

A COST-BENEFIT ANALYSIS OF A CANADIAN MANAGED ALCOHOL PROGRAM

A report prepared by the Centre for Addictions Research of British Columbia
for the Kwae Kii Win Centre Managed Alcohol Program

Kendall Hammond, MPA
Lynda Gagne, CGA, PhD
Bernie Pauly, RN, PhD
Tim Stockwell, MA (Oxon), PhD

February 2, 2016



University of Victoria | Centre for Addictions
Research of BC

EXECUTIVE SUMMARY

Background: In 2012, Shelter House opened a 15-bed Managed Alcohol Program in Thunder Bay, Ontario for homeless individuals with severe alcohol dependence. The program follows a Housing First model by providing participants with access to housing and individualized supports. Most notably, participants are provided with regular doses of alcohol to help manage and regulate consumption. A preliminary evaluation of the program found that MAP recipients had experienced reductions in service utilization, fewer alcohol-related harms, and improvements in health and quality of life outcomes when compared to their outcomes prior to program entry and to a Treatment-As-Usual control group. The purpose of this study is to assess these findings further by conducting a cost-benefit analysis of the program.

Methodology: This study provides a cost-benefit analysis of the Managed Alcohol Program in Thunder Bay by comparing the societal cost for program participants and the cost of program administration to societal costs for two control groups. Differences in service utilization costs are used to determine the cost savings associated with program participation while taking a broader societal perspective that places a value on homelessness equal to the cost of providing an emergency shelter bed every night that the homeless remain unsheltered.

Findings: Table ES1 outlines the average annual service utilization patterns for each group during the study period. Using an annual average, MAP participants spent three days receiving inpatient treatment, visited the emergency department 14 times, and were detained by police on four occasions while in MAP whereas they previously spent 99 nights at the emergency shelter, 19 days receiving inpatient treatment, visited the emergency department 13 times and were detained by police on 13 occasions. Meanwhile, those in the control group spent 97 nights at the emergency shelter, 20 days receiving detoxification treatment, visited the emergency department 26 times and were detained by police on 14 occasions. The finding that MAP participants visited the emergency department more often while in MAP than prior to program entry may be anomalous due to the small sample size of the study as other studies of similar programs have found that treatment recipients typically reduce their utilization of emergency department services.

Service	MAP participants while in MAP	MAP participants prior to program entry	Control group
Emergency shelter (nights)	0	99.00	96.94
Detoxification (days)	1.03	18.86	20.72
Inpatient (days)	3.69	6.42	5.98
Emergency department (visits)	13.94	13.14	26.10
Police detention (days)	4.24	12.95	14.10

Table ES2 shows the average annual cost of health, social, and legal service utilization for each group taking into account the societal cost of homelessness. The annual cost of service utilization by program participants while in MAP was \$13,379 per person whereas the annual cost of service utilization by program participant prior to receiving treatment and the control group was \$45,304 per person and \$48,969 respectively. The annual cost of delivering the Managed

Alcohol Program was \$29,306 per participant. In total, the annual cost of all service utilization and program participation by MAP recipients was \$42,685 per person.

Service	MAP participants while in MAP (\$)	MAP participants prior to MAP (\$)	Control group (\$)
Missing services	3,128	6,797	6,797
Emergency shelter, detoxification, inpatient, ED, and police detention	10,251	38,507	42,172
MAP	29,306	N/A	N/A
Total	42,685	45,304	48,969

Table ES3 shows the cost-effectiveness of the program by outlining the cost savings achieved as a result of program participation on the basis of two comparisons. First, the cost of health, social, and legal service utilization and program participation for MAP recipients is compared to their cost of service utilization prior to program entry. On the basis of this comparison, program participation was associated with an annual saving of \$2,619 per person. Second, the cost of health, social, and legal service utilization and program participation for MAP recipients is compared to the cost of service utilization for the control group. On the basis of the comparison of and control groups, program participation was associated with an annual saving of \$6,284 per person. As a result, there was a saving of between \$1.09 and \$1.21 for every dollar invested in the MAP.

Comparison	Savings (\$)	Savings per dollar invested (\$)
MAP participants while in MAP and prior to program entry	2,619	1.09
MAP participants while in MAP and control group	6,284	1.21

We would note that the service utilization is likely under reported for each group. Patterson et al (2007) found that the cost for people with severe mental health and addictions issues was 55,000 in 2006 dollars. This would be \$60,029 in 2012/2013. Assuming that the average annual cost of homelessness for each participant in this study is \$60,029 per person and that MAP recipients experience service utilization cost reductions of between 59.7% and 64.8% (as we reported elsewhere), the cost savings associated with program participation would be greater than reported in this study. Under this scenario, there would be a saving of between \$1.64 and \$1.87 for every dollar invested in MAP treatment.

Conclusion: Preliminary findings from the MAP in Thunder Bay suggest that the provision of adequate housing and individualized supports to help manage and regulate alcohol consumption can be a cost-beneficial way to address homelessness for those with severe alcohol dependence. When factoring in the social costs of homelessness, it is estimated that there is a saving of between \$1.09 and \$1.21 for every dollar invested in treatment due to significant reductions in the frequency of health, social, and legal service utilization by treatment recipients in comparison to prior to program entry and a control group.

Recommendation: This research group recommends that further evaluation of MAPs be undertaken so that the longer-term outcomes of MAP recipients can be measured and recorded.

