Feasibility of a Managed Alcohol Program (MAP) for Sydney's homeless

November 2015

Ezard, N., Dolan, K., Baldry, E., Burns, L., Day, C., Hodge, S., Cubitt, T., Loesch, B., & Mackay, T.

ST VINCENT'S HOSPITAL
SYDNEY
A FACILITY OF ST VINCENT'S HEALTH AUSTRALIA

fare
Foundation for Alcohol
Research & Education

About the Foundation for Alcohol Research and Education

The Foundation for Alcohol Research and Education (FARE) is an independent, not-for-profit organisation working to stop the harm caused by alcohol. Alcohol harm in Australia is significant. More than 5,500 lives are lost every year and more than 157,000 people are hospitalised making alcohol one of our nation's greatest preventative health challenges.

For over a decade, FARE has been working with communities, governments, health professionals and police across the country to stop alcohol harms by supporting world-leading research, raising public awareness and advocating for changes to alcohol policy. In that time FARE has helped more than 750 communities and organisations, and backed over 1,400 projects around Australia.

FARE is guided by the World Health Organization's *Global Strategy to Reduce the Harmful Use of Alcohol*[i] for stopping alcohol harms through population-based strategies, problem directed policies, and direct interventions.

If you would like to contribute to FARE's important work, call us on (02) 6122 8600 or email info@fare.org.au.

About St Vincent's Hospital Sydney

Founded in 1857 by the Sisters of Charity, St Vincent's Hospital is one of Australia's most iconic Hospitals, which functions as a full service acute public teaching hospital. Part of the NSW-based arm of St Vincent's Health Australia, the Hospital provides significant training and research activities housing several specialty units that are internationally recognised as centres of excellence.

St Vincent's Alcohol and Drug Service recognises alcohol, tobacco, and other drug use as common to societies and cultures around the word. The mission of the Service is to promote well-being and minimise the harm resulting from the use of these substances, offering a range of services to individuals and communities to achieve this.

The correct citation for this publication is:

Ezard, N., Dolan, K., Baldry, E., Burns, L., Day, C., Hodge, S., Cubitt, T., Loesch, B., & Mackay, T. (2015). *Feasibility of a Managed Alcohol Program (MAP) for Sydney's homeless.* Canberra: Foundation for Alcohol Research and Education.

---

[i] World Health Organization (2010). *Global strategy to reduce the harmful use of alcohol.* Geneva: World Health Organization.

Researcher affiliations

Investigators

Nadine Ezard, Clinical Director, Alcohol & Drug Service, St Vincent's Hospital (Principal Investigator)

Kate Dolan, Professor, National Drug & Alcohol Research Centre (NDARC), UNSW

Eileen Baldry, Professor of Criminology, Deputy Dean, Faculty of Arts and Social Sciences, UNSW

Lucy Burns, Associate Professor, National Drug & Alcohol Research Centre (NDARC)

Carolyn Day, Associate Professor, Addiction Medicine, Central Clinical School, University of Sydney

Research team

Sianne Hodge, Project and Research Coordinator, Alcohol & Drug Service, St Vincent's Hospital

Tim Cubitt, Counsellor, Alcohol & Drug Service, St Vincent's Hospital

Brayden Loesch, UNSW Forensic Masters Student

Thomas Mackay, UNSW Forensic Masters Student

Steering committee

Jenny O'Mahony, A/Program Manager, Inner City Health Program, St Vincent's Hospital

Carlos Duarte, Clinical Psychologist, Haymarket Foundation

Major Darrell Slater, Manager, Foster House, Salvation Army

Dougie Wells, Senior Project Officer, Homelessness NSW

Joseph McGarry, Counsellor, Gorman House, Alcohol & Drug Service, St Vincent's Hospital

Julie Smith, Team Leader, Matthew Talbot Hostel, St Vincent de Paul Society

Marianne Jauncey, Medical Director, Sydney Medically Supervised Injecting Centre (MSIC)

Meredythe Crane, Senior Policy Officer, Foundation for Alcohol Research & Education (FARE)

Superintendent Michael Fitzgerald, Commander, Kings Cross Local Area Command, NSW Police Force

Wendy Suma, Programs Manager, Wayside Chapel

Health economist adviser

Marian Shanahan, Health Economist, NDARC, UNSW

Acknowledgements

Contents

List of tables

List of figures

Abbreviations

AUDIT	Alcohol Use Disorders Identification Test
ED	Emergency Department
FARE	Foundation for Alcohol Research and Education
FTE	Full-Time Equivalent
MAP	Managed Alcohol Program
RCT	Randomised Controlled Trial
SOCRATES	Stages of Change Readiness and Treatment Eagerness Scale
SVH	St Vincent's Hospital, Sydney

Summary

Alcohol dependence affects almost half of Sydney's homeless adult population. Alcohol dependent homeless people experience higher rates of chronic illness, injuries and assaults, longer hospital stays, increased mortality, and higher levels of contact with the criminal justice system. Many also suffer from mental illness and alcohol-related brain injury.

Managed Alcohol Programs (MAPs) are a novel approach for delivering health and social services to a population that has not responded to or engaged with existing services. MAPs operate within homeless shelters and involve dispensing a regulated amount of alcohol at set times to those with severe and intractable alcohol dependence. MAPs currently operate in Canada, the United States of America (USA), Norway, and the United Kingdom (UK). The establishment of a MAP in Sydney has been hampered by a lack of evidence of feasibility and acceptability. This study sought to address this gap by reviewing the literature, surveying potential MAP service users, and estimating costs and service utilisation savings offered by the establishment of a MAP in Sydney.

A systematic literature review was conducted between July and September 2014. Of 1,376 records identified for screening, 14 were retained in the final analysis. The evidence base is limited, consisting largely of evaluations of small scale uncontrolled pilot programs. Results indicate reductions in alcohol use, days intoxicated, contact with police, incarceration, healthcare costs, emergency department contacts and hospital admissions. Improvements in mental health, attending healthcare appointments and receiving medical treatment were also evident. Although the scientific quality of the evidence is weak, the literature reviewed strongly suggests that MAPs may offer an important intervention for chronically homeless and alcohol dependent adults. Further research is needed to establish the evidence base and identify program attributes.

A survey of eligible homeless alcohol dependent residents of the inner Sydney short stay alcohol withdrawal service, Gorman House, was conducted from 9 July to 3 November 2014. Of the 51 participants (which were 94 per cent male, with a median age of 45 years), almost half (45 per cent) were rough sleeping, nearly all (96 per cent) had high scores consistent with alcohol dependence on the Alcohol Use Disorders Identification Test (≥ 20) [AUDIT] and reported street drinking (94 per cent). Participants were surveyed about four MAP models:

- day shelter with bring-your-own alcohol
- day shelter with one alcoholic drink provided every hour for 15 hours a day
- residential facility with bring-your-own alcohol
- residential facility with one alcoholic drink provided every hour for 15 hours a day.

The majority of respondents indicated strong interest in a MAP with a preference for the residential model (76 per cent expressed interest in the bring-your-own alcohol model and 69 per cent in a service where alcohol is provided). Willingness of respondents to pay a proportion (at least 25 per cent) of their income for the service was up to 90 per cent for a residential facility where alcohol is provided. In terms of location there was a preference for an inner city/Kings Cross area location (around a third preferred outside the city).

Findings demonstrate technical, operational, and economic feasibility of a MAP for Sydney. A 15-bed residential facility is estimated conservatively to result in a net reduction in service utilisation costs of around $480,000 per year (range $390,000-$580,000). Establishment of a rigorously evaluated MAP may herald an important policy shift in meeting the housing, social, health and welfare needs of

homeless people with ongoing severe alcohol dependence. What is required next is the development of a MAP pilot implementation plan and model of care, commencing with stakeholder analysis and engagement.

Introduction

Homeless people have higher rates of chronic illness, longer hospital stays, increased mortality, and higher levels of contact with the criminal justice system than the non-homeless population (Podymow, Turnbull, Coyle, Yetisir & Wells, 2006; Reed, 2008). Mortality, morbidity and health resource utilisation by this group is predictably high, with homeless persons occupying hospital beds at four times the rate of the general population (Chin, Sullivan & Wilson, 2011; Silins, Sannibale, Larney, Wodak & Mattick, 2008). In many instances, admissions could have been avoided with timely care in the ambulatory setting.

The highest concentration of rough sleepers in New South Wales (NSW) is located in the City of Sydney. About 30 per cent of homeless persons admitted to St Vincent's Hospital have a primary diagnosis related to alcohol and/or drug problems (Chin, Sullivan & Wilson, 2011). Recent estimates suggest that up to 44 per cent of homeless people in Sydney are alcohol dependent (Taylor & Sharpe, 2008).

Alcohol dependence is a serious and sometimes fatal condition. Half (50 per cent) of those with alcohol dependence are expected to go into remission within 16 years from the onset of dependence (Heyman, 2013). A smaller percentage (15 per cent) will continue to drink heavily well past their sixties. Among this group are likely to be an even smaller percentage of people whose alcohol dependence never remits and who ultimately die as a direct (such as cirrhosis of the liver) or indirect (such as injury) result of alcohol use.

Homeless people who are alcohol dependent cannot have all their needs addressed by an abstinence-based housing system. In Australia, most short and medium term shelters and housing programs targeting the homeless typically require abstinence. Such a system has been linked to increased drinking immediately prior to entering shelters to avoid "wasting" alcohol as drinking is prohibited (Podymow et al., 2006; Larimer et al., 2009). Enforced abstinence may contribute to additional harm due to withdrawal from alcohol contributing to alcohol-related seizures and acquired brain injury.

Due to the significant challenges involved in providing health and welfare services to transient and often inveterate street drinkers, a variety of non-abstinence-based approaches to managing chronic alcohol dependence have begun to emerge (Kidd, Kirkpatrick & George, 2011). The evolution of these new approaches has been described as a significant policy shift in meeting the housing, social, health and welfare needs of homeless persons with ongoing alcohol use problems and who are unwilling or unable to interrupt their drinking habits (Van Wormer & Van Wormer, 2009).

A number of day shelters and hostels allowing alcohol use on site were established in the UK by the 1980s. Operating from a harm reduction perspective, they promoted access to healthcare and a safe environment. These came to be termed 'wet shelters' where alcohol consumption was permitted on site, and 'damp shelters' where intoxication but not consumption of alcohol was tolerated. More recently, such approaches have been incorporated into housing first programs, which have a low threshold for admission and prioritise housing over abstinence.

A novel intervention is the MAP. MAPs involve the onsite supervised administration of measured doses of beverage alcohol[ii] at fixed time periods to people with severe and intractable alcohol dependence (Reed, 2008; Stockwell, Chow, Vallance & Perkin, 2013). This population is characterised by repeated attempts at treatment of alcohol use disorder, with little impact. MAPs were pioneered in Canada where alternatives to abstinence-based approaches were sought due to homeless, dependent alcohol consumers being at risk of significant harm during the Canadian winter. Unlike other approaches to managing alcohol dependence, there is no mandate that requires residents to stop drinking to receive treatment or housing as would be expected of people being admitted for traditional detoxification and supported accommodation programs.

These service model approaches are summarised in Table 1.

Table 1. Service model overview

Model	Description	Purpose
Dry shelter **Residential**	Alcohol consumption is not permitted.	Provide basic necessities such as accommodation and food only
Housing first (wet shelter) **Residential/day shelter**	Consumption of alcohol is permitted but is not supplied or monitored by the service.	Provide accommodation and food. Low threshold for admission. Alcohol use is not a barrier, allowing better access to services to alcohol dependent individuals.
Housing first variation **Residential/day shelter**	Housing service will manage participants' alcohol, however the alcohol must be purchased and supplied by the individual.	Alcohol is supplied by and then dispensed to the participant at negotiated intervals. This allows for the participant to be assessed for intoxication at regular intervals.
Managed Alcohol Program **Residential/day shelter**	Beverage alcohol is provided to participants throughout the day; this is actively managed and subject to ongoing assessment. Exchange of non-beverage alcohol (such as methylated spirits, hand sanitiser) for beverage alcohol.	Provides accommodation, food and access to healthcare and psychosocial supports to those dependent on alcohol. Assessment of intoxication at regular intervals.

Although MAPs operate in Canada, the USA, Norway, and the UK and evidence of success is accumulating (Stockwell et al, 2013), there are currently no MAPs operating in Australia. MAPs may have a place as one of a range of effective services to address the health and social needs of the

---

[ii] Beverage alcohol refers to alcohol intended for beverage consumption. Products such as mouthwash, hand saniser, cooking wine, and vanilla essence contain alcohol but are not intended for beverage consumption. Ingesting non-beverage alcohol can lead to intoxication and overdose (toxicity). Despite these risks some elect to consume non-beverage alcohol due its high alcohol content and because it is relatively affordable and readily available.

homeless alcohol dependent population in Sydney. However, there is no evidence regarding the feasibility of a MAP for the City of Sydney.

Study aims and objectives

The aim of this study was to explore the feasibility of establishing a MAP in Sydney to improve the health and housing status of Sydney's homeless.

The study hypothesised that establishing a MAP for Sydney would result in more efficient use of community resources.

The primary objective of this study was to determine the attributes of a MAP and whether a MAP is technically, operationally and economically feasible for the City of Sydney.

