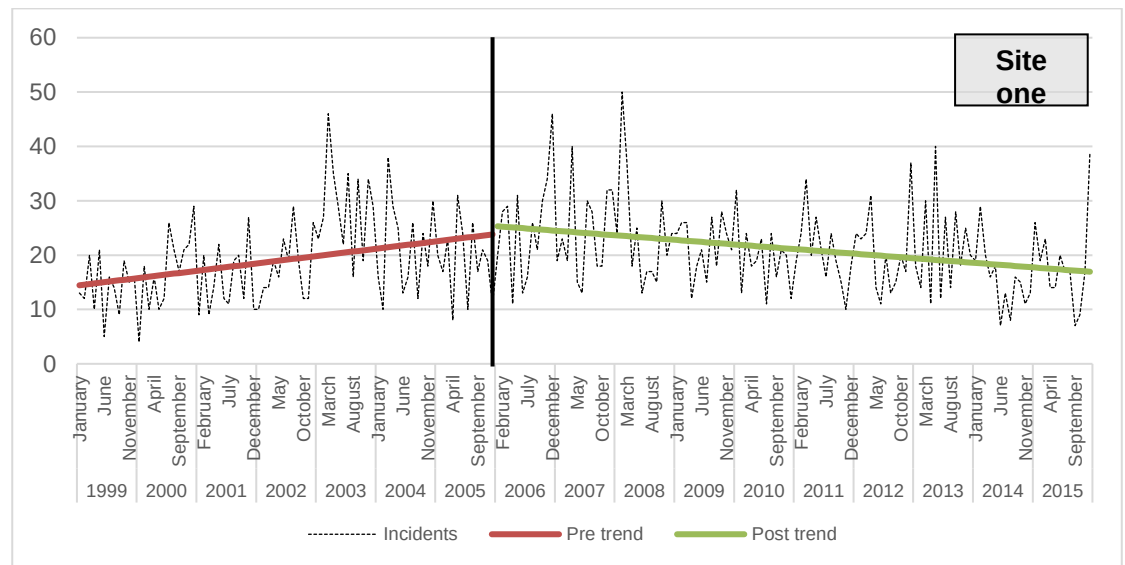
Outcome	Site	Trend pre-intervention ^a		Level ^b		Trend post-intervention ^c		Trend post-intervention-end ^d	
		Coefficient	p value	Coefficient	p value	Coefficient	p value	Coefficient	p value
POIs (excl. driving offences)	1	0.122	<.001	1.772	0.194	-0.194	<.001	n/a	n/a
	2	0.015	0.017	-0.192	0.922	-0.362	0.156	0.35	0.189
	3	0.129	<.001	0.447	0.918	-1.395	0.012	3.473	0.01
Incidents (excl. driving offences)	1	0.114	0.001	1.49	0.495	-0.184	<.001	n/a	n/a
	2	0	0.983	-0.992	0.745	-0.315	0.422	0.393	0.342
	3	0.149	<.001	2.395	0.73	-1.655	0.061	1.199	0.229

^a The trend pre-intervention indicator variable represents the period of time before the intervention commenced; ^b The level indicator variable represents the immediate effect of the introduction of the intervention; ^c The first trend indicator variable, trend post-intervention, represents the post-intervention period; ^d The second trend indicator variable, trend post-intervention-end, represents the period of time after the intervention ended for Sites two and three

The relationship between the program and number of incidents of crime

Figure 6 shows the number of incidents of crime involving male POIs aged 15 to 18 years per month, between January 1999 and December 2015, for each of the three sites. Table 9 shows that, prior to the commencement of the program, there was a statistically significant upward trend in sites one ($\beta = 0.114$, $p = 0.001$), and three ($\beta = 0.149$, $p = <.001$) in the monthly number of incidents of crime involving male POIs aged 15 to 18 years. In the post-intervention period, there was a statistically significant downward change in trend in site one ($\beta = -0.184$, $p <.001$).

Figure 6: Program impact on the number of incidents of crime involving male POIs aged 15 to 18 years pre/post intervention



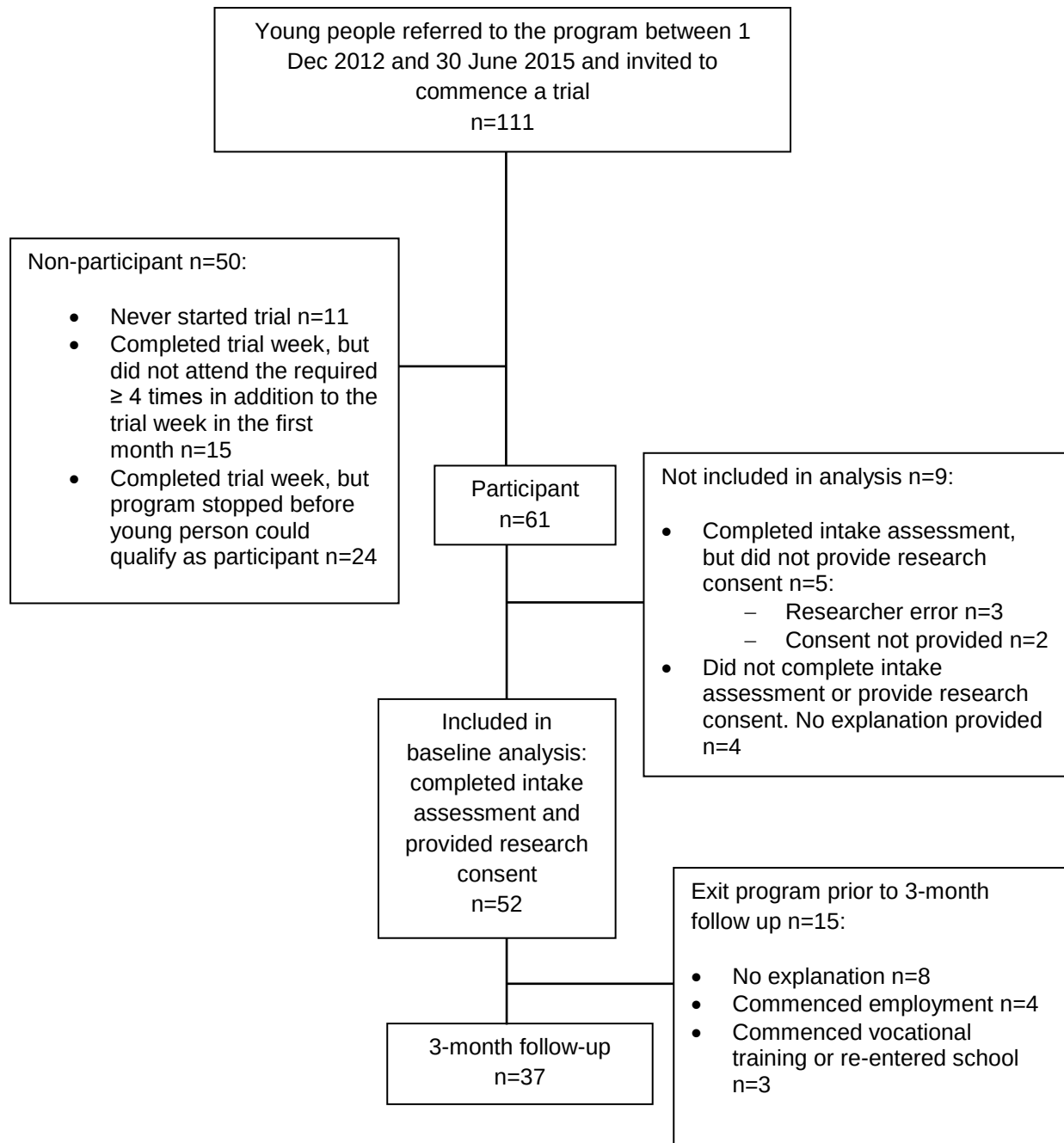
There were no significant changes in the level of the time series when the program commenced (the level represents the immediate effect of the introduction of the intervention) in any of the sites, nor in the post-intervention-end trend.

5.4.2 Self-report data

Descriptive statistics for the self-report data

As shown in Figure 7, of the 111 young people referred to the program, 50 did not become program participants because they did not attend their one-week trial (n=11), or did not meet the required criterion to become a participant (attend at least four times in the first month) (n=15), or the program ceased to operate in their community before they could complete their trial period (n=24). Of the 61 program participants, 52 became study participants and completed an intake assessment, and of the study participants, 37 (71%) were followed-up at three months. These participants, compared to those who completed the intake assessment and were lost to follow-up at three months (n=15), were more likely to be male (84% v 100%) and Aboriginal (53% v 40%).

Figure 7: Flow-chart of participation into, and through, a TSO-delivered program for high-risk young people



The relationship between the program and self-reported outcomes

The results of the pre/post analysis of self-reported outcomes from intake to three-month follow-up, are summarised in Table 10.

Table 10: Short-term program impact on participant self-reported outcomes (N=37)

Outcome	Intake		Follow-up		Change		
	n (%)	Mean (SD)	n (%)	Mean (SD)	Δ n	Δ Mean	P value
Mental health and wellbeing							
Experienced suicidal ideation in past 4 wks (n=34)*	18 (51)		10 (29)		-8		0.008
Psychological distress score (n=34)		7.63 (4.9)		7.09 (4.3)		-0.54	0.557
Severe psychological distress(n=37)	4 (11)		4 (11)		0		-
Moderate psychological distress (n=37)	19 (51)		20 (54)		1		-
Resilience (n=34)		4.7 (1.9)		5.2 (1.6)		0.47	0.228
Substance use							
AUDIT-C score (n=37)		5.35 (2.6)		4.84 (2.6)		-0.51	0.081
Lifetime alcohol risk (n=37)	24 (65)		19 (51)		-5		0.180
Single (binge) occasion alcohol risk (n=28)	21 (75)		18 (64)		-3		0.250
At least monthly use of cannabis (n=37)	11 (30)		5 (13)		-6		0.070

**the 'n' values indicate the number of participants who responded to each item.*

Mental health and wellbeing. The proportion of participants who reported suicidal ideation was statistically significantly reduced ($p=0.008$) from 51% to 29%. There was also a reduction in the average psychological distress score recorded by participants, although this was not a statistically significant result. When psychological distress scores were categorised as

severe (≥ 13) or moderate (≥ 5), there were no changes from intake to three-month follow-up in the proportion of participants meeting these cut-offs. Resilience improved, although this did not reach statistical significance, but the mean score remained below that of a normative sample of young people (6.91).

Substance use. All outcomes associated with the risk domain of substance use improved, however none reached statistical significance. Notably, at least monthly use of cannabis was reduced from 30% to 13% and this result came close to reaching statistical significance ($p = .070$).

5.5 Discussion

This study found that the program was associated with a statistically significant reduction in the trend representing the number of male POIs aged 15 to 18 years involved in crime and the number of criminal incidents involving males aged 15 to 18 years, in two of the three intervention sites (sites one and three). Although a statistically significant result was not observed for site two, the observed change was in the hypothesised direction. The findings relating to the self-report data show that the program was associated with a statistically significant reduction in participant suicidal ideation, and a near statistically significant reduction in monthly use of cannabis use.

5.5.1 Implications of the findings

Results from the analysis of the routinely-collected crime data show sufficient evidence to conclude that the program had a demonstrable

effect on the number of male POIs aged 15 to 18 years involved in crime, and the number of criminal incidents involving males aged 15 to 18 years, in two of the three sites, with the third site showing promising results in the hypothesized direction. The lack of comparable statistically significant effect in site two suggests that either: i) the effects in sites one and two were not attributable to the program; ii) that in site two the program had insufficient time to achieve an observable trend (given it is recommended there are at least 12 data points pre/post intervention for time-series studies (Wagner, Soumerai, Zhang, & Ross-Degnan, 2002), sites two [which had 12 data points] and three [which had 13 data points] were at the very lower limit of this recommendation); or iii) that in site two there was insufficient data to establish a reliable trend. The latter explanation seems the most plausible, given that site two includes the communities with the smallest populations of young people. These results also imply that an outreach model of program delivery, where participants have limited access to experienced staff and program activities, is not as effective as having the program delivered in the community where participants spend most of their time, and attend the program onsite.

The conclusion that the program was associated with a reduction in crime is further supported by the observation that there was a significant change in the trend (i.e. a reduction in the increase in trend) in sites two and three in the post-intervention relative to the pre-intervention period, and when the program ceased operations in these sites (in the post-intervention-end period) there was a further change in the trend in the opposite direction to the program effect (which reached statistical significance in site three for

number of POIs involved in crime). The consistent trends across two sites, at different points in time, instils confidence that the observed changes are due to the program, not other factors such as changes in legislation, problematic families moving in or out of town, crime 'blitzes' by police, or serious offenders being incarcerated. It is also unlikely that findings are the result of a broader downward trend in crime across NSW as the MBD accounts for any underlying trends and findings show that in each site crime was trending upwards in the pre-intervention period.

Results from the self-report data show there was a statistically significant reduction in participant suicidal ideation in a three-month period, which suggests the program may have contributed to reducing one of the most serious risk behaviours that young people can experience. Failure to replicate the statistically significant reductions in substance use found in a study (Rohde et al., 2012) of a similar program identified in the systematic review in Chapter 2, could be because outcomes in this study were measured over a shorter time-frame (three months) compared to the 12 and 24 month time-frames in the other study. This might reflect that risk behaviours associated with substance use need a longer period of intervention before change can be detected. Or, given the raw data demonstrated a trend in the right direction across all substance use outcomes, there may have been insufficient data to determine whether these changes were statistically significant.

5.5.2 Limitations and methodological considerations

Although this study applied a rigorous evaluation design, it was subject to other methodological limitations. First, because this evaluation was not researcher-led, but rather a collaborative partnership between the research team and program staff, pragmatic considerations meant it was not possible for the research team to unilaterally decide on which communities randomly commenced the program. By the time the program staff approached the research team about the evaluation, for example, the first community had already been in receipt of the program for several years. Similarly, program commencement dates for subsequent communities involved in the evaluation were dictated by community willingness to participate and resourcing constraints, which may have influenced outcomes. For example, in sites two and three, unplanned restrictions to program funding led to the early termination of the program in those sites, which may have introduced bias. The observed similarity in outcome trends across all sites, however, suggests that the extent of any bias was not substantial.

Second, analysis of Australian Bureau of Statistics Census data (ABS, 2011a, 2017) over the study period indicates a small decrease in the proportion of young males living in the participating intervention communities over time, which could be the reason for any observed effects. This is unlikely, however, given the post-intervention trend period in sites two and three was only 12 and 13 months respectively, and impacts from population change generally do not occur over such short time periods.

Third, for the self-report outcomes, the pre/post design limits the conclusions that can be drawn from the results, as there is no way of knowing if these results can be attributed to the program, or other extraneous variables. In addition, the small number of study participants who completed the intake assessment (N=52) may have impacted on the ability to detect statistically significant changes in participant outcomes due to lack of statistical power in analyses. This statistical power issue, which is a consequence of the evaluation being associated with a single TSO-delivered program could be resolved if the standardised but flexible program framework (Chapter 3), and the embedded data collection processes (Chapter 4), were to be adopted by similar programs nationally and internationally.

Finally, the moderate retention rate at three-month follow-up for this evaluation (71%), does not necessarily reflect a poor outcome. Anecdotal reports from program staff revealed that, of the 15 participants who did not complete a three-month follow-up survey, seven achieved a good outcome: four were no longer attending because they had entered employment, whilst three entered vocational training or returned to school. Ideally, participants no longer actively engaged in the program would have been followed up as well, but the program staff had limited capacity to do so. In a traditional evaluation, an external team of evaluators would collect participant data, but this study trialled an innovative, program-led model of evaluation. Although largely successful, future iterations could be improved by formally up-skilling existing staff in evidence-based data collection methods, or even establishing a dedicated evaluation position

within a TSO, or one position that could be shared across multiple TSOs. Individuals recruited to these positions would ensure that: i) data collection was implemented smoothly; ii) program insights and findings from evaluation and monitoring were translated into practice in a timely manner; and importantly iii) that the workload of program staff was not substantially increased. Another option would be to develop the capacity to monitor participants' outcomes over time using routinely collected administrative datasets, such as criminal justice, health and welfare datasets. Clearly these would need to be tested for feasibility and cost, and would only be available in an anonymous format with participants' signed consent.

5.6 Conclusion

Given that the systematic review of the international peer-review literature in Chapter 2 (Knight, Shakeshaft, et al., 2017) found very few methodologically adequate evaluation studies of TSO-delivered programs available for high-risk young people, and none that used routinely-collected administrative data to assess the impact of programs on population-level outcomes, this study provides new evidence for how this can be achieved using a pragmatic evaluation design (a MBD). Overall, the findings suggest that the BackTrack program had a positive and significant impact on outcomes at both the population (e.g. crime) and participant level (e.g. suicidal ideation). To improve the strength of these conclusions, it is clearly worth replicating this evaluation approach across similar programs that focus on improving outcomes among high-risk young people, using the methods developed in earlier chapters of this thesis.

Chapter 6: Discussion, implications and future directions

The lack of capacity and capability amongst TSOs to conduct rigorous evaluation, has arguably led to a lack of quality evidence for programs focused on improving outcomes among high-risk young people. Driven by the growing demand for TSOs to increase the quantity and methodological quality of evaluations of their activities so they can better improve outcomes for participants and demonstrate their effectiveness to relevant funding bodies, the overall aim of this thesis has been to demonstrate innovative methods that TSOs can adopt to improve their internal capacity and capability to conduct quality evaluation. Although the focus of this thesis was on TSO-delivered programs that focus on improving outcomes among high-risk young people, these processes will likely have application for a broad spectrum of TSOs working with vulnerable populations.

The research presented in this thesis found that, despite the harms experienced by high-risk young people highlighted in Chapter 1, there is very little known about how to effectively intervene to improve their outcomes, and that the quality of the available research is mixed (Chapter 2). Specifically, Chapter 2 found that of the 268 data-based studies (as opposed to opinion pieces or study protocols) published in the international literature between 2009 and 2014, only 13 were evaluations of programs for high-risk young people who engaged in multiple-risk behaviour (as opposed to interventions for single-risk behaviours, such as substance abuse only or suicide prevention only), half of these (n=7) were rated as methodologically weak against standard criteria, and no economic analyses had been undertaken. In addition, of the 13 identified intervention programs, only one had been delivered by a TSO in a

community-based setting, with the remainder delivered in controlled settings such as schools or health clinics, all used a different model of intervention (e.g. each targeted a different combination of risk behaviours using a different combination of program components), and all quantified the effectiveness of the program using a wide variety of outcome measures.

Despite this variation, the programs described in the six methodologically adequate studies identified in Chapter 2 did share thematic commonalities: i) they provided access to training and/or skill development to increase their chances of accessing meaningful employment; ii) they used behaviour change techniques to assist the young people to better understand their thoughts and behaviours; and iii) they used case management techniques to help young people navigate the pressures of their day-to-day lives. Nonetheless, the wide variation in intervention activity and outcomes limited the ability to draw direct comparisons about the effectiveness of different interventions, signalling the need for greater consistency in how TSOs define their programs, and the outcome measures they use to define their success.

The findings from the review reported in Chapter 2 led to the development of an intervention framework that could achieve greater standardisation in the way TSO-delivered programs can be defined and evaluated (Chapter 3), presenting a relatively simple method for increasing the ability to compare program impact in evaluation, and allowing the subsequent pooling of results in meta-analyses. A novel process for embedding best-

evidence outcome measures into the routine data collection processes of TSO-delivered programs was also designed and implemented and could, if taken up by other TSOs, enable staff to continuously tailor their service delivery model to participants' changing needs, whilst facilitating access to high-quality data for evaluation (Chapter 4). Chapter 5 then demonstrated how TSOs can use a pragmatic, yet rigorous, evaluation design (the MBD) to evaluate the effectiveness of their programs in partnership with researchers.

This final chapter provides a summary of the key findings and contributions from this thesis. Prior to considering the implications of the findings and directions for future research, the main limitations of this research are discussed.

6.1 Summary of key findings and contributions

6.1.1 The existing evidence base for TSO-delivered programs is not sufficient to improve outcomes for high-risk young people

This thesis found a lack of intervention research conducted for populations of high-risk young people, and more specifically, for TSO-delivered programs for high-risk young people that are delivered in community settings (Knight, Shakeshaft, et al., 2017). This means there is very little robust evidence that can be used to inform program development to ensure better outcomes for this population of vulnerable young people, and guide the efficient allocation of resources by funding bodies. In response, this thesis has offered innovative solutions that TSOs can readily adopt, and that have potential to increase their internal capacity and capability to conduct quality evaluation of their programs. The

alternative is likely to be a continuation of the publication of a small number of under-powered evaluations of programs, of varying methodological quality.

6.1.2 Contribution of a tool for increasing the evidence for TSO-delivered programs focused on improving outcomes among high-risk young people

Given that this thesis identified that one reason for the small number of high-quality evaluations of TSO-delivered programs for high-risk young was due to the extent of heterogeneity of the type of programs available (Chapter 2), increasing the frequency with which programs internationally can be defined in a standardised way would increase the evidence base by improving the ability to standardise seemingly different programs. This ability to standardise programs is important because services do not systematically adopt existing evidence-based program components and, individually, they typically engage with a relatively small number of high-risk young people. As shown in Chapter 4, for example, BackTrack only engaged 61 participants between December 2012 and June 2015, across five communities (Knight, Havard, et al., 2017). The reality of engaging only a small number of participants is that it limits the ability to use rigorous evaluation designs, such as RCTs or MBDs, in any determination of program effectiveness. It also reduces the statistical power of outcome analyses that could be achieved in the evaluation of any one program. The lack of program standardisation also limits the ability to pool results across evaluation studies in meta-analysis. These methodological limitations mean that

TSOs will continue to struggle to determine which of their activities are effective, and then demonstrate this to funding bodies.