We are currently completing a larger multi-site analysis of all known MAPs in Canada so that the findings of this study can be triangulated with data from a larger sample size to determine if any of the findings in this report are anomalous. Further, we plan to conduct economic costing of these multi-site analyses so as to allow for a comparison of the effectiveness of different program delivery models.

TABLE OF CONTENTS

Executive Summary	i
1 Introduction	1
2 Background	1
3 Literature Review	2
3.1 Homelessness	2
3.2 Alcohol Dependence	3
3.3 Relationship between Homelessness and Alcohol Dependence	4
3.4 Housing First Programs for Homeless Individuals with Alcohol Dependence	4
4 Methodology	5
4.1 Service Utilization Costs	6
4.2 Valuing Homelessness Costs	7
4.3 Limitations	7
5 Findings	8
5.1 Service Utilization Patterns	8
5.2 Service Utilization Costs, Total Costs, and Cost Savings	9
5.3 Net Social Costs including Missing Services and the Costs of Homelessness	10
6 Discussion	11
6.1 Service Utilization in Other Communities	11
6.3 Long-Term Treatment Outcomes	13
7 Conclusion	13
References	13
Appendix I	19

TABLE OF FIGURES

Table 1: Time periods for service utilization data analyzed	6
Table 2: Emergency shelter, detoxification, inpatient, ED, police detention, and MAP per diem rates	7
Table 3: Annual service utilization patterns	9
Table 4: Social costs excluding costs of homelessness	10
Table 5: Total annual social costs including cost of homelessness	11
Table 6: Total annual cost savings after accounting for societal cost of homelessness	11

LIST OF ABBREVIATIONS

AHCS	At Home/Chez Soi
CARBC	Centre for Addictions Research of British Columbia
CBA	Cost-Benefit Analysis
ED	Emergency Department
MAP	Managed Alcohol Program
MOHLTC	Ontario Ministry of Health and Long-Term Care
TAU	Treatment-As-Usual

1 INTRODUCTION

In March 2012, Shelter House opened a 15-bed Managed Alcohol Program (MAP) at the Kwae Kii Win Centre in Thunder Bay, Ontario. The mission of Shelter House (2013, p. 5) is “to provide basic needs, dignity, and comfort to people living in poverty and stimulate action to address the root causes of homelessness.” At the Kwae Kii Win Centre, MAP participants are provided with permanent access to adequate housing and supports to help manage and regulate alcohol consumption consistent with a Housing First approach. MAP recipients are typically individuals with severe alcohol dependence and long histories of homelessness, public intoxication, and regular consumption of non-palatable alcohol (Hajdu, 2014, p. 4; Pauly et al., 2013, p. 12; Shelter House, 2013, p. 5).

The Centre for Addictions Research of British Columbia (CARBC) conducted an evaluation of the program in December 2013 and found that MAP recipients had experienced fewer alcohol-related harms and improvements in health and quality of life outcomes when compared to their outcomes prior to program entry and to a treatment-as-usual (TAU) control group (Pauly et al., 2013, p. 18). CARBC also found that MAP recipients had experienced significant reductions in health, social, and legal service utilization over a six-month study period in comparison to a control group including a:

- 43% reduction in police contact
- 88% reduction in withdrawal management service utilization
- 37% reduction in hospital admissions
- 47% reduction in emergency department visits (Pauly et al., 2013, pp. 34-36).

The purpose of this study is to assess these initial findings further by conducting a cost-benefit analysis (CBA) of the program in terms of tangible costs and benefits.

2 BACKGROUND

Ongoing concerns regarding the prevalence of homelessness and public intoxication in Thunder Bay served as a catalyst for the creation of the MAP. Program development was facilitated by the work of the Thunder Bay Drug Strategy and the Thunder Bay Police Service to address public intoxication in a compassionate manner that reduced reliance on enforcement (Hajdu, 2014, p. 4; Pauly et al., 2013, p. 12). The aim of the program is to reduce the occurrence of alcohol-related harms and to alleviate demand placed on community service providers, including police and emergency responders, by providing participants with access to adequate housing and a maintenance dose of beverage alcohol, administered in a supervised setting, to replace dangerous patterns of episodic, very heavy drinking, and non-beverage alcohol consumption (Hajdu, 2014, p. 12).

Criteria for program admission include a history of severe alcohol dependence, chronic homelessness, and a high rate of police contact (Hajdu, 2014, p. 12; Shelter House, 2013, p. 5). Shelter House staff, the Thunder Bay Police Service, and other community service providers that frequently interact with this population are responsible for identifying prospective candidates.



MAP recipients during the study period included both men and women, all of whom self-identified as Indigenous (Pauly et al., 2013, p. 13).

At the Kwae Kii Wii Win Centre, recipients are provided with meals, life skills training, assistance with money management, and access to adequate housing, counselling, and primary health care services (Hajdu, 2014, p. 4; Pauly et al., 2013, p. 12). Most notably, MAP recipients are given a six-ounce alcoholic beverage, typically white wine, every 90 minutes from 8:00 A.M. to 11:00 P.M. as a means to manage and regulate their alcohol consumption. Currently, recipients are required to be at the facility for 90 minutes prior to receiving their dose. Drinking outside of the program setting is strongly discouraged, and participants are refused alcohol if they are not at the facility for the specified period before receiving their dose. Shelter House staff track the provision of alcohol to ensure that each recipient's level of intoxication is safe and allows them to function. Residential tenure is contingent on continued program participation (Pauly et al., 2013, p. 13).