Study design

There were two parts to the study:

- Literature review: A comprehensive literature search was conducted to review the range of existing models and their outcomes. Additional data were obtained by correspondence with key personnel who manage MAPs in other countries. Data derived from the literature were used to inform estimates of change in service utilisation costs associated with a MAP.

- Gorman House survey: One-on-one structured interviews were conducted with sequential eligible consenting residents to describe characteristics of potential service users, to quantify the severity of alcohol dependence in the target population and assess their interest in using a MAP and the acceptability of different MAP models. To inform cost estimates, participants' Gorman House admission data, St Vincent's Hospital admission data and emergency department presentation data (including number of presentations) were collected.

Literature review

Co-occurring homelessness and alcohol dependence has become an increasingly salient issue in the landscape of Australian healthcare, spurred partly by reduction in homelessness services throughout Sydney (Moore, 2014). Homeless people with co-occurring alcohol dependence are vulnerable to a range of health and social harms.

Homeless individuals occupy hospital beds at a rate of four times that of the general population (Chin et al., 2011). The mortality rate of homeless men and women is between three and four times higher than that of the general population in NSW (Babidge & Butler, 2001). Alcohol dependent, homeless individuals are at increased risk of harm relative to the general population. In considering the paucity of services available to address these issues, exploration of alternative approaches is necessary.

MAPs are emerging overseas as an innovative model of care to meet the complex needs of this demographic. MAPs provide secure housing for homeless, alcohol dependent persons without the necessity for abstinence prior to admission. MAPs involve the administration of standardised doses of beverage alcohol at set time periods to those with severe and intractable alcohol dependence. Facilitating contact with medical and psychosocial services (Collins et al., 2012) is also a key feature of the program design.

To date, MAPs have been introduced as an innovative service model to address pressing needs of homeless populations and have not been subject to rigorous research. There is a lack of high grade

evidence in the peer reviewed literature (Muckle, Muckle, Welch & Tugwell, 2012). Reasons for this include, in addition to resource constraints, ethical and logistical barriers which need to be overcome in studying such vulnerable heterogeneous populations with complex needs. We sought to assess the real-world application of MAPs by conducting a review of the literature to include evaluations, pilot programs, peer reviewed studies and the grey literature. The aim of this review is to assess evidence on the impact and outcomes of established MAPs on homeless, alcohol dependent individuals to inform the development of a MAP in Australia.

Methods

A literature search was conducted between July 2014 and September 2014. The following databases were utilised throughout this search: Medline (OVID), Healthline (OVID), Psycinfo (OVID), and CINAHL (Ebsco). Only literature from 1950 onwards was included. Further data were obtained through contact with MAP service providers, sociological abstracts and grey literature.

The following keywords and terms were used in all stated databases: Alcohol*(or alcoholism, alcoholics); alcohol use; alcohol dependency; alcohol abuse; chronic alcohol dependence; chronic public inebriates, homeless* (or homelessness, homeless persons); street drinker; program, housing; shelter; intervention; managed alcohol; managed alcohol program; wet shelter; wet house; wet hostel; damp shelter; harm reduction.

Selection for this systematic review was performed through standardised un-blinded assessment by three independent reviewers. Disagreements regarding study selection were infrequent and resolved by means of consensus. Studies were selected through database search and subsequent individual review. Articles were initially identified for potential relevance, and short listed for full analysis. Initial screening consisted of searching for studies involving homeless, alcohol dependent individuals. Articles were only excluded in the case that abstracts failed to explicitly specify these two populations.

Retained studies were assessed for whether a MAP was operational or evaluated. Selected studies included; pilot studies, evaluations of pilot studies or established programs, effect of MAPs on the wider healthcare system, implications of MAPs regarding criminality and housing retention/outcomes of such programs.

Findings

Of the 1,376 records screened, 89 were retained for full text review and 14 retained in the final analysis. A summary of these studies can be found in Table 2. The level of evidence was generally weak according to standard measures of quality of evidence. Four studies addressed pilot MAPs for homeless people, one on 'housing first' initiatives, and two on the effect of MAPs on other healthcare services. Seven articles were included from the grey literature (including evaluations, cost savings analysis, and service descriptions). Eight were from Canada, three from the USA, one each from Ireland and the UK. Five studies used qualitative methods, four used quasi-experimental mixed methods, one was a case study and two conducted secondary data analysis.

Table 2. Summary of retained studies

Author, year	Study design	Study location	Study sample	Outcome measure	Results
Collins et al 2012	Multi-phase qualitative evaluation.	USA	75 chronically homeless, alcohol dependent individuals	Thematic analysis of MAP staff and participant qualitative reporting.	Motivations for alcohol use shown, positive experience of MAP service reported.
Collins et al 2012b	Secondary analysis of a multi-phase qualitative interview design.	USA	75 chronically homeless, alcohol dependent individuals.	Treatment attendance, recognition and taking steps in SOCRATES scale.	Treatment attendance has a positive correlation with SOCRATES measures and improved alcohol outcomes.
Duffin 2006	Qualitative interviews.	Ireland	8 industry professionals, 1 service user.	Alcohol consumption, instances of police contact.	Alcohol consumption significantly reduced per day, stakeholder and participant groups showed consensus in support for MAP model.
Kesselring 2013	Qualitative interviews.	Canada	114 individuals who drink non-beverage alcohol or support someone who does.	Focus group consensus, thematic analysis of outcomes from group sessions.	Strong outcomes regarding positive effects of MAPs, hesitance as to how a MAP might be received by the community local to it.
Kidd et al 2011	Longitudinal instrumental case study.	Canada	1 alcohol dependent, homeless male	Quality of life improvement.	Self-rated improvement in a range of social and psychological areas.
Larimer et al 2009	Uncontrolled before and after study.	USA	134 chronically homeless, alcohol dependent individuals.	Healthcare costs before and during MAP engagement, alcohol consumption.	Significant reduction in healthcare use and costs, reduction in alcohol use.
London Homeless Coalition 2011	Secondary data analysis.	UK	Population level data.	Cost savings estimates.	Estimated cost reductions due to reduction in policing, emergency and medical service contacts.

McNeil et al 2012	Qualitative interviews	Canada	54 MAP staff across several sites.	Improvements in barriers to end of life services.	Thematic evidence of MAPs improving access to services.
Pauly et al 2013	Quasi-experimental mixed methods design	Canada	38 chronically homeless, alcohol dependent individuals with high rates of police contact.	Changes in contacts with the police, emergency admissions.	Reductions in police contacts, instances of incarceration and hospital admissions over the course of the MAP.
Podymow et al 2006	Uncontrolled before and after study	Canada	17 alcohol dependent, homeless individuals.	Alcohol consumption, frequency of ED visits.	Reduction in both measures.
Podymow et al 2006b	Quasi-experimental mixed methods design	Canada	140 chronically homeless individuals with alcohol or mental health diagnoses.	Access to medical and social services.	Improved access to housing, significantly improved access to medical services.
Reed 2008	Secondary data analysis	Canada	Population level data.	Community police, hospital, ambulance health data.	Majority of at risk users shown to not be seeking treatment, MAPs estimated to reduce police, and health contacts.
Stockwell et al 2013	Quasi-experimental mixed methods design	Canada	14 chronically homeless, alcohol dependent individuals. 7 MAP staff members.	Alcohol consumption, connection to services, self-rated health.	Reduction in non-beverage alcohol consumption, improvements in connection to services and mental health.
Stockwell et al 2014	Quasi-experimental mixed methods design	Canada	7 chronically homeless, alcohol dependent individuals.	Non-beverage alcohol use, alcohol-related harms.	Reduction in non-beverage alcohol use, reduction in financial, crime and medical related harms.

Further details on each of the retained studies can be found in Appendix A.

Service model findings for the four studies describing services are summarised in Table 3. Three were in Canada and one in the USA. All were residential (ranging from 7-75 beds) for both men and women; the proportion of men was far greater than for women. The Canadian services had a sizeable proportion of Aboriginal people. A range of models is described. Services provide a regulated amount of alcohol every hour for 12 to 15 hours a day. This amount is largely set at one standard drink per hour. Clients elect whether to attend or not and are declined alcohol if assessed to be intoxicated.

Some services allow clients to bring their own alcohol to be dispensed back to them, other MAPs purchase alcohol for residents; other MAPs exchange non-beverage alcohol, for example methylated spirits or alcohol based hand wash, for wine or beer; and one service engages the clients in home brewed wine (to avoid contravening local regulations around alcohol provision) (London Homeless Coalition, 2011). Most services offered permanent housing; one service provided a two-step process with a short stay in a stabilisation unit followed by transition to permanent accommodation (London Homeless Coalition, 2011).

Table 3. MAP models in retained studies

Author, year	Location	Service model (day/ residential)	Residents (age, gender, ethnicity, duration of homelessness)	Administration of alcohol	Staffing
Collins et al, 2012	Northwest, USA	Residential	Participants: 75 Demographics: N/A	Alcohol volunteered to staff was re-administered based on alcohol management plan.	16 full-time staff composed of: project manager, residential counsellors, a nurse and on-call counsellors.
Pauly et al, 2013	Thunder Bay, Canada	Residential	Participants: 38 Age: 39 Gender: 15 female, 23 male. Aboriginal: 38 Homeless: 100%	Mean of 9-11 standard drinks per day while on program.	N/A
Podymow et al, 2006	Ottawa, Canada	Residential	Participants: 17 Gender: 15 male, 2 female. Age: 50.7* Aboriginal: 1 Homeless > 2 years: 94%	Hourly on demand from 0700-2200.	N/A
Stockwell et al, 2013	Vancouver, Canada	Residential	Participants: 7 Gender: 5 Male, 2 Female Aboriginal: 6 Homeless: 100%	1 standard drink per hour for a maximum of 12hrs per day unless participant is impaired or ill.	N/A

N/A=Not available

Outcome data were presented in six studies. Table 4 summarises quantitative estimates in change in alcohol use, criminal justice contacts, emergency department presentations and healthcare utilisation from these studies. Data suggests that MAPs result in reduced alcohol consumption (Podymow et al, 2006; Larimer et al., 2009; Stockwell et al., 2013) and emergency service contacts (London Homeless Coalition, 2011; Pauly et al., 2013) and hospital admissions (Larimer et al., 2009; Pauly et al., 2013), with concomitant reductions in healthcare costs (Larimer et al., 2009). The findings show that MAPs can facilitate engagement with medical and social services. Treating health problems early in primary care can prevent many hospital presentations for more severe illness. Yet homeless people who are

alcohol dependent are unlikely to be engaged in primary care. As a result, healthcare services prior to the introduction of a MAP were expensive as they were largely delivered through hospital and emergency department. The high cost to healthcare services prior to introduction of a MAP may be attributed to the barriers (including discrimination by service providers) experienced by homeless alcohol users for whom primary care may promote hospital avoidance. Improved social interaction and pro-social activity has also been observed from MAPs, with long term health and wellbeing benefits (Kidd et al., 2011; Muckle et al.,2012) and stabilisation of mental health (Stockwell et al., 2013). In addition to the health benefits, there is some evidence that clients' police contacts and incarceration are reduced (Van Wormer & Van Wormer, 2009; Stockwell et al., 2013). Qualitative evidence from service users and staff from established MAPs showed satisfaction with the service and improvement in quality of life (Kidd et al., 2011).

Table 4. Quantitative outcome data from MAP studies

Outcome (source)	Result
Alcohol-related	
Alcohol consumption, standard drinks (1)	Decrease from 46 at baseline to 8 standard drinks per day at follow up, p=0.002
Treatment attendance (16)	Correlation between SOCRATES scale and improved alcohol use outcomes, p=0.001
Days intoxicated per month (7)	Decrease from median 28 at baseline to 10 at 12-month follow up, p=0.003
Alcoholic beverages consumed, standard drinks/day (7)	Decrease from 15.7 to 10.6 standard drinks per day (no test of significance)
Instances of contact with police	
Average number of police contacts per month (1)	Decrease from 18.1 to 8.8, p=0.018
Police contacts, total (1)	Reduced by 51%, p=0.018
Police contacts leading to custody (21)	Reduced by 43%, p<0.0001
Number of instances of being held in custody per 100 days (21)	Reduced from mean 4.77 to 2.79, p=0.0001
Emergency department contacts	
Emergency department contacts (19)	Reduced by 93% (no test of significance)
Cost to healthcare services (7)	Decreased from $4,066 to $1,492 per person per month in first 6 months housed. Reduces to $958 per person, per month at 12 months housed
Hospital admissions per 100 days (21)	Reduced from 0.38 to 0.24, p=<0.05 (one tailed)
Medical treatment	
Treatment for medical issues (22)	83% treated for a medical issue
Facilitated in keeping medical appointments(22)	89% received transport to healthcare appointments
Improved or stabilised mental health on self-report (10)	Increased by 71%

Discussion

Although the scientific quality of the evidence is weak, the articles retained for this review suggest that MAPs may offer an important intervention option for homeless and alcohol dependent adults, where treatment has not been successful for this group and options are limited. These findings pertain to residential MAPs. Day shelters offering alcohol have been mentioned in the literature, but models described in the articles retained for review were residential (Table 3). Although housing only provision is associated with some reduction in alcohol consumption (Collins, Malone & Larimer, 2012; Van Wormer & Van Wormer, 2009), reductions are not as great as those associated with MAPs (Podymow, Turnbull, Tadic & Muckle, 2006). Indeed, several services report that some residents stop drinking alcohol altogether after some months in the service (London Homeless Coalition, 2011).