This thesis has provided a pragmatic solution for overcoming these methodological limitations by describing an intervention framework that can be standardised across services, using five common core program components, operationalised by service-specific activities. Built on the principles of complex interventions (Campbell et al., 2007; Craig et al., 2008; Hawe et al., 2004), this framework does not require that programs adhere to a prescribed set of intervention activities, but provides a common model, within which different services can develop and implement their preferred program activities. This provides more confidence that any outcomes achieved are a consequence of the program, which is a powerful tool for TSOs seeking to improve their capacity to demonstrate their effectiveness and subsequent value to funding bodies.

6.1.3 It is feasible to embed best-evidence measures in routine data collection processes to support sustained evaluation

This thesis has demonstrated that data on participant risk behaviours can feasibly be collected by embedding a best-evidence assessment tool into the routine data collection processes of a TSO-delivered program for high-risk young people (Knight, Havard, et al., 2017). The routine collection of these outcome data provides programs with access to timely information that enables them to tailor their activities to better target the most prevalent risks experienced by their participants. In addition to facilitating tailoring when participants commence a program, these data allow

program staff to monitor participant risk behaviours, through re-administration of the assessment tool at regular time intervals, ensuring a mechanism for the service to adapt to the changing needs of participants, whilst also providing an opportunity for staff to provide personalised feedback to participants to motivate them to maintain their change in risk behaviour. Importantly, these regularly collected data also provide an invaluable resource for services to measure the effectiveness of their programs in evaluations.

A complementary benefit of having identified a best-evidence assessment tool that can be feasibly integrated into the routine processes of a service for high-risk young people is that, if adopted by other TSOs, it is likely to improve the consistency with which similar programs measure outcomes. This would increase opportunities to pool results to draw conclusions about the effectiveness of programs for high-risk young people.

6.1.4 Taking a multi-component approach to intervening in relation to multiple risk behaviour in high-risk young people improves outcomes

This thesis has demonstrated that taking a multi-component approach to intervention of multiple-risk behaviour can effectively improve outcomes associated with participation in crime and mental health amongst high-risk young people. Given that high-risk young people typically engage in multiple risk behaviours that have a complex aetiology (Jackson et al., 2012; Knight, Havard, et al., 2017), this is an important finding, particularly as the systematic literature review conducted in Chapter 2 found that by

far the majority of intervention studies (88%) were outcome evaluations of interventions targeting single-risk behaviours in young people.

6.2 Limitations

As each chapter has outlined in detail the limitations associated with its study methodology, rather than repeating that discussion here, only the broad limitations that have implications for the main conclusions of the thesis will be considered.

Although the findings are promising, their generalisability is compromised because they are the result of trialling these methods on only one TSO-delivered program for high-risk young people. To strengthen the findings, application of these methods, including use of the MBD design in evaluation, should be trialled on multiple programs across multiple communities. This would not only strengthen generalisability because the methods would be informed by the expertise of TSOs beyond one program, but also provide a benchmark against which future TSO-delivered programs for high-risk young people, both in Australia and internationally, could be assessed.

A further, but not unrelated, limitation of this thesis is the relatively small study sample size (N=52) across the five communities, and the less than optimal follow-up rate of 71% (Chapter 5). Taken together, these limitations may have impacted on the ability to detect statistically significant changes in self-reported participant outcomes due to lack of statistical power in analyses. Again, strengthening these findings will

depend on the scaling up of the implementation of the standardised intervention framework across different programs available for high-risk young people in multiple communities.

The issue related to the lack of follow-up data is perhaps harder to remedy given that improvements may impose an additional data collection burden on both program staff and participants. In an attempt to minimise this burden, this research ensured that, as far as possible, the outcome measures were brief (e.g. using the shorter form of AUDIT) and aligned with the routine administrative requirements of the program. Indeed, anecdotally, program staff reported that they valued the additional information the outcome measures provided (e.g. a specific indicator of each participants level of risk regarding their alcohol use, smoking status and other drug use) because it contributed to their understanding of 'where participants were at' so they could tailor service delivery accordingly. It was less clear whether staff understood the importance of routinely administering the same set of questions for evaluation purposes. One potential solution for improving the quality of follow-up data collected by program staff could be to leverage the TSO-researcher partnership, and have the researchers deliver regular training to program staff in research methods to improve their understanding of the importance and benefits of rigorous and systematic data collection. Where funding allows, programs could also employ dedicated staff to support data collection and other evaluation activities.

Finally, throughout the process of working with BackTrack to develop these methods, it became clear that there is only so much TSOs can do internally to improve the quality of their evaluations, and that sustained improvement is likely to depend on a number of systemic changes that are largely out of the control of the third sector. Systemic change will be particularly important for enabling the methods proposed in this thesis to be sustainably adopted by a range of TSO-delivered programs for high-risk young people, across different locations in Australia and internationally. Specific improvements that could facilitate this change are: 1) agreement on a standard definition for high-risk young people; 2) investment in an Information and Communications Technology (ICT) system to enable consistent, quality data collection; 3) establishment of a strong, central body that can lead the coordination and collaboration of intervention and evaluation activities across the sector; and 4); dedicated resources to support evaluation.

6.3 Implications and future directions

As discussed in the previous section, a key limitation of this research is that the methods proposed within this thesis have only been trialled on one program. Consequently, following on from this doctoral research, a study will be conducted, funded by the Australian Research Council (ARC), to trial the generalisability of the methods in multiple programs in different communities across Australia. This will allow all included programs to be included in an evaluation, and will result in a more reliable estimate of the effectiveness of these programs on nominated outcomes. If it is successful, it will demonstrate the feasibility and benefits of greater

standardisation across programs and outcome measures for high-risk young people. A cost-benefit analysis undertaken alongside this Doctoral research will also be completed and published, which will provide the first published evidence of the economic efficiency with which the outcomes from the best-practice program were achieved (that is, the extent to which these programs provide good value for money).

To facilitate the routine adoption of the methods described in this thesis by TSO-delivered programs for high-risk young people, and to increase the chances of sustainable change, several systemic improvements have been proposed below.

6.3.1 Agreement on a standard definition for high-risk young people

There is no consistent definition for a high-risk young person available in the literature. As a result, studies tend to examine different combinations of risk behaviours (or focus solely on one risk behaviour) amongst different age cohorts, and use inconsistent language to describe these behaviours. Given the wide variation in terms used to describe this population, and the definitional ambiguity, there is an urgent need for future research to develop a specific taxonomy for the classification of high-risk young people. This taxonomy could, for example, classify high-risk young people into categories of risk or vulnerability using variables such as age, location, and number and/or severity of risk behaviours.

Development of a consistent definition for high-risk young people would further enable programs to identify and refine their programs to ensure they are targeting the most relevant risk behaviours. It would also contribute much needed consistency in data collection on risk behaviours which would, in turn, build a clearer picture for policy experts and researchers regarding the scope of harm experienced by high-risk young people.

6.3.2 Investment in ICT systems to enable consistent, quality data collection

This thesis has proposed an innovative method for improving the quality of data collected on risk behaviours amongst high-risk young people (Chapter 4). To ensure that these data are consistently collected in a timely and coordinated manner across a number of programs, there is a need for investment in the development of a single national youth-specific data collection system. Investment in such a data collection system would reduce the burden on programs to fund the development of bespoke systems for their own use, which is not only costly but could potentially exacerbate the problem by allowing development of a multitude of different systems that collect different outcome data. Having a single national data collection system would support programs to develop coordinated, targeted, and timely responses to participant risk behaviours, and also contribute valuable data so researchers and policymakers can improve the accuracy with which they can identify the burden of harm experienced by high-risk young people.

6.3.3 *Strong cross-sector collaboration and coordination of intervention and evaluation activities for high-risk young people*

Currently in Australia, there is no single agency with responsibility for collating the evidence on what works to improve outcomes for high-risk young people. Policy development and the responsibility for decisions regarding funding of TSO-delivered programs within Australia, sits with a variety of government agencies at both the state and federal government levels. These agencies have traditionally operated in siloes without cross-agency collaboration, prioritisation or planning for the allocation of limited resources into the most effective programs. Given that this thesis has shown high-risk young people experience multiple risk behaviour, it follows that they will likely come into contact with multiple agencies at different levels of government (e.g. Education, Justice, Families and Community Services). However, the lack of collaboration across different agencies and levels of government, not to mention the siloed and fragmented approach to funding third sector intervention activity, measuring outcomes, and conducting evaluations, has led to the inefficient allocation of public resources, and duplication of programs with a poor evidence base across populations.

Whether this responsibility sits with the government (preferably at the federal level) or an independent agency, establishment of a body that can oversee strong national, cross-sector coordination and collaboration of intervention and evaluation activities for high-risk young people is critical. Without an overarching coordinating body, there is no central point for monitoring the quality of evaluation findings and providing consistent guidance back to the third sector on what is likely to work best to improve

outcomes for high-risk young people. Furthermore, establishment of a central body that could represent the 'single source of truth' regarding evidence for the implementation and evaluation of programs for high-risk young people, would improve the ability of the third sector to choose where to allocate resources and demonstrate their performance to secure grants or contracts.

Having a central body responsible for oversight of intervention and evaluation activity, would also enable the implementation of the methods proposed in this thesis. For example, the central body could facilitate cross-sector agreement on a standardised program framework for high-risk young people. Similarly, it would make the previous two recommendations regarding definitions, data and ICT systems far easier to action.

6.3.4 *Dedicated resourcing for evaluation*

The findings of this thesis support those recently reported by (Bach-Mortensen & Montgomery, 2018) demonstrating the key barriers the third sector face in undertaking evaluation relate to issues of capacity and capability. Whilst this thesis has focused on developing methods to improve the internal capacity and capability of TSOs to conduct evaluation, the reality is that many TSOs will still lack the financial capacity to conduct evaluation (Bach-Mortensen & Montgomery, 2018; Ógáin et al., 2012). Given this, there is a clear need for increased financial support from external sources to complement the internal capacity and capability improvements proposed in this thesis.

Historically, when it comes to the third sector, evaluation has been under-funded or not funded at all by various funding agencies (Bach-Mortensen & Montgomery, 2018), which has contributed to the poor methodological quality of evaluations to date. In future, given the increasing burden on the sector to demonstrate effectiveness of their programs, funders should allocate a certain proportion of funds specifically for evaluation activities.

Part of this quarantined funding could be directed toward recruitment of dedicated on-site, evaluation staff, or up-skilling current staff.

Recruitment of an individual with the necessary research training, who could be based onsite and oversee evaluation activities, would reduce the burden on already overworked staff, and ensure a higher quality of evaluation. This recommendation is in line with earlier research (Fiore, Keller, & Curry, 2007; Ziedonis et al., 2007), which shows the advantages of engaging a respected and influential study champion to promote activities relevant to the study, and problem solve issues as they arise. The person recruited to this position could also provide basic training for program staff in research methods to improve their understanding of the importance of rigorous and systematic data collection, and develop strategies for translating evaluation findings into simple, comprehensible formats appropriate for multiple stakeholders (including participants) at regular intervals.

6.4 Conclusions

This thesis has developed and applied a range of methods designed to support the internal capacity and capability of TSO-delivered programs for high-risk young people to conduct better quality evaluation. First, in an effort to understand what has worked to improve outcomes for high-risk young people, a systematic review of the international peer-review literature was undertaken and the common program components across the methodologically adequate studies were identified. The findings from this review led to the development of an intervention framework that could achieve greater standardisation in the way TSO-delivered programs are defined and evaluated, presenting a relatively simple method for increasing the ability to compare program impact in evaluation. A novel process for embedding best-evidence outcome measures into the routine data collection processes of TSO-delivered programs was also trialled to enable staff to continuously tailor their service delivery model to participant needs, whilst facilitating access to high-quality data for evaluation. Finally, this thesis demonstrated how TSOs can use a pragmatic, yet rigorous, evaluation design (the MBD) to evaluate the effectiveness of their programs.

As a result of this doctoral research, an ARC funded study will be conducted to trial the generalisability of the methods in multiple programs in different communities across Australia. Broad dissemination of the innovative methods described in this thesis will not only improve the internal capacity and capability of TSO-delivered programs to conduct evaluations, but should increase the capacity of governments and public

policy experts to invest limited resources into the most effective programs, and ultimately lead to better outcomes for high-risk young people and their communities.

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Appendices

Appendix A: Publications arising from this thesis

Appendix A1:

Knight, A., Shakeshaft, A., Havard, A., Maple, M., Foley, C., Shakeshaft, B. (2017). The quality and effectiveness of interventions that target multiple-risk factors among young people: A Systematic Review. *Australia New Zealand Journal of Public Health*. 41:54-60.

Appendix A2:

Knight, A., Maple, M., Shakeshaft, A., Pearce T., Shakeshaft, B. Improving the evidence base for services working with youth at-risk of involvement in the criminal justice system: developing a standardised program approach. *Health and Justice*. In press.

Appendix A3:

Knight, A., Havard, A., Shakeshaft, A., Maple, M., Snijder, M., Stone, C., Shakeshaft, B. (2017). The feasibility and utility of embedding best-evidence measures into the routine delivery of services for high-risk young people. *International Journal of Environmental Research and Public Health*. 14(2) 208.

Appendix A1: Published version of Chapter 2

The quality and effectiveness of interventions that target multiple risk factors among young people: a systematic review

Alice Knight,¹ Anthony Shakeshaft,¹ Alys Havard,^{2,1} Myfanwy Maple,³ Catherine Foley,¹ Bernie Shakeshaft⁴

Most young people experience one or two behavioural risk factors, such as substance use or risky sexual behaviour, but the majority navigate adolescence with relatively few long-term negative consequences.¹⁻³ A small minority experience disproportionately higher rates of co-occurring risk, which increases their likelihood of experiencing detrimental outcomes later in life, such as homelessness, incarceration, or premature death. For young people who experience these single risk factors (e.g. excessive alcohol consumption, cannabis use, depression or anxiety), single-focus interventions with an established evidence base, such as cognitive behaviour therapy (CBT) or motivational interviewing (MI), are available.^{1,2} These interventions are typically delivered in a single, specialised and controlled environment, such as a school,⁴ are relatively inexpensive to implement and have demonstrated benefits for young people across a wide range of populations.⁷ For young people who experience multiple risk factors simultaneously (hereafter high-risk young people), however, these interventions have not been shown to be effective.⁸⁻⁹ A recent review of interventions targeting co-occurring substance use and risky sexual behaviour among adolescents, found that interventions that aimed to address both risk factors simultaneously were more likely to be effective than those that aimed to address only one risk factor at a time.¹⁰ While the above-cited review examined the evidence for interventions targeting two specific risk

Abstract

Objective: To identify evaluations of interventions that target multiple risk factors in high-risk young people, describe their characteristics, critique their methodological quality and summarise their effectiveness.

Methods: A search of the literature published between 2009 and 2014 identified 13 evaluations of interventions that targeted multiple risk factors, compared to 95 evaluations that targeted single risk factors. The methodological adequacy of the 13 evaluation studies was analysed using the Quality Assessment Tool for Quantitative Studies and information regarding characteristics and intervention effectiveness was extracted and summarised.

Results: There were very few outcome evaluation studies of interventions that targeted multiple risk factors, relative to single risk factors, among high-risk young people. Of the identified studies, half were methodologically weak. Interventions delivered in community settings targeted a greater number of risk factors, while those delivered in a school or health setting reported a higher proportion of statistically significant outcomes. No economic analyses were conducted.

Conclusions and Implications for Public Health: More methodologically rigorous evaluations of interventions targeting multiple risk factors among high-risk young people are required, especially for those delivered in community settings. Four key areas for improvement are: i) more precisely defining the risk factors experienced by high-risk young people; ii) achieving greater consistency across interventions; iii) standardising outcome measures; and iv) conducting economic analyses.

Key words: high-risk young people, at-risk young people, intervention, systematic review

factors, there has been no synthesis of the evidence regarding interventions targeting multiple risk factors simultaneously.

This systematic review aims to identify evaluations of interventions that target multiple risk factors in high-risk young people, describe the characteristics of the interventions and their effectiveness, and critique the methodological quality of the evaluations.

Method

Search strategy

Figure 1 summarises the databases searched, the exclusion criteria applied and the classification of included articles.

Consistent with the methods detailed in the Cochrane Collaboration Handbook on Systematic Reviews of Health Promotion and Public Health Interventions,¹¹ the search strategy comprised two steps.

1. National Drug and Alcohol Research Centre (NDARC), UNSW Australia, New South Wales

2. Centre for Big Data Research in Health, UNSW Australia, New South Wales

3. School of Health, University of New England, New South Wales

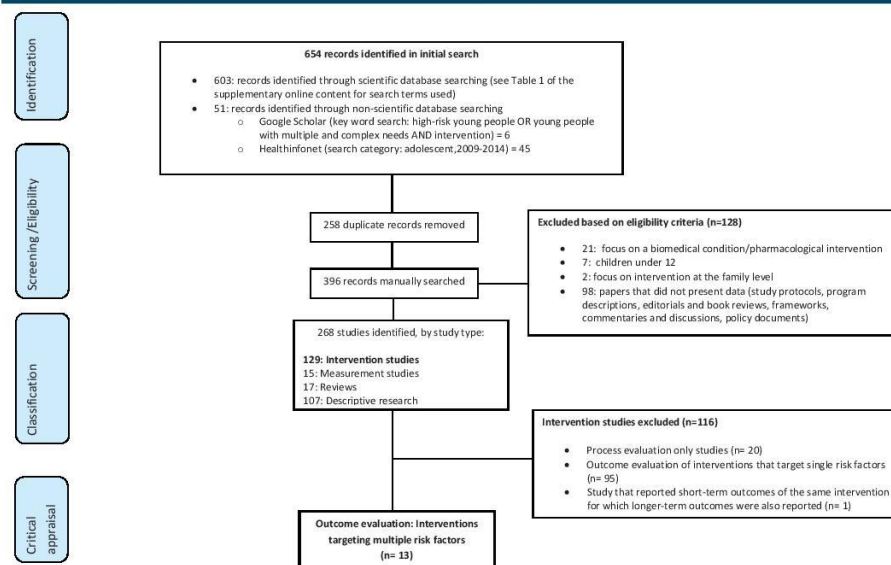
4. BackTrack, New South Wales

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Submitted: January 2016; Revision requested: April 2016; Accepted: May 2016

The authors have stated they have no conflict of interest.

Figure 1: PRISMA flow diagram summarising systematic search identifying intervention studies among the published literature relevant to high-risk young people.



First, seven scientific electronic databases were searched: Medline, PsycINFO, Social Work Abstracts, Global Health, CINCH, CINCH-ATSI, and FAMILY. Electronic databases were searched individually so that database-specific search strings could be used, except for the last three, which were searched simultaneously using the Informit online database.

As detailed in Table 1 of the online supplementary content, the search strings were designed to allow for the imprecise definition of the population of young people being searched (i.e. they are variously referred to as, 'high-risk young people', 'young people with multiple and complex needs', or 'at-risk young people') and no age range was specified. The combined searches of all databases located 603 articles, of which 258 duplicates were removed. Searches were limited to the years 2009-14 for two reasons: first, to ensure a realistic number of articles would be identified for categorisation and critique; and second, to optimise the likelihood the included studies represent best-evidence practice because they are informed by earlier research findings.

Second, the grey literature was searched to identify articles that were not located by the electronic search. All publications within

the 'Adolescent' section of the 'Population Groups' tab on the HealthInfoNet website were searched, and the search terms synonymous with 'high-risk young people', and 'intervention' were entered together into Google Scholar. Searching the grey literature identified 51 articles.

Classification of studies

The title and abstracts of the 396 identified articles were then used to classify articles using a three-step process.

Step 1: applying eligibility criteria

Papers were excluded if: a) the study of interest focused on a biomedical or pharmacological intervention (n=21); b) the study focused on young people outside the age range of 12-24 years (this age range was selected because it is the definition of a young person used in national reports in Australia¹³) (n=7); c) the intervention was a family-based intervention with a primary objective of improving outcomes for the parents/carers (n=2) or; d) the study did not present data (study protocols, program descriptions, editorials and book reviews, frameworks, commentaries and discussions, policy documents) (n=98). A total of 128 articles were excluded at this step.

Step 2: identifying intervention studies

The remaining 268 articles were classified by their study type using categories adapted from similar reviews:^{4,13} a) measurement studies, included papers that were primarily concerned with developing measurement instruments that could be used to evaluate interventions (n=15); b) reviews, defined as narrative and systematic literature reviews, meta analyses, or rapid evidence syntheses (n=17); c) descriptive research, defined as papers that described the characteristics of potential interventions or young people that the interventions could target (n=107); and d) intervention studies, defined as a process evaluation study (any evaluation activity conducted for the purpose of determining the acceptability, dose, fidelity, and/or reach of an intervention) or an outcome evaluation study (reported a quantitative intervention outcome) (n=129). All non-intervention studies (n=139) were excluded at this point.

Step 3: identifying outcome evaluations of interventions targeting multiple risk factors

The full-text versions of the 129 intervention studies were obtained and articles that only reported a process evaluation were excluded from further analysis (n=20). All

outcome evaluation studies ($n=109$) were read in full, and classified according to the number of risk factors the intervention sought to impact. For the purposes of this review, the risk factors that were targeted were identified from the objective(s) of an intervention, as described in the Introduction, or intervention description section of the Methods in each article. Information on the outcomes measured was not used to identify the risk factors targeted. To guide the process of determining the number and type of risk factors the intervention in each study targeted, a heuristic classification tool was developed by the authors (see Table 2 of the supplementary online content) for six common risks factors associated with high-risk young people identified in existing studies: criminal activity; education and employment; mental health and wellbeing; risky sexual behaviour; substance use; and violence.^{1,3} For example, if an intervention had the sole objective of reducing cannabis use, it was classified as targeting a single risk factor: substance use. Alternatively, if an intervention had the multiple objectives of reducing cannabis use, improving mental health and reducing violent behaviour, it was classified as targeting multiple risk factors: substance use; mental health and wellbeing; and violence. The 95 studies that evaluated an intervention targeting a single risk factor were excluded, even if outcomes from multiple domains were measured.

Of the remaining 14 outcome evaluations of interventions that targeted multiple risk factors, the outcomes of one intervention were published in two separate articles^{14,15} and, consequently, only the paper reporting the longer follow-up period was included. The rationale behind this decision was that the paper reporting the longer follow-up period was more likely to report accurate change attributable to the intervention.¹⁶ A total of 13 papers were identified for review.