The Kwae Kii Win Centre is staffed 24-hours per day with at least two employees on site at all times to provide supports and oversee the administration of alcohol. A community worker is available to help MAP recipients connect with legal service providers and offer assistance with obtaining government identification, income support, or other social supports. A nurse practitioner from a local community health centre visits the centre each week to provide basic health care services. MAP recipients also have access to primary care and community supports to facilitate improvements in health and wellness (Pauly et al., 2013, p. 13).

The Kwae Kii Win Centre is located directly across a lane from an emergency shelter, also operated by Shelter House. Accommodation is similar to a rooming house and includes communal living spaces where residents can cook, socialize, and participate in other activities (Hajdu, 2014, p. 9).

The City of Thunder Bay, the Province of Ontario, and the Government of Canada through its Homelessness Partnering Strategy provide project grants to fund program operations. Similar to other Housing First programs, MAP recipients are required to contribute a portion of their social assistance for room and board (Hajdu, 2014, p. 13).

3 LITERATURE REVIEW

This section provides an outline of the problem of homelessness in Canada and some of the consequences including the high cost of disproportionate health, social, and legal service utilization by individuals experiencing homelessness. The consequences of severe alcohol dependence and its relationship to homelessness are also each discussed in turn. This section concludes with an overview of Housing First programs for homeless individuals with severe alcohol dependence similar to the MAP in Thunder Bay.

3.1 Homelessness

Homelessness has emerged over the past two decades as a significant social problem in cities across Canada (Gaetz, Donaldson, Richter, & Gulliver, 2013, p. 30). In many communities,

homelessness is widely visible and places considerable strain on public resources and businesses (Patterson, Somers, & McIntosh, 1997, p. 25). It is estimated that over 235,000 individuals experience homelessness each year in Canada, with over 35,000 individuals experiencing homelessness on any given night (Gaetz, Gulliver, & Richter, 2014, p. 5).

A wide body of literature exists that demonstrates the significant costs that homelessness imposes on society. Researchers who study resource utilization patterns find that homeless individuals typically utilize health, social, and legal services far more frequently and for longer periods than housed individuals (Frencher et al., 2010, p. 191; Krushel, Perry, Bangsberg, & Moss, 2002, p. 7778; Martinez & Burt, 2006, p. 992; Rickards et al., 2010, p. 149). In particular, studies have found that homeless individuals disproportionately utilize emergency shelters, respite centers, and nursing homes (Culhane, Malone, & Larimer, 2002, p. 107; Metraux, Marcus, & Culhane, 2003, p. 67; Tsemberis, Moran, Shinn, Asmussen, & Shern, 2003, p. 305).

Most significantly, homelessness is associated with high health care costs because homeless individuals experience an array of taxing “mental, physical, economic, and social conditions including extreme poverty, exposure to the elements, mental and substance use disorders, malnutrition, victimization, bias, and stigma” (Rickards et al., 2010, p. 151). As a result, homeless individuals typically utilize ED and acute care services more frequently and require a higher intensity of care to stabilize their condition in comparison to those who are housed (Eberle, Krauss, Pomeroy, & Hulchanski, 2001, p. 3; Hwang, Waever, Aubry, & Hoch, 2011, p. 353; Pearson, Bruggman, & Haukoos, 2005, p. 646; Salit, Kuhn, Hartz, Vu, & Mosso, 1998, p. 1734; Srebnik, Connor, & Sylla, 2013, p. 316).

Homelessness is also associated with high legal costs as homeless individuals are more likely to be arrested, incarcerated, or the victim of a crime (Culhane, Metraux, & Hadley, 2002, pp. 128-129; Rickards et al., 2010, p. 152). There is also evidence that correctional facilities inadvertently serve as a temporary housing option for homeless individuals without access to appropriate housing services (Patrick, 2014, p. 20). In total, it is estimated that the annual cost of homelessness to the Canadian economy is \$7.05 billion (Gaetz et al., 2013, p. 33).

3.2 Alcohol Dependence

According to the World Health Organization (2004, p. 1), an estimated 76.3 million individuals suffer from alcohol disorders globally. In Canada, alcohol dependence affects 2.6% of the population (Tjepkema, 2004, p. 9). Both of the main international diagnostic classification systems (DSM-IV and ICD-10) define alcohol dependence in terms of a clustering of signs and symptoms including increased tolerance, experience of withdrawal, continued use despite consequence, and a degree of impaired control over consumption (Hasin, Hatzenbuehler, Keyes, & Ogburn, 2006, p. 59).

There are three categories of harm associated with alcohol dependence: (i) “acute” comprising injuries, poisonings, or acute illnesses caused in part by heavy alcohol consumption; (ii) “chronic” comprising a range of serious illnesses including liver disease, cancers, strokes, and gastrointestinal diseases which are caused by the overall volume of alcohol consumed over time;

and (iii) “social” comprising problems relating to housing, relationships, employment, finances, and crime (Rehm et al., 2001, p. 1418).

Alcohol dependence contributes to binge drinking, consumption of non-beverage alcohol (e.g. mouthwash, cleaning products, and cough and cold remedies), violent behaviours, criminal behaviours, suicide, job instability, poor compliance with treatment, public inebriation, more frequent ED visits, and increased mortality (Caton et al., 2005, p. 1754; Egbert, Reed, Powell, Liskow, & Liese, 1985, 474; Hibbs et. al, 1994, p. 305).