Given the noted bidirectional relationship between homelessness and alcohol and drug use (O'Toole, Hanusa, Freyder, Conde & Fine, 2004), exclusive services provide limited access to at risk potential clients. Despite detoxification and aftercare being considered the best treatment response for this demographic (either residential or day programs), ongoing compliance to abstinence-based programs is low (Castaneda, Lifshutz, Galanter, Medalia & Franco, 1992). As a result of this developing literature, the response to the homeless, alcohol dependent population has undergone an important progression. Alternative approaches are emerging, based on the concept that it is ineffectual to require alcohol use to be addressed prior to the provision of housing (Pauly, Schactman & Belle-Isle, 2011). Indeed, provision of housing may contribute to arresting the development of further substance use and/or mental health issues (Edens, Mares, Tsai & Rosenheck, 2011).

MAPs are restricted to those experiencing chronic homelessness and alcohol dependence and have been developed to improve outcomes for this population. MAPs can provide stable housing for homeless, alcohol dependent individuals, without the requisite of abstinence for admission. In combination with the provision of stabilised housing, MAPs administer standardised doses of beverage alcohol at set intervals. Largely this will account for a reduction in alcohol consumption, and certainly a reduction in risky behaviours such as consuming non-beverage alcohol (Stockwell et al., 2013). As a consequence of concurrently providing housing and addressing participants' alcohol use issues, other medical and social issues are addressed. A reduced exposure to harms associated with homelessness is noted (Robinson, 2010; Larney, Conroy, Mills, Burns & Teesson, 2009). Improved contact with medical and psychosocial services (Pauly et al., 2013; Podymow et al., 2006) is also evident due to the MAP design facilitating healthcare contacts.

The most significant limitation of current work in this area is the lack of high grade experimental evidence on the efficacy of the MAP model (Muckle, Muckle, Welch & Tugwell, 2012). It is also important to note limitations in the generalisability of findings from the range of social and geographical settings reviewed here. For example, data from Canada, the USA and UK may reflect extremes of winter weather not relevant to Australia. Nevertheless, existing services that provide accommodation for homeless people do not meet demand which suggests that homeless people with alcohol dependence may likely be interested in a model of care which incorporates shelter. It is unknown how the learnings from the cultural context of services for Aboriginal populations in Canada can be applied to the Australian context.

Conclusion

Homeless, alcohol dependent individuals are subject to service barriers and are at increased risk of co-occurring and often untreated medical issues. The MAP model has been successfully established in Canada and the USA to address the health and social needs of this population. There is some (albeit

weak) evidence to suggest that MAPs provide housing stability, facilitate reduction in alcohol intake, reduce barriers to medical and social services, and significantly reduce social and medical service utilisation costs to the community. The MAP approach is aligned with the harm reduction framework (Van Wormer & Van Wormer, 2009; Evans, 2012). Based on the literature available, MAPs may represent an effective and appropriate response option to the complex co-occurring issues of homelessness and dependent alcohol consumption.

Survey of homeless alcohol dependent adults

Background

In order to better understand the need for and attributes of a MAP for the City of Sydney, and to conduct estimates of service utilisation costs, we surveyed homeless alcohol dependent adults on the severity of alcohol dependence and their willingness to attend a MAP.

Methods

Structured face-to-face interviews were conducted with sequential eligible residents of Gorman House withdrawal service, a 20-bed short stay residential unit of St Vincent's Hospital in Sydney, from 9 to 30 July 2014, and from 3 September to 3 November 2014. Eligible participants included both male and female homeless adults (aged at least 18 years) who identified alcohol as being their principal drug of concern, who met homelessness criteria, and who had been in the unit for the past two to three days. The later criterion was introduced to ensure consent was not compromised by acute withdrawal.

For the purposes of this study, homelessness was operationally defined as those individuals who fit into one of the following three categories:

- **Primary homelessness**: People without conventional accommodation (living on the streets, in deserted buildings, improvised dwellings, under bridges, in parks, etc.)

- **Secondary homelessness**: People moving between various forms of temporary shelter including friends and relatives, emergency accommodation, youth refuges, hostels and boarding houses. Secondary homelessness also includes people staying in boarding houses on a short-term basis, defined as 12 weeks or less.

- **Tertiary homelessness**: People living in single rooms in private boarding houses without their own bathroom, kitchen or security of tenure provided by a lease. This also referred to people who live in boarding houses on a medium to long term basis, operationally defined as 13 weeks or longer.

Exclusion criteria included:

- English language skills were insufficient to understand the consent process or the research questions

- inability to provide informed consent due to the presence of severe cognitive impairment, or the presence of major medical or psychiatric condition.

See Appendix B for questionnaire. The study received Human Research Ethics approval from St Vincent's Hospital Human Research Ethics Committee (LNR/14/SVH/165, LNRSSA/14/SVH/210). Interviews were conducted by one of four interviewers. Responses were recorded electronically on a computer tablet during the interview using Surveymonkey® (SurveyMonkey, Palo Alto, Califormia).

De-identified secondary data on participant demographics and service utilisation were collected from the hospital electronic records systems. Data were de-identified and analysed for simple proportions using Excel® (Microsoft Corporation, Redmond, Washington). Pseudonyms are used in the report.

Findings

A total of 233 Gorman House residents were screened during the data collection period of 9 July 2014 to 3 November 2014. Of this, 91 people were identified as potentially eligible and were approached for inclusion. Following further screening, 40 people were excluded leaving a sample of 51 participants. Reasons for exclusion were: discharge (n=15), individual declined to participate (n = 10), individual did not fully meet the eligibility requirements when approached (n = 6), and other reasons, such as cognitive impairment, hearing impediment, language barriers (n=9).

The characteristics of the 51 participants interviewed are presented below in Table 5. The median age of the sample was 44 years (range: 30-66 years). Of the sample the majority was male (94 per cent), born in Australia (80 per cent), identified English as their preferred language (88 per cent), and did not identify as Aboriginal and/or Torres Strait Islander (76 per cent).

Table 5. Participant demographic characteristics (n=51)

Variable	*n*	%*
Gender		
Male	48	94
Female	3	6
Age in years		
(median, range)	44	30-66
Country of birth		
Australia	41	80
Canada	1	2
Croatia	1	2
Fiji	1	2
France	1	2
Germany	1	2
Kenya	1	2
South Africa	1	2
United Kingdom	1	2
Unknown	2	4
Preferred language		
English	45	88
Unknown	6	12
Aboriginal or Torres Strait Islander		
Yes	3	6
No	39	76
Unknown	9	18

*Total may not equal 100 per cent because of rounding

Participants' housing status is presented in Table 6. Of participants, almost half (49 per cent) had not lived in a permanent housing situation for 12 months or more. The median length of time participants had been without a permanent housing situation was ten months (range: 1 week to 42 years). Of the

participants, almost half (45 per cent) were identified to be "rough sleeping (without conventional accommodation)" in the month prior to interview.

Table 6. Participants' housing status (n=51)

Variable	*n*	%*
> 12 months since living in permanent housing situation	25	49
Length of time since participant lived in a permanent housing situation in months *(median, range)*	*10 months*	*1 week – 42 years*
Living arrangement in the last month		
Rough sleeping (without conventional accommodation)	23	45
Staying in emergency/crisis accommodation	3	6
Staying with friends or relatives	11	21
Staying in a hostel	7	14
Staying in a refuge	2	4
Staying in a private boarding house without your own bathroom or kitchen and lease	5	10

*Total may not equal 100 per cent because of rounding

Participants' alcohol use and treatment characteristics are presented in Table 7.

Results indicate a high prevalence of high risk drinking among those surveyed with 96 per cent of participants scoring 20 or more on the AUDIT (Babor et al, 2001). The median AUDIT score for the sample was 34 (range: 11-40). Prevalence of 'street drinking' among the sample was also high with over half of participants (55 per cent) disclosing that they drink alcohol on the street or in parks "daily or almost daily". Of participants, more than a quarter (28 per cent) reported having consumed non-beverage alcohol. Of this number, around one in five (22 per cent) reported drinking non-beverage alcohol at a frequency of 'less than monthly' (22 per cent). Methylated spirits was identified as the most common type of non-beverage alcohol consumed (58 per cent).

In terms of alcohol treatment, 69 per cent of participants reported that they had previously been involved in treatment or rehabilitation (other than Gorman House). Of participants, around a quarter reported that they had not completed the treatment or program undertaken. This figure is based on thematic analysis of responses from a qualitative question around treatment history.

The number of participants with previous admissions to Gorman House was high with 82 per cent of the sample recorded as having at least one previous admission. The median number of Gorman House admissions in participants' electronic record was nine (range: 1-116) while the median number of Gorman House admissions in the last 12 months was three (range: 2-26).

St Vincent's Hospital admission and emergency department data were also examined. Combined, the sample had 622 admissions (range: 0-66) and 205 emergency department presentations, the median of which was two (range: 0-18).

**Table 7. Participants' alcohol use and treatment characteristics (n=51)**

Variable	*n*	%*	Median	Range
AUDIT score			34	11-40
Low risk (0-7)	0	0		
Risky or hazardous (8-15)	1	2		
High risk or harmful level (16-19)	1	2		
High risk (> 20)	49	96		
Frequency of drinking alcohol on the streets or in parks				
Never	3	6		
Less than monthly	7	14		
Monthly	5	10		
Weekly	8	16		
Daily or almost daily	28	55		
Frequency of consuming non-beverage alcohol				
Never	37	73		
Less than monthly	11	22		
Monthly	1	2		
Weekly	0	0		
Daily or almost daily	2	4		
Type of non-beverage alcohol consumed				
Methylated spirits	11	58		
Mouthwash	4	21		
Hand sanitiser	1	5		
Cooking wine	1	5		
Vanilla essence	2	11		
Previous alcohol treatment or rehabilitation (other than Gorman House, self-report)				
Yes	35	69		
No	16	31		
Previous admissions to Gorman House (self-report)				
Yes	42	82		
No	9	18		
Total admissions to Gorman House (electronic record)	744		9	1-116
Total admissions to Gorman House in the last 12 months (electronic record)	225		3	2-26
Total admissions to St Vincent's Hospital (electronic record)	622		5	0-66
Total admissions to St Vincent's Hospital in the last 12 months (electronic record)	239		2	0-21
Total additional presentations to St Vincent's Hospital emergency department in the last 12 months (electronic record)	205		2	0-18

*Total may not equal 100% because of rounding

Participants were also asked to rate their level of agreement with a number of operating models to gauge their preferences and interest in attending a MAP. The results are presented below (Figure 1).

All models were received positively, with greater preference for a residential facility and for bringing own alcohol (76 per cent in favour). Although not included in the graph, model preference was less clear among participants who reported having consumed non-beverage alcohol. Of this group, the same proportion of participants (18 per cent) rated their level of agreement as either "yes, definitely" or "yes, generally" to both a day shelter and residential facility.

Figure 1. Participants' level of agreement with MAP operating models (n=51)
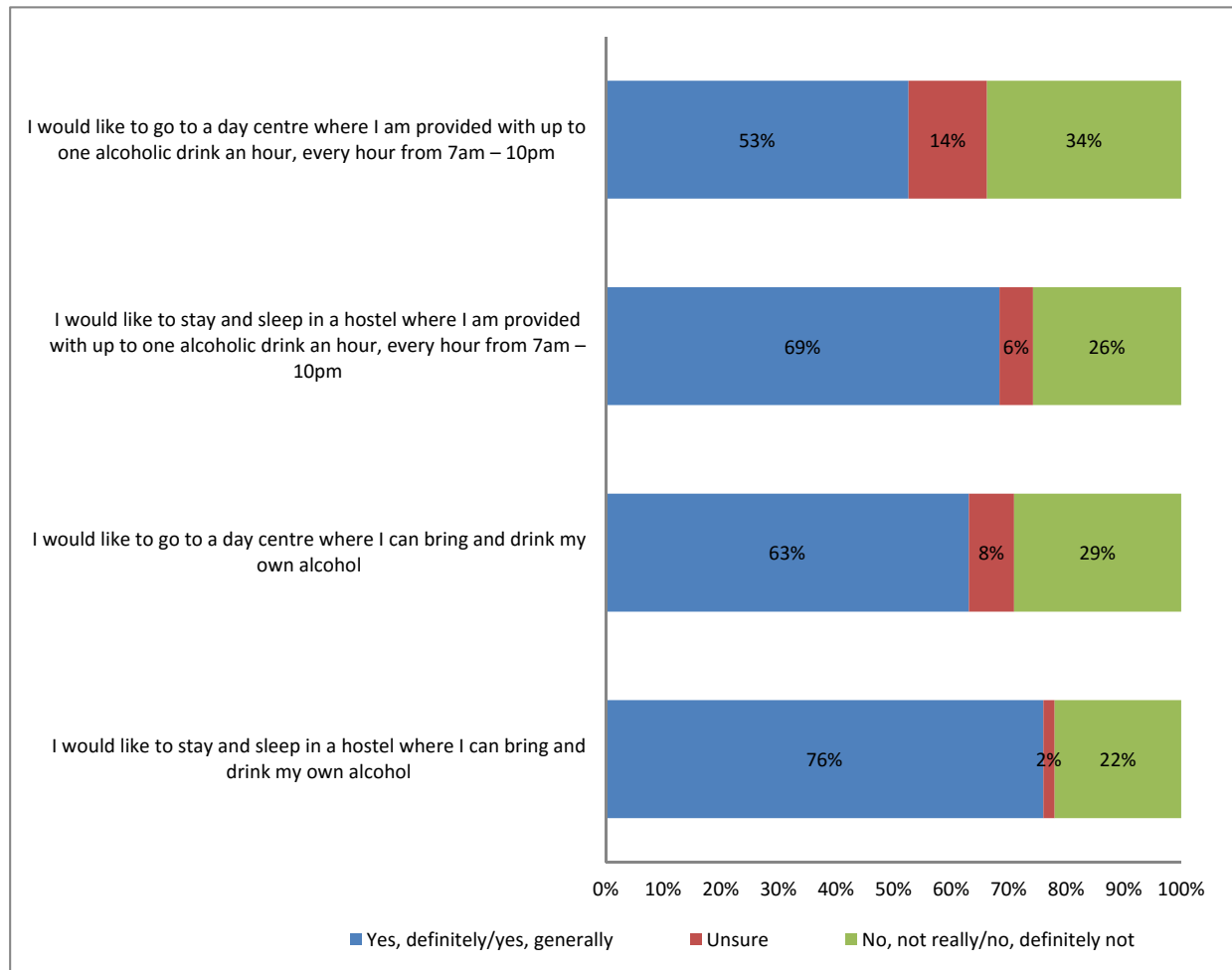
*Total may not equal 100% because of rounding

Participants were also asked where they thought the given facility should be located. There was no clear locality preference, with around a third preferring each of the options (Kings Cross/Darlinghurst, elsewhere in inner Sydney, outside of inner Sydney) for each of the service delivery models, as shown in Figure 2.