Key characteristics of interventions

Criteria used for data extraction were adapted from the Cochrane Collaboration Handbook for Systematic Reviews of Health Promotion and Public Health Interventions.¹¹ Information extracted and presented in Table 1 includes: first author, year of publication and country where the intervention was implemented; sample size and setting; age range or mean age of participants and the proportion that was male; intervention description; and the risk factors targeted by the intervention.

Critique of the methodological quality of studies

Methodological quality was assessed using the Quality Assessment Tool for Quantitative Studies.¹⁶ Sections A-F (A, selection bias; B, study design; C, confounders; D, blinding; E, data collection methods; F, withdrawal and dropouts) were coded weak, moderate or strong as guided by the component rating scale. Section G (intervention integrity) and H (analysis) require a brief description of adequacy rather than coding, the definitions of which are guided by the Tool. Summary ratings comprise weak (studies that receive two or more weak scores), moderate (studies that receive one weak score) or strong (studies that receive no weak scores). In order to quantify the likely extent of classification error, the methodological quality of the studies, as assessed by author AK, was re-assessed by author CF as a blinded coder. This resulted in 95% agreement on ratings for components A-F, and 92% agreement on the summary ratings for each study. Where there was disagreement, the first author's classifications were used.

Effectiveness of interventions

Given the interventions – populations targeted and outcomes measured varied substantially across studies – a meta-analysis was not appropriate. Consequently, evidence regarding the effectiveness of interventions that targeted multiple risk factors was summarised by identifying the outcomes on which the intervention had a statistically significant effect (i.e. $p<0.05$) and whether an economic evaluation was conducted. To avoid over-interpreting poor-quality evidence, only the six studies that received an overall methodological summary rating of moderate or strong were included in the synthesis of intervention effectiveness (summarised in Table 2), although data for methodologically weak studies were included in results tables for comprehensiveness.

Results

Characteristics of interventions

Six of the 13 interventions that targeted multiple risk factors were delivered in a school setting, two in a health setting (one in a clinic and one in an Emergency Department), and five in a community setting. For the purpose of this review, interventions delivered in a community setting are defined as services operated by professionals in various settings

across a community, rather than only delivered within a single setting (e.g. a school or a hospital).⁵ Participants' ages ranged from 10 to 35 years and the proportion that was male ranged from 0% to 83%. This information is summarised in Table 1.

Critique of the methodological quality of outcome evaluations

Two studies obtained an overall classification of strong for methodological quality,^{17,18} four obtained an overall classification of moderate^{15,19,21} and seven were classified as weak.²²⁻²⁸ Only one study of a community-based intervention received a methodological rating higher than weak.²¹ Further detail on the methodological quality of studies is available in Table 3 of the supplementary online content.

Effectiveness of interventions

The effectiveness of interventions is summarised in Table 2, separately for the six studies rated as methodologically strong or moderate and for the seven studies rated as weak.

Effectiveness by intervention for methodologically strong/moderate studies ($n=6$)

A school-based, brief, web intervention for students aged 15–16 years in the Netherlands statistically significantly improved rates of self-reported safe sex, mental health status, and health related quality of life.¹⁷ Similarly, a school-based, group cognitive-behavioural depression prevention program for students aged 14–19 years statistically significantly reduced self-reported substance use and improved depressive symptoms.¹⁸ A brief intervention delivered in an Emergency Department for people 14–18 years statistically significantly reduced rates of self-reported peer aggression and peer victimisation.¹⁵ An MI intervention, integrated with social networking counselling and delivered in a health clinic for females aged 14–18 years, statistically significantly reduced rates of self-reported trouble due to alcohol use, substance use before sex, offers to use marijuana, and improved social stress and readiness to start counselling.¹⁹ A school-based intervention that combined CBT with relaxation techniques, problem-solving skills, knowledge about depression and positive self-esteem, and study skills and school-work techniques for students, statistically

Table 1: Characteristics of identified interventions.					Table 2: Effectiveness of identified interventions, by methodological strength.
First author & year of publication (Country)	Sample/setting	Age Range or mean age (% male)	Intervention description	Domains of risk targeted by intervention	Outcomes & effectiveness*
Bannink 2014 ¹⁷ (The Netherlands)	Students (n=1256) Schools (n=12)	15-16 years (54.7%)	Web-based brief intervention: health messages tailored to responses given on a questionnaire, plus feedback compared to normative sample, and the option of MI for young people with poor mental health	1. Mental health and wellbeing 2. Substance use 3. Risky sexual behaviour	- Mental health status* - Health related quality of life* - Alcohol use - Drug use - Smoking - Safe sex*
Cunningham 2012 ¹⁵ (US)	Urban adolescents presenting for illness or injury (n=726) Emergency Department (n=1)	14-18 years (43.5%)	Brief intervention based on MI delivered by a therapist with computer assistance	1. Substance use 2. Violence	- Alcohol misuse - Binge drinking - Alcohol related consequences - Peer aggression* - Peer victimisation* - Violence consequences
Mason 2011 ⁹ (US)	Female adolescent patients (n=28) Health clinic (n=1)	14-18 years (female only)	MI integrated with social network counselling: rapport building, presentation of substance use feedback from baseline assessment, introduction of social network information, developing future plans	1. Substance use 2. Mental health & wellbeing	- Overall substance use - Trouble due to alcohol use* - Substance use before sex* - Offers to use marijuana* - Readiness to start counselling* - Overall social network quality - Social stress*
Poirier 2013 ⁸ (Canada)	Students (n=53) Schools (n=4)	Mean=14 years (17%)	Pare-Chocs: CBT, problem solving techniques, study skills and schoolwork techniques, and education on depression, positive self-esteem and body-image	1. Mental health & wellbeing 2. Education & employment	- Cognitive distortions* - Problem solving strategies* - Frequency of depressive symptoms - School drop-out risk
Rohde 2012 ¹⁸ (US)	Students (n=341) Schools (n=6)	14-19 years (44%)	Group cognitive-behavioural depression prevention program: building group rapport, increasing pleasant activities, learning cognitive restructuring techniques, and developing plans for future stressors	1. Substance use 2. Mental health & wellbeing	- Substance use* - Depressive symptoms*
Schaeffer 2013 ¹⁹ (US)	Juvenile offenders (n=97) Community-based	15-18 years (83%)	CRAFT: classroom based construction skill training, academic skill development, employability skill development, job placement assistance, assistance with job retention, personal development, case management	1. Education & employment 2. Substance use 3. Mental health & wellbeing 4. Criminal activity	- Employment* - Education outcomes* - Substance use - Mental health symptoms - Criminal activity and recidivism
Faulkner 2012 ²¹ (Australia)	Students (n=60) Schools (n=3)	Mean=12	DRUMBEAT: Music therapy and CBT	1. Mental health & wellbeing 2. Education & employment	- Self-esteem - School attendance - Anti-social behaviour at school - Cooperation and collaboration in the classroom
Grace 2014 ²¹ (Australia)	Unemployed, homeless young people in Victoria (n=396) Community-based	10-35 years (73% aged 18 to 24) (65%)	Joined-up case management: intensive client centred case management from one point of contact	1. Homelessness 2. Mental health & wellbeing 3. Education & employment	- Stability of housing - Affordability of housing - Health & wellbeing - Community connectedness - Income from employment - Participation in education and training
Green 2014 ²⁰ (UK)	Young people in foster care (n=219) Community-based	10-17 years	MTFC: specialist training and support for foster parents, individual and family therapy, social skills training, diversionary activities, case management, and education support	1. Mental health & wellbeing 2. Education & employment 3. Criminal activity	- Mental health - Social and physical functioning - Scholastic outcomes - Attendance - Offending
Rhoades 2013 ¹⁴ (UK)	Adolescent girls in foster care (n=58) Community-based	12-16 years (female only)	MTFC: specialist training and support for foster parents, individual and family therapy, social skills training, diversionary activities, case management, and education support	1. Violence 2. Criminal activity 3. Substance use 4. Risky sexual behaviour 5. Mental health & wellbeing 6. Education & employment	- Violence* - Offending* - Substance use - Risky sexual behaviour* - Self-harm* - Participation in school activities*

significantly improved rates of self-reported cognitive distortions and problem-solving strategies amongst young people with an average age of 14 years.²⁰ Finally, a community-based intervention that involved apprenticeship-focused training for juvenile offenders aged 15-18 years statistically significantly improved rates of self-reported employment and educational outcomes.²¹

Effectiveness by risk factor for methodologically strong/moderate studies (n=6)

The most commonly measured outcomes were associated with the risk factors of mental health and wellbeing (n=10) and substance use (n=12). There were three outcomes measured associated with the

risk factor of education and employment, three outcomes measured associated with the risk factor of violence, and one outcome measured for the risk factors of criminal activity and risky sexual behaviour.

Of the 10 outcomes measured associated with the risk factor of mental health and wellbeing, seven (70%) achieved a statistically significant improvement. Of the 12 outcomes measured associated with the risk factor of substance use, four (33%) achieved a statistically significant improvement. Of the three outcomes measured associated with the risk factor of education and employment, two (66%) achieved a statistically significant improvement, as was the case for the risk factor of violence. The one outcome measured associated with the risk factor of

risky sexual behaviour achieved a statistically significant improvement, unlike the outcome measured associated with the risk factor of criminal activity.

Effectiveness by intervention setting for methodologically strong/moderate studies (n=6)

Community-based interventions targeted a greater number of risk factors (mean=4) than both school-based interventions (mean=2) and health-based interventions (mean=3). A higher proportion of the outcomes measured in the evaluations of school-based interventions and health-based interventions were significant (n=7, 44% for both), relative to the community-based interventions (n=2, 13%).

Table 1 continued: Characteristics of identified interventions.					Table 2 continued: Effectiveness of identified interventions, by methodological strength.
First author & year of publication (Country)	Sample/setting	Age range or mean age (% male)	Intervention description	Domains of risk targeted by intervention	Outcomes & effectiveness*
Wiggins 2009 ²¹ (UK)	Young people at risk of teen pregnancy, substance misuse or exclusion from school. (n=2,724) Community-based	13-15 years (60%)	Young Peoples Development Programme: education, training/employment opportunities, life skills, mentoring, volunteering, health education, arts, sports, and advice on accessing services	1. Risky sexual behaviour 2. Substance use 3. Mental health & wellbeing 4. Education & employment 5. Criminal activity	- Heterosexual sex before 16 (significant increase for women only)* - No. sexual partners - Condom use - Perceived difficulty in initiating condom use - Expectations of being a parent by age 20 (significant increase for women only)* - Cannabis use weekly in past 6 months - Drunkenness monthly in past 6 months - Worry often in past few weeks - Often angry in past few weeks - Difficulty discussing personal things with close friends - Dislike school - Truancy in past 6 months* - Temporary school exclusion in past 6 months (significant increase for women only)* - Expectation of being in a steady job by age 20 - Contact with police
Williamson 2013 ²⁶ (US)	Students (n=31) Alternative school (n=1)	14-18 years (94%)	PLC program: 10 group sessions of CBT assisted by workbook	1. Violence 2. Mental health & wellbeing	- Propensity for physical aggression* - Propensity for verbal aggression* - Aggressive behaviour - Sense of self* - Self-control - Decision making* - Moral beliefs* - Prosocial connectedness
Wood 2013 ²⁷ (Australia)	Students (n=180) Primary schools (n=10) Secondary schools (n=5) Intensive English centres (n=4)	Not specified.	DRUMBEAT: music therapy and CBT	1. Mental health & wellbeing 2. Education & employment	- Self-esteem* - School behaviour incidents* - School absences

Key to abbreviations: CBT – Cognitive Behavioural Therapy; CRAFT – Community Resilience Apprenticeship-Focused Training; MI – Motivational Interviewing; MTRC – Multidimensional Treatment Foster Care; PLC – Positive Life Changes

* [bold] Indicates a statistically significant result (at the level of p<0.05), if a statistical comparison is reported.

Shaded cells represent studies with a methodological rating of weak (n=7)

Cost analysis for methodologically strong/moderate studies (n=6)

No studies included a cost or economic analysis.

Discussion

This systematic review found that of the 108 intervention studies identified, only 12% (n=13) were outcome evaluations of interventions targeting multiple risk factors in high-risk young people, compared with 88% (n=95) targeting a single risk factor, and half the 13 identified studies were methodologically weak.

Key characteristics of interventions

The 13 interventions that targeted multiple risk factors in high-risk young people were delivered across multiple geographic regions and in a range of settings, including schools (n=6), hospitals and health clinics (n=2), and in the community more broadly (n=5). Each targeted a different combination of risk factors, with an extensive range of intervention activities. While this lack of homogeneity between interventions reflects a broad spectrum of intervention activity for high-risk young people, it also limits the capacity for direct comparisons about their relative effectiveness.

Critique of the methodological quality of outcome evaluations

More than half the evaluations used either a Randomised Controlled Trial or Clinical Controlled Trial design, and the majority adequately controlled for confounding, utilised valid and reliable self-report measures, and reported adequate descriptions of the withdrawal and dropout of participants. The weakness of most studies was the selection bias generated by their participant selection procedures and their failure to adequately blind both participants and assessors to the research question. While ethical and practical considerations can often render these two aspects of public health evaluations problematic,⁶ these limitations can still reduce the validity of the data collected. Reporting on intervention integrity was also mixed, with only half the studies measuring the implementation fidelity of the intervention, which limits the transferability of their findings to other communities or settings. Furthermore, although valid and reliable self-report measures were used in the majority of studies that collected self-report

data, half the studies relied solely on self-report measures. Since self-report data can be prone to bias,²⁹ even where data collection tools are of demonstrated reliability and validity, future intervention studies should consider using a combination of self-report and more objective measures, such as routinely collected crime or health services data. This would also improve the capacity of studies to capture community-level benefit.

Generally, studies of interventions delivered in a school or health setting were of relatively high methodological quality, whereas only one of the five community-based interventions achieved a methodological quality rating higher than weak.²¹ This methodological disparity may reflect that school- or health-based interventions are delivered in more controlled environments, which allows greater consistency in intervention implementation, improved intervention fidelity, higher follow-up rates, and greater statistical power in evaluations; or it may reflect a higher degree of complexity among the high-risk young people who are accessed through community-based settings (e.g. they can be highly transient which makes adequate follow-up rates harder to achieve).

Effectiveness of interventions

There were far more outcomes measured associated with the risk factors of mental health and wellbeing (n=10) and substance use (n=12), than outcomes associated with other risk factors. This could indicate that these are the most common risk factors among high-risk young people, that interventions target these risk factors more frequently, or that there are more readily available outcome measures for these risk factors.

Although wide variation in the outcomes measured and the instruments used meant results from different interventions could not be pooled, a simple count of significant findings suggested that interventions targeting multiple risk factors in high-risk young people are more effective at improving outcomes associated with the risk factors of risky sexual behaviour, mental health and wellbeing, education and employment, and violence, than substance use. Indeed, this review highlights that outcomes associated with the risk factor of substance use were only statistically significantly reduced about one-third of the time that they were measured. There was no evidence that these interventions had an impact on outcomes associated with the risk factor of

criminal activity. In terms of intervention setting, interventions delivered in a school or health setting were associated with a higher proportion of statistically significant results (both n=7, 44%), than interventions delivered in a community setting (n=2, 13%). Nevertheless, the interventions delivered in community settings targeted a greater number of risk factors simultaneously. Again, this finding is consistent with the idea that interventions delivered in school or health-based settings are delivered in a more controlled environment allowing greater consistency of implementation and continuity of care which, in turn, increases the likelihood of achieving statistically significant improvements in risk factors. It is also likely that young people still engaged in school are at least minimally connected with a supportive care-giver, which is also likely to have a protective effect. Conversely, community-based interventions are often delivered across multiple settings in the community, and they tend to engage with young people who experience a higher degree of complexity (i.e. they target a greater number of risk factors than other interventions) and have fewer reliable social support structures, all of which increase the difficulty of achieving statistically significant improvements in risk factors.

No studies reported on the cost of their interventions, nor conducted an economic analysis to weigh the costs of these interventions against their benefits. Given the high economic costs to society likely to accrue over the lifetimes of high-risk young people, the potential economic benefits from intervening early are likely to be substantial, and obtaining such data would help support the case for funding programs for high-risk young people that have been shown to be effective.^{30,32}

Limitations

The lack of an agreed and specific definition for high-risk young people meant a broad combination of search terms was required. Since this requirement led to the identification of a high number of studies, the search was limited to studies published between 2009 and 2014. Although these studies only comprise relatively recently implemented interventions, they are likely to represent best-evidence practice based on the assumption that they are informed by earlier research findings.

The wide variation in interventions, and in the outcomes measured, limits the ability

to draw direct comparisons about the effectiveness of different interventions for different populations of high-risk young people. This finding highlights the need for greater consistency in defining intervention programs. Given the possibility that the wide variability in intervention programs is due to uncertainty about the precise nature of the most important risk factors experienced by high-risk young people, one solution is to more precisely define and prioritise those risk factors. A complementary solution to improving the comparability of interventions across different settings, while simultaneously allowing interventions to be tailored to available resources and the specific needs of the high-risk young people being targeted, is to design them using the principles of complex interventions.³³ This approach is yet to be applied to interventions for high-risk young people.

Conclusions

Outcome evaluation studies of interventions targeting multiple risk factors in high-risk young people comprised only 12% (n=13) of intervention studies published between 2009 and 2014. The methodological quality of half these evaluations was weak (n=7). Increasing the number of evaluations published, and the proportion of them that are of good methodological quality, seems most likely to be achieved by four key actions: i) more precisely defining the risks experienced by high-risk young people; ii) achieving greater consistency across interventions by utilising the principles of complex interventions; iii) standardising the measures used to evaluate intervention effects; and iv) conducting economic analyses. Given promising evidence from this review that interventions targeting multiple risk factors can improve a range of outcomes for high-risk young people, achieving these four actions would help realise the potential of these interventions.

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Supporting Information

Additional supporting information may be found in the online version of this article:

Supplementary Table 1: Databases and search strings utilised in search strategy.

Supplementary Table 2: Classification Tool for risk factors.

Supplementary Table 3: Critique of the methodological quality of studies.

Appendix A2: Accepted version of Chapter 3

Improving the evidence base for services working with youth at-risk of involvement in the criminal justice system: developing a standardised program approach

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Abstract

Background: Young people who engage in multiple risk behaviour (high-risk young people) such as substance abuse, antisocial behaviour, low engagement in education and employment, self-harm or suicide ideation are more likely to experience serious harms later in life including homelessness, incarceration, violence and premature death. In addition to personal disadvantage, these harms represent an avoidable social and economic cost to society. Despite these harms, there is insufficient evidence about how to improve outcomes for high-risk young people. A key reason for this is a lack of standardisation in the way in which programs provided by services are defined and evaluated.

Methods: This paper describes the development of a standardised intervention model for high-risk young people. The model can be used by service providers to achieve greater standardisation across their programs, outcomes and outcome measures. To demonstrate its feasibility, the model is applied to an existing program for high-risk young people.

Conclusions: The development and uptake of a standardised intervention model for these programs will help to more rapidly develop a larger and more rigorous evidence-base to improve outcomes for high-risk young people.

Keywords: high-risk young people; multiple risk behaviour; young people with multiple and complex needs; youth program; complex intervention; intervention; evaluation.

Introduction

Adolescence is a period of increased risk for adverse physical and mental health outcomes: approximately half of all lifetime mental disorders, for example, begin by the mid-teens and three quarters by the mid-twenties (Kessler et al., 2007). The majority of young people experience relatively few harms as a consequence of engaging in a small number of risk behaviours, such as recreational substance use and physical inactivity (Australian Institute of Health and Welfare, 2011). Nevertheless, a minority of adolescents will experience more substantial harms associated with multiple risk behaviours (high-risk young people), including exposure to violence, homelessness, incarceration, and premature death (Bruun, 2012; DHS, 2010; E. H. Hawkins, 2009; Mitchell, 2011; United Nations, 2004). Moreover, the presence of multiple risk behaviours has a multiplier effect: increased frequency of substance abuse and involvement in crime, for example, is associated with disengagement from school and declining academic performance, which in turn is associated with reduced employment opportunities (as a consequence of criminal convictions and poor literacy) and increased risk of self-harm, suicide, and recidivism into both juvenile and adult prisons (Bruun, 2012; Henry, 2010; McLaughlin et al., 2010).

Complicating the presence of multiple risk behaviour is that their aetiology is typically complex, being associated with a range of social determinants of poor health, including childhood abuse, low socio-economic status (SES), and minority cultural identity (Fergusson, Horwood, & Nagin, 2000; Groark & McCall, 2009; Vitaro & Tremblay, 2009). This complex aetiology implies the occurrence of significant harm among young people will not be spread randomly across individuals in a population, but will cluster within defined sub-populations. Indigenous people in Australia, for example, have had a recent history of colonisation (including dispossession of their land), racism, oppression, and low socio-economic status which, in turn, has increased the rate with which they experience mental health and physical harms. Alcohol-related suicide rates among 15-29 year old Indigenous Australians, for example, are four (males)

and five (females) times higher than for non-Indigenous young people (Calabria, Doran, Vos, Shakeshaft, & Hall, 2010), rates of all-cause alcohol-related disease and injury are more than double for Indigenous males and seven times greater for Indigenous females (Calabria et al., 2010), and more than 50% of 10-17 year old juvenile detainees are Indigenous, despite Indigenous Australians comprising an estimated 2-3% of the population (Australian Institute of Criminology, 2008; Australian Institute of Health and Welfare, 2003).