3.3 Relationship between Homelessness and Alcohol Dependence

Severe alcohol dependence is sometimes associated with homelessness or housing instability (Cordray & Lehman, 1993, p. 355). Although homelessness cannot be explained by alcohol dependence alone as many of those with addictions challenges never experience homelessness, an individual in an unstable housing situation, often due to low income, is at an increased risk of becoming homeless if they have alcohol use problems. Once on the streets, an individual with alcohol dependence has little chance of obtaining housing as they face significant barriers to obtaining health care, including substance use treatment services and recovery supports and in some cases go without shelter as a consequence of alcohol use (Muckle, Muckle, Welch, & Tugwell, 2012, p. 3; Williams, 2011).

Rates of alcohol use are disproportionately high among the homeless population. A recent meta-analysis found that an estimated 37.9% of homeless individuals suffer from alcohol dependence (Fazel, Khosla, Doll, & Geddes, 2008, p. 1675). These figures are clinically and socially significant because alcohol dependence influences not only the health and social outcomes of these individuals, but also impacts families and local communities. In Canada, Indigenous peoples are over-represented among the homeless population and are more likely to experience harmful consequences related to alcohol use (Hwang, 2001, p. 229; Reading, 2009).

The health and social consequences associated with concurrent experiences of alcohol dependence and homelessness oftentimes lead to the more frequent utilization of costly health, social, and legal services as these individuals typically have more complex care needs than those facing either of these challenges independently (D’Amore, Hung, Chiang, & Goldfrank, 2001, p. 1051; Kushel, Vittinghoff, & Haas, 2001, p. 201; Mandelberg, Kuhn, & Kohn, 2000, p. 640). Patterson, Somers, and McIntosh (2007, pp. 10-11) estimate that the annual cost of street homelessness for individuals with severe addictions and mental illness is \$55,000 per person.

3.4 Housing First Programs for Homeless Individuals with Alcohol Dependence

There are few treatment options available for those who are concurrently experiencing homelessness and severe alcohol dependence (Collins et al., 2012a, p. 111; Collins et al., 2012c, p. 511; Podymow, Turnbull, Coyle, Yetisir, & Wells, 2006, p. 45; Larimer et al, 2009, p. 1350; Thornquist, Biros, Olander, & Sterner, 2002, p. 300). However, there are Housing First programs for this population that seek to reduce the harms of substance use without necessarily eliminating or reducing consumption using a harm reduction philosophy (Collins et al., 2012b, p. 4; Marlatt, 1996, p. 779; Marlatt & Witkeiwitz, 2010; Riley & O’Hare, 2000). Typically, these programs

seek to reduce harms for a particular population, primarily by providing access to stable housing, which can have intrinsic health and social benefits, and also through tolerating continued use of alcohol. MAPs take this approach a step further by providing beverage alcohol of known quality and quantity to program participants at regular intervals to replace patterns of non-beverage alcohol consumption which may be more hazardous.

Initial research on Housing First interventions for homeless individuals with severe alcohol dependence has shown that the provision of non-abstinence based housing can reduce the harms of alcohol use and contribute to improved health outcomes and quality of life for recipients (Collins et al., 2012a, p. 111; Collins et al., 2012b, p. 511; Collins, Malone, & Larimer, 2012d, p. 931; Larimer et al., 2009, p. 1349; Pauly et al., 2013, pp. 5-6; Podymow et al., 2006, p. 47). Studies have also shown that participants in supportive housing programs that tolerate alcohol consumption reduce their utilization of ambulance, detoxification, inpatient, ED, and policing services (Podymow et al., 2006, p. 47; Thornquist et al., 2002, p. 300). However, to our knowledge, there has not been an economic analysis of the costs and benefits associated with the implementation of MAPs.

4 METHODOLOGY

This study provides a CBA of the MAP by comparing the estimated annual social cost for MAP participants and two separate control groups. Social costs include costs associated with the utilization of emergency shelter, detoxification, inpatient, ED, and police detention services and the provision of treatment to MAP participants minus the costs of program evaluation and spirits¹. Costs are first estimated taking a narrow government agency perspective that only incorporates costs incurred by housing, health, and justice agencies (Table 4). Costs are then estimated taking a broader societal perspective that places a value on homelessness equal to the cost of providing an emergency shelter bed every night that the homeless remain unsheltered and also include estimated social costs of public services other than those monitored by the program (Table 5).

While the societal perspective taken is broader, it is still incomplete. Estimating the full societal benefits of the program would include placing value on the added benefits to the homeless and society more generally of moving homeless individuals into stable housing rather than providing them with accommodation at an emergency shelter and is beyond the scope of this analysis. These benefits could include improved health, social, and economic outcomes, reduced neighbourhood blight, and increased public safety.

Two comparisons are made to estimate the impact of program participation on service utilization and the associated costs during the study period. First, the service utilization patterns of 18 MAP recipients are compared to their patterns prior to program entry. Second, the service utilization patterns of 18 MAP recipients are compared to those of 20 individuals in a TAU control group. The frequency of emergency shelter, detoxification, inpatient, ED, and police detention service utilization by each study group is multiplied by the corresponding per diem rate to determine the annual cost of utilizing these services.

¹ The cost of spirits is not included for either program participants or control groups.