Figure 2. Participants' preferred location for a MAP (n=51)
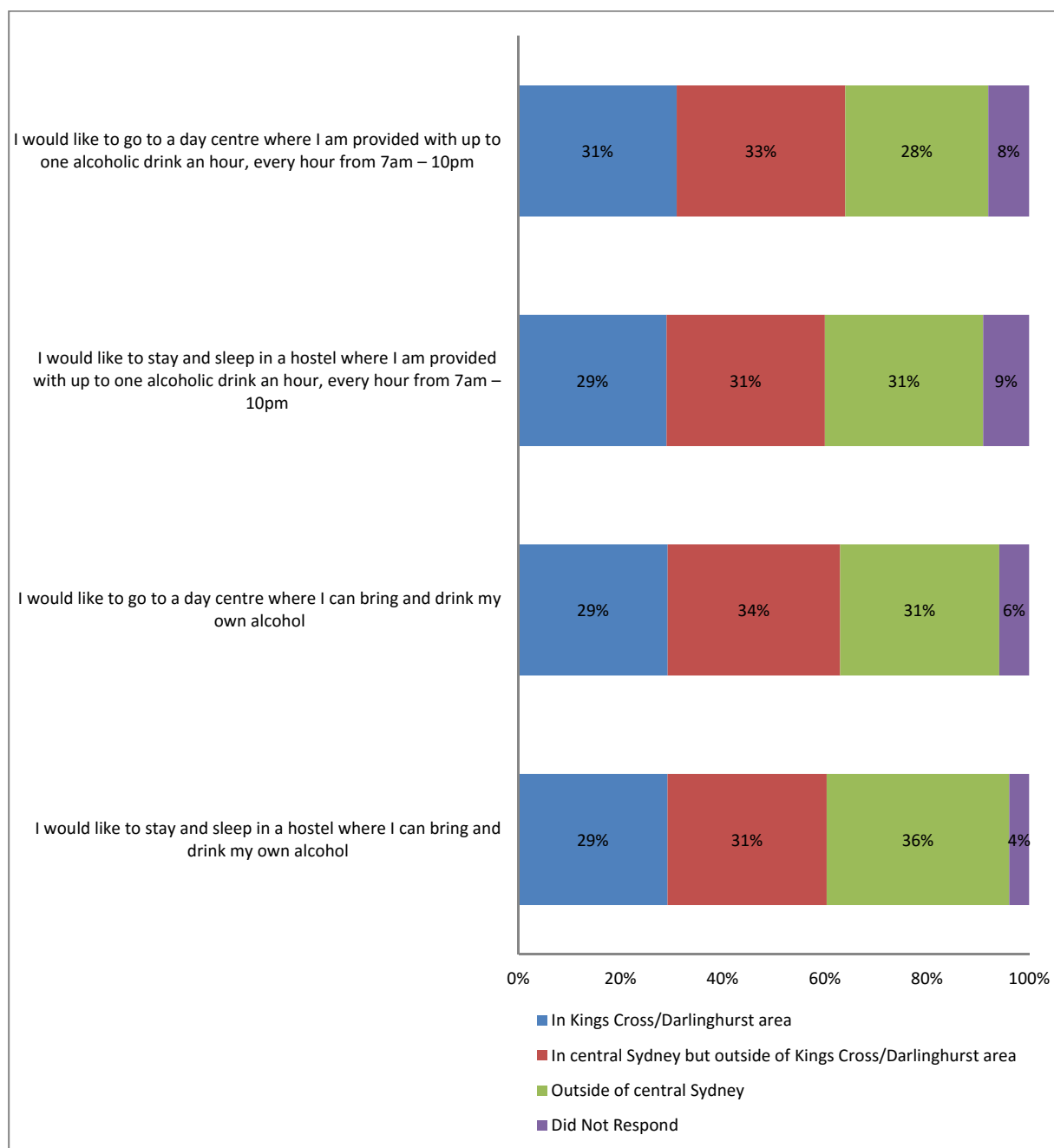
*Total may not equal 100% because of rounding

Participants were also asked how much of their pension/Centrelink payment/income they would be willing to pay for the given facility. The majority of participants were willing to pay at least 25 per cent of their income for a MAP (ranging from 90 per cent for a hostel with bring-your-own alcohol and 87 per cent for a hostel with alcohol provided, to 75 per cent for a day centre with bring-your-own alcohol and 67 per cent for a day centre with alcohol provided). For the hostel model, around half were willing to pay at least 50 per cent of their income (47 per cent for bring-your-own and 50 per cent for alcohol provided). An important minority were not willing to pay anything for a day centre (20 per cent for a bring-your-own alcohol model, 25 per cent for an alcohol provided model) although most commonly (50 per cent for both models) participants were willing to pay 25 per cent of their income for a day centre MAP. Results are presented in Figure 3.

Figure 3. Proportion of income participants are willing to pay for a MAP

	0%	25%	50%	75%	100%	Did not Respond
I would like to go to a day centre where I am provided with up to one alcoholic drink an hour, every hour from 7am – 10pm	25%	51%	14%	2%		8%
I would like to stay and sleep in a hostel where I am provided with up to one alcoholic drink an hour, every hour from 7am – 10pm	6%	37%	34%	16%		8%
I would like to go to a day centre where I can bring and drink my own alcohol	20%	51%	14%	10%		6%
I would like to stay and sleep in a hostel where I can bring and drink my own alcohol	6%	43%	27%	16%	4%	4%

Nominated percentage of income

*Total may not equal 100% because of rounding

Individual case studies: estimates in changes in single hospital service utilisation costs

Four case studies of survey participants are examined to assess their impact on service utilisation costs at just one hospital. Health costs incurred at other services are not included (See Table 8).

Case study one, LM, was a 45 year old man who had been homeless for ten months at the time of being interviewed, living on the streets and sleeping rough, mostly in the Pyrmont area. LM reported a history of daily 'street drinking' and scored 39 (out of 40) on the AUDIT, a score indicative of severe alcohol dependence. LM also reported a history of non-beverage alcohol use (methylated spirits). LM's client records showed 12 Gorman House admissions, 13 hospital admissions and four emergency department presentations in the 12 months prior to interview.

At the time of interview, case study two, QH, a 37 year old man, had obtained a room to rent in Balmain, however four months prior to interview, QH was homeless (three months of which were spent 'sleeping rough'). QH had an AUDIT score of 35, consistent with high risk drinking and severe alcohol dependence. QH also had a history of daily 'street drinking', but no history of non-beverage alcohol use. QH's client records showed eight Gorman House admissions, 16 hospital admissions and two emergency department presentations in the 12 months prior to his interview. In addition, QH had previously undertaken a six-month residential rehabilitation program for his alcohol use.

Case study three, CC, was a 39 year old man who had been living in emergency accommodation in the three months prior to being interviewed. CC stated that he had been homeless for 14 months prior to interview and revealed that he did not know where he would be living when he left Gorman House. CC had an AUDIT score of 38 and a history of daily street drinking and non-beverage alcohol use. CC

reported that on one occasion he drank half a bottle of methylated spirits. CC reported that he had tried a number of rehabilitation programs over the years, but was unable to recall the amount. Client records show that CC had 26 Gorman House admissions and 18 hospital admissions in the 12 months prior to interview.

Case study four, NQ, was a 33 year old woman with a nine year history of homelessness. NQ reported that living on the streets left her feeling vulnerable to physical and sexual violence and in constant fear for her personal safety. Prior to coming to Gorman House NQ reported that she was 'living on the streets and sleeping rough'. NQ's AUDIT score was 36. NQ reported drinking alcohol on the streets or in public parks daily or almost daily, but denied any non-beverage alcohol use. NQ reported that she has not previously undertaken any treatment or rehabilitation program for her alcohol use (other than Gorman House). Her records show 11 Gorman House admissions, 16 hospital admissions and nine emergency department presentations over the 12 month period prior to her interview.

Table 8. Estimates of reductions in single hospital service utilisation costs for four case studies

Participant characteristics	Service contact	Past 12 month frequency	Past 12 month service utilisation costs	Reduction in 12 month service utilisation costs if participating in a residential MAP
45 year old man, AUDIT 39, sleeping rough 10 months	Hospital admissions	13	$54,144	$20,033
	Gorman House admissions	12	$57,744	$50,815
	ED presentations	4	$1584	$744
	Total		*$113,472*	*$71,592*
39 year old man, AUDIT 38, crisis accommodation, homeless 14 months	Hospital admissions	18	$74,969	$27,739
	Gorman House admissions	26	$125,112	$110,099
	ED presentations	0	$0	$0
	Total		*$200,081*	*$137,837*
45 year old man, AUDIT 39, sleeping rough 10 months	Hospital admissions	13	$54,144	$20,033
	Gorman House admissions	12	$57,744	$50,815
	ED presentations	4	$1584	$744
	Total		*$113,472*	*$71,592*
33 year old woman, AUDIT 36, sleeping rough, homeless 9 year	Hospital admissions	16	$66,639	$24,657
	Gorman House admissions	11	$52,932	$46,580
	ED presentations	9	$3564	$1675
	Total		*$123,135*	*$72,912*

Assumptions: 37 per cent reduction in hospital admissions, 88 per cent reduction in Gorman House admissions, 47 per cent reduction in ED presentations (Pauly et al., 2013); costs $4,812 per admission from the Independent Health Pricing Authority's *National hospital cost data collection Australian public hospitals cost report 2011-2012: Average cost of admitted acute weighted separation* (Independent Hospital Pricing Authority, 2012).

Reductions in single hospital service utilisation costs from a MAP with capacity for 15 persons

Using the same methods, we made estimates of changes to service utilisation costs to St Vincent's Hospital for 15 study participants assuming they were housed in a MAP (See Table 9, and Appendix C for supplementary data). Reflecting the MAP target population, the most frequent users of the service

were selected for these calculations. It was estimated that the hospital had allocated $795,505 for hospital admissions alone, $524,508 for withdrawal admissions and $22,176 for emergency department presentations over the previous 12 month period, totalling $1,342,190 for 15 homeless and alcohol dependent individuals over the last year. Calculations for potential reductions in health service utilisation costs were based on Canadian residential MAP evaluation findings[21]. Overall, the reduction in health service utilisation costs from Gorman House admissions, St Vincent's Hospital admissions and emergency department presentations for this cohort at this hospital over a 12-month period are estimated at $718,864 should this cohort participate in a MAP in Sydney. The actual resource allocation of St Vincent's Hospital on the abovementioned services to Sydney's chronic homeless and alcohol dependent population could potentially be more than halved through the implementation of a MAP.

Table 9. Estimates of reduction in single hospital service utilisation costs for a 15-person residential MAP

	Past 12 month frequency	Past 12 month service utilisation costs	Reduction in 12 month service utilisation costs if participating in residential MAP
Hospital admissions	191	$795,505	$294,337
Residential withdrawal (Gorman House)	109	$524,508	$414,104
ED presentations	56	$22,176	$10,423
Total		$1,342,190	*$718,864*

Abbreviations: ED=Emergency Department. Assumptions: 37 per cent reduction in hospital admissions, 88 per cent reduction in Gorman House admissions, 47 per cent reduction in ED presentations (Pauly et al., 2013); costs $4,812 per admission from the Independent Health Pricing Authority's National Hospital Cost Data Collection Australian Public Hospitals Cost Report 2011-2012: Average cost of admitted acute weighted separation (Independent Hospital Pricing Authority, 2012)

Discussion

This exercise demonstrates the potential reduction in service utilisation costs to one facility estimated at around $720,000 per year for the 15-person cohort. As we selected the most frequent users of the service for these calculations, this figure may be an overestimation of hospital savings if a MAP attracted alcohol dependent homeless people with fewer comorbidities. Nevertheless, since additional service utilisation reductions can be expected from other city hospitals, primary care services, and ambulance services, the estimates likely represent an underestimation of the total reduction in total health service utilisation costs directed towards this population. Resources may be redirected as a result of less service contacts with this homeless cohort.