In addition to personal disadvantage, these harms represent an avoidable social and economic cost to society, including: increased social disruption, such as loss or damage to property and fear for personal safety; increased need for health care at an earlier stage in life (e.g. hospital and rehabilitation services for injury); greater reliance on social security benefits; and avoidable police, court and incarceration costs. The cost of juvenile custodial services in 2010/2011 in one state in Australia (New South Wales) was \$114.5 million, for example, while the cost of poor mental health among young people in Australia alone, in terms of employment, health and social impacts, is estimated to cost \$6.3 billion per annum (Australian Institute of Criminology, 2008; ReachOut Australia, 2015). Youth detention costs are similarly high internationally. The long-term cost of the confinement of young people in the US, including the cost of recidivism, lost educational opportunities, and lost future earnings and taxes, is estimated to be between US\$8 billion and US\$21 billion per annum (The Justice Policy Institute, 2014). From a lifetime perspective, the monetary value of a 14-year-old high risk juvenile avoiding crime over his/her lifetime was estimated to be between US\$3.2 billion and US\$5.8 billion (Cohen, 2009), while the economic burden associated with the entire sub-population of disengaged youth was estimated to be US\$4.7 trillion in 2011 (Belfield, 2012). In the UK, the average annual cost of detention is estimated to be £65,000 for Youth Offender Institutions, £178,000 for Secure Training Centres, and £212,000 for Secure Children's Homes (Natale, 2012; The Ministry of Justice, 2013), while the UK's Youth Justice Board estimated the cost of detention

for the entire sub-population of detained young offenders was £245 million in 2012/2013 (The Ministry of Justice, 2013).

Although the poor personal, social, and economic outcomes experienced by high-risk young people highlights the need for relevant, high-quality intervention programs, a 2016 systematic literature review conducted by the authors found that there are very few published evaluations of programs that simultaneously target multiple risk behaviour in young people: of the 268 relevant studies published in the international literature between 2009 and 2014, only 13 (5%) were evaluations of programs for young people who engaged in multiple risk behaviour, and half of these were rated as methodologically weak against standard criteria (n=7) (Knight et al., 2016). Moreover, of the 13 identified programs, all but one had been implemented in relatively controlled settings (e.g. a school or a health clinic), all used a different model of intervention (e.g. each targeted a different combination of risk behaviours using a different combination of program components), and all quantified the effectiveness of the program using a wide variety of outcome measures (Knight et al., 2016).

The small number of methodologically adequate evaluations of programs means there is limited high-quality evidence that service providers and policy makers can use to improve the effectiveness of programs for high-risk young people. The lack of homogeneity in intervention components, outcomes, and outcome measures limits the ability to use rigorous evaluation designs in determination of program effectiveness, pool results into meta-analysis (as a method of increasing the strength of existing evidence) and reduces the generalisability of the results to other populations of high-risk young people. One way to rapidly engender a larger and more rigorous evidence-base to support the uptake of best evidence programs for high-risk young people, is to achieve greater standardisation in the way in which programs provided by services are defined, implemented, and evaluated.

This paper describes the development of a standardised intervention model that could be used to achieve greater standardisation across programs, outcomes, and outcome measures delivered by different services for high-risk young people. It has two specific aims. First, to describe the development of the model. Second, to apply the model to an existing program for high-risk young people to demonstrate how it can be operationalised and how it might be replicated by other programs.

Methods

The development of a standardised intervention model

As delineated in Figure 1, the proposed standardised intervention model adapts a program logic framework to ensure clarity about the proposed program components (part b), why they are likely to be effective (part c – mechanisms of change), and to ensure the program components are strongly aligned with the specific problems being targeted (part a), the outcomes and outcome measures (part d), and the process measures (part e) (Dalkin, Greenhalgh, Jones, Cunningham, & Lhussier, 2015; Groark & McCall, 2009). While the program logic concept *per se* is not new, this proposed standardised intervention model has two key innovations. First, it includes stipulating a mechanism of change (part c) which requires a clear articulation of the rationale for change: that is, why the proposed program (the core components and flexible activities) would be expected to achieve the proposed outcomes. The primary purpose of the mechanism of change is to challenge those designing new, or refining existing, programs to be clear about exactly what outcomes each program component is attempting to achieve. Second, the development of the proposed program components (part b) allows programs for high-risk young people to be both standardised (the core components) and adaptable to the individual circumstances of different services (the flexible activities), as opposed to the more narrow and rigid way in which programs have been typically defined, which limits their generalisability and comparability (Knight et al., 2016). This

standardised but flexible approach is aimed at solving the well-established, but as yet difficult to resolve, tension articulated in the complex intervention literature, between the need for standardisation (to provide adequate comparability across programs delivered by different services in different circumstances) and the need for sufficient flexibility (to allow tailoring to the resources and circumstances of different settings (N. C. Campbell et al., 2007; Craig et al., 2008; Hawe, Shiell, & Riley, 2004). The bolded text in Figure 1 are the components of the proposed standardised intervention model (aim 1), while the normal text highlights how it is tailored to the specific circumstances of one program (aim 2).

The development of this standardised intervention model required establishing the core, standardised program components that would need to be delivered by any program for high-risk young people (whilst the flexible activities that operationalise these core components are, by definition, the responsibility of each service to articulate). Five standardised, core program components were developed using the central tenet of evidence-based practice: that is, by integrating the best available external evidence with the expertise of individual service providers (Sackett, Rosenberg, Gray, Haynes, & Richardson, 1996). The best available external evidence was distilled by the 2016 systematic review conducted by the authors (Knight et al., 2016), and the expertise of service providers was obtained through the process of applying the initial model (i.e. the first draft of the model that was based only on the published literature) to an existing program.

The best available external evidence

The systematic review identified four commonalities across published evaluations of programs. First, the 13 evaluated programs targeted a mean of three risk behaviours, ranging from two to six per program: no program targeted a single risk behaviour (Knight et al., 2016). This highlights the need for programs to comprise multiple components aimed at addressing participants' multiple risk behaviour.

Figure 1: The proposed standardised intervention model components (bold text) and its application to the BackTrack program (normal text)

a. Areas of need	b. Intervention		c. Mechanisms of change	d. Outcomes (outcome measures)	e. Process measures
	Core components	Flexible activities			
- Emerging or established involvement in criminal incidents and the criminal justice system - Tenuous engagement with the education system and/or un-, under-employment - Risky drug and alcohol use - Low self-efficacy and/or emerging mental health issues	1. Engagement	- Paws-Up - Youth forum	1. Successful engagement with participants ensures sufficient exposure to program components	- <i>A reduction in crime/severity of crime</i> (e.g. routinely collected police incident data; self-reported involvement in crime) - <i>A reduction in substance misuse</i> (e.g. Alcohol Use Disorder Identification Test [AUDIT], the Alcohol, Smoking and Substance Involvement Screening Test [ASSIST], the Heaviness of Smoking Index [HSI]) - <i>A reduction in suicide ideation and/or psychological distress</i> (e.g. self-reported suicide ideation; psychological distress [such as Kessler-6]) - <i>Improved employment options</i> (e.g. employment status; school attendance; formal skills training; work experience) - <i>Improved self-efficacy or resilience</i> (e.g. the Connor-Davidson Resilience Scale)	- The extent to which the program was delivered as planned (program fidelity) - Participant attendance and exposure to the different core components of the program (program dose) - Participant satisfaction with the program - Participant acceptability of the program - Contextual facilitators/barriers to program implementation
	2. Case management	- Assist with legal issues (e.g. attend court) - Work ready preparation - Contingency planning - Inter-agency liaison	2. Prioritising participants' most immediate problems (e.g. legal issues), and developing pragmatic solutions to these problems, allows participants to focus on pro-social activities		
	3. Diversionary activities	- Supervised events in town on weekends - Interstate travel on weekends to community events (e.g. Dog jump competitions) - Day-to-day attendance at the program	3. Reducing participants' exposure to high-risk situations (at home and in public), at high-risk times (e.g. the weekend)		
	4. Personal development, identity, and team identity	- Circle Work - Chilling the brain - Counselling - BackTrack shirts	4. Improving participants' capacity to manage when they are in high-risk situations		
	5. Training and skill development	- BackTrack school - Work experience - Vocational training - Volunteer work experience	5. Improving participants' education and life skills to increase their opportunities for active participation in employment		

Second, a detailed critique of the six evaluations identified as being of moderate or good methodological quality identified three common core components: i) case management, to help young people navigate the pressures of their day-to-day lives; ii) utilising behaviour change techniques to foster personal development and assist the young people to better understand their thoughts and behaviours; and iii) providing access to training and/or skill development to increase their chances of accessing meaningful employment.

More specifically, *case management* requires a high degree of cooperation and communication between different service providers in the community, and highlights the importance of, as far as possible, having the same case worker or case manager. The prioritisation of the most immediate problems being experienced by a young person, and identifying pragmatic solutions for these problems, such as securing crisis accommodation or facilitating access to legal aid for court appearances, were identified as a critical focus for case management. *Personal Development* was fostered through the application of evidence-based behaviour change techniques: of the six programs evaluated, three primarily used Motivational Interviewing (MI) techniques (Bannink et al., 2014; Cunningham et al., 2012; Mason, Pate, Drapkin, & Sozinho, 2011), two primarily used Cognitive Behavioural Therapy (CBT) (Poirier M, 2013; Rohde P, 2012), and one primarily used Multisystemic Therapy (MST), Multidimensional Family Therapy (MDFT) or Functional Family Therapy (FFT) (Schaeffer CM, 2014). *Training and/or skill development* was used to different extents. The three intervention programs that implemented MI techniques, for example, provided tailored information to participants on specific risk behaviours, in an effort to improve their understanding of the risk behaviour and their skills to modify their behaviour. Two programs explicitly provided opportunities for active participation in education or training (e.g. classroom-based skill development, numeracy and

literacy training, employability training, study skills and schoolwork techniques, or work experience) to improve participants' chances of securing employment.

The expertise of individual service providers

The research team facilitated two workshops with staff from an existing program for high-risk young people to obtain their input into the development of the standardised intervention model. These workshops were held at the University of New England (UNE) in March and May 2014. The primary purpose of the first workshop was to report the key findings from the critical review of the literature (the best available external evidence) and examine their relevance to their program. The primary purpose of the second workshop was to map their current service delivery model to the first version of the standardised intervention model that was based solely on the findings from the critical review. These workshops identified two additional program components that staff perceived as being critical to their approach to working effectively with high-risk young people. The first, *engagement*, recognises that success in the program is largely determined by the extent to which participants are actively engaged with the program, and to increase the likelihood that they attend for enough time to gain sufficient exposure to the program components. To enhance engagement, staff emphasised the importance of voluntary participation, and ensuring that young people have the opportunity to choose to participate and take ownership of their decisions. The second additional component, *Diversionary Activities*, was included after staff highlighted the importance of needing to divert high-risk young people from high-risk activities and peers (e.g. antisocial behaviour in public places) during high-risk times (e.g. late at night or during the weekends), in order to achieve both reduced short-term exposure to high-risk situations and sustained behaviour change.

Further to identifying these additional two core program components, the workshops with the service providers was used to articulate the mechanism of change for each core component: i) *effective engagement* ensures participants are exposed to a sufficient number of intervention components; ii) *case management* ensures participants' most immediate problems are prioritised (e.g. legal issues); iii) *diversionary activities* reduce participants' exposure to high-risk situations at high-risk times (e.g. late at night or on the weekend); iv) *personal development, identity, and team identity* improve participants' capacity to manage when they are in high-risk situations and create a sense of belonging and acceptance; and v) *learning and skills development* increase the opportunities for active participation in employment and greater engagement with their communities.

The application of a standardised intervention model to an existing program for high-risk young people

To demonstrate the feasibility of operationalising the proposed standardised intervention model delineated in Figure 1, it was applied to an existing program for high-risk young people called BackTrack.

Overview of the BackTrack program

The BackTrack program was established in Armidale in northern New South Wales (NSW) in 2006 (<http://www.backtrack.org.au>). It is underpinned by six key principles: i) the need for multiple program components, which recognises that participants are more likely to engage in multiple risk behaviours which can be targeted simultaneously (e.g. personal development, skills training and legal issues); ii) flexibility in the delivery of the program components, which reflects that the focus of young people's needs shifts over time; iii) flexibility in program

attendance, so that participants are able to start, leave and re-enter the program as they wish, or their life circumstances permit; iv) a requirement that young people in the program eventually actively participate in all components of the program; v) active engagement of local businesses, local media, key stakeholders (e.g. police, magistrates), and community members in delivering program elements, resolving bureaucratic problems, providing infrastructure and funds, and facilitating communication about the benefits of the program; and vi) recognition that achieving sustained change among high-risk young people will take a number of years.

Applying the standardised core components to BackTrack

The three common themes identified in the existing literature, and the additional two components identified by staff in the workshops, became the foundation for the multiple core program components within the standardised intervention model, and were used to guide the classification of existing BackTrack program activities. For example, where staff described learning activities they implemented with participants to improve their literacy and numeracy skills, these were classified as belonging to the core component of *Training and Skill Development*. A brief description of the BackTrack program activities, as they relate to the five program components, is provided below.

Core component 1: Engagement

The major engagement activity for BackTrack is called 'PawsUp'. It involves participants initially interacting with working dogs, in terms of simple unstructured play and involvement in their care. A second engagement activity is called the 'Youth Forum.' This is led by existing participants, rather than staff, and requires all new participants to agree to the ground rules of BackTrack. It specifies the consequences of failing to meet these ground rules. All participants

are encouraged to recognise the difficulties that they each face in their lives and to support each other to make BackTrack work for them, despite coming from a range of different schools, neighbourhoods, communities and cultural backgrounds.

Core component 2: Case management

The highest priority issues in the first year of BackTrack participation are typically related to legal and mental health issues. Consequently, staff will work with participants to ensure that participants have access to resources and meet their obligations (e.g. accessing Legal Aid, attending court on time in clean clothes, advocating to the magistrate on their behalf, and providing formal reports for court). This focus is combined with group tutorials on how the legal system works, and informal discussions at BackTrack, periodically attended by local police and the local Magistrate. Over time, the specific range of case management activities typically shifts from a focus on acute legal issues to improved educational attainment and employability. These activities include: 'work ready preparation' (e.g. obtaining a Tax File Number, opening and managing bank accounts, arranging appropriate transportation to work); contingency planning (supporting participants to manage challenging situations that occur in their day-to-day lives, such as housing insecurity and health issues); and, inter-agency liaison (developing and maintaining relationships with a range of agencies and key stakeholders to minimise risky situations, and optimise opportunities for training and skill development, personal development, and community integration).

Core component 3: Diversionary activities

These activities can range from supervised events in town on the weekend or in the evenings, such as trips to the town pool or local football games, to group trips away from town on the

weekends, such as camping or to participate in dog-jumping competitions. Day-to-day attendance at the program is also considered an important diversionary activity as participants are engaged in meaningful activity and surrounded by supportive peers and staff. This reduces the likelihood of them becoming bored and helps reduce their interaction with high-risk peer or family members.

Core component 4: Personal development, identity, and team identity

Many activities within this component draw on elements of motivational interviewing (Naar-King, 2011), cognitive-behavioural therapy (Spirito, Esposito-Smythers, Wolff, & Uhl, 2011), choice theory (participants can choose activities, for example, and not be concerned about being excluded from the program) (Walter, Lambie, & Ngazimbi, 2008), and mindfulness (Schonert-Reichl & Lawlor, 2010). One specific activity BackTrack implements is called 'Circle Work' which provides participants the opportunity to verbalise their feelings, instigate conversations about issues with which they are having difficulty coping, and express their hopes for the future. Other activities in this component include anger management, role-playing, mindfulness activities and regular meditation (referred to as 'chilling the brain'). These activities are applicable to both individuals and the group and can be integrated into BackTrack's day-to-day activities (e.g. chilling the brain might occur in a mini-bus on the way home from a skills-based activity).

In addition to personal development, activities within this core component provide opportunities for participants to develop a greater sense of belonging to the BackTrack team. One simple activity that operationalises this component is the provision of a distinctive BackTrack shirt, which participants are required to keep clean and wear when they are involved

in skills training and community-based activities. For some participants, BackTrack is the only aspect of their lives in which they can develop a sense of pride, achievement and responsibility for their own behaviour, which can become associated with their BackTrack shirt. Since Aboriginal Australians are over-represented in BackTrack (they represent 49% of participants despite comprising only 9% of the local population (Australian Bureau of Statistics, 2011)), cultural awareness is also embedded into all program components. Agricultural work, for example, provides an opportunity for discussion with local Aboriginal Elders about Aboriginal and non-Aboriginal methods of land management, and how these might become more closely aligned. The non-Aboriginal participants are routinely engaged in the cultural awareness activities, which builds their understanding of the long history of Aboriginal stewardship and the unique status of Aboriginal Australians as the oldest continuing culture on Earth.

Core component 5: Training and skill development

BackTrack has partnered with different agencies to provide a range of skill learning options. One example is the BackTrack School, which is taught by a qualified teacher, with a focus on developing basic literacy and numeracy skills. Although the content of the lessons is fixed, because they are legally required to be mapped to the NSW school curriculum, the format of their delivery is flexible to account for participants' concentration capacity: participants determine the length of lessons, the nature of activities which intersperse lessons (e.g. outdoor exercise or music), and the learning aids that they prefer to use (e.g. participants are encouraged to help each other with tasks and to use the 'PawsUp' dogs as reading partners so they are less threatened by their perceived poor literacy).

To complement the BackTrack School, pragmatic skills-based programs are provided in partnership with formal vocational training organisations so that young people build demonstrable, industry recognised, qualifications to improve their employability. Although the specific range of programs provided varies depending on the availability of resources and different vocational training partners, the core set of programs focus on agricultural-related skills because BackTrack is located in a rural community and the programs are designed to meet known skill shortages in the region (to optimise the likelihood that program participants will progress into employment). One skills program, called 'AgLads', requires participants to enrol in the agricultural Certificate I and II courses at the local technical college. Another program, called 'IronMan Welding', uses an on-site, fully operational welding workshop to develop skills in artistic and functional welding. Art pieces are sold in local markets and at the BackTrack shed location, while the functional components provide metal fabrication products and services for local industry, businesses, and individuals. This program requires participant enrolment in the Certificate II in Metals and Engineering course at the local technical college. Other programs have the same structure (ie: skills based and require enrolment in the relevant course at the local technical college) and focus on developing a range of other recognised skills, including first aid, occupational health and safety, small motor operation and maintenance (e.g. chainsaws and lawn mowers), and operating heavy machinery. In urban settings, programs could develop skills to meet workforce shortages in other sectors of the economy, such as hospitality, manufacturing, and retail.

To avoid the development of skills in isolation from local farmers, industries, businesses, government, and non-government organisations, and to increase the number and strength of connections between participants and their community, BackTrack also actively seeks to create

a range of potential job and work experience opportunities for participants. For example, significant flooding in 2012 provided opportunities for BackTrack participants to apply their rural skills on a volunteer basis to assist farmers to repair damage to their properties and minimise their stock losses, while bushfires in 2013 and 2015 provided an opportunity for BackTrack participants to act as refuelling volunteers for fire-fighting helicopters at the local airport (Harris, 2015; Meldrum-Hanna, 2011; Yamamoto, Uchiyama, Sakakibara, Taniguchi, & Kuwabara, 2013). Volunteering for these activities emphasises the importance of contributing to their community, and provides an opportunity to develop participants' interpersonal skills, such as teaching them to look directly at people when being introduced and to shake hands as appropriate ways of interacting with others. They also allow participants to gain these skills as a group, so they can support each other in these unfamiliar situations that they find extremely challenging. Utilising these opportunities is a clear example of the process of tailoring program activities to local circumstances, while maintaining the core program component of learning and skills development.

Discussion

This paper proposes a standardised, best-evidence intervention model that can be used by different services that provide programs for high-risk young people. Given the small number of high-quality evaluations of programs for high-risk young people that have been published in the peer-review literature, and the extent of heterogeneity of both the type of programs available and the outcome measures used to evaluate their effectiveness, increasing the extent of standardisation across programs internationally would build the evidence base by improving the ability to compare seemingly different programs across communities. This option is especially important for these programs because individually, they typically engage with a

relatively small number of high-risk young people. BackTrack, for example, only engaged 61 participants between December 2012 and June 2015. The reality of engaging a small number of participants is that it limits the ability to use rigorous evaluation designs, such as a randomised controlled trial (RCT) or the multiple baseline design (MBD) (N. G. Hawkins, Sanson-Fisher, Shakeshaft, D'Este, & Green, 2007) in any determination of program effectiveness, and it reduces the statistical power of outcome analyses that could be achieved in the evaluation of any one program. A further benefit to standardisation is that it would increase the frequency with which participants' outcomes are assessed using best-evidence measures and facilitate the pooling of results across studies in meta-analysis.

This paper proposes a pragmatic solution to key methodological limitations that are common across programs for high-risk young people. It describes an intervention model that can be standardised across services, primarily by using five common core program components that are operationalised by service-specific activities. Built on the principles of complex interventions (Bonell, Fletcher, Morton, Lorenc, & Moore, 2012; M. Campbell et al., 2000; Craig et al., 2008; Hawe et al., 2004), this model does not require that programs adhere to a prescribed set of intervention activities, but provides a common framework, within which different services can develop and implement their preferred program activities. Although this approach does require the adoption of the five core components to achieve adequate standardisation across programs (as summarised in Figure 1), individual programs would still be required to determine their own program activities to operationalise the core components, and could even add their own core components. A cultural connectedness or awareness

component, for example, might be highly valued by programs delivered in Indigenous-specific settings, or specifically for minority cultural groups.

Adoption of the intervention model delineated in Figure 1 could also help standardise the outcome measures used to assess the impact of different programs. Ideally, these measures would be embedded into the intake assessment procedures of service providers so that high-quality data are collected routinely for all program participants. Programs could augment this standard set of assessment measures with additional measures of relevance to their program. The intake assessment would need to be repeated at agreed time intervals (e.g. three, six and twelve months, then annually thereafter), and although this may impose a task on staff in addition to their regulatory reporting requirements, it could be used to provide personalised feedback to participants on their progress over time, as well as generating comparable measures of the effectiveness of programs.

At the same time that programs are routinely collecting these self-report data, researchers could develop measures of the community-level benefits of programs (e.g. reduced population rates of crime, which might occur if the high-risk young people in a community are associated with the majority of crime committed by young people in a community), as well as methods for routinely conducting economic evaluations to weigh the benefits of programs against their costs. The need for economic evaluations of these programs seems especially acute, given current systematic reviews by the authors did not identify any economic evaluations of programs for high-risk young people (Knight et al., 2016).