Table 1 outlines the time periods that service utilization data is collected and analyzed for each study group. Shelter utilization data is provided by Shelter House and collected for the period from March 2011 to February 2012 for MAP recipients prior to program entry and for the control group for the period from September 2012 to August 2013. CARBC provides detoxification, inpatient, ED, and police detention data for MAP recipients for the periods of September 2012 to August 2013 while in treatment and September 2008 to February 2012 prior to program entry and for the control group for the period from September 2008 to February 2012 in the report *Towards Alcohol Harm Reduction: Preliminary Results from an Evaluation of a Canadian Managed Alcohol Program* (Pauly et al., 2013).

Service	MAP participants while receiving treatment	MAP participants prior to receiving treatment	Control group
Emergency shelter	September 2012 – August 2013	March 2011 – February 2012	September 2012 – August 2013
Detoxification, inpatient, ED, and police detention	September 2012 – August 2013	September 2008 – February 2012	September 2008 – August 2013

CARBC presents detoxification, inpatient, ED, and police detention utilization data as the average amount of time spent receiving or the number of interactions with each service per 100 days during the study period. The reported rate of service utilization is multiplied by 3.65 to determine the annual rate of utilization.

4.1 Service Utilization Costs

The annual cost of emergency shelter, detoxification, inpatient, ED, and police detention service utilization for each study group is calculated by multiplying the frequency of utilization by the corresponding per diem rate for each service and then summing these figures. Table 2 lists the per diem rate for each of these services during the study period.

Emergency shelter and MAP per diem rates are calculated by dividing the annual cost of service delivery by the number of available of shelter beds or program spaces and by 365. Service delivery costs are detailed in the Shelter House income statement for September 2012 to August 2013. As noted above, program evaluation costs are not included in the cost of treatment delivery. Program staff at the Balmoral Withdrawal Management Services Detoxification Centre, the only detoxification centre in Thunder Bay, provided the detoxification service per diem rate for the 2012/2013 fiscal year.

The per diem rate for inpatient services at the Thunder Bay Regional Health Sciences Centre for the 2012/2013 fiscal year is obtained from the Ontario Ministry of Health and Long-Term Care (MOHLTC) (2012a). This figure is adjusted by adding 9.6% to account for greater intensity of treatment required by homeless individuals in comparison to those who are housed due to more complex care needs and by adding another 6% to account for capital costs (Hwang et al., 2011, p. 353; Rosenheck, Frisman, & Neale, 1994, p. 493). The cost of an ED visit during the 2012/2013 fiscal year is based on the interprovincial rate provided by the MOHLTC (2012b) and adjusted by adding 4% to account for capital costs (Rosenheck, Frisman, & Neale, 1994, p. 493). The cost of an ED visit is presumed to be the same throughout Ontario.

The cost of a police detention is unavailable for the 2012/2013 fiscal year. Instead, the reported cost of a police detention from the Toronto site of the *At Home/Chez Soi Study* (Mental Health Commission of Canada, 2012, p. 48) is used as a proxy. The cost of a police detention in Thunder Bay is presumed to be the same as in Toronto.

Service	Per diem rate (\$)
Emergency shelter	57.48
Detoxification	179.14
Inpatient	1,266.98
ED	280.80
Police detention	349.00
MAP	80.29*

* The annual cost of MAP delivery was \$29,306 per participant after excluding the cost of program evaluation.

Service use costs monitored as part of the evaluation exclude some of the service costs included in the *At Home/Chez Soi Study* (AHCS) (Mental Health Commission of Canada, 2012, Appendix F), a somewhat comparable social intervention. This suggests that the list of services listed above may be incomplete. Additional services included in the AHCS study include outpatient consults, visits to social service agencies, prison or jail, transitional housing, and addiction treatment. The AHCS cost for treatment and control groups estimated for these missing services are added to the MAP treatment and control group costs to account for these missing cost elements.

4.2 Valuing Homelessness Costs

The above costs are from the perspective of the taxpayer or funding agencies and ignore the broader societal costs of homelessness. Permanent housing not only provides the homeless with benefits (reduces their cost of being homeless), it is also likely to reduce other societal costs associated with homelessness not incorporated in this analysis such as negative impacts on businesses and neighbourhoods. To partially account for these costs and benefits, the nights that MAP participants prior to program entry and those in the control group are unhoused are valued at the average nightly cost of an emergency shelter stay in Thunder Bay.

4.3 Limitations

A limitation of this study is that the small sample size of eligible participants increases the likelihood that some of the findings may be anomalous. However, this limitation is mitigated by triangulating comparable evidence across similar studies.

Another limitation is that individuals in the control group participants were selected specifically because of their greater likelihood of remaining in Thunder Bay for the duration of the study period to facilitate the collection of administrative data and follow-up assessments. The selection of less mobile individuals for the control group may account for some of the differences in the service utilization patterns as those in the control group may be more familiar with the services available in Thunder Bay and thus, more likely to access available services than those in the treatment group. Relatedly, the treatment and control groups were not randomly assigned. As

such, post-treatment comparisons that do not account for potential initial differences between the groups suffer from the threat to validity that the groups are dissimilar in ways that affect outcomes.