The population surveyed is typical of MAP populations with high rates of homelessness (particularly rough sleeping) and frequent service use. Consistent with the international literature, a relatively high proportion of the sample identified that they were 'rough sleeping' (45 per cent) in the month prior to interview. Forty-nine per cent were found to have been homeless for 12 months or more, and the remainder resided in emergency or temporary accommodation. Furthermore, participants were frequent service users, with a total of almost 450 emergency department and hospital treatment episodes in the last 12 months for the 51 participants. Existing MAPs identify eligible participants from shelters and hospitals (Podymow et al., 2006), lists of homeless individuals (Pauly et al., 2011), and

those with the highest rate of contact with emergency services (Collins et al., 2012). Of the 51 participants, 94 per cent were male with a median age of 45, and 82 per cent had multiple previous detoxification admissions. Almost a third of the sample reported having consumed non-beverage alcohol (28 per cent). Demographically this sample is representative of the literature (Podymow et al., 2006), while the consumption of non-beverage alcohol is also represented in literature (Kesselring, Graham, Tzemis & Buxton, 2013; Stockwell et al., 2014). Six per cent of the study sample was Aboriginal and Torres Strait Islander. Evidence has shown that alcohol-related harms disproportionately affect Aboriginal and Torres Strait Islander peoples. The Canadian experience also emphasises the importance of addressing needs of Aboriginal populations (Pauly et al., 2013) which is expected to be thematically relevant to a MAP in central Sydney where an important proportion of the population is Aboriginal and Torres Strait Islander.

The fiscal evidence for the feasibility of a MAP is strong. However, it is also important to note that this is a new form of program in the context of homeless healthcare in Sydney. The efficacy of a MAP has been evidenced in recent literature, while financial feasibility and willingness of the sample to engage such a service is shown. Of note is the generalisability of these findings to the homeless and alcohol dependent population.

Despite this research being conducted at St Vincent's Hospital, these data may be considered representative of the wider Sydney region and applicable to other healthcare areas and services. The frequent service use demonstrated by this sample suggests that current approaches are not working, and new service delivery models are needed. The demographics and contact episodes of this sample, as well as alcohol use, are consistent with the literature. From this, a strong argument may be made for a MAP both financially and in healthcare utilisation.

Several limitations became apparent in this research. Women were underrepresented in the sample. This reflects residential treatment services around Australia, where women are underrepresented, and the organisation of Gorman House specifically, with two beds out of 20 allocated to women. More efforts will need to be made to understand and address the needs of homeless alcohol dependent women. In addition, it is not known how generalisable this information is to the Australian context since the international MAP literature is drawn from a range of contexts. For example, the Canadian experience includes typically frozen winters, which are not experienced in Australia.

In terms of MAP acceptability and operating model preferences, the vast majority of participants indicated strong interest in a MAP and willingness to pay a proportion (at least 25 per cent) of their income for the service (ranging from 67 per cent for a day shelter where one's own alcohol can be consumed to 90 per cent for a residential facility where alcohol is provided). There was preference for an inner city/Kings Cross area location (around a third preferred outside the city) and participants leaned towards a residential model, where residents are permitted to bring their own alcohol (76 per cent in favour versus 69 per cent in favour of a residential model where alcohol is provided). This was mirrored in the proportion of participants who were willing to pay for a residential MAP with 90 per cent of participants indicating they were willing to pay (at least 25 per cent) for a bring-your-own model (compared to 86 per cent for a model where alcohol is provided).

Given the health implications for ongoing alcohol dependence and homelessness, this study is highly important. The positive outcomes reported in the literature on healthcare contacts (London Homeless Coalition, 2011), improved mental health (Stockwell et al., 2014) and alcohol consumed daily (Larimer et al., 2009) alone highlight the positive effect that a MAP may have on the homeless population. The ongoing financial viability of such a program is then pivotal to its establishment and ongoing ability to provide care.

A MAP has the ability to provide significant outcomes in a range of areas, not only to the participant, but also to healthcare and criminal justice agencies. While this evaluation discusses feasibility in terms of healthcare, it is expected that there would be a flow on effect to services such as ambulance, GP, social services and other Sydney hospitals for which data was unavailable. Given the far reaching effects that a MAP may have on a relatively small cohort, such a program is potentially important in the healthcare landscape of Sydney.

Conclusion

The study revealed important information regarding the feasibility and acceptability of a MAP among Sydney's chronically homeless and alcohol dependent population attending a residential withdrawal service. Findings indicate there is strong support and acceptability among the sample for this novel approach. Establishing a MAP would considerably reduce service utilisation expenditure on this population and contribute to improved client outcomes.

Feasibility of a MAP in Sydney

Findings suggest that a managed alcohol program (MAP) for the City of Sydney is feasible, considered along three axes: technical, operational and financial (Figure 4).

Technical feasibility

Findings from the literature review and the survey demonstrate that a MAP for the City of Sydney is technically feasible. Technical feasibility refers to the technical elements required to implement a MAP. Technical requirements are reasonably low, and consistent with those required of a hostel or other residential facility. Both day and residential models require a little more expertise than what already exists among credentialed residential support and drug and alcohol workers. Guidelines and precedents on case management, specialist care, and psychosocial support already exist. Additional capacity building will be required on the provision of a managed alcohol program, learning from international experience.

The findings presented here suggest that a residential facility may be preferred to a day facility by homeless alcohol dependent people, since survey participants in this sample indicated their preference for a residential facility. There is currently limited research evidence to support residential over day models, however outcome data is unavailable for day facilities. There is also insufficient research evidence to support the provision of alcohol on the hour by a third party over allowing consumption of own alcohol in a MAP environment. However, the majority of survey participants reported that they preferred to provide and consume their own alcohol rather than receive a measured hourly provision. More research is required to build the evidence base on MAP variables, particularly in an Australian context.

Operational feasibility

Findings from the study indicate that a MAP for the City of Sydney is operationally feasible. Operational feasibility implies that the service can be established to meet the expressed purpose. Based on experience described in the literature, we explored four possible MAP models in our survey of potential service users:

- day shelter, up to one alcoholic drink provided an hour for 15 hours a day

- residential facility, up to one alcoholic drink provided an hour for 15 hours a day

- day shelter, participants bring and drink own alcohol

- residential facility, participants bring and drink own alcohol.

All models were received positively, with a preference for a residential facility and for bringing and purchasing own alcohol (53 per cent would like a day facility where alcohol is provided on the hour, 63 per cent would like a day facility where own alcohol is consumed, 69 per cent would like a residential facility where alcohol is provided on the hour, 76 per cent would like a residential facility where their own alcohol is consumed).

Demand for a MAP appears to be high with the vast majority of those interviewed expressing willingness to contribute financially and interest in participating. Close to half of those interviewed were rough sleepers, the remainder were in crisis or temporary accommodation. The vast majority scored very highly on the AUDIT (96 per cent $\geq$ 20, indicating alcohol dependence requiring comprehensive assessment and management). Nearly all participants (94 per cent) reported street drinking. As these 51 people accounted for 225 Gorman House admissions, 239 St Vincent's Hospital admissions and 205 St Vincent's Hospital ED presentations alone in the past year, they represent a high resource-using population.

Figure 4. MAP feasibility framework

Technical feasibility	Operational feasibility
What technical capacity is required to provide a MAP?	**What administrative and programmatic capacity is required to establish and maintain a MAP?**
Technical capacity (credentialed workforce, guidelines) already exists for provision of alcohol in both day and residential models, including case management, alcohol and drug services, primary healthcare, screening and referral, counselling, residential support. Training and capacity building will be required on managed alcohol provision informed by international experience.	Shelter services with wrap around care, inreach and outreach and assertive follow-up with community liaison, monitoring and evaluation. Preference for City of Sydney location and residential facility. For example, for a 15-person MAP: Staff: 7 drug and alcohol/residential support workers, 1 administrator, 1 manager, 2.6 nurses, weekly general practitioner visit. Food and beverage, utilities, cleaning.

Economic feasibility

What are the annual costs and savings associated with establishing a MAP?

For example, for a 15-person residential MAP:

	Estimate (range)
Costs	
Operating costs (excluding rent and building costs)	$1,096,551 ($877,241-$1,315,862)
-Residential contribution	-$184,672 ($147,737-$221,606)
Costs total (a)	**$911,879 ($729,503-$1,094,255)**
Cost reductions	
Medical	$717,943 ($574,354-$861,531)
Criminal Justice	$259,548.97 ($207,639-$311,458)
Crisis accommodation	$418,563 ($334,850-$502,275)
Total reductions (b)	**$1,396,054 ($1,116,843-$1,675,265)**
Net benefit in reduction of service utilisation costs for cohort (b-a)	**$484,175 ($387,340-$581,010)**

Economic feasibility

A MAP for the City of Sydney is economically feasible, resulting in reduction in service utilisation costs conservatively estimated at around $32,000 per person (range $26,000-$39,000) per year taking into account the costs of running the service. As an example we made estimates on a 15-bed residential unit (Figure 4). Since there is uncertainty around our assumptions, we included a range of +/-20 per cent around our estimates.

Residential centre operating costs for a 15-person residential facility where alcohol is provided are estimated to be $1,096,551 per year. This estimate includes 11.6 full-time equivalent (FTE) staff consisting of seven FTE drug and alcohol/residential support workers, one FTE administrator, one FTE manager, and 2.6 FTE registered nurses. Costs have also been included for a once weekly visit from a General Practitioner, estimated at a standard consultation for a non-admitted patient, $39 per person per week totalling $30,435 per year. Hot water, electricity and cleaning costs are estimated at $79,910.48, food at $87,500 and beverage alcohol at $70,000 per year (wine or beer).

Assuming a financial contribution from participant's equivalent to 50 per cent[iii] of the Disability Support Pension and rent assistance valued at $12,311 per person, per year (Australian Government Department of Human Services, 2015), revenue is estimated at $184,673.

The total operating costs (without rental and maintenance of the property) of a residential MAP with alcohol provision are estimated at $1,096,551. Without alcohol provision, costs are reduced by $70,000. Based on the literature, costs for security have not been included. Rental and maintenance costs are not included owing to the great variability and location specificity of these costs.

Operating costs for a MAP day centre are estimated at $983,493 per year for a seven day, 7am-10pm service. Operating costs are estimated using the same calculations as above, with two FTE fewer drug and alcohol/residential support workers. Participant contribution is set at the equivalent of 25 per cent[iv] of Disability Support Pension or $5,250 per person, per year totalling $78,757.

The total operating costs (without rental and maintenance of the property) of the day centre MAP with alcohol provision are estimated at $779,654. Without alcohol provision, costs are reduced by $70,000.

A residential service is preferred based on the literature and research findings (and the cost difference between a day centre and residential service is small). Estimates have been made on the basis of the research findings and drawing on the literature for a residential facility. There are no data on benefits from a day centre so valid estimates of reductions in service utilisation costs associated with this model to the community and hospital cannot be made.

We used data from the participant survey using assumptions from the international literature to estimate reduction in health service costs for a 15-person cohort (Table 9). They are assumed to be underestimates as they exclude ambulance, primary care, and other hospital costs. We used assumptions from the international literature and Australian cost estimates to calculate reductions in community services utilisation costs (Table 10).

[iii] 49 per cent of surveyed participants indicated they would be prepared to contribute at least 50 per cent of their income to a residential facility providing alcohol, 47 per cent in one where they brought their own alcohol.
[iv] 67 per cent of participants surveyed indicated they would be prepared to contribute at least 25 per cent of their income to a day facility providing alcohol, 90 per cent in one where they brought their own alcohol.

Table 10. Estimates of reduction in service utilisation costs for a 15-bed residential MAP

	Mean events per year	Mean cost per event	Cost per person per year	Cost for 15-person cohort per year	Estimated reduction with MAP	Reduction
Crisis housing	365	$76.45(36)	$27,904.25	$418,563.75	100%	$418,563.75
Criminal justice						
Police encounters	191.65(1)	$1563.09(36)	$19,971.08	$299,566.20	51%(1)	$152,778.76
Custody	17.7(21)	$296.42(36)	$5,258.19	$78,872.85	43%(21)	$33,915.33
Court costs	17.7(21)	$636.75(36)[*]	$11,295.33	$169,429.95	43%(21)	$72,854.88
Criminal justice total				**$547,869.00 (a)**	**47%****	**$259,548.97 (b)**

Assumptions: [*]Each instance of custodial sentence is assumed to have involved a local court appearance. An average cost per court case has been taken from the offences of non-aggravated robbery ($1,115), possess and/or use illicit drugs ($416), regulated public order offences ($463), and offensive conduct ($553) (Baldry, Dowse, McCausland & Clarence, 2012).
** calculated as b/a%

Due to the low running costs of such a program and the high cost to the community of even a small number of homeless, alcohol dependent individuals, such a program is fiscally viable. The hospital and community savings, both financial and social, indicate a significant benefit in establishing a MAP both to the participant and the community. Detailed costing, including estimates of infrastructure and capital works costs, are site and partner specific and will need to be calculated in subsequent studies.