Conclusion

There is a clear lack of rigorous evidence to support the international uptake of programs for high-risk young people (Knight et al., 2016). This paper provides a mechanism for improving this evidence base by increasing standardisation across program components and outcome measures. It proposes a standardised intervention model comprising five core components that are required to be operationalised by individual services, by tailoring them to their available resources and practical circumstances. The feasibility of this process is demonstrated by its application to the BackTrack program. Nevertheless, given staff are likely to have a strong preference for their own, existing program, a key issue is the extent to which program providers are willing to adapt their programs to use the same core program components and the same core assessment tools, in order to achieve a substantially improved evidence-base for these programs in a relatively short period of time through pooled analysis of outcomes from their individual programs. The alternative to adopting this standardised but flexible model is likely to be a continuation of the publication of a small number of under-powered evaluations of varying methodological quality (Knight et al., 2016).

A key next step is to quantify the benefits and costs of at least one program defined using this model and, if it is promising, applying the model to multiple programs and then re-evaluating its benefits and costs across these multiple programs. This approach would strengthen the generalisability of the model because it would be informed by the expertise of service providers beyond the BackTrack program, and would give a more reliable estimate of the typical costs and benefits of these programs as they are implemented in different communities. It would also rapidly develop a larger and more rigorous evidence-base that could be used to accelerate the wider uptake of these programs which would, consequently, improve social, health, and economic outcomes for a greater number of high-risk young people. An Australian

study being undertaken by the authors will commence in 2017 to trial the generalisability of this model nationally. If it is successful, it will demonstrate the feasibility and benefits of greater standardisation across programs for high-risk young people. This new study could provide a benchmark against which future program improvements, both in Australia and internationally, can be assessed.

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Appendix A3: Published version of Chapter 4



Article

The Feasibility of Embedding Data Collection into the Routine Service Delivery of a Multi-Component Program for High-Risk Young People

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Abstract: Background: There is little evidence about how to improve outcomes for high-risk young people, of whom Indigenous young people are disproportionately represented, due to few evaluation studies of interventions. One way to increase the evidence is to have researchers and service providers collaborate to embed evaluation into the routine delivery of services, so program delivery and evaluation occur simultaneously. This study aims to demonstrate the feasibility of integrating best-evidence measures into the routine data collection processes of a service for high-risk young people, and identify the number and nature of risk factors experienced by participants. Methods: The youth service is a rural based NGO comprised of multiple program components: (i) engagement activities; (ii) case management; (iii) diversionary activities; (iv) personal development; and (v) learning and skills. A best-evidence assessment tool was developed by staff and researchers and embedded into the service's existing intake procedure. Assessment items were organised into demographic characteristics and four domains of risk: education and employment; health and wellbeing; substance use; and crime. Descriptive data are presented and summary risk variables were created for each domain of risk. A count of these summary variables represented the number of co-occurring risks experienced by each participant. The feasibility of this process was determined by the proportion of participants who completed the intake assessment and provided research consent. Results: This study shows 85% of participants completed the assessment tool demonstrating that data on participant risk factors can feasibly be collected by embedding a best-evidence assessment tool into the routine data collection processes of a service. The most prevalent risk factors were school absence, unemployment, suicide ideation, mental distress, substance use, low levels of physical activity, low health service utilisation, and involvement in crime or with the juvenile justice system. All but one participant experienced at least two co-occurring domains of risk, and the majority of participants (58%) experienced co-occurring risk across four domains. Conclusions: This is the first study to demonstrate that best-evidence measures can feasibly be embedded into the routine data collection processes of a service for high-risk young people. This process allows services to tailor their activities to the most prevalent risks experienced by participants, and monitor these risks over time. Replication of this process in other services would improve the quality of services, facilitate more high quality evaluations of services, and contribute evidence on how to improve outcomes for high-risk young people.

Keywords: high-risk young people; Indigenous; male; community-based program; embedded research; co-created research

1. Introduction

Despite being experienced as a turbulent time most young people successfully navigate adolescence and avoid any serious, long-term harms. A minority of young people, however, will experience more substantial harms associated with co-occurring risk-factors (high-risk young people), including substance abuse, low engagement in education and employment, exposure to violence and/or suicide, homelessness, participation in criminal activity, and/or incarceration [1–3]. Moreover, the presence of co-occurring risk factors has a multiplier effect, even if the causal relationship between these factors is unclear: increased frequency of substance abuse and involvement in crime, for example, is associated with disengagement from school and declining academic performance, which in turn is associated with reduced employment opportunities (as a consequence of criminal convictions and poor literacy) and increased risk of self-harm, suicide and recidivism into both juvenile and adult prisons [4–8].

Complicating the presence of co-occurring risk factors is that their aetiology is typically complex, being associated with a range of social determinants of poor health, including childhood abuse, low socio-economic status (SES) and minority cultural identity [9–11]. This complex aetiology implies that the occurrence of significant harm among young people will not be spread randomly across individuals in a population, but will cluster within defined sub-populations. Indigenous people in Australia, for example, have had a recent history of dispossession, racism, oppression and low socio-economic status which, in turn, has increased the rate with which they experience mental health and physical harms: alcohol-related suicide rates among 15–29 year old Indigenous Australians are four (males) and five (females) times higher than for non-Indigenous young people [12]; rates of all-cause alcohol-related disease and injury are more than double for Indigenous males and seven times greater for Indigenous females [12]; and more than 50% of 10–17 year old juvenile detainees are Indigenous, despite Indigenous Australians comprising an estimated 2% of the population [13,14].

Despite this harm, very little is known about ways of effectively intervening with high-risk young people: a current systematic review found only 10% ($n = 13$) of 129 evaluation studies of interventions for high-risk young people were for interventions that addressed co-occurring risk factors and more than half of the studies ($n = 7$) were rated as methodologically weak [15]. This finding mirrors those from other fields engaged in complex social or health interventions, and is likely a direct result of the complexity, cost and time involved in evaluating these types of programs, and that the focus of most service staff is on the day-to-day delivery of their program, not conducting scientifically rigorous evaluation [16–18].

One way to increase the number and quality of evaluations of services for high-risk young people is to have researchers and service providers collaborate on developing evaluations that can be embedded into the routine delivery of services so that program delivery and evaluation occur simultaneously, a process described as co-creation [19] or co-production [20]. Embedded evaluations would ideally integrate best-evidence measures into the routine data collection processes of services which, in addition to facilitating evaluation of effectiveness, would improve the accuracy with which risk factors experienced by high-risk young people accessing services are identified, allowing organisations to improve their efforts to tailor services to the specific needs of participants. Repeated application of best-evidence measures would have the added benefit of providing services with the ability to monitor the changing needs of their participants over time so they can modify their program components accordingly.

Despite the potential benefits of co-creation, services for high-risk young people do not appear to be embedding data collection into routine service delivery: outcome data for all 13 evaluations

identified in a recent systematic review were collected by members of a research team, as opposed to being embedded into the routine data collection processes of the service [15]. In order to encourage greater embedded data collection in this field, this study aims to demonstrate the feasibility of integrating best-evidence measures into the routine data collection processes of a service for high-risk young people, and identify the number and nature of risk factors experienced by the service participants.

2. Methods

2.1. Service and Setting

The service is a Non-Government Organisation (NGO), established in 2006 in a rural community in the New England region of New South Wales (NSW), Australia. Its broad objective is to provide alternative and positive pathways into adulthood for high-risk young people by providing a multi-component service that can target co-occurring risk factors. This objective is operationalised through a number of flexible activities, organised into five standardised core program components: (i) *effective engagement*, to optimise participation in the program; (ii) *case management*, to address participants' immediate and practical needs, such as attending court or homelessness; (iii) *diversionary activities*, to reduce participants' exposure to high-risk situations, such as night-time encounters with police in public places or volatile situations at home; (iv) *personal development, identity and team identity*, to improve participants' personal coping strategies when they are in high-risk situations and their sense of connection to their peers and community; and (v) *learning and skills*, to increase their opportunities for active participation in education or training likely to lead to employment.

The model of standardisation (the five core program components) with built-in flexibility (the specific activities that operationalise each component which are selected and designed by staff) provides a mechanism to both standardise the intervention across multiple communities and tailor it to the resources available in different communities. This service has been implemented in different formats for high-risk young people in five different communities. For the first community, the service was delivered in a previously disused shed donated by the local council. For the second and third communities, services were provided as an outreach model through a combination of young people attending the shed in the first community, and staff from the first community providing activities in the second and third communities. For the fourth and fifth communities, high-risk young people accessed the service on a working, but largely disused, farm.

For the purpose of this paper, the five communities were clustered into three groups based on the different service delivery models: on-site based in a shed (community one); outreach (communities two and three); and on-site based on a farm (communities four and five).

2.2. Participants of the Service

Young people are eligible to participate in the service if they: (i) reside in a community where the service is available; (ii) are aged 14–21 years; and (iii) are currently experiencing more than one of the following behavioural risk factors: involvement in criminal activity; substance use; violent behaviour; homelessness; poor mental health and wellbeing; poor engagement with school (including suspensions and unexplained absences); and un- or under-employment.

Potential participants are referred from: individuals (self-referral, family members/primary caregivers, or a community member); local schools (because they are at risk of becoming completely and permanently disconnected from mainstream education); or another government or non-government agency (e.g., police, magistrate, NSW Department of Family and Community Services). Each referral is made using a standard expression of interest (EOI) form, comprising questions about the young person's status in relation to the eligibility criteria. The EOI is reviewed by the program manager and at least two senior staff, each of whom provide a recommendation. The manager makes the final decision on placement. Young people who meet the inclusion criteria and are recommended for placement

are then interviewed by senior staff. Those who demonstrate a commitment to personal growth and appear genuinely self-motivated to participate are invited to attend the program for one week on a trial basis. If the number of suitable referrals is greater than the places currently available in the program, they are placed on a waiting list. Those who do not meet the inclusion criteria, or are not invited for a trial placement, have this decision explained to them and their referring agent by a senior staff member in a face-to-face meeting, and they are given the option of being referred to a more appropriate agency.

Trial participants become program participants if they successfully complete their trial week and attend at least four days in the first month. Participants who leave the program are welcome to recommence when it suits them, and the program manager ensures there are vacancies in the program for this eventuality. This flexibility is designed to foster ownership of decisions and personal responsibility.

2.3. Measures

Prior to establishing the NGO and researcher partnership, the service's intake procedure comprised the completion of a basic administrative form (e.g., emergency contact details), and the setting of priorities and goals for participants. Collaboration between service staff and the researchers resulted in the development of a new, practically relevant, and scientifically rigorous routine assessment tool that was embedded into the existing intake procedure to measure participants' risk factors. Acknowledging the dearth of appropriate measures of risk factors with published evidence for their reliability and validity amongst young people, let alone high-risk young people [21], this collaboration achieved a compromise between pragmatism and scientific rigor by using "best-evidence" (BE) measures of risk factors. These are psychometrically tested measures with published evidence for their reliability or validity amongst a similar youth population, or where this is not possible, a normative adult population. Where these were unavailable, but staff required the information nonetheless for program design or monitoring of participant risk factors, non-psychometrically tested assessment items were sourced from surveys that targeted a similar population (SP) group (e.g., the NSW Schools Students Health Behaviours Survey [22]). Where BE or SP assessment items could not be identified, new (N) items were developed by the researchers in partnership with staff. Assessment items were organised into demographic characteristics and four domains of risk sourced from a classification developed by the authors in a previous systematic review of services for high-risk young people [15]:

Demographic characteristics (SP): Gender, date of birth, Aboriginal or Torres Strait Islander status, and community of residence.

Education and employment (SP): Number of school suspensions in the past six months, frequency of school attendance, employment status, and receipt of a government financial benefit [22].

Mental health and wellbeing (BE, SP, and N): In line with previous research [23], a summary measure of recent suicide ideation was based on positive endorsement of one or more of five yes/no items from the Psychiatric Symptom Frequency Scale [24]: "In the past four weeks have you ever felt that life is hardly worth living?"; "In the past four weeks have you ever thought that you would be better off dead?"; "In the past four weeks have you ever thought about taking your own life?"; "In the past four weeks have you ever made plans to take your own life?"; and "In the past four weeks have you ever attempted to take your own life?". Given staff highlighted the importance of this measure as a screening tool to identify participants experiencing current suicide ideation, the time period from the original scale, which assesses suicide ideation "in the past year", was modified to assess suicide ideation "in the past four weeks". Resilience was measured using a brief 10-item version (CD-RISC-10) of the original 25-item Connor-Davidson resilience scale [25,26]. This reliable and valid scale assesses respondents' perceptions of their ability to adapt to change, to deal with unexpected events, to cope with illness, injury, unpleasant feelings or obstacles, and to remain positive in stressful situations. The CD-RISC-10 was favoured by staff over the original version because it has been administered to youth samples [27,28] and its brevity reduces its response burden. Items are scored on a scale from 0

(not true at all) to 4 (true nearly all the time) and summed to a total score ranging from 0 to 40. Higher scores reflect greater resilience. Mental distress was measured using the six-item Kessler Psychological Distress Scale (K6), where each item was again rated on a five-point scale from 0 (none of the time) to 4 (all of the time) and summed to a total score from 0 to 24 [29,30]. A score of ≥ 5 indicates moderate mental distress and a score of ≥ 19 indicates serious mental distress.

General health and wellbeing items relating to frequency of fast food consumption in the past week and frequency of physical activity in the past week were sourced from the NSW Schools Students Health Behaviours Survey [22], and a new item was developed to measure frequency of health service utilisation.

Substance use (BE and SP): Risky drinking was measured using the AUDIT-C (comprising the first three items of the Alcohol Use Disorders Identification Test (AUDIT) [31]) which has demonstrable evidence for its reliability and validity, and performs well as an abbreviated alcohol screening measure in integrated health-risk surveys delivered in non-medical, community settings [32]. Given staff indicated a high proportion of participants were Indigenous and that there was a general lack of understanding amongst participants about standard drink sizes, a modified version of the original AUDIT-C wording was used, which has proven to be acceptable to Indigenous Australians [33,34]. The third item of the AUDIT-C, which refers to heavy drinking, was also modified to reflect the Australian Alcohol Guidelines in place at the time of this study [35] (see Table 1 for relevant modifications). Responses were scored as 0–4 and summed to a total ranging from 0 to 12. Risky drinking was measured using the validated Indigenous-specific AUDIT-C cut-off scores, and defined as a score of ≥ 5 [33]. For smoking, respondents were asked if they were current, occasional, ex-, or non-smokers (SP item). Current smokers were also asked the two item Heaviness of Smoking Index (HSI): how many cigarettes per day do you smoke; and how soon after waking do you smoke your first cigarette [36]. Using the standard classifications, a HSI score of 5 or more indicated high dependence. To measure illicit drug use, an abbreviated version of the illicit drug use questions in the Alcohol, Smoking and Substance Involvement Screening Test (ASSIST) questionnaire [37] was developed to achieve a balance between standardisation and response burden. The eight ASSIST illicit drug questions (which ask about specific drug use) were summarised into five: “Have you ever used cannabis”, and if yes, “How often did you use cannabis in the past three months?”, “Have you ever used an illicit substance (that was not cannabis)?”, and if yes, “How often did you use an illicit substance in the past three months that was not cannabis?”, and “which illicit substance did you use that was not cannabis?”

Table 1. AUDIT-C—adapted wording for Indigenous Australians.

Adapted AUDIT-C Item	Original AUDIT-C Item	Response	Score
1. How often do you have a drink of alcohol?	How often do you have a drink containing alcohol?	Never	0
		Monthly or less	1
		2–4 times a month	2
		2–3 times a week	3
		4 or more times a week	4
2. When you have a drink of alcohol, how many drinks do you usually have?	How many standard drinks containing alcohol do you have on a typical day when drinking?	1 or 2	0
		3 or 4	1
		5 or 6	2
		7 to 9	3
		10 or more	4
3. How often do you have five or more drinks all in one go?	How often do you have six or more drinks on one occasion?	Never	0
		Less than monthly	1
		Monthly	2
		Weekly	3
		Daily or almost daily	4

Crime (N): Respondents were asked if they had ever committed a crime, had ever been a victim of crime, had a high risk of exposure to crime in the home (defined as having lived with someone who had ever been to prison, or having lived with someone who had been released from prison in the past 6 months), and had they ever been involved with the juvenile justice system (defined as ever having to appear in court as the person of interest, or ever having been detained in a juvenile facility).

2.4. Procedure to Optimise the Feasibility of Applying Best-Evidence Measures

The new best-evidence assessment tool was designed with several practical features to facilitate flexible implementation in a dynamic program environment. First, it was developed to be delivered by staff in electronic format via tablet or laptop. These electronic devices pique participants' interest in the assessment tool and allow staff to implement it across all three modes of service delivery. Second, it was designed so that it could be delivered in four discrete sections rather than requiring participants to complete the full assessment in one sitting. Third, a bespoke database was developed, into which assessment responses are automatically downloaded and from which pre-formatted reports can be generated. This allows staff to easily track participants' progress over time and modify program activities to their changing needs. This process also allows researchers efficient access to de-identified data from consenting participants. Fourth, to ensure the ongoing utility of the assessment tool, electronic automatic reminders were built into the database to remind senior staff when follow-up assessments were due. This replicates computerised clinical decision support systems used in health care services that have improved the performance of health practitioners [38]. The program manager attended a one-day training session, facilitated by the researchers, on the new data collection procedures and management of the database. The manager then communicated this information to staff through their usual organisational processes.

For each participant, the intake procedure is initiated at the discretion of service staff, but it must occur within one month of their trial week to ensure risk factors are defined before behaviour change commences. Prior to commencing the intake procedure, participants are assured by staff that their responses are confidential. For young people who leave before qualifying as a participant but return at a later date, the intake procedure is re-initiated.

2.5. Statistical Methods

All analyses were performed using SPSS version 22 (SPSS Inc., Chicago, IL, USA) [39]. The feasibility of integrating best-evidence measures into the routine data collection system of the program was determined by the proportion of participants who completed the intake assessment and provided research consent. The proportion of missing data for each survey item was also measured. Frequencies and percentages for participants' demographic characteristics and the different types of risk factors they report are presented as appropriate, except for participant resilience which is presented as a mean and median score. Participant age was aggregated into three categories (14 years, 15 to 18 years, and 19 to 21 years) based on anecdotal reports from the service staff that their participants were typically aged 15–18 years. Median age and the interquartile range for age were also reported. To calculate the number of risks experienced by each participant, a summary variable was created for each of the four domains of risk, based on positive endorsement of one or more of the risk factors within that domain. A simple count of the summary risk variables was calculated to represent the number of co-occurring risks experienced by each participant.

2.6. Ethical Considerations, Ethics Approval and Consent to Participate

All staff members are trained to screen for suicidal behaviours amongst participants. If, during administration of the assessment tool these behaviours are evident and the staff member feels the issue is beyond their training, the procedure is for the staff member to immediately stop the assessment, monitor their behaviour, and refer them on to a suicide call back service. If the participant does not want to talk to a staff member about this issue, and indicates he or she will not use the Suicide Call Back

Service, the staff member will ask the young person for their permission to refer them to the School Counsellor, their local Headspace office, the community health centre, or other health professional qualified to address suicide-related issues.

Ethics approval (HC13055) was granted for this study by the University of New South Wales, University of New England, James Cook University, the University of Queensland, and the NSW Aboriginal Health and Medical Research Council. Participants were informed about the research study at the beginning of the formal intake procedure. They were assured that the inclusion of their data in the research was optional, that only de-identified data would be provided to the researchers from consenting participants, and that choosing not to provide consent would not impact their relationship with program staff, or their ability to attend the program. Only participants who provided signed consent (for participants 18 years or older), or assent and parental consent (for participants 17 years or younger), were eligible to participate in the study.

3. Results

3.1. The Feasibility of Embedding Data Collection in the Routine Processes of A Service for High-Risk Young People

As shown in Figure 1, 111 young people were referred to the service between 1 December 2012 and 30 June 2015 and invited to commence a trial. Of these, 50 (45%) did not go on to qualify as a participant: 11 (10%) did not accept the invitation to trial the program; 15 (14%) completed their trial week but did not attend the required four or more days in the first month; and 24 (22%) completed their trial week but could not attend the required four or more days in the first month because the program was stopped in their community. Of the participants ($n = 61$), nine were excluded from the analysis: three because, although completing the intake assessment, the correct research consent was not obtained due to researcher error; two because, although completing the intake assessment, they did not provide their research consent; and four because they did not complete the intake assessment or provide their research consent. The final study sample size was 52 (85%) of the 61 participants.

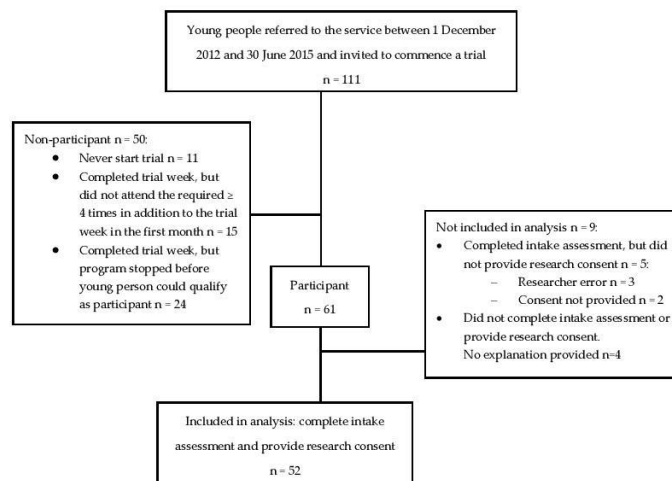


Figure 1. Flow-chart of referral to a service for high-risk young people.

Of the 19 items relating to risk factors in the intake assessment, five items (26%) were completed by all 52 participants, and 16 items (84%) were completed by at least 80% (42 or more) of participants. Three measures of risk were completed by less than 80% of participants: (i) “How often have you used an illicit substance in the past three months?”; (ii) “Have you committed a crime?”; and, (iii) “Have you been a victim of crime?”.