Despite the selection of less mobile individuals for the control group, many participants in both the treatment and control groups reside in Thunder Bay for part of the year and return to, often remote, Indigenous communities for significant lengths of time (Pauly et al., 2013, p. 14). The utilization of services in communities other than Thunder Bay is unaccounted for in this study. These considerations arguably to a greater to the control groups as they do not have access to stable housing in Thunder Bay. This limitation therefor likely underestimates the benefits associated with MAP treatment.

The Kwaie Kii Win Centre is located directly across a lane from the emergency shelter where control group participants frequently resided during the study period. The proximity of the facilities increases the likelihood of interaction between the two groups. Also, two individuals from the control group joined the MAP during the study period. This analysis excludes the findings for these individuals.

The amount of time spent in police custody is unavailable for this study. The length of each detention is assumed to be one day to partially mitigate this limitation. However, the amount of time spent in police detention is likely underreported as any lengthier stays are unaccounted for. Additionally, any differences in the crimes committed by participants in the treatment and control groups are also unaccounted for. Again, this likely results in underreporting of the benefits associated with MAP treatment as there was evidence that the Thunder Bay police were more likely to return MAP participants to their stable accommodation (Pauly et al., 2013).

5 FINDINGS

This section includes a comparison of the service utilization patterns and associated costs for MAP participants while in treatment, prior to program entry, and for the control group during the study period. This section also includes estimates of service utilization not monitored as part of the MAP evaluation. This information is used to estimate the cost savings associated with MAP participation by comparing 1) service utilization costs for MAP participants while in MAP and prior to program entry and 2) service utilization costs for MAP participants while in MAP and for the control group.

5.1 Service Utilization Patterns

Table 3 provides a breakdown of the annualized service utilization patterns of each study group. MAP participants spent an average of four days receiving inpatient treatment, visited the ED 14 times, and were detained four times by the police while in treatment. The provision of supporting housing eliminated the utilization of shelter services by MAP participants while in MAP whereas MAP participants had previously spent an average of 99 nights at the emergency shelter, typically with intermittent shelter utilization patterns consisting of months with frequent utilization followed by months without any stays. These individuals also spent an average of 19

days receiving detoxification treatment, six days receiving inpatient treatment, visited the ED 13 times, and were detained by police on 13 occasions.

Control group participants spent an average of 97 nights at the emergency shelter, 21 days receiving detoxification treatment, six days receiving inpatient treatment, visited the ED 26 times, and were detained by police on 14 occasions. Typically, control group participants also had intermittent shelter utilization patterns with months of frequent utilization followed by months without any stays. The service utilization patterns of MAP participants prior to program entry and the control group were similar with the exception that the control group visited the ED almost twice as often.

Service	MAP participants while in treatment	MAP participants prior to program entry	Control group
Emergency shelter (nights)	0	99.00	96.94
Detoxification (days)	1.03	18.86	20.72
Inpatient (days)	3.69	6.42	5.98
ED (visits)	13.94	13.14	26.10
Police detention (days)	4.24	12.95	14.10

MAP participants spent 94.5% less time receiving detoxification treatment, 42.5% less time receiving inpatient treatment, and 67.3% less time in police custody than prior to program entry. However, MAP participants visited the ED 6.1% more often while in MAP than prior to program entry, a potentially anomalous finding due to the small sample size. Other studies have typically found that MAP recipients reduce their utilization of ED services (Podymow et al., 2006, p. 47; Thornquist et al., 2002, p. 300). However, it is a surprising finding given that their service utilization patterns are otherwise consistent that found in the literature. It is likely that using the five-year baseline pre-MAP period did not adequately account for periods when participants resided outside the Thunder Bay area, thereby greatly reducing the estimated rates of ER presentations prior to entry to MAP.

In comparison to the control group, MAP participants spent 95% less time receiving detoxification treatment, 38.3% less time receiving inpatient, visited the ED 46.6% less often, and 69.9% less time in police custody.

5.2 Service Utilization Costs, Total Costs, and Cost Savings

Table 4 outlines the cost of emergency shelter, detoxification, inpatient, ED, police detention, and MAP service utilization for each study group. In total, the annual cost of the utilization of these services by MAP participants while in MAP was \$10,251 per person, with inpatient and ED services accounting for the majority (83.8%) of this cost. For MAP participants prior to program entry, the annual cost of the utilization of these services was \$25,145 per person with inpatient service utilization accounting for \$8,136 (or 32%) of this cost and shelter utilization accounting for \$5,691 (or 22.4%). For the control group, the annual cost of the utilization of these services was \$29,109 per person with inpatient service utilization accounting for \$7,575 (or 26%) and ED visits accounting for \$7,328 (or 25.2%).

Service	MAP participants while in MAP (\$)	MAP participants prior to MAP (\$)	Control group (\$)
Emergency shelter	0	5,691	5,572
Detoxification	184	3,378	3,712
Inpatient	4,673	8,136	7,575
ED	3,915	3,670	7,328
Police detention	1,478	4,521	4,922
Total	10,251	25,415	29,109
MAP	29,306	N/A	N/A
Total (including MAP)	39,557	25,415	29,109

* Figures may not add up due to rounding. All estimates rounded to nearest whole dollar.

MAP participants decreased their annual cost of emergency shelter, detoxification, inpatient, ED, and police detention service utilization while in MAP by \$15,165 (or 59.7%) per person in comparison to the cost prior to program entry and by \$18,858 (or 64.8%) per person in comparison to the control group.