Limitations

Our study was subject to a number of limitations. Funding changes to the housing sector resulted in amendment to the proposed recruitment strategy that was initially proposed. Instead of recruiting through homeless services, participants were recruited through a residential withdrawal facility targeting, among others, homeless people. As participants were restricted to those accessing the residential facility, a broader range of participants (including more women and those not seeking assistance for alcohol withdrawal) were not surveyed. We do not know how this may influence the findings, if at all. The survey was limited to people seeking assistance from an abstinence-based service. This may bias the findings away from a MAP and therefore underestimate the degree of interest among the target population if those not seeking an abstinence-based service are included.

Recruitment of participants was slower than expected, and, despite prolongation of the data collection period (9 July 2014 to 3 November 2014), the final sample size was 51. As the sample was non-probabilistic, it is not known how this would have affected the findings. Nevertheless, the results are still favourable for acceptability among those surveyed.

Women were underrepresented in our sample reflecting the client group of the service from which participants were drawn. Underrepresentation of women is common in research on homelessness and alcohol dependence. We cannot draw any firm conclusions about acceptability and preferred model for women and women's needs will need to be explicitly explored in service design. Further research is required.

The initial study protocol included an analysis of data on the extent, prevalence and intersectionality between the key variables of homelessness and alcohol dependence in the City of Sydney to estimate the size of the population eligible for a MAP and describe the population demographics (including gender, age, cultural and linguistic diversity). Routine retrospective administrative data from police, ambulance, homeless services, and other hospitals were not available within the resources and timeline of the project; a separate study would be required. Instead, Gorman House data were used to describe the local surveyed population, and, together with published data and information from MAP service providers were used to make cost estimates.

While the study explored technical, operational and economic feasibility, it did not develop a detailed model of care (including for example type and strength of alcohol provision, duration of residence, or entry in and out of the service). Furthermore, it did not examine the implementation of such a service including model of care, legal implications, potential sites and partners. Detailed cost-benefit analysis should be site and partner specific. These aspects should be incorporated into the next phase of a MAP project. Importantly, the study only partly answers some of the salient questions around establishing a MAP. Political feasibility needs to be assessed, with key stakeholders surveyed regarding barriers and acceptability of a MAP. Learning from the establishment of the Medically Supervised Injecting Room (MSIC) in Sydney, stakeholder opinions are crucial to implementing innovative harm reduction initiatives (Joint Select Committee on Safe Injecting Rooms, 1998).

Conclusion

Implications for alcohol policy

MAPs represent a step forward in the development of alcohol policy in Australia. Although they are not yet established in Australia, international experience strongly suggests that they have the potential to reduce harm and improve individual wellbeing for people with chronic alcohol dependence and for whom treatment has not been successful. MAPs also have the potential to decrease costs and public nuisance to the community. Our survey of potential service users showed a positive response to a MAP, with more than two thirds expressing interest in using a MAP and more than three quarters willing to pay at least a quarter of their income to participate. We estimate conservatively that operating a 15-bed service in inner Sydney will result in a net benefit in reducing community service expenditure on this population of around $480,000 (range $390,000-$580,000) a year, taking into account the cost of providing such a service.

A very small proportion of Australians take up a disproportionate amount of community resources due to severe alcohol dependence, yet these resources are arguably utilised ineffectively. Embedded in a harm reduction approach, MAPs provide a rational alternative option for policy makers to address chronic intractable harmful alcohol use. The suite of public health measures addressing the spectrum of alcohol use currently includes: restricting alcohol promotion and availability, early intervention for hazardous use, and treatment for harmful use. Thiamine supplementation of flour for bread was an early public health triumph to address alcohol-related harm, reducing the incidence of Wernicke's – Korsakoff syndrome by 40 per cent after its introduction in 1990 (Ma & Truswell, 1995). In the 1980s,

Australia had the highest recorded prevalence of this alcohol-related life-threatening syndrome in the world (Harper, 1983). A MAP will complete the harm reduction and intervention options for the small proportion of people with very severe alcohol use disorder.

MAPs can also provide the opportunities for service collaboration and delivery for integrated models of care to better meet the needs of complex alcohol dependent populations. Establishment of a rigorously evaluated MAP has important implications for alcohol policy in Australia and internationally as it will build the evidence base for improved care of those with severe alcohol dependence. It will also reinforce Australia's reputation for adopting innovative best practice [as has been demonstrated by the establishment of Sydney's MSIC (Medically Supervised Injecting Centre)] and the roll out of needle and syringe programs.

Next steps

The findings from this study demonstrate feasibility of a MAP for Sydney.

The next step is to test the MAP model in the Australian context. This requires defining the service delivery model (including location, target population, duration of stay, entry and exit points) and developing a pilot implementation plan (including sites, partners, outcomes and evaluation framework). This will require:

- a detailed costing study for a partnership model between a health service and a homeless shelter and an academic institution
- a detailed stakeholder analysis to explore barriers, facilitators and acceptability.

Recommendations for further research

The literature suggests that MAPs are acceptable and effective in promoting housing stability, improved health outcomes, and lower costs to the community. Further research is required to identify to what extent a MAP meets these objectives. We recommend that a MAP research project be formally conducted as part of a trial in the City of Sydney and evaluate its efficacy and cost-effectiveness. Features could include:

- wait list research design (randomise entrants to either MAP or waiting list for MAP and compare outcomes for the two groups)
- develop model of care including type and strength of alcohol, administration and supervision mechanisms, duration of residence and referral pathways
- measure change in: health status; frequency of contact with health, ambulance, police services; alcohol consumption; wellbeing and social function indicators
- identify individual and systems factors associated with successful outcomes
- assess cost-effectiveness of the intervention
- develop model for dissemination and replication.

Preliminary evidence is strongly supportive of trialling a MAP in Sydney. The next steps of detailed service design will require stakeholder and service user consultation. A program of rigorous intervention research and program evaluation should accompany the establishment of such as a service.

Appendix A. Summary of articles retained in the literature review

Managed alcohol interventions for homeless people

Four articles considered managed alcohol pilot programs. The first article evaluated a MAP in Ottawa. This particular program consisted of 17 participants (n=17) considered to be chronically homeless, and experiencing alcohol dependence as defined by the DSM-IV (at the time), therefore meeting the selection for this review. Participants gained access to accommodation, beds and meals. Shelter staff facilitated social benefit applications, medical appointments and dispensed medication. Up to 140ml of wine or 90ml of sherry was dispensed per hour. Nurses and two physicians provided 24-hour medical care. Eligibility for data analysis in this study required 5 months of continuous engagement from participants, which was analysed in an uncontrolled before and after design. This study reported on an array of outcomes from the MAP in Ottawa, however those relevant to this study are as follows. Among participants, mean monthly emergency department visits reduced from 13.5 to 8.1. Interaction with police decreased from (monthly mean) 18.1 for the cohort, to 8.8 (p=0.018). However most notably the mean standard units of alcohol consumed daily decreased from 46 to 8 (p=0.002). Compliance with prescribed medication was noted at 80% of cohort, while the mean monthly 'direct' cost of the program was $771 per person. A reduction in costs of ED services ($96), Hospital Care ($150) and Police ($201) services was also shown (Podymow et al., 2006).

A second article employed a longitudinal instrumental case study design to provide insight into the experience of a typical individual involved in a MAP. This study is composed of a larger qualitative study involving 17 individuals in MAP settings. The individual assessed was a 48-year-old male. The individual had been homeless for 10 years prior to the interviews commencing. At commencement of the MAP, the individual had experienced several failed attempts at engaging with programs requiring abstinence. The longitudinal instrumental case study design was justified because the individual had a 'typical' experience of individuals engaging with a MAP, in conjunction with being particularly accessible and articulate about his experience. Data was collected through three semi-structured interviews – one month prior to entering the MAP, and then at 1 and 10 months after entering the MAP. The delay in final interview was attributed to the participant leaving the program for 8 months and then returning. This study provided insight into the beneficial aspects of a MAP, providing longer term stability during the process of reducing alcohol consumption. Emphasis was placed on the psychosocial stressors which accompany this, and the facilitation of exploring and forming a new identity removed from alcohol dependence. Particular importance was placed by the participant on resources such as medical assistance and time in order to successfully overcome dependence (Kidd et al., 2011).

A third article considered MAPs as a means of overcoming barriers to services experienced by homeless, alcohol dependent individuals seeking end of life care in Ottawa, Canada. This study utilised a qualitative design performed on a case study basis in order to explore end of life care regarding this population. The final design of the study included 54 MAP staff from multiple sites, primarily nurses. Data collection were through semi-structured interviews based around end of life care and its facilitation to homeless and substance affected populations. MAPs serving as a key end of life service to homeless, alcohol dependant individuals were thematically evident in data collection. It was consistently noted that end of life services at MAP sites were an extension of the medical and nursing services innately offered as part of the service. This article concluded that the inaccessibility of services

to this population is problematic. However, implementation of harm reduction programs may serve as referral services, or alternative sources of end of life care (McNeil et al., 2012).

A fourth article evaluated a housing first approach against traditional substance use treatment. Throughout this housing first study, a managed alcohol aspect was implemented. Participants were given the option of staff holding their alcohol for them, and to distribute it at agreed upon times and quantities. This facilitated more frequent points of contact with staff, and allowed staff to withhold alcohol if the participant appeared impaired. Data for this article were collected at a housing first program in the United States. Seventy-five chronically homeless, alcohol dependent individuals made up the cohort (n=75). This cohort had a mean age of 48.39 years, and a mean alcohol use of 24.39 standard units of alcohol per day. Of the 75 participants, 65.2% had experienced delirium tremens in their lifetime. Importantly regarding housing first efficacy, the mean number of alcohol treatment episodes (detoxification etc) was 17.19. Participants were sourced from a list of those incurring the highest costs for alcohol-related contact with emergency services or a list of individuals suggested by community providers as having a particularly high use of emergency services. Qualitative data were primarily utilised, which was collected through naturally occurring data, focus group records, and interview sessions with staff. This study found that, with 90% of the cohort evincing alcohol dependence, a strong thematic outcome was the use of alcohol simply to avoid withdrawal. Similarly, ongoing alcohol consumption was shown to be a means of maintaining community connectedness. The primary outcomes of this evaluation centred around thematically considering the participant perspective on housing first. This article suggests taking further account of individual participants' views of their own alcohol use and their motivation for this use (Collins et al., 2012).

Housing first approach for chronically homeless alcohol dependent individuals

One article featured a secondary analysis of data on housing first services collected by Collins et al (2012). This was done as a means of considering a potential correlation between motivation to change, and treatment attendance in a housing first setting. The data were sourced from a cohort of 75 participants. Participants were interviewed at baseline, 3, 6, 9, 12, 18 and 24 month intervals. There was a 61% response rate at the 24-month interview. Participants displayed an observably decreasing rate of alcohol use, while motivation to change scores remained stable. This was scored on the Stages of Change Readiness and Treatment Eagerness Scale (SOCRATES) scale assessing motivation to change based on ambivalence, recognition and taking steps. Treatment attendance was reported at 47.4% (n=45) while of this group 51.4% (n=23) reported attending only once over the two year period. A point-biserial correlation coefficient showed a significant, weak positive correlation between treatment attendance and problem recognition (p=.0001), and the taking steps scale towards action on behavioural change (p=.0001). Overall it was shown that recognition of alcohol consumption related to greater overall alcohol consumption at the two year follow up interviews. Most importantly the taking steps scale was consistently associated with reduced alcohol use. This was due to its association with behaviour change motivation. Importantly, treatment attendance was not found to be associated with reductions in alcohol use for this group. (Collins et al., 2012)

Effect on other healthcare services

Two articles considered the effect of MAPs on other healthcare services. The first article utilised a quasi-experimental design to evaluate the effect of the housing first approach on the cost of use among homeless, alcohol dependent individuals. The study involved a cohort of 95 participants, and a control group of 39, sourced using an ordered list of homeless individuals in Seattle, Washington. This group was defined as those who incur the greatest monetary costs for use of services related to alcohol use, primarily emergency departments, detoxification services, and prison. Justification for not utilising random assignment in this study was based in the unethical nature of denying homeless

individuals available housing. Assessments were performed at 3, 6, 9 and 12 months. Participants received $20 for each interview. Self-report was the primary method of gathering data. Other sources of participant data were used with consent of the individual involved. This included: emergency centre use, medical centre use, time spent in correctional facilities, sobering centre visits and contact with inpatient and outpatient services. Participants in this study were primarily male (94%) with a mean age of 48 years. For the year prior to commencement of the study individuals accrued a median cost of $4,066 per month for the mentioned services. For the 95 participants placed in housing, a cost of $8,175,922 was accrued. At the 6 and 9 month intervals after housing, costs fell to $1,492 and $958 per month respectively. In total this fell to $4,094,291 for the 95 participants. Quantity of alcoholic beverages consumed per day was recorded at baseline, 6, 9 and 12 months. Median number of alcoholic drinks consumed at baseline was 15.7 per day, which fell to 14.0, 12.5, and 10.6 daily at 6, 9 and 12 months respectively. A significant (p=0.003) reduction in number of days intoxicated per month was also shown, falling from 28 (out of 30) at baseline to 10 days at 12 month follow up (Pauly et al., 2011).