3.2. Demographic Characteristics and Risk Factors of Program Participants

Demographic characteristics: As reported in Table 2, 89% of program participants were male, with the majority (91%) aged 15 to 18 years. The median age was 17 years. Indigenous young people were over-represented (49%) given the Indigenous population in the New England region of NSW is 9% [40]. A similar proportion of participants received the program in each of the three formats, ranging from 25%–42%.

Education and employment: Eighty-one per cent of participants had been suspended from school three or more times in the past six months, 23% reported that they did not usually attend school, 76% were unemployed, and 19% reported that they were receiving government financial benefits.

Table 2. Demographic characteristics and risk factors of participants.

Characteristics	Participants (n = 52)		
	N	Total	%
Demographics			
Sex: Male	46	52	89
Age (years):			
14	2	45	4.5
15–18	41	45	91
19–21	2	45	4.5
Median (IQR)		17 (2)	
Identify as Indigenous	23	47	49
Communities of residence clustered by the service delivery site:			
Community 1 (on-site program based in shed)	17	52	33
Communities 2 and 3 (outreach program)	13	52	25
Communities 4 and 5 (on-site program based on farm)	22	52	42
Risk domain 1: Education and employment			
Suspended ≥3 times in past 6 months	39	48	81
Do not usually attend school	10	43	23
Unemployed	39	51	76
Receive government financial benefit	10	52	19
Risk domain 2: Mental health and wellbeing			
Experienced suicide ideation in past 4 weeks	26	47	55
Experienced moderate mental distress in past 4 weeks	28	51	55
Experienced serious mental distress in past 4 weeks	5	51	10
Resilience: Mean (Median)	24 (24)	48	
Ate fast food ≥3 times in past week	14	52	27
Do not exercise in past week	12	51	24
Last visit to health professional ≥1 year	38	48	79
Risk domain 3: Substance use			
Risky drinker	33	51	65
Current smoker	39	52	75
HSI: High tobacco dependence	9	51	18
Have tried illicit substances (including cannabis)	38	50	76
At least weekly illicit substance use in past 3 months	15	40	38
Risk domain 4: Crime			
Have committed a crime	23	37	62
Have been a victim of crime	13	34	38
High risk of exposure to crime in the home	20	46	43
Have been involved with the juvenile justice system	17	43	40

Mental health and wellbeing: Fifty-five per cent of respondents responded positively to at least one of the five suicide questions, placing them at-risk of suicide ideation, and the same proportion reported experiencing moderate mental distress in the past four weeks, whilst 10% reported serious mental distress. The mean and median resilience score was 24 out of a possible 40 (a recent study reported an average resilience score of 30 for U.S. youth populations) [27]. Twenty-seven per cent of participants reported eating fast food three or more times in the past week, 24% reported doing no exercise in the past week, and 79% had not visited a health professional for more than one year.

Substance use: Approximately two-thirds of respondents (65%) reported risky drinking according to the Indigenous specific AUDIT-C cut-off scores. Seventy-five per cent of respondents reported being a current cigarette smoker and 18% were highly tobacco dependent. Three quarters of respondents had ever tried an illicit substance (67% had only ever tried cannabis), and 38% reported at least weekly use of an illicit substance (including cannabis) in the past three months. Of these, approximately four times as many respondents reported using cannabis (34%) compared to any other illicit substance (9%). Of the respondents who did report using an illicit substance other than cannabis in the past three months, use of speed and prescription medications was reported.

Crime: Sixty-two per cent of respondents reported ever having committed a crime, 38% reported ever being the victim of a crime, 43% reported exposure to crime in the home, and 40% reported having been involved with the juvenile justice system.

Co-occurring risk. Ninety-eight per cent ($n = 51$) of participants experienced two or more co-occurring domains of risk, the median number of domains of risk experienced by participants was four, and 58% of participants experienced co-occurring risk in all four domains.

4. Discussion

4.1. The Feasibility of Embedding Data Collection in the Routine Processes of a Service for High-Risk Young People

This study demonstrates that standardised, methodologically rigorous data on participant risk factors can feasibly be collected by embedding a best-evidence assessment tool into the routine data collection processes of a service for high-risk young people: of the 61 program participants in a 19-month period, 52 (85%) completed the intake assessment, and the majority (84%) of survey items were completed by 80% of participants. The majority of program participants were male and aged 15 to 18 years, and Indigenous participants (49%) were clearly over-represented relative to their population (9%) [40]. All but one participant experienced at least two co-occurring domains of risk, and the majority of participants (58%) experienced co-occurring risk across all four domains. The most prevalent risk factors were frequent school absence (whether voluntarily or because they had been suspended), unemployment, a propensity towards suicidality, high levels of mental distress, weekly illicit substance use, risky drinking, smoking, low levels of physical activity, low utilisation of health services, involvement in crime, exposure to household members with a history of incarceration, and involvement with the juvenile justice system.

4.2. The Utility of Embedding Data Collection in the Routine Processes of a Service for High-Risk Young People

The results from this study have a number of implications surrounding the utility of the data, particularly in relation to service delivery.

First, given the benefits of tailoring interventions to the specific risk factors of participants [41,42], by demonstrating that it is feasible for services to collect rigorous data on risks experienced by their participants services are provided with an opportunity to tailor their current activities to improve the precision with which they target the most prevalent risk factors experienced by participants. For example, some of the more serious risks identified among participants of this particular program, such as mental distress and suicide ideation, suggest that providing access to evidence-based therapies such as Cognitive Behaviour Therapy and Motivational Interviewing, as well as a suicide-specific risk

assessment and response tools, such as the Suicide Assessment Kit (SAK) [43], should be a priority across all program components. Similarly, as substance use, crime, and exposure to incarceration among household members were found to be problematic, the core program component that focuses on diversionary activities could be expanded to offer emergency accommodation which is safe and secure, and has ready access to highly qualified staff. This would further reduce participants' exposure to high-risk people and situations and may reduce their levels of mental distress.

In addition to poor mental health and wellbeing, participants were found to experience risks associated with poor physical health. A tailored health and wellbeing component, which includes activities emphasising the importance of accessing and preparing nutritious food, engaging in regular exercise and having access to health professionals could be an important addition to the program. These activities could include cooking demonstrations, shopping tours that provide guidance on how to obtain relatively inexpensive, nutritious food, group exercise classes or dedicated personal training sessions, and on-site health checks delivered in partnership with local General Practitioners and/or Aboriginal Medical Services. Given the finding that 75% of participants were current cigarette smokers, two-thirds were risky drinkers and 38% used illicit substances on a weekly basis, on-site health checks would also provide opportunities for substance use cessation intervention. The over-representation of Indigenous young people in these data also suggest that all program components should include activities which emphasise the importance of, and facilitate meaningful access to, Indigenous culture, elders and traditional country.

Second, in addition to facilitating tailoring when participants commence a service, these service-specific data allow staff to monitor participant risk factors, through re-administration of the assessment tool at regular time intervals, ensuring a mechanism for the service to adapt to the changing needs of participants, whilst also providing an opportunity for staff to provide personalised feedback to participants to motivate them to maintain their change in risk behaviour [44].

Third, these regularly collected data provide an opportunity for services to measure the effectiveness of their programs whilst adjusting for baseline risk. This could be readily undertaken by research partners based in local, regional universities or in major metropolitan universities. Alternatively, the service could hire the services of a statistician, or employ an administrative person to conduct basic analyses in Microsoft Excel, which would impose minimum expense to the service.

A complementary benefit of having identified a best-evidence assessment tool that can be feasibly integrated into the routine processes of a service for high-risk young people, is that it is likely to improve the consistency with which similar programs measure outcomes, increasing opportunities to pool results to draw conclusions about the effectiveness of programs for high-risk young people.

4.3. Other Implications of This Study

The finding that nearly one quarter of participants are usually absent from school (23%) highlights the need for community-based services that can effectively engage with this small number of vulnerable young people, given they are unlikely to access programs offered through schools or other educational institutions. This finding also reinforces the importance of the skills and learning core component of this program in ensuring young people achieve at least a basic level of education.

These results also show that despite participants representing only 0.5% of young people in the region where this study was conducted, they contribute to a high proportion of crime in their communities: 62% report having committed a crime; 43% report being exposed to crime in the home; and 40% report having been involved with the juvenile justice system. This finding suggests there is scope for future studies to examine routinely collected, unit-level crime data to determine whether services for high-risk young people have an impact at the community level through reducing the incidence of youth crime and anti-social behaviour.

Finally, this study points to the utility of a strict referral procedure into the service (detailed in the Methods section), which ensures a replicable and largely objective process of referral into the service, and minimises inefficient allocation of resources to young people who are unlikely to benefit from

participation in the program. For this program, the well-defined referral procedure meant only 61 of the 111 young people referred accessed a substantial part of the program, 85% of whom completed the assessment and engaged for at least four weeks. Future evaluation of this and similar programs could establish retention rates after three, six or twelve months to further gauge the success of the intake procedure in specifically engaging with those young people who are most likely to benefit from these types of community-based programs.

4.4. Limitations

Although it is possible that not all risk factors relevant to high-risk young people have been captured in this assessment tool, it does reflect the combined knowledge of the service providers and researchers. Nevertheless, it may need to be revised to ensure it is relevant to other services for high-risk young people delivered in different settings. As was done for the intervention itself, the tension between standardising and tailoring measures could be resolved by establishing a toolbox of core measures for particular risk factors, which all services working with high-risk young people could utilise for their intake assessments. This standardised intake assessment could then be augmented with tailored measures that are of particular interest to service staff.

As the assessment tool was developed as part of a collaborative effort with program staff, trade-offs were made to reduce reporting burden on participants and to ensure that it was feasible to deliver for staff. This meant that, evidence-based assessment items were selected where available, but that it was necessary for items with no evidence-base, or with no evidence-base for young people, were developed where required. Future research could usefully establish the reliability and validity of these new assessment items for this particular sub-population of young people. Additionally, in some cases, modifications were made to existing evidence-based measures to reduce respondent burden. The ASSIST (Alcohol, Smoking and Substance Involvement Screening Test) is one such example. Although this appears to have been appropriate for this service, given the small proportion of participants who reported using illicit substances other than cannabis, it may not be appropriate for other services as it could result in the under-reporting of particular types of illicit substance use. Given the current concern surrounding methamphetamine use in Australia, for example, and evidence to suggest that the number of regular and dependent users in recent years has risen, particularly among young people aged 15 to 34 years [45], the full version of the ASSIST might be more suitable for future iterations of this assessment tool. Similarly, despite using the modified wording of the AUDIT-C, which has proven acceptable to Indigenous people, further study is required to establish the reliability and validity of these questions for high-risk young people. There is also a need to determine whether using open-ended responses for the AUDIT-C questions provides a measure of alcohol risk status that has comparable reliability and validity to the standard categorical responses in AUDIT-C that are based on the concept of standard drinks, particularly as Indigenous Australians are unlikely to conceptualise their drinking in those terms [46]. In practical terms, this is also an important consideration because open-ended questions would eliminate the need to modify the assessment tool when national guidelines [35] are updated, but response options for standardised measures, such as the AUDIT-C, remain unchanged [47].

The measures of risk that were completed by less than 80% of participants, specifically those relating to illicit substance use in the past three months, participation in crime and being a victim of crime, could have led to an under-, or over-representation of risk in the domains of substance use and/or crime. It also signals that participants might have been uncomfortable responding to these items. In future, instead of using a self-report intake assessment to collect baseline data on these risk factors, perhaps objective measures would be more appropriate (e.g., gaining permission to access participants' routinely collected, deidentified, police incident data). Obtaining this type of data would require safeguarding the identity of participants to ensure analysis was not conducted by someone with intimate knowledge of participants' histories (because this could allow re-identification even without names), such as the research partner or the statistician. This would limit the ability to use

these data for tailoring program activities to individual participant needs, but it would still be useful for overall program evaluation and identification of program priorities.

Finally, given staff in this service anecdotally reported that the intake assessment took some time to complete and was usually not their priority when faced with participants exhibiting difficult behaviour, an abbreviated version of the assessment tool could be developed using standard psychometric methods to further improve the feasibility of integrating best-evidence measures into the routine data collection processes of the service. Leveraging the partnership developed during the co-creation process, a further solution could be to have researchers deliver basic training to program staff in research methods to improve their understanding of the importance and benefits of rigorous and systematic data collection.

5. Conclusions

As highlighted by an earlier systematic review of the international literature, this is the first study to demonstrate that best-evidence measures can feasibly be embedded into the routine data collection processes of a service for high-risk young people [15]. Replication of this process in other services would improve the quality of services available for high-risk young people, facilitate a greater number of high quality evaluations of these services, and contribute much needed evidence on how to improve outcomes for high-risk young people.

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Conflicts of Interest: Two authors (Anthony Shakeshaft and Bernie Shakeshaft) are brothers. Authors Bernie Shakeshaft and Myfanwy Maple are, or have been, on the BackTrack Management Advisory Committee. Bernie Shakeshaft is the manager of the BackTrack program.

Abbreviations

The following abbreviations are used in this manuscript:

ASSIST	Alcohol, Smoking and Substance Involvement Screening Test
AUDIT	Alcohol Use Disorders Identification Test
BE	Best-evidence
CD-RISC-10	Connor Davidson Resilience Scale (10-item)
HSI	Heaviness of Smoking Index
K6	Kessler Psychological Distress Scale (six-item)
N	New item
NSW	New South Wales 0
SP	Similar population group
SAK	Suicide Assessment Kit

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Appendix B: Methodological quality of studies in Chapter 2

Critique of the methodological quality of studies in Chapter 2

<i>First author & year of publication</i>	<i>Selection bias (A)</i>	<i>Study design (B)^a</i>	<i>Confounders (C)</i>	<i>Blinding(D)</i>	<i>Data collection methods (E)^a</i>	<i>Withdrawal & dropouts (F)</i>	<i>Intervention integrity (G)</i>	<i>Analysis (H)</i>	<i>Summary rating</i>
Bannink 2014	Moderate -Source population somewhat likely to be representative of target population (i.e. selected from 14 schools). -Greater than 80% participation of source population in study	Strong Cluster RCT	Strong -Groups balanced at baseline (table provided); -Confounding controlled for in analysis	Moderate -Participants aware of their allocation status -Assessors not aware of participant intervention status	Moderate -Method: Self-report only - Self-report measures: (i) Health behaviour measures (Monitor Gezondheid - not R or V); (ii) mental health status and wellbeing (Strengths & Difficulties Quest. and the Youth Self-Report - both R & V)	Moderate -F/up rate between 60-79% -Withdrawals and dropouts not adequately described	-Consistency of intervention delivery not reported	Intent-to-treat analysis included	Strong
Cunningham 2012	Weak -Source population not likely to be representative of target population as sourced from 1 Emergency Department only	Strong RCT	Strong - Groups balanced at baseline (sample characteristics reported in previous study – reference provided) -Confounding controlled for in analysis	Moderate -Participants aware of research question and of their intervention allocation status -Assessors not aware of participant intervention status	Strong -Methods: Self-report only - Self-report measures: (i) Alcohol use (AUDIT – R & V); (ii) Alcohol consequences (POSIT – R & V); (iii) Peer violence and peer victimisation (Conflict Tactic Scale – R & V); (iv) Violence consequences (not R or V)	Strong -F/up rate >80% -Withdrawals and dropouts described	-Consistency of intervention delivery not reported	Intent-to-treat analysis included	Moderate
Faulkner 2012	Weak -Source population not likely to be representative of target population as sourced from 4 schools only -Purposefully selected to participate by student services manager	Strong CCT	Weak -Control of confounders not described	Weak -Assessor aware of participant intervention status. -Does not specify whether participants aware of their allocation status	Strong - Methods: self-report; informal interviews; observation of activities & behaviour; and analysis of school records -Self-report measure: Self-esteem (Rosenberg Self-Esteem Scale – R & V)	Strong -F/up rate > 80% - Withdrawals and dropouts described	-Consistency of intervention delivery not reported	Cannot tell if intent-to-treat analysis was conducted	Weak
Grace 2014	Weak -Source population somewhat likely to be representative of target population (i.e. selected	Strong CCT	Weak - Control of confounders not described	Weak -Assessor aware of participant intervention status	Weak - Methods: Centrelink administrative data (dollar amounts of financial support received, employment income	Strong -F/up rate > 80% - Withdrawals and dropouts described	-Consistency of intervention delivery measured via no. of contacts made with case manager	Intent-to-treat analysis included	Weak

	from 4 different geographical areas) -Randomisation of selection of participants by Centrelink staff not described -Greater than 80% participation of source population in study			-Does not specify whether participants aware of their allocation status	reported, reported cost of accommodation, and accommodation types and durations)				
Green 2014*	Weak - <60% of source population participated in RCT	Strong RCT	Strong - Groups balanced at baseline (table provided) -Confounding controlled for in analysis	Moderate -Assessor aware of participant intervention status -Participant unaware of their allocation status but aware of research question	Strong - Methods: self-report (participants and carers); interviews with participants and carers; and analysis of records and reports from services -Self-report measures: (i) Mental health and social and physical functioning (Health of the Nation Outcome Scales for Children & the Adolescents & Children's Global Assessment Scale- Both R & V); (ii) Education outcomes (Health of the Nation Outcome Scales for Children – R & V)	Weak -F/up rate <60% - Withdrawals and dropouts not described adequately	-Consistency of intervention delivery measured via monitoring of foster carers by intervention team & monitoring of program staff by intervention developers	-Intent-to-treat analysis included -Lacked statistical power to detect a plausible effect size in RCT due to small sample size	Weak
Mason 2011	Weak -Purposeful sampling of urban, African American females limits the generalizability of results - Source population not likely to be representative of target population as sourced from 1 clinic only	Strong RCT (pilot)	Strong -Groups balanced at baseline (table not provided) -Confounding controlled for in analysis	Strong -Assessor unaware of participant intervention status -Participant unaware of the research question	Strong -Methods: Self-report only -Self-report measures: (i) Risk behaviours (CDC's Youth Risk Behaviour Survey & Behavioural Assessment System for Children – both R & V); (ii) Social networks (Adolescent Social Network Assessment R & V); (iii) readiness Ruler (not R & V)	Strong -F/up rate > 80% -Withdrawals and dropouts described	-Consistency of intervention delivery not reported	Cannot tell if intent-to-treat analysis was conducted	Moderate
Poirier 2013	Weak -Participants non-randomly selected into experimental group;	Moderate Before-After quasi-experimental design with non-	Strong -Control group significantly younger than experimental group at	Moderate Blinking is not described	Strong -Methods: Self-report only. -Self-report measures: (i) Cognitive distortions (Dysfunctional Attitude Scale - R&V); (ii) Problem	Strong -F/up rate > 80% -Withdrawals and dropouts not described adequately	-Consistency of intervention delivery measured via adherence, dose and participant/parent responsiveness,	Intent-to-treat analysis not included	Moderate

	-Less than 60% of source population participated in study	equivalent control	baseline (table not provided) - Confounding controlled for in analysis		solving strategies (Problem Solving Inventory - R&V); (iii) Depressive symptoms (Centre for Epidemiologic Studies Depression Scale- R & V); (iv) School drop-out (Screening questionnaire for school drop-out - R&V)		intensity of participation		
Rhoades 2013**	Moderate Source population somewhat likely to be representative of target population -Between 60-79% participation of source population in study	Moderate Before-After	Weak (Not possible in before-after)	Weak (Not possible in before-after)	Weak -Methods: Self-report (carer and participants); and analysis of participant files -Self-report measures: neither reliability nor validity of measures described	Weak -Withdrawals and drop-outs not adequately described	- Consistency of intervention delivery not reported	Intent-to-treat analysis not included	Weak
Rohde 2012	Moderate - Source population somewhat likely to be representative of target population (i.e. 6 schools selected)	Strong RCT	Strong -Groups balanced at baseline (table not provided) -Confounding controlled for in analysis	Moderate -Participants aware of research question but not of their intervention allocation status -Assessors not aware of participant intervention status	Strong -Methods: Self-report only -Self-report measures: (i) Substance use (10 items by Stice and Barrera – R & V); (ii) Depressive symptoms (Schedule for Affective Disorders and Schizophrenia for School-Age Children –R & V)	Strong -F/u rate > 80% -Withdrawals and drop-outs not adequately described	-Consistency of intervention delivery measured via adherence and competence of implementation measures and assessment of therapist competence	Intent-to-treat analysis included	Strong
Schaeffer 2013	Moderate -Source population somewhat likely to be representative of target population (i.e. sourced from 9 treatment teams in one region) -Greater than 80% source population participated in study	Strong RCT	Strong -Groups balanced at baseline (table provided) -Confounding controlled for in analysis	Weak -Assessor aware of participant intervention status - Participants aware of research question but not of their intervention allocation status	Strong -Methods: Self-report (carer and participants); Urine testing; and analysis of police records -Self-report measures: (i)Employment/education (not R or V); (ii) substance use (Form 90 & GAIN - Substance Frequency Scale – both R & V); (iii) Mental health (Youth Self Report/Child Behaviour Checklist – R & V); (iv) Criminal activity (Self-	Strong F/u rate > 80%; -Withdrawals and drop-outs not adequately described	-Consistency of intervention delivery not reported -Youths receiving one of three evidence-based interventions for substance use and delinquent behaviour at the time of referral to study which may have influenced outcomes	Intent-to-treat analysis included	Moderate

report Delinquency Scale
– R & V)

Wiggins 2009	Weak -Participants purposefully selected to participate in intervention	Moderate Prospective matched cluster comparison (Before-After)	Moderate -Some baseline differences reported between groups at baseline due to non-random allocation (table provided) -Confounding controlled for in analysis	Weak (Not possible in before-after)	Weak -The data collection instruments or measures are not described	Weak -F/up rate <60% (at time-point 2) -Withdrawals and drop-outs not adequately described	-Consistency of intervention delivery not reported	Intent-to-treat analysis not included	Weak
Williamson 2013	Weak -Source population not likely to be representative of target population (i.e. sourced from 1 school)	Moderate Before-After (pilot)	Weak (Not possible in before-after)	Weak (Not possible in before-after)	Strong -Methods: Self-report only -Self-report measures: (i) Propensity for verbal and physical aggression ('What would make you fight' scale – R & V); (ii) Aggressive behaviour (Self-report of Behaviour Scale- R & V); (iii) Core competencies (the Core Competency Survey – R & V)	Strong -F/up rate > 80% -Withdrawals and dropouts described	-Consistency of intervention delivery not reported	Intent-to-treat analysis included	Weak
Wood 2013	Moderate -Source population somewhat likely to be representative of target population (i.e. selected from 19 schools) -Source population participation not described	Moderate Before-After	Weak (Not possible in before-after)	Weak (Not possible in before-after)	Strong -Methods: Self-report; School behaviour incidences and absences from school records; and teacher observations -Self-report measure: Self-esteem (Rosenberg Self-Esteem scale- R & V)	Moderate -Withdrawals and drop-outs not adequately described	-Consistency of intervention delivery not reported	Cannot tell if intent-to-treat analysis was conducted	Weak

^a Key to abbreviations: CCT – Clinical Controlled Trial; F/up – Follow-up; R & V – reliable and valid; RCT – Randomized Controlled Trial.