As noted in Section 4.2, the list of social costs included here is incomplete. In their interim report, the Mental Health Commission of Canada (2012) estimated service cost differentials between AHCS program participants and their TAU group. Appendix I provides an analysis of these differentials, comparing them to MAP participants and control differentials. Noteworthy similarities and differences between the findings from the two studies include:

- MAP study participants have far more ER and detention costs than AHCS study participants and MAP controls have far higher detox costs than AHSC controls; this makes sense since MAP participants suffer from alcohol dependence.
- MAP controls and AHCS controls have comparable shelter costs; this makes sense as both groups should be similar in shelter needs.
- MAP and AHCS have comparable inpatient costs; this is also reasonable, although MAP participation appears to have reduced these costs more than AHCS.

Out of the list of costs included for the AHCS study, outpatient consults, provider visits, prison or jail, transitional housing, and addiction treatment were not included in the MAP study. Adding the costs found in the AHCS study for those services not included in the MAP study yields an additional annual service use differential cost of \$3,669, which when added to the average cost differential between MAP participants and the two control groups yields an average differential of \$20,680 as shown in Appendix I. The AHCS study estimated costs for these missing services are added in the list of service costs for treatment and control groups in the next section.

5.3 Net Social Costs including Missing Services and the Costs of Homelessness

Table 5 show the results of factoring in missing service cost differentials and the costs of homelessness into the CBA. While it is not possible to evaluate the costs to businesses and neighbourhoods of homelessness, estimates for the cost of providing shelter to the homeless are available. These estimates are used to derive a cost for the days that MAP participants prior to program entry and those in the control group are without shelter. An implicit assumption is that

the homeless individuals associated with this study are indeed ‘full-time’ homeless and in need of shelter 365 days a year.

With the missing service cost differential and additional shelter costs factored in for control groups, the estimated total cost per person increased from \$39,557 to \$42,685 for MAP participants, \$25,415 to \$45,304 for MAP participants prior to program entry, and from \$29,109 to \$48,969 per person for those in the TAU control group.

Table 5: Total annual social costs including cost of homelessness

Service	MAP participants while in MAP (\$)	MAP participants prior to MAP (\$)	Control group (\$)
Missing services	3,128	6,797	6,797
Emergency shelter, detoxification, inpatient, ED, and police detention	10,251	38,507	42,172
MAP	29,306	N/A	N/A
Total	42,685	45,304	48,969

Table 6 shows the estimated annual cost savings as a result of MAP participation, taking into account missing service costs and the cost of homelessness. On the basis of the before and after program entry comparison, there was an annual saving of \$31,925 per person associated with program participation. On the basis of the comparison of treatment and control groups, there is an annual saving of \$35,590 per person. As a result, there was a saving of between \$1.09 and \$1.21 for every dollar invested in the MAP.

Table 6: Total annual cost savings after accounting for societal cost of homelessness

Comparison	Savings (\$)	Savings per dollar invested (\$)
MAP participants while in MAP and prior to program entry	2,619	1.09
MAP participants while in MAP and control group	6,284	1.21

6 DISCUSSION

The above analysis indicates that participation in a program such as the MAP in Thunder Bay is likely to substantially reduce health, social services, and criminal justice system costs for individuals eligible to participate in the program. Although there were significant estimated cost savings due to service use reductions by MAP participants while receiving MAP in comparison to their previous service use and those in the TAU control group, several other factors and services for which no data was available are likely to result in an understatement of the estimated social benefits of MAP participation as calculated above. These include: societal benefits from reducing homelessness that are not fully factored into the cost of housing shelters; service use in other communities by individuals in control groups; economies of scale; and, program learning. Some of these issues were discussed in Section 4.3 and some are discussed below.

6.1 Service Utilization in Other Communities

The service utilization data analyzed in this study was collected from service providers in Thunder Bay. However, many study participants reside in Thunder Bay for a portion of the year and return to their, often remote, Indigenous communities for significant lengths of time. Any

utilization of emergency shelter, detoxification, inpatient, ED, and police detention services in communities other than Thunder Bay during the study period is unaccounted for. The shelter utilization patterns of each study group included individuals who had periods consisting of frequent shelter followed by prolonged periods of inactivity. This pattern of shelter utilization supports the possibility that the utilization of health, social, and legal services by study participants is greater than reported in this study.

In particular, service utilization by MAP participants prior to program entry is likely underreported as all MAP recipients are Indigenous and thus, more likely to return to Indigenous communities when not staying at the emergency shelter in Thunder Bay. The selection of less mobile participants for the control group makes the underreporting of health, social, and legal service utilization less likely to occur.

6.2 Program Cost-Effectiveness

It should be noted that the economic benefits of the MAP outweigh the cost of program administration and that is likely due to the fact that people are being identified for the program because of high service use. In the AHCS, the Housing First intervention resulted in decreased service utilization costs of \$3.42 to 9.60 for every \$10 invested. The economic benefits of the intervention did not outweigh the cost of program administration. The authors point out that this is not surprising as people were recruited on the basis of their needs rather than service utilization. They observe that although recruiting the most costly 10% of service users would result in economic benefits that surpass the cost of the intervention, this approach would miss people who are in need of housing but not currently using programs and services and are underserved (Mental Health Commission of Canada, 2014).