A second article considered shelter based convalescence for homeless individuals, who primarily had co-occurring substance dependence issues. This study consisted of a cohort of 140 participants equating to 181 admissions to the shelter, or Special Care Unit. A maximum three-month limit was placed on individuals in this program. The majority of participants were sourced from other shelters (57.4%) and Hospital (23.8%). Mean age of participants was 47.7 years and 139 participants were male. Of participants, 64.3% (n=90) were dependent on alcohol. Mean stay post-admission was 40 days, while 26 participants were admitted more than one time. Admission resulted in the treatment of medical issues in 83.4% of participants. While at the shelter 89.3% received transport to and from medical appointments, 60% received assistance with housing applications, and 20% applied for and gained a health card. On leaving the shelter 24.3% of participants gained housing. One-third of participants returned to shelter based housing. A small proportion (6.6%) were discharged into palliative care, and 2.2% were incarcerated. Stabilisation of medical status in this study was indicative of reduced emergency department admissions and costs (Podymow et al., 2006).

Grey literature regarding MAPs

Seven articles met the criteria for grey literature in discussing MAPs. The first article reviewed was a thesis submitted to the University of Dublin. With specific regard to the Aungier St MAP in Dublin City, Ireland and the Shepherds of Good Hope MAP in Ottawa, Canada, the thesis argues the benefits of MAPs in reducing alcohol consumption, violent and difficult behaviours, and encouraging service engagement. MAPs were likened in this thesis to the prescription of methadone to dependent heroin users. Criteria for admission was determined by a diagnosis of severe 'alcoholism' as defined by the DSM-IV, showing examples of community or self-harm and a history of failure or refusal to attend abstinence based services. Outcomes of the MAP program in Ottawa, Canada were also explored. Participants contributed $100 of their $112 social welfare payments towards the program's cost of alcohol. The result of this program was stated to be a mean reduction from 46 alcoholic beverages per day to eight per day over the duration of the program. Emergency department visits reduced by 36% and instances of police contact reduced by 51%. The findings of this article were an overwhelming support for the managed alcohol model and an increased necessity for services designed around the needs of homeless, alcohol dependent individuals (Duffin, 2006).

A second article detailed the results for the Vancouver MAP evaluation (Centre for Addictions Research of British Colombia, and the University of Victoria, Canada) (Stockwell et al., 2014). This program provides housing, two meals per day, one alcoholic beverage per hour between 7:30am and 9:30 pm, regular physician contact and facilitates psychosocial intervention. Eligibility criteria included

an AUDIT score greater than 15, indicating alcohol dependence in combination with a history of failed treatment for alcohol dependence and health conditions precipitated by alcohol dependence or consumption of non-beverage alcohol. This research included structured participant interview, qualitative interviews with staff, liver function tests, alcohol administration records and clinician ratings of participants. This research also included emergency department and police contact records. Participants (n=7) had a mean age of 47 years, consisting of five men and two women. Participants were interviewed at baseline, 3 and 6 months. Over the course of this study, a significant decline in harms experienced by participants was recorded. A similar effect was recorded for standard drinks consumed per month with the number declining while engaged with the MAP. Participants reported being highly satisfied with their housing situation, as well as positive changes in self-perception of wellbeing. The quantity of non-beverage alcohol consumed reduced, and subsequently harms experienced were reduced, such as withdrawal seizures. This study also reported a decline in liver health. Importantly, this study recommends that alcohol administration is tailored to the individual in order to assure that frequency and amount of alcohol consumed does not increase. It was also suggested that options for short and long term abstinence are made available to participants (Stockwell et al., 2014).

A third article considered the benefits and detriments of administering alcohol to alcohol dependent individuals in homeless shelters. This article provides literature review based evidence of efficacy of and barriers to MAPs. A primary indicator of the necessity for MAPs is that 85% of alcohol dependent individuals do not seek treatment. This is explained through community resistance, resistance from business owners, and the perception of MAPs posing violent threats to the community. Another barrier discussed was the attrition rate among staff. The moralistic aspects of providing alcohol to alcohol dependent individuals are explored within the framework of harm reduction. These factors are contrasted with the most significant benefits of MAPs. Primarily this included the ability to have ongoing contact with medical services, and more consistent medication. With a reported 75% of homeless, alcohol dependent individuals experiencing a mental health diagnosis, this is an important factor. The necessity for facilitating abstinence programs was emphasised, as was the reduction in experience of withdrawal seizures. This study strongly emphasised the improved social cost resulting from MAPs. The cost of law enforcement encounters over the preceding 40 months to the study was estimated at $9.2 million. MAPs evaluated in this article have shown reduction in ambulance services, hospital admissions, diagnoses of intoxication, contact with police and trauma by up to a factor of 2.05. Fewer contacts with detoxification also featured as a reduced public cost. This article concluded that the success of MAPs is based on several factors such as finding and securing suitable and accessible grounds. Offering services in combination with the MAP were suggested, such as outreach, detoxification and health services. Finally, targeted awareness among the homeless community was strongly suggested as a means of reducing barriers to the homeless individuals seeking help (Reed, 2008).

A fourth article provided results of a qualitative evaluation of illicit alcohol use in British Columbia, Canada. This research was gathered through ten focus groups totalling 114 participants. Inclusion criteria required participants to be currently or previously involved with the consumption of illicit alcohol or to be involved in the support of an individual who does. In this study illicit alcohol was defined as alcohol that is not intended for human consumption, also known as non-beverage alcohol. Consensus among illicit alcohol users was that a MAP would be beneficial, however that it was unlikely to be accepted by the community. Specific mention was made of the potential difficulty of operating and engaging a MAP without involvement of local law enforcement (Kesselring et al., 2013).

A fifth manuscript (from the non-peer reviewed "grey" literature) was a costing study for a MAP in London, Ontario, Canada. A 16-20 bed residential map was suggested, staffed primarily with

community support workers and some nurses. This model is associated with costing around $943,000 per year, which equates to $81.67 per patient, per day. Justification for this program was stated as a dependent alcohol use rate among 53-73% of the target homeless population. Among this group, between 5 and 35 contacts with emergency services were recorded per week. On average this resulted in two paramedics to assist an individual, and a mean of 54 minutes call time to emergency services per contact. A mean cost of $550.00 per contact, $19,250 per week for 35 contacts, and approximately $1billion for emergency services contact were calculated for this group alone. This process was replicated for contacts with law enforcement and emergency department visits resulting in approximately $78,000 and $416,780 respectively. The report used data drawn from the experience of an already established Canadian MAP, Seaton House in Ontario. A 93% and 96% reduction in emergency department visits and medical service calls was reported respectively since 1996 when the Seaton House MAP commenced (London Homeless Coalition, 2011).

A sixth article evaluated the MAP in Thunder Bay, Ontario, Canada. Eighteen participants were involved in the program, as well as 20 control participants (n=38), evaluated through a mixed methods design focussed on drinking behaviour and health over the first six months of program engagement. All 38 of the participants in this study identified as aboriginal. The Thunder Bay MAP provided 15 beds for both male and female participants who have been chronically homeless or residing in emergency shelters. Participants were also required to have experienced a high rate of police contact. Participants were given meals, assistance in organising liquid assets, health services, psychosocial intervention, and were provided with health and housing referrals, as well as cultural supports as necessary. Of the 17 participants involved in this study, 14 retained housing over the six-month period required for study eligibility. Throughout the study there was a 42% reduction in police contact. A 43% (p=<0.0001) reduction in MAP participants held in custody as a result of police contact was evident and shown to be significant. A 37% reduction in hospital admissions was also observed while participants were involved in the MAP compared to admissions prior to taking part in the study (paired t, t=2.11) (p<0.05). While the average rate of ER presentations was 47% (t=-0.80) lower for MAP participants than those in the control group, this was not significant. MAP participants saw a 77% reduction in detoxification episodes compared to controls (t= -1.69, p<0.1). There was a non-significant change in alcohol use from baseline to follow up. The most striking result of this MAP is the reduction in police interaction (Pauly et al., 2013).

A seventh study evaluated a pilot MAP in Vancouver, Canada. Of the 14 individuals surveyed, seven were service users and the remaining seven were staff (n=14), with data collected at baseline, 3 and 6 month intervals. Data collection included qualitative and quantitative measures such as: structured surveys, liver function tests, records of alcohol administration, and assessments by qualified medical professionals. Professional staff, primarily nurses, administered one standard drink (measured at 17.05 ml of pure alcohol) per hour consumed in the form of beer, wine or spirits. A maximum of 12 standard drinks were to be administered per day, unless participants became unwell. Of this cohort, two participants were administered 1.5 standard drinks every hour and two standard drinks at first administration in the morning respectively due to medical risk factors. There was a reported non-significant drop in beverage alcohol use throughout the duration of the program while there was a significant drop in non-beverage alcohol consumption. All participants reported fewer markers of alcohol dependence on the Severity of Dependence Questionnaire administered by physicians. Seventy-one per cent of participants reported improved or stable mental health on the Short Form 12 (SF-12) Mental Component survey. There was a reported non-significant drop in beverage alcohol use throughout the duration of the program while there was a significant drop in non-beverage alcohol consumption. All participants reported fewer markers of alcohol dependence on the Severity of Dependence Questionnaire administered by physicians while 71% of participants reported improved or stable mental health on the Short Form 12 (SF-12) Mental Component survey (Stockwell et al., 2013).

Appendix B. Interview questionnaire

Eligibility Check: Confirm that participants are homeless. Homelessness is operationally defined as those who fit into one of the following 3 categories:

- **Primary Homelessness**: People without conventional accommodation (living on the streets, in deserted buildings, improvised dwellings, under bridges, in parks, etc.)

- **Secondary Homelessness**: People moving between various forms of temporary shelter including friends and relatives, emergency accommodation, youth refuges, hostels and boarding houses. Secondary homelessness also includes people staying in boarding houses on a short-term basis, operationally defined as 12 weeks or less.

- **Tertiary Homelessness**: People living in single rooms in private boarding houses without their own bathroom, kitchen or security of tenure provided by a lease. Refers to people who live in boarding houses on a medium to long-term basis, operationally defined as 13 weeks or longer.

This will be assessed using the following questions:

1. Where were you living before you entered Gorman House and where will you be living after you leave Gorman House?

2. Which of the following best describes your living situation over the last month?

    ~   Rough sleeping (without conventional accommodation)

    ~   Staying in emergency/crisis accommodation

    ~   Staying with friends or relatives

    ~   Staying in a hostel

    ~   Staying in a refuge

    ~   Staying in a private boarding house without your own bathroom or kitchen and lease*

    *If participants identify as staying in a private boarding house, ask about duration of stay.

If necessary, follow-up questions will be used to clarify participant's responses.

Interview Questions:

1. What is your age?

2. What is your gender?

3. How long has it been since you lived in a permanent housing situation?

4. How many days have you currently been in Gorman House?

5. Have you ever been to Gorman House before?

    Yes   No   Can't remember

    If yes:

        a)   How many times (including this admission)?

6. Administration of the Alcohol Use Disorders Identification Test (AUDIT).

7. How often do you drink alcohol on the street or in parks?

    1=Never   2=Less than monthly   3=Monthly   4=Weekly   5=Daily or almost daily

8. How often do you drink non-beverage alcohol (alcohol not intended for drinking) such as rubbing alcohol, methylated spirits, mouthwash or hand sanitiser?

   1=Never   2=Less than monthly   3=Monthly   4=Weekly   5=Daily or almost daily

   If answer 2-5:

   a) What types of non-beverage alcohol do you consume?

   b) How much would you normally drink on the days you drank this?

9. Have you ever been involved in any <u>alcohol</u> treatment or rehabilitation programmes other than Gorman House?

   Yes   No   Can't remember

   If yes:

   a) How many other treatment programmes have you been involved in?

   b) What was this/were these treatment program(s)?

   c) Did you complete this/these program(s)?

I am now going to read out some statements about services that provide alcohol and I want you to rate how much you would like to go to this service.

10. I would like to go to a day centre where I am provided with up to one alcoholic drink an hour, every hour from 7am – 10pm.

    1=Yes, definitely 2=Yes, generally 3=Unsure 4=No, not really 5=No, definitely not

    i. How much of your pension/Centrelink payment/income would you be willing to pay for this?

       0%   25%   50%   75%   100%

    ii. Where would you prefer to go to this service?

       1) In Kings Cross/Darlinghurst area

       2) In central Sydney but outside of Kings Cross/Darlinghurst area or

       3) Outside of central Sydney

11. I would like to stay and sleep in a hostel where I am provided with up to one alcoholic drink an hour, every hour from 7am – 10pm.

    1=Yes, definitely 2=Yes, generally 3=Unsure 4=No, not really 5=No, definitely not

    i. How much of your pension/Centrelink payment/income would you be willing to pay for this?

       0%   25%   50%   75%   100%

    ii. Where would you prefer to go to this service?

       1) In Kings Cross/Darlinghurst area

       2) In central Sydney but outside of Kings Cross/Darlinghurst area or

       3) Outside of central Sydney

12. I would like to go to a day centre where I can bring and drink my own alcohol.

    1=Yes, definitely 2=Yes, generally 3=Unsure 4=No, not really 5=No, definitely not

      i.   How much of your pension/Centrelink payment/income would you be willing to pay for this?

            0%   25%   50%   75%   100%

     ii.   Where would you prefer to go to this service?