* Only the RCT reported in analysis.

** Only the primary study in the UK reported in analysis.

Appendix C: Study materials

Appendix C.1 Participant intake package (Assent)

Appendix C.2 Participant intake package (Consent)

Appendix C.3 Participant three-month follow-up survey

Appendix C.1 Participant intake package (Assent)

A decorative graphic featuring several grey paw prints arranged in a trail that curves around a central text box. The prints are of varying sizes and orientations, creating a sense of movement.

The BackTrack participant
intake package
(17 years and younger)

Date:

Participant ID:

BACKTRACK PARTICIPANT INTAKE PACKAGE: Step 1
Participant contact details

Please note: this information is for Backtrack staff ONLY. Not for research purposes. This form will be kept separate to the survey.

1. What is your full name? _____

2. What is your date of birth? _____

3. Where do you usually live? Number: _____

Street: _____

Suburb: _____

Postcode: _____

4. What is your best phone number? _____

5. What is your email address? _____

6. What is your Medicare number? If you are unsure, can you ask your parent/carer?

Can you please provide the contact details of a friend or family member that we can contact if we are unable to contact you?

7. Name: _____

8. What is their best phone number?: _____

9. Address: _____

BACKTRACK PARTICIPANT INTAKE PACKAGE: Step 2
Research assent

FOR THE PARTICIPANT

(for participants 17 years and younger)

You are making a decision whether or not to participate in the BackTrack research. Your signature indicates that, having read the Participant Information Statement:

- You understand the purposes, study tasks and risks of the research described in the project;
- You have had an opportunity to ask questions and are satisfied with the answers you have received;
- You freely agree to participate in this research study as described and understand that you are free to withdraw at any time during the project and withdrawal will not affect your relationship with any of the named organisations and/or research team members;
- You will be given a copy of this document to keep.

ASSENT (17 YEARS AND YOUNGER)

Signature of participant: _____ **Date:** _____

Witnessed by (print full name): _____

Signature of witness: _____ **Date:** _____

BACKTRACK PARTICIPANT INTAKE PACKAGE: Step 2
Research consent

FOR THE PARENT/GUARDIAN
(of participants 17 years and younger)

You are making a decision whether or not to permit your child/ward to participate in the BackTrack research. Your signature indicates that, having read the Participant Information Statement:

- You understand the purposes, study tasks and risks of the research described in the project;
- You have had an opportunity to ask questions and are satisfied with the answers you have received;
- You freely agree for your child/ward to participate in this research study as described and understand that you are free to withdraw your child/ward at any time during the project and withdrawal will not affect their relationship with any of the named organisations and/or research team members;
- You will be given a copy of this document to keep.

CONSENT (Parent/guardian)

Signature of parent/guardian: _____ **Date:** _____

Witnessed by [print full name]: _____

Signature of witness: _____ **Date:** _____

Date:

Participant ID:

BACKTRACK PARTICIPANT INTAKE PACKAGE: Step 3

Survey

Before you begin:

1. Give the 'Participant Information Sheet' to the participant to read or read it aloud
2. Check the participant understands the key points, is eligible and ensure they sign and date the consent form
3. Remind participant that all information given in this survey will remain confidential within reasonable limits (e.g. if indicate intent to harm self/others, it's our job to ensure they're ok); they are under no obligation to answer any question, and should feel free to ask questions or stop at any time.
4. Re-iterate that the researchers will not be able to identify them from the information they provide. No names or identifying information will be captured in this survey.

Section A: Questions about you

A1. On a scale of 1-10, where 1 is crap and 10 is super-duper, how do you feel about where you live?

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

Crap
duper

Super-

☐ Don't know

☐ Don't wish to answer

A2. On a scale of 1-10, where 1 is crap and 10 is super-duper, how do you feel about the school you go to?

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

Crap
duper

Super-

☐ Don't know

☐ Don't wish to answer

A3. If there is one thing you could change about your life at the moment, what would it be?

A4. What is your dream?

A5. What would you like to get out of BackTrack?

A6. On a scale of 1-10, where 1 is crap and 10 is super-duper, how useful is BackTrack to you?

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

Crap
duper

Super-

☐ Don't know

☐ Don't wish to answer

B. How have you been feeling recently?

These questions ask about how you have been feeling in the past four weeks.

On a scale of 1-5, where 1 is none of the time and 5 is all of the time, how often did you feel:

B1. ...nervous?

1	2	3	4	5
---	---	---	---	---

None of the time

All of the time

☐ Don't know

☐ Don't wish to answer

B2. ...hopeless?

1	2	3	4	5
---	---	---	---	---

None of the time

All of the time

☐ Don't know

☐ Don't wish to answer

B3. ...restless or fidgety?

1	2	3	4	5
---	---	---	---	---

None of the time

All of the time

☐ Don't know

☐ Don't wish to answer

B4. ...so depressed that nothing could cheer you up?

1	2	3	4	5
---	---	---	---	---

None of the time All of the time

☐ Don't know

☐ Don't wish to answer

B5. ...that everything was an effort?

1	2	3	4	5
---	---	---	---	---

None of the time All of the time

☐ Don't know

☐ Don't wish to answer

B6. ...worthless?

1	2	3	4	5
---	---	---	---	---

None of the time All of the time

☐ Don't know

☐ Don't wish to answer

These questions ask about how you are feeling right now.

On a scale of 1-5, where 1 is not true at all and 5 is true nearly all the time, how do you feel right now?:

B7. I am able to adapt when change occurs

1	2	3	4	5
---	---	---	---	---

Not true at all True nearly all the time

☐ Don't know

☐ Don't wish to answer

B8. I can deal with whatever comes my way

1	2	3	4	5
---	---	---	---	---

Not true at all True nearly all the time

-
- ☐ Don't know
☐ Don't wish to answer

B9. I can see the humorous side of things

1	2	3	4	5
---	---	---	---	---

Not true at all

True nearly all the time

- ☐ Don't know
☐ Don't wish to answer

B10. I believe that coping with stress strengthens me

1	2	3	4	5
---	---	---	---	---

Not true at all

True nearly all the time

- ☐ Don't know
☐ Don't wish to answer

B11. I tend to bounce back after illness or hardship

1	2	3	4	5
---	---	---	---	---

Not true at all

True nearly all the time

- ☐ Don't know
☐ Don't wish to answer

B12. I can achieve my goals

1	2	3	4	5
---	---	---	---	---

Not true at all

True nearly all the time

- ☐ Don't know
☐ Don't wish to answer

B13. When I'm under pressure, I can focus and think clearly

1	2	3	4	5
---	---	---	---	---

Not true at all

True nearly all the time

- ☐ Don't know
☐ Don't wish to answer

B14. I am not easily discouraged about failure

1	2	3	4	5
---	---	---	---	---

Not true at all

True nearly all the time

- ☐ Don't know

☐ Don't wish to answer

B15. I think of myself as a strong person

1	2	3	4	5
Not true at all			True nearly all the time	

☐ Don't know

☐ Don't wish to answer

B16. I can handle unpleasant feelings

1	2	3	4	5
Not true at all			True nearly all the time	

☐ Don't know

☐ Don't wish to answer

These questions also ask about how you have been feeling in the past four weeks.

B17. Have you felt that life is hardly worth living?

☐ Yes

☐ No

☐ Don't know

☐ Don't wish to answer

B18. Have you thought that you would be better off dead?

☐ Yes

☐ No

☐ Don't know

☐ Don't wish to answer

B19. Have you thought about taking your own life?

☐ Yes

☐ No

☐ Don't know

☐ Don't wish to answer

B20. Have you made plans to take your own life?

☐ Yes

☐ No

☐ Don't know

☐ Don't wish to answer

B21. Have you attempted to take your own life??

☐ Yes

☐ No

☐ Don't know

☐ Don't wish to answer

If you want to talk to someone other than a BackTrack staff member about how you are feeling, please contact any of the below organisations for a chat:

- *Headspace – 1800 650 890 (available 24 hours per week, 7 days a week)*
- *Suicide Call Back Service – 1300 659 467*
- *LifeLine – 13 11 14*

C. These questions ask about what it's like at your home

C1. Who is your main carer? (You can tick more than one box)

☐ Just mum

☐ Just dad

☐ Both parents

☐ Grandparents

☐ Parent and step-parent

☐ Adoptive parent

☐ Both parents

☐ Foster parents

☐ Siblings

☐ Just dad

☐ Other (please specify) _____

☐ Don't wish to answer

C2. How many people usually live in the house that you sleep in most of the time? _____

C3. How many bedrooms are there in this house? _____

C4. Do you have your own bed to sleep in each night?

☐ Yes

☐ No

☐ Don't wish to answer

D. These questions ask about how you're going at school and/or study

D1. Do you currently attend school?

- ☐ Yes (*please skip to question D2*)
- ☐ No, I don't attend school
- ☐ No, I am enrolled in distance education
- ☐ No, I am suspended
- ☐ No, I am expelled

D2. If yes, how often did you attend school in the last fortnight?

- ☐ 4-5 days of each week
- ☐ 3-4 days of each week
- ☐ 3 days or less of each week

D3. If you go to school, what year are you in at school?

- ☐ Year 7
- ☐ Year 8
- ☐ Year 9
- ☐ Year 10
- ☐ Year 11
- ☐ Year 12

D4. If you attend school, which school do you attend?

D5. Have you ever been suspended from school and if so, how many times?

- ☐ No
- ☐ Yes, 1-2 times
- ☐ Yes, 3-4 times
- ☐ Yes, 5-9 times
- ☐ Yes, 10-19 times
- ☐ Yes, 20+ times

D6. Have you ever been expelled from school?

- ☐ No, I have never been suspended
- ☐ Yes

If yes, how many times? _____

D7. Have you ever been enrolled in training?

- ☐ No
- ☐ Yes

If yes, what kind of training? _____

D8. Are you currently participating in any training?

- ☐ No
- ☐ Yes

If yes, what kind of training? _____

E. These questions ask about your general health

E1. On a scale of 1-10, where 1 is crap and 10 is super-duper, how would you rate your general health?

1	2	3	4	5	6	7	8	9	10
Crap									Super-
duper									

- ☐ Don't know
☐ Don't wish to answer

E2. What do you think about your weight at the moment?

- ☐ Too thin
☐ About the right weight
☐ Too fat
☐ Don't know
☐ Don't wish to answer

E3. How many times in the past week did you do any physical activity for at least 30 minutes that made you sweat and breathe hard? (like footy training)

- ☐ I did not do any physical activity in the past week
☐ Once
☐ Twice
☐ 3 times
☐ 4 times
☐ 5 times
☐ 6 or more times

E4. When was the last time you saw a doctor or nurse or health worker about your health for any reason?

- ☐ I have never seen a doctor, nurse or health worker
☐ In the last 6 months
☐ 6 to 12 months ago
☐ More than a year ago

E5. If I could get a doctor, nurse or health worker to give you a general health check-up to make sure everything is ok, would you be interested?

- ☐ Yes
- ☐ No

F. These questions ask about drug and alcohol use

F1. At what age did you have your first full alcoholic drink (e.g. a full can or glass, not just a sip)?

- ☐ I have never had a full alcoholic drink (*please skip to question F6*)
- ☐ Age 10 or below
- ☐ Age 11
- ☐ Age 12
- ☐ Age 13
- ☐ Age 14
- ☐ Age 15 or above

F2. At what age did you first get drunk?

- ☐ Age 10 or below
- ☐ Age 11
- ☐ Age 12
- ☐ Age 13
- ☐ Age 14
- ☐ Age 15 or above

F3. Generally, how often do you have a drink of alcohol? (e.g. a full glass or can, not just a sip)

- ☐ Once a month or less
- ☐ 2 to 4 times per month
- ☐ 2 to 3 times per week
- ☐ 4 or more times per week
- ☐ Every weekend, but not during the week

F4. Generally, when you have a drink of alcohol, how many drinks do you usually have? (e.g. 1 can of beer or 1 can of rum and coke)

- ☐ 1 or 2
- ☐ 3 or 4
- ☐ 5 or 6
- ☐ 7 to 9
- ☐ 10 or more

F5. Generally, how often do you have five or more drinks all in one go?

- ☐ Never
- ☐ Less than monthly
- ☐ Monthly

- ☐ Weekly
- ☐ Daily or almost daily
- ☐ Every weekend, but not during the week

F6. At the present time, would you consider yourself to be:

- ☐ A heavy smoker
- ☐ A light smoker
- ☐ An occasional smoker
- ☐ An ex-smoker (*please skip to question F9*)
- ☐ A non-smoker (i.e. have never smoked cigarettes) (*please skip to question F9*)

F7. How many cigarettes per day do you smoke?

- ☐ 10 or less
- ☐ 11 - 20
- ☐ 21 -30
- ☐ 31 or more

F8. How soon after waking up do you smoke your first cigarette?

- ☐ Within 5 minutes of waking
- ☐ Within 6-30 minutes of waking
- ☐ Within 31-60 minutes of waking
- ☐ After 60 minutes

F9. Have you ever used marijuana?

- ☐ No (*please skip to question F12*)
- ☐ Yes

F10. At what age did you first use marijuana (dope, weed, ganja, yandi)?

- ☐ Age 10 or below
- ☐ Age 11
- ☐ Age 12
- ☐ Age 13
- ☐ Age 14
- ☐ Age 15 or above

F11. In the last 3 months how often have you used marijuana?

- ☐ I have not used marijuana in the last 3 months
- ☐ Once or twice only
- ☐ Monthly
- ☐ Weekly
- ☐ Daily or almost daily

F12. Have you ever used a drug other than alcohol, marijuana or tobacco?

- ☐ No *(please skip to section G)*
- ☐ Yes

F13. In the last 3 months how often have you used a drug other than alcohol, tobacco or marijuana

- ☐ Once or twice only
- ☐ Monthly
- ☐ Weekly
- ☐ Daily or almost daily

F14. If yes, which other drugs have you used?

G. These questions ask about encounters with the police and legal issues

G1. Has anyone you usually live with been in prison or juvenile detention?

- ☐ Yes
- ☐ No
- ☐ Don't know
- ☐ Don't wish to answer

G2. Has that person been released from prison/juvenile detention in the last 6 months?

- ☐ Yes
- ☐ No
- ☐ Don't know
- ☐ Don't wish to answer

G3. Have you committed a crime in the last 6 months?

- ☐ Yes
- ☐ No
- ☐ Don't know
- ☐ Don't wish to answer

G4. Have you been the victim of a crime in the last 6 months?

- ☐ Yes
- ☐ No
- ☐ Don't know
- ☐ Don't wish to answer

G5. Have you been to court for something you were accused of doing in the last 6 months?

- ☐ Yes

- ☐ No
- ☐ Don't wish to answer

G6. Have you ever been to juvenile detention or jail?

- ☐ Yes
- ☐ No
- ☐ Don't wish to answer

G7. In an average week, how often would you come into contact with the Police (e.g. the Police approach you for a chat, visit you at home) _____

G8. If so, what did they want to talk about?

Thank you for taking the time to complete this survey!

Appendix C.2 Participant intake package (Consent)

A decorative graphic featuring several grey paw prints arranged in a trail that curves around a central text box. The prints are of varying sizes and orientations, creating a sense of movement.

The BackTrack participant
intake package
(18 years and older)

Date:

Participant ID:

BACKTRACK PARTICIPANT INTAKE PACKAGE: Step 1
Participant contact details

Please note: this information is for Backtrack staff ONLY. Not for research purposes. This form will be kept separate to the survey.

1. What is your full name? _____

2. What is your date of birth? _____

3. Where do you usually live? Number: _____

Street: _____

Suburb: _____

Postcode: _____

4. What is your best phone number? _____

5. What is your email address? _____

6. What is your Medicare number? If you are unsure, can you ask your parent/carer?

Can you please provide the contact details of a friend or family member that we can contact if we are unable to contact you?

7. Name: _____

8. What is their best phone number?: _____

9. Address: _____

BACKTRACK PARTICIPANT INTAKE PACKAGE: Step 2
Research consent

(for participants 18 years and older)

You are making a decision whether or not to participate in the BackTrack research. Your signature indicates that, having read the Participant Information Statement:

- You understand the purposes, study tasks and risks of the research described in the project;
- You have had an opportunity to ask questions and are satisfied with the answers you have received;
- You freely agree to participate in this research study as described and understand that you are free to withdraw at any time during the project and withdrawal will not affect your relationship with any of the named organisations and/or research team members;
- You will be given a copy of this document to keep.

CONSENT (18 YEARS AND OLDER)

Signature of participant: _____ **Date:** _____

Witnessed by [print full name]: _____

Signature of witness: _____ **Date:** _____

Date:

Participant ID:

BACKTRACK PARTICIPANT INTAKE PACKAGE: Step 3

Survey

Before you begin:

1. Give the 'Participant Information Sheet' to the participant to read or read it aloud
2. Check the participant understands the key points, is eligible and ensure they sign and date the consent form
3. Remind the participant that all information given in this survey will remain confidential within reasonable limits (e.g. if indicate intent to harm self/others, it's our job to ensure they're ok); they are under no obligation to answer any question, and should feel free to ask questions or stop at any time.
4. Re-iterate that the researchers will not be able to identify them from the information they provide. No names or identifying information will be captured in this survey.

Section A: Questions about you

A1. On a scale of 1-10, where 1 is crap and 10 is super-duper, how do you feel about where you live?

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

Crap

Super-duper

☐ Don't know

☐ Don't wish to answer

A2. On a scale of 1-10, where 1 is crap and 10 is super-duper, how do you feel about the school you go to?

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

Crap

Super-duper

☐ Don't know

☐ Don't wish to answer

A3. If there is one thing you could change about your life at the moment, what would it be?

A4. What is your dream?

A5. What would you like to get out of BackTrack?

A6. On a scale of 1-10, where 1 is crap and 10 is super-duper, how useful is BackTrack to you?

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

Crap Super-duper

☐ Don't know

☐ Don't wish to answer

B. How have you been feeling recently?

These questions ask about how you have been feeling in the past four weeks.

On a scale of 1-5, where 1 is none of the time and 5 is all of the time, how often did you feel:

B1. ...nervous?

1	2	3	4	5
---	---	---	---	---

None of the time All of the time

☐ Don't know

☐ Don't wish to answer

B2. ...hopeless?

1	2	3	4	5
---	---	---	---	---

None of the time All of the time

☐ Don't know

☐ Don't wish to answer

B3. ...restless or fidgety?

1	2	3	4	5
None of the time			All of the time	

☐ Don't know

☐ Don't wish to answer

B4. ...so depressed that nothing could cheer you up?

1	2	3	4	5
None of the time			All of the time	

☐ Don't know

☐ Don't wish to answer

B5. ...that everything was an effort?

1	2	3	4	5
None of the time			All of the time	

☐ Don't know

☐ Don't wish to answer

B6. ...worthless?

1	2	3	4	5
None of the time			All of the time	

☐ Don't know

☐ Don't wish to answer

These questions ask about how you are feeling right now.

On a scale of 1-5, where 1 is not true at all and 5 is true nearly all the time, how do you feel right now?:

B7. I am able to adapt when change occurs

1	2	3	4	5
Not true at all			True nearly all the time	

☐ Don't know

☐ Don't wish to answer

B8. I can deal with whatever comes my way

1	2	3	4	5
---	---	---	---	---

Not true at all

True nearly all the time

☐ Don't know

☐ Don't wish to answer

B9. I can see the humorous side of things

1	2	3	4	5
---	---	---	---	---

Not true at all

True nearly all the time

☐ Don't know

☐ Don't wish to answer

B10. I believe that coping with stress strengthens me

1	2	3	4	5
---	---	---	---	---

Not true at all

True nearly all the time

☐ Don't know

☐ Don't wish to answer

B11. I tend to bounce back after illness or hardship

1	2	3	4	5
---	---	---	---	---

Not true at all

True nearly all the time

☐ Don't know

☐ Don't wish to answer

B12. I can achieve my goals

1	2	3	4	5
---	---	---	---	---

Not true at all

True nearly all the time

☐ Don't know

☐ Don't wish to answer

B13. When I'm under pressure, I can focus and think clearly

1	2	3	4	5
---	---	---	---	---

Not true at all

True nearly all the time

☐ Don't know

☐ Don't wish to answer

B14. I am not easily discouraged about failure

1	2	3	4	5
---	---	---	---	---

Not true at all

True nearly all the time

☐ Don't know

☐ Don't wish to answer

B15. I think of myself as a strong person

1	2	3	4	5
---	---	---	---	---

Not true at all

True nearly all the time

☐ Don't know

☐ Don't wish to answer

B16. I can handle unpleasant feelings

1	2	3	4	5
---	---	---	---	---

Not true at all

True nearly all the time

☐ Don't know

☐ Don't wish to answer

These questions also ask about how you have been feeling in the past four weeks.

B17. Have you felt that life is hardly worth living?

☐ Yes

☐ No

☐ Don't know

☐ Don't wish to answer

B18. Have you thought that you would be better off dead?

☐ Yes

☐ No

☐ Don't know

☐ Don't wish to answer

B19. Have you thought about taking your own life?

- ☐ Yes
- ☐ No
- ☐ Don't know
- ☐ Don't wish to answer

B20. Have you made plans to take your own life?

- ☐ Yes
- ☐ No
- ☐ Don't know
- ☐ Don't wish to answer

B21. Have you attempted to take your own life??

- ☐ Yes
- ☐ No
- ☐ Don't know
- ☐ Don't wish to answer

If you want to talk to someone other than a BackTrack staff member about how you are feeling, please contact any of the below organisations for a chat:

- *Headspace – 1800 650 890 (available 24 hours per week, 7 days a week)*
- *Suicide Call Back Service – 1300 659 467*
- *LifeLine – 13 11 14*

C. These questions ask about what it's like at your home

C1. Who is your main carer? (You can tick more than one box)

- ☐ Just mum
- ☐ Just dad
- ☐ Both parents
- ☐ Grandparents
- ☐ Parent and step-parent
- ☐ Adoptive parent
- ☐ Both parents
- ☐ Foster parents
- ☐ Siblings
- ☐ Just dad
- ☐ Other (please specify) _____
- ☐ Don't wish to answer

C2. How many people usually live in the house that you sleep in most of the time? _____

C3. How many bedrooms are there in this house? _____

C4. Do you have your own bed to sleep in each night?

☐ Yes

☐ No

☐ Don't wish to answer

D. These questions ask about how you're going at school and/or study

D1. Do you currently attend school?

☐ Yes (*please skip to question D2*)

☐ No, I don't attend school

☐ No, I am enrolled in distance education

☐ No, I am suspended

☐ No, I am expelled

D2. If yes, how often did you attend school in the last fortnight?

☐ 4-5 days of each week

☐ 3-4 days of each week

☐ 3 days or less of each week

D3. If you go to school, what year are you in at school?

☐ Year 7

☐ Year 8

☐ Year 9

☐ Year 10

☐ Year 11

☐ Year 12

D4. If you attend school, which school do you attend? _____

D5. Have you ever been suspended from school and if so, how many times?

☐ No

☐ Yes, 1-2 times

☐ Yes, 3-4 times

☐ Yes, 5-9 times

☐ Yes, 10-19 times

☐ Yes, 20+ times

D6. Have you ever been expelled from school?

☐ No, I have never been suspended

☐ Yes

If yes, how many times have you been expelled? _____

D7. Have you ever been enrolled in training?

☐ No

☐ Yes

If yes, what kind of training? _____

D8. Are you currently participating in any training?

☐ No

☐ Yes

If yes, what kind of training? _____

E. These questions ask about your general health

E1. On a scale of 1-10, where 1 is crap and 10 is super-duper, how would you rate your general health?

1	2	3	4	5	6	7	8	9	10
Crap									Super-duper

☐ Don't know

☐ Don't wish to answer

E2. What do you think about your weight at the moment?

☐ Too thin

☐ About the right weight

☐ Too fat

☐ Don't know

☐ Don't wish to answer

E3. How many times in the past week did you do any physical activity for at least 30 minutes that made you sweat and breathe hard? (like footy training)

☐ I did not do any physical activity in the past week

☐ Once

☐ Twice

☐ 3 times

☐ 4 times

☐ 5 times

☐ 6 or more times

E4. When was the last time you saw a doctor or nurse or health worker about your health for any reason?

- ☐ I have never seen a doctor, nurse or health worker
- ☐ In the last 6 months
- ☐ 6 to 12 months ago
- ☐ More than a year ago

E5. If I could get a doctor, nurse or health worker to give you a general health check-up to make sure everything is ok, would you be interested?

- ☐ Yes
- ☐ No

F. These questions ask about drug and alcohol use

F1. At what age did you have your first full alcoholic drink (e.g. a full can or glass, not just a sip)?

- ☐ I have never had a full alcoholic drink (*please skip to question F6*)
- ☐ Age 10 or below
- ☐ Age 11
- ☐ Age 12
- ☐ Age 13
- ☐ Age 14
- ☐ Age 15 or above

F2. At what age did you first get drunk?

- ☐ Age 10 or below
- ☐ Age 11
- ☐ Age 12
- ☐ Age 13
- ☐ Age 14
- ☐ Age 15 or above

F3. Generally, how often do you have a drink of alcohol? (e.g. a full glass or can, not just a sip)

- ☐ Once a month or less
- ☐ 2 to 4 times per month
- ☐ 2 to 3 times per week
- ☐ 4 or more times per week
- ☐ Every weekend, but not during the week

F4. Generally, when you have a drink of alcohol, how many drinks do you usually have? (e.g. 1 can of beer or 1 can of rum and coke)

- ☐ 1 or 2
- ☐ 3 or 4
- ☐ 5 or 6
- ☐ 7 to 9
- ☐ 10 or more

F5. Generally, how often do you have five or more drinks all in one go?

- ☐ Never
- ☐ Less than monthly
- ☐ Monthly
- ☐ Weekly
- ☐ Daily or almost daily
- ☐ Every weekend, but not during the week

F6. At the present time, would you consider yourself to be:

- ☐ A heavy smoker
- ☐ A light smoker
- ☐ An occasional smoker
- ☐ An ex-smoker (*please skip to question F9*)
- ☐ A non-smoker (i.e. have never smoked cigarettes) (*please skip to question F9*)

F7. How many cigarettes per day do you smoke?

- ☐ 10 or less
- ☐ 11 - 20
- ☐ 21 -30
- ☐ 31 or more

F8. How soon after waking up do you smoke your first cigarette?

- ☐ Within 5 minutes of waking
- ☐ Within 6-30 minutes of waking
- ☐ Within 31-60 minutes of waking
- ☐ After 60 minutes

F9. Have you ever used marijuana?

- ☐ No (*please skip to question F12*)
- ☐ Yes

F10. At what age did you first use marijuana (dope, weed, ganja, yandi)?

- ☐ Age 10 or below
- ☐ Age 11

- ☐ Age 12
- ☐ Age 13
- ☐ Age 14
- ☐ Age 15 or above

F11. In the last 3 months how often have you used marijuana?

- ☐ I have not used marijuana in the last 3 months
- ☐ Once or twice only
- ☐ Monthly
- ☐ Weekly
- ☐ Daily or almost daily

F12. Have you ever used a drug other than alcohol, marijuana or tobacco?

- ☐ No (*please skip to section G*)
- ☐ Yes

F13. In the last 3 months how often have you used a drug other than alcohol, tobacco or marijuana

- ☐ Once or twice only
- ☐ Monthly
- ☐ Weekly
- ☐ Daily or almost daily

F14. If yes, which other drugs have you used?

G. These questions ask about encounters with the police and legal issues

G1. Has anyone you usually live with been in prison or juvenile detention?

- ☐ Yes
- ☐ No
- ☐ Don't know
- ☐ Don't wish to answer

G2. Has that person been released from prison/juvenile detention in the last 6 months?

- ☐ Yes
- ☐ No
- ☐ Don't know
- ☐ Don't wish to answer

G3. Have you committed a crime in the last 6 months?

- ☐ Yes
- ☐ No
- ☐ Don't know
- ☐ Don't wish to answer

G4. Have you been the victim of a crime in the last 6 months?

- ☐ Yes
- ☐ No
- ☐ Don't know
- ☐ Don't wish to answer

G5. Have you been to court for something you were accused of doing in the last 6 months?

- ☐ Yes
- ☐ No
- ☐ Don't wish to answer

G6. Have you ever been to juvenile detention or jail?

- ☐ Yes
- ☐ No
- ☐ Don't wish to answer

G7. In an average week, how often would you come into contact with the Police (e.g. the Police approach you for a chat, visit you at home) _____

G8. If so, what did they want to talk about?

Thank you for taking the time to complete this survey!

Appendix C.3 Participant three-month follow-up survey

A series of grey paw prints arranged in a trail that starts from the top right, goes down and left, then down and right, and finally down and left again, framing the central text box.

The BackTrack participant
survey
3 month follow-up

Date:

Participant ID:

BACKTRACK PARTICIPANT 3 MONTH SURVEY: Step 1

Participant contact details

Please note: this information is for Backtrack staff ONLY. Not for research purposes. This form will be kept separate to the survey.

1. What is your full name? _____

3. Where do you usually live? Number: _____

Street: _____

Suburb: _____

Postcode: _____

4. What is your best phone number? _____

5. What is your email address? _____

6. What kind of activities would you be interested in doing more of during your time at BackTrack?

Date:

Participant ID:

BACKTRACK PARTICIPANT 3 MONTH SURVEY: Step 2

Survey

Before you begin:

1. Remind the participant that all information given in this survey will remain confidential within reasonable limits (e.g. if indicate intent to harm self/others, it's our job to ensure they're ok); they are under no obligation to answer any question, and should feel free to ask questions or stop at any time.
2. Re-iterate that the researchers will not be able to identify them from the information they provide. No names or identifying information will be captured in this survey.

A. How have you been feeling recently?

These questions ask about how you have been feeling in the past four weeks.

On a scale of 1-5, where 1 is none of the time and 5 is all of the time, how often did you feel:

A1. ...nervous?

1	2	3	4	5
None of the time			All of the time	

☐ Don't know

☐ Don't wish to answer

A2. ...hopeless?

1	2	3	4	5
None of the time			All of the time	

☐ Don't know

☐ Don't wish to answer

A3. ...restless or fidgety?

1	2	3	4	5
None of the time			All of the time	

☐ Don't know

☐ Don't wish to answer

A4. ...so depressed that nothing could cheer you up?

1	2	3	4	5
---	---	---	---	---

None of the time

All of the time

☐ Don't know

☐ Don't wish to answer

A5. ...that everything was an effort?

1	2	3	4	5
---	---	---	---	---

None of the time

All of the time

☐ Don't know

☐ Don't wish to answer

A6. ...worthless?

1	2	3	4	5
---	---	---	---	---

None of the time

All of the time

☐ Don't know

☐ Don't wish to answer

These questions ask about how you are feeling right now.

On a scale of 1-5, where 1 is not true at all and 5 is true nearly all the time, how do you feel right now?:

A7. I am able to adapt when change occurs

1	2	3	4	5
---	---	---	---	---

Not true at all

True nearly all the time

☐ Don't know

☐ Don't wish to answer

A8. I tend to bounce back after illness or hardship

1	2	3	4	5
Not true at all			True nearly all the time	

☐ Don't know

☐ Don't wish to answer

These questions also ask about how you have been feeling in the past four weeks.

A9. Have you felt that life is hardly worth living?

☐ Yes

☐ No

☐ Don't know

☐ Don't wish to answer

A10. Have you thought that you would be better off dead?

☐ Yes

☐ No

☐ Don't know

☐ Don't wish to answer

A11. Have you thought about taking your own life?

☐ Yes

☐ No

☐ Don't know

☐ Don't wish to answer

A12. Have you made plans to take your own life?

☐ Yes

☐ No

☐ Don't know

☐ Don't wish to answer

A13. Have you attempted to take your own life??

☐ Yes

☐ No

☐ Don't know

☐ Don't wish to answer

If you want to talk to someone other than a BackTrack staff member about how you are feeling, please contact any of the below organisations for a chat:

- *Headspace – 1800 650 890 (available 24 hours per week, 7 days a week)*
- *Suicide Call Back Service – 1300 659 467*
- *LifeLine – 13 11 14*

B. These questions ask about how you're going at school and/or study

B1. Have you been suspended from school in the last 3 months?

- ☐ No, I was not suspended
- ☐ Yes, 1-2 times
- ☐ Yes, 3-4 times
- ☐ Yes, 5-9 times
- ☐ Yes, 10-19 times
- ☐ Yes, 20+ times

B2. Have you been expelled in the last 3 months?

- ☐ Yes
- ☐ No

B3. Did you enrol in training or start studying in the last 3 months?

- ☐ Yes
- ☐ No

C. These questions ask about drug and alcohol use

C1. Generally, how often do you have a drink of alcohol? (e.g. a full glass or can, not just a sip)

- ☐ I never drink alcohol (*please skip to question C4*)
- ☐ Once a month or less
- ☐ 2 to 4 times per month
- ☐ 2 to 3 times per week
- ☐ 4 or more times per week
- ☐ Every weekend, but not during the week

C2. Generally, when you have a drink of alcohol, how many drinks do you usually have? (e.g. 1 can of beer or 1 can of rum and coke)

- ☐ 1 or 2
- ☐ 3 or 4
- ☐ 5 or 6
- ☐ 7 to 9
- ☐ 10 or more

C3. Generally, how often do you have five or more drinks all in one go?

- ☐ Never
- ☐ Less than monthly
- ☐ Monthly
- ☐ Weekly
- ☐ Daily or almost daily
- ☐ Every weekend, but not during the week

C4. How many cigarettes per day do you smoke?

- ☐ I do not smoke cigarettes (*please skip to question C6*)
- ☐ 10 or less
- ☐ 11 - 20
- ☐ 21 -30
- ☐ 31 or more

C5. How soon after waking up do you smoke your first cigarette?

- ☐ Within 5 minutes of waking
- ☐ Within 6-30 minutes of waking
- ☐ Within 31-60 minutes of waking
- ☐ After 60 minutes

C6. In the last 3 months, how often have you used marijuana?

- ☐ I have not used marijuana in the last 3 months
- ☐ Once or twice only
- ☐ Monthly
- ☐ Weekly
- ☐ Daily or almost daily

C7. In the last 3 months, how often have you used a drug other than alcohol, tobacco or marijuana?

- ☐ Once or twice only

- ☐ Monthly
- ☐ Weekly
- ☐ Daily or almost daily

C8. If you have used other drugs in the last 3 months, which drugs have you used?

D. These questions ask about encounters with the police and legal issues

D1. Has anyone you usually live with been in prison or juvenile detention in the last 3 months?

- ☐ Yes
- ☐ No
- ☐ Don't know
- ☐ Don't wish to answer

D2. Has that person been released from prison/juvenile detention in the last 3 months?

- ☐ Yes
- ☐ No
- ☐ Don't know
- ☐ Don't wish to answer

D3. Have you committed a crime in the last 3 months?

- ☐ Yes
- ☐ No
- ☐ Don't know
- ☐ Don't wish to answer

D4. Have you been the victim of a crime in the last 3 months?

- ☐ Yes
- ☐ No
- ☐ Don't know
- ☐ Don't wish to answer

D5. In an average week, how often would you come into contact with the Police (e.g. the Police approach you for a chat, visit you at home) _____

D6. If so, what did they want to talk about?

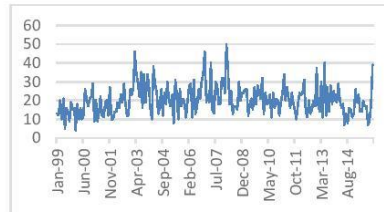
Thank you for taking the time to complete this survey!

Appendix D: Assumptions tests for Chapter 5

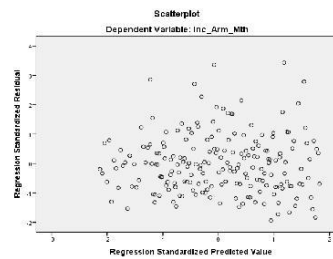
Appendix 1: Tests of assumptions and covariates of regression analysis.

Site one: Number incidents

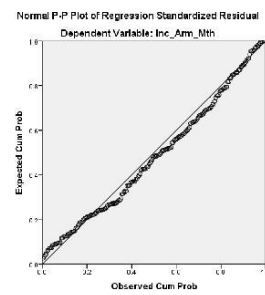
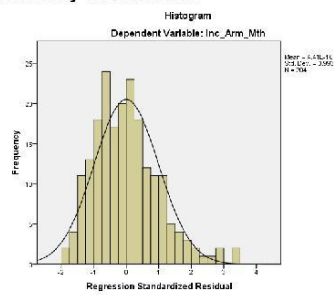
Linearity



Constant variance



Normality of residuals

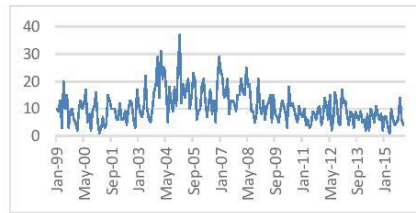


Autocorrelation

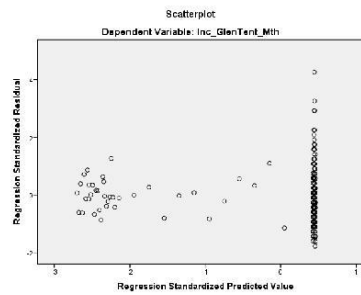
Durbin-Watson d-statistic = 1.966

Site two: Number incidents

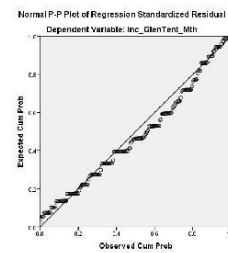
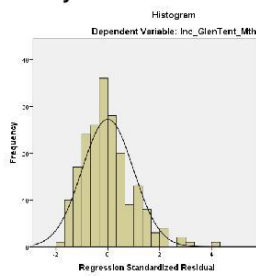
Linearity



Constant variance



Normality of residuals

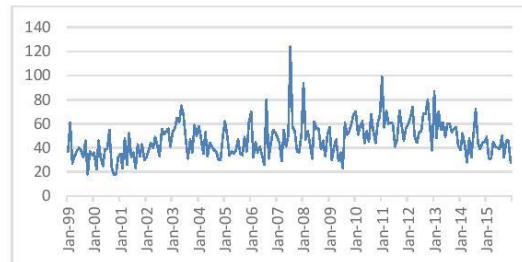


Autocorrelation

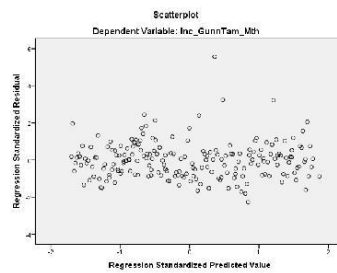
Durbin-Watson d-statistic = 1.29

Site three: Number incidents

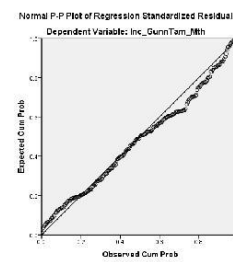
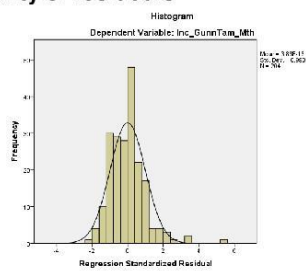
Linearity



Constant variance



Normality of residuals

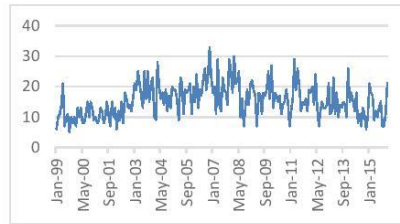


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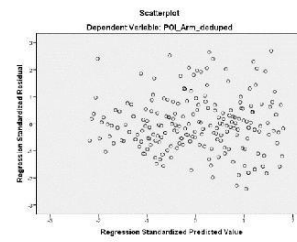
Durbin-Watson d-statistic = 1.812

Site one: Number POIs

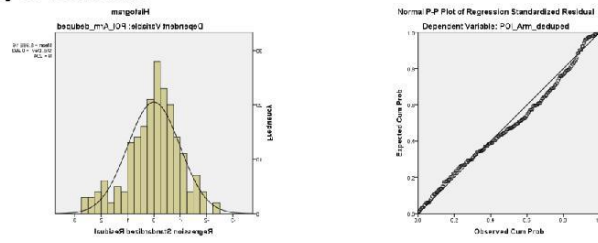
Linearity



Constant variance



Normality of residuals

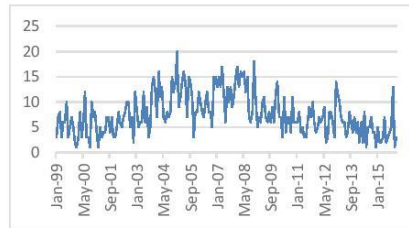


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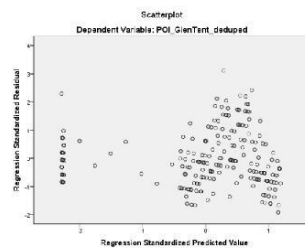
Durbin-Watson d-statistic = 1.939

Site two: Number POIs

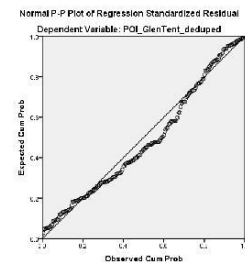
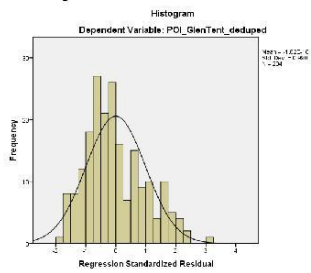
Linearity



Constant variance



Normality of residuals

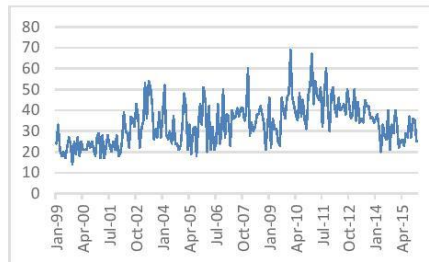


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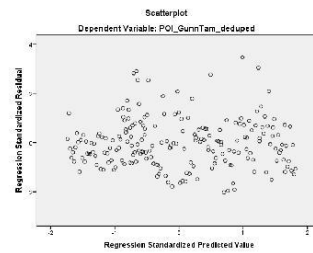
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Site three: Number POIs

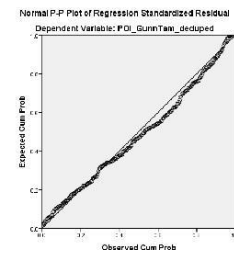
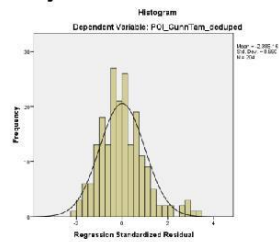
Linearity



Constant variance



Normality of residuals



Autocorrelation

Durbin-Watson d-statistic = 1.743