      1)   In Kings Cross/Darlinghurst area

      2)   In central Sydney but outside of Kings Cross/Darlinghurst area or

      3)   Outside of central Sydney

13. I would like to stay and sleep in a hostel where I can bring and drink my own alcohol.

    1=Yes, definitely 2=Yes, generally 3=Unsure 4=No, not really 5=No, definitely not

      i.   How much of your pension/Centrelink payment/income would you be willing to pay for this?

            0%   25%   50%   75%   100%

     ii.   Where would you prefer to go to this service?

      1)   In Kings Cross/Darlinghurst area

      2)   In central Sydney but outside of Kings Cross/Darlinghurst area or

      3)   Outside of central Sydney

14. I would like to go to a day centre where I can exchange my non-beverage alcohol (such as rubbing alcohol, methylated spirits, mouthwash and hand sanitiser) for beverage alcohol (beer or wine) that is provided to me up to one alcoholic drink an hour, every hour from 7am – 10pm.

    1=Yes, definitely 2=Yes, generally 3=Unsure 4=No, not really 5=No, definitely not

      i.   How much of your pension/Centrelink payment/income would you be willing to pay for this?

            0%   25%   50%   75%   100%

     ii.   Where would you prefer to go to this service?

      1)   In Kings Cross/Darlinghurst area

      2)   In central Sydney but outside of Kings Cross/Darlinghurst area or

      3)   Outside of central Sydney

15. I would like to stay and sleep in a hostel where I can exchange my non-beverage alcohol (such as rubbing alcohol, methylated spirits, mouthwash and hand sanitiser) for beverage alcohol (beer or wine) that is provided to me up to one alcoholic drink an hour, every hour from 7am – 10pm.

    1=Yes, definitely 2=Yes, generally 3=Unsure 4=No, not really 5=No, definitely not

      i.   How much of your pension/Centrelink payment/income would you be willing to pay for this?

            0%   25%   50%   75%   100%

     ii.   Where would you prefer to go to this service?

      1)   In Kings Cross/Darlinghurst area

      2)   In central Sydney but outside of Kings Cross/Darlinghurst area or

3) Outside of central Sydney

That is the end of the interview. Thank you for your time.

The Alcohol Use Disorders Identification Test: Interview Version (Babor et al, 2001)

Read questions as written. Record answers carefully. Begin the AUDIT by saying "Now I am going to ask you some questions about your use of alcoholic beverages during this past year." Explain what is meant by "alcoholic beverages" by using local examples of beer, wine, vodka, etc. Code answers in terms of "standard drinks". Place the correct answer number in the box at the right.

1. How often do you have a drink containing alcohol? (0) Never [Skip to Qs 9-10] (1) Monthly or less (2) 2 to 4 times a month (3) 2 to 3 times a week (4) 4 or more times a week	6. How often during the last year have you needed a first drink in the morning to get yourself going after a heavy drinking session? (0) Never (1) Less than monthly (2) Monthly (3) Weekly (4) Daily or almost daily
2. How many drinks containing alcohol do you have on a typical day when you are drinking? (0) 1 or 2 (1) 3 or 4 (2) 5 or 6 (3) 7, 8, or 9 (4) 10 or more	7. How often during the last year have you had a feeling of guilt or remorse after drinking? (0) Never (1) Less than monthly (2) Monthly (3) Weekly (4) Daily or almost daily
3. How often do you have six or more drinks on one occasion? (0) Never (1) Less than monthly (2) Monthly (3) Weekly (4) Daily or almost daily *Skip to Questions 9 and 10 if Total Score for Questions 2 and 3 = 0*	8. How often during the last year have you been unable to remember what happened the night before because you had been drinking? (0) Never (1) Less than monthly (2) Monthly (3) Weekly (4) Daily or almost daily
4. How often during the last year have you found that you were not able to stop drinking once you had started? (0) Never (1) Less than monthly (2) Monthly (3) Weekly (4) Daily or almost daily	9. Have you or someone else been injured as a result of your drinking? (0) No (2) Yes, but not in the last year (4) Yes, during the last year
5. How often during the last year have you failed to do what was normally expected from you because of drinking? (0) Never (1) Less than monthly (2) Monthly (3) Weekly (4) Daily or almost daily	10. Has a relative or friend or a doctor or another health worker been concerned about your drinking or suggested you cut down? (0) No (2) Yes, but not in the last year (4) Yes, during the last year

Record total of specific items here

If total is greater than recommended cut-off, consult User's Manual.

Appendix C.

Table 11. Hospital service utilisation costs for 15 participants

Participant	Hospital admissions (12 months)	Gorman House admissions (12 months)	ED presentations (12 months)	Hospital Costs (12 months)
1.	16	8	2	$105,927.20
2.	18	2	4	$86,177.10
3.	12	8	0	$84,516.84
4.	21	3	1	$102,295.95
5.	18	26	0	$200,081.10
6.	18	6	1	$104,237.10
7.	14	3	0	$71,260.84
8.	13	12	4	$113,472.35
9.	16	11	9	$123,135.20
10.	10	4	9	$64,461.5
11.	10	5	2	$66,501.5
12.	2	10	4	$58,033.90
13.	9	4	3	$57,920.55
14.	6	3	17	$46,157.70
15.	8	4	0	$52,567.60
Total	*$795,505.45*	*$524,508.00*	*$22,176*	*$1,342,189.45*

References

Australian Government Department of Human Services (2015). *Payment rates for Disability Support Pension*. Retrieved October 2015 from http://www.humanservices.gov.au/customer/services/centrelink/disability-support-pension

Babidge, N.C., Buhrich, N., & Butler, T. (2001). Mortality among homeless people with schizophrenia in Sydney, Australia: A 10-year follow-up. *Acta psychiatrica Scandinavica*, 103(2):105-10.

Babidge, N.C., Buhrich, N., & Butler, T. (2001). Mortality among homeless people with schizophrenia in Sydney, Australia: A 10 year follow-up. *Acta Psychiatrica Scandinavica,* 103:105-10.

Babor, T., Higgins-Biddle, J., Saunders, J., & Monteiro, M. (2001). *The alcohol use disorders identification test: Guidelines for use in primary care*. Geneva: World Health Organization.

Baldry, E., Dowse, L., McCausland, R., & Clarence, M. (2012). *Lifecourse institutional costs of homelessness for vulnerable groups.* Department of Families, Housing, Community services and Indigenous Affairs.

Berry, B. (2007). A repeated observation approach for estimating the street homeless population. *Evaluation Review.* 31(2):166-99.

Castaneda, R., Lifshutz, H., Galanter, M., Medalia, A., & Franco, H. (1992). Treatment compliance after detoxification among highly disadvantaged alcoholics. *The American Journal of Drug and Alcohol Abuse*, 18(2):223-34.

Chin, C.N., Sullivan, K., & Wilson, S.F. (2011). A 'snap shot' of the health of homeless people in inner Sydney: St Vincent's Hospital. *Australian Health Review*, 35(1):52-6.

Collins, S.E., Clifasefi, S.L., Dana, E.A., Andrasik, M.P., Stahl, N., Kirouac, M., et al. (2012). Where harm reduction meets housing first: exploring alcohol's role in a project-based housing first setting. *International Journal of Drug Policy*, 23(2):111-9.

Collins, S.E., Malone, D.K., & Larimer, M.E. (2012). Motivation to change and treatment attendance as predictors of alcohol-use outcomes among project-based Housing First residents. *Addictive Behaviors*, 37(8):931-9.

Duffin, T. (2006). *Past, current and future perspectives on service responses to the homeless street drinking population of Dublin city centre*. MSc thesis submitted to the University of Dublin, Trinity College.

Edens, E.L., Mares, A.S., Tsai, J., & Rosenheck, R.A. (2011). Does active substance use at housing entry impair outcomes in supported housing for chronically homeless persons? *Psychiatric Services*, 62(2):171-8.

Evans, J. (2012). Supportive measures, enabling restraint: Governing homeless 'street drinkers' in Hamilton, Canada. *Social and Cultural Geography*, 13:185-200.

Harper, C. (1983). The incidence of Wernicke's encephalopathy in Australia--a neuropathological study of 131 cases. *Journal of Neurology, Neurosurgery and Psychiatry*, 46(7):593-8.

Heyman, G.M. (2013). Addiction and choice: Theory and new data. *Frontiers in Psychiatry*, 4(31):5.

Independent Hospital Pricing Authority. (2012). *National hospital cost data collection Australian public hospitals cost report 2011-2012.*

Joint Select Committee on Safe Injecting Rooms. (1998). *Report on the establishment or trial of safe injecting rooms.* Sydney: Parliament of NSW.

Kesselring, S., Graham, B., Tzemis, D., & Buxton, J. (2013). *Illicit alcohol in British Columbia: Results from a qualitative research study.* British Columbia Centre for Disease Control.

Kidd, S.A., Kirkpatrick, H., & George, L. (2011). Getting to know Mark, a homeless alcohol-dependent artist, as he finds his way out of the river. *Addiction Research & Theory*. 19(2):pp.

Larimer, M.E., Malone, D.K., Garner, M.D., Atkins, D.C., Burlingham, B., Lonczak, H.S., et al. (2009). Health care and public service use and costs before and after provision of housing for chronically homeless persons with severe alcohol problems. *Journal of the American Medical Association*. 301(13):pp.

Larney, S., Conroy, E., Mills, K.L., Burns, L., & Teesson, M. (2009). Factors associated with violent victimisation among homeless adults in Sydney, Australia. *Australian and New Zealand Journal of Public Health*. 33(4):347-51.

London Homeless Coalition. (2001). *Managed alcohol: Housing, health & hospital diversion*. Retrieved from http://londonhomeless.ca/wp-content/uploads/2013/11/Managed-Alcohol-Report.pdf accessed January 2015.

Ma, J.J., & Truswell, A.S. (1995). Wernicke-Korsakoff syndrome in Sydney hospitals: before and after thiamine enrichment of flour. *Medical Journal of Australia*. 163(10):531-4.

McNeil, R., Guirguis-Younger, M., Dilley, L.B., Aubry, T.D., Turnbull, J., & Hwang, S.W. (2012). Harm reduction services as a point-of-entry to and source of end-of-life care and support for homeless and marginally housed persons who use alcohol and/or illicit drugs: a qualitative analysis. *BMC Public Health*. 12:312.

Moore, C. (2014). *Homelessness services in the Inner City Council item*. 3.4:1-4.

Muckle, W., Muckle, J., Welch, V., & Tugwell, P. (2012). Managed alcohol as a harm reduction intervention for alcohol addiction in populations at high risk for substance abuse. *The Cochrane database of systematic reviews*. 12:CD006747.

New South Wales Ministry of Health. (2011). *Cost of care standards 2009/2010*. Inter-Government and Funding Strategies branch.

O'Toole, T.P., Gibbon, J.L., Hanusa, B.H., Freyder, P.J., Conde, A.M., Fine, M.J. (2004). Self-reported changes in drug and alcohol use after becoming homeless. *American Journal of Public Health*. 94:830-5.

Pauly, B., Reist, D., Schactman, C., Belle-Isle, L. (2011). *Housing and Harm Reduction: A policy framework for greater Victoria*. Centre for Addictions Research of British Columbia.

Pauly, B., Stockwell, T., Chow, C., Gray, E., Krysowaty, B., Vallance, K., Zhao, J., & Perkin, K.. (2013). *Towards alcohol harm reduction: Preliminary results from an evaluation of a Canadian managed alcohol program*. Centre for Addictions Research of British Columbia.

Podymow, T., Turnbull, J., Coyle, D., Yetisir, E., & Wells, G. (2006). Shelter-based managed alcohol administration to chronically homeless people addicted to alcohol. *Canadian Medical Association Journal.* 174(1):45-9.

Podymow, T., Turnbull, J., Tadic, V., & Muckle, W. (2006). Shelter-based convalescence for homeless adults. *Canadian Journal of Public Health*. 97(5):379-83.

Reed, M. (2008). *Wet shelters: The benefits and risks associated with alcohol-administering homeless shelters: Scoping review*. Ministry of Labour and Citizens' Services, British Columbia, Canada.

Robinson, C. (2010). *Rough living: Surviving violence and homelessness*. University of Technology Sydney Shopfront. 6:1-64.

Silins, E., Sannibale, C., Larney, S., Wodak, A., & Mattick, R. (2008). Residential detoxification: essential for marginalised, severely alcohol- and drug-dependent individuals. *Drug and Alcohol Review*. 27(4):414-9.

Stockwell, T., Pauly, B., Chow, C., Vallance, K., & Perkin, K. (2013). *Evaluation of a Managed Alcohol Program in Vancouver, BC: Early findings and reflections on alcohol harm reduction*. Centre for Addictions Research of British Columbia.

Stockwell, T., Pauly, B., Vallance, K., Chow, C., & Perkin, K. (2014). *Managed alcohol program: Evaluating effectiveness of alcohol harm reduction and housing instability*. Centre for Addictions Research of British Columbia.

Taylor, K.M., Sharpe, L. (2008). Trauma and post-traumatic stress disorder among homeless adults in Sydney. *Australian and New Zealand Journal of Psychiatry*. 42(3).

Van Wormer, R., Van Wormer, K. (2009). Non-abstinence-based supportive housing for persons with co-occurring disorders: A human rights perspective. *Journal of Progressive Human Services*. 20(2).

Foundation for Alcohol Research & Education

PO Box 19, Deakin West ACT 2600

Level 1, 40 Thesiger Court Deakin ACT 2600

Ph 02 6122 8600

info@fare.org.au

www.fare.org.au