Given the nature of people in need of MAP, many of them are actually among those who are both in high need and high service use. The MAP was uniquely situated to meet their needs which had not been met in other programs. As stated earlier, service utilization is likely underreported for each study group. However, available emergency shelter, detoxification, inpatient, ED, and police detention utilization data show that MAP participants experienced cost savings of 59.7% in comparison to prior to program entry and 64.8% in comparison to the control group due to reductions in the utilization of these services by MAP recipients.

According to Patterson et al. (2007, pp. 10-11), the annual cost of street homelessness for individuals with severe addictions and mental illness in Vancouver is estimated to be \$55,000 per person in 2006 dollars, or \$60,029 in comparable dollars after adjusting for Consumer Price Index reported.² The population from the Patterson study shares many similar characteristics to that of both MAP participants and the control group in this study due to the selection criteria for program participation. As such, the difficulties associated with fully reporting the health, social, and legal service utilization patterns of participants in this study suggest that it is probable that the annual cost of homelessness for the individuals with severe alcohol dependence in this study is close to \$60,029 per person. Assuming that the average annual cost of homelessness for each participant in this study is \$60,029 per person and that MAP recipients experience service

² The 2006 CPI in Vancouver was 108.1 and 117.98 in August 2013. These figures were obtained from Statistics Canada Consumer Price Index reports.

utilization cost reductions of between 59.7% and 64.8%, the cost savings associated with program participation would be greater than reported in this study. Under this scenario, there would be a saving of between \$1.64 and \$1.87 for every dollar invested in MAP treatment.

6.3 Long-Term Outcomes

This study analyzes the cost-effectiveness of the MAP by comparing the service utilization costs of program participants for the one-year period from September 2012 to August 2013 to their costs prior to program entry and to a control group. Given the shortness of the assessed period, the long-term impacts associated with continued program participation are not captured in this study. Other Housing First programs have found that continued program participation is typically associated with ongoing improvements in housing stability, health, and quality of life outcomes. Additionally, continued program participation is also associated with escalating reductions in health, social, and legal service utilization. As a result, a future evaluation of the MAP in Thunder Bay would allow for long-term outcomes to be measured and may find that the cost-effectiveness of the program is even greater than reported in this study.

7 CONCLUSION

Preliminary findings from the MAP in Thunder Bay suggest that the provision of stable housing and individualized supports to help manage and regulate alcohol consumption can be a cost-beneficial way to address homelessness for those with severe alcohol dependence. When factoring in the societal costs of homelessness, MAP participants decreased their costs by \$2,619 and \$6,284 when comparing to their costs prior to program entry and to those in the control group. It is estimated that there is a saving of between \$1.09 and \$1.21 for every dollar invested in MAP due to significant reductions in the frequency of health, social, and legal service utilization reported by MAP recipients.

We recommend that further evaluation of MAPs be undertaken so that the longer-term outcomes of MAP recipients can be measured and recorded. We are currently completing a larger multi-site analysis of all known MAPs in Canada so that the findings of this study can be triangulated with data from a larger sample size to determine if any of the findings in this report are anomalous. Further, we plan to conduct economic costing of these multi-site analyses so as to allow for a comparison of the effectiveness of different program delivery models.

REFERENCES

- Caton, C. L., Dominguez, B., Schanzer, B., Hasin, D. S., Shrout, P. E., Felix, A., et al. (2005). Risk factors for long-term homelessness: findings from a longitudinal study of first-time homeless single adults. *American Journal of Public Health, 95*(10): 1753–1759.
- Collins, S., Clifasefi, S., Dana, E., Andrasik, M., Stahl, N., Kirouac, M., & Malone, D. (2012a). Where harm reduction meets housing first: Exploring alcohol's role in a project-based housing first setting. *International Journal of Drug Policy, 23*(2), 111–119.
- Collins, S., Malone, D., Clifasefi, S., Ginzler, J., Garner, M., Burlingham, B., & Larimer, M. (2012b). Project-based Housing First for chronically homeless individuals with alcohol problems: Within-subjects analyses of 2-year alcohol trajectories. *American Journal of Public Health, 102*(3), 511–519.
- Collins, S. E., Malone, D. K., Clifasefi, S. L., Ginzler, J. A., Garner, M. D., Burlingham, B. & Larimer, M. E. (2012c). Project-based Housing First for chronically homeless individuals with alcohol problems: Within-subjects analyses of 2-year alcohol trajectories. *American Journal of Public Health, 102*(3), 511-519.
- Collins, S., Malone, D., & Larimer, M. (2012d). Motivation to change and treatment attendance as predictors of alcohol-use outcomes among project-based Housing First residents. *Addictive Behaviors, 37*(8), 931–939.
- Cordray, D. & Lehman, A. (1993). Prevalence of alcohol, drug, and mental disorders among the homeless. *Contemporary Drug Problems, 20*:355–84.
- Culhane, D., Metraux, S., & Hadley, T. (2002). The Impact of Supportive Housing for Homeless People with Severe Mental Illness on the Utilization of the Public Health, Corrections, and Emergency Shelter Systems: The New York-New York Initiative. *Housing Policy Debate, 13*(1): 107–163.
- D'Amore, J., Hung, O., Chiang, W., & Goldfrank, L. (2001). The epidemiology of the homeless population and its impact on an urban emergency department. *Academic Emergency Medicine, 8*(11):1051–1055.
- Eberle, M., Krauss, D., Pomeroy, S., & Hulchanski, D. (2001). The Cost of Homelessness in British Columbia. Province of British Columbia. Homelessness: Causes and Effects, 3. Retrieved from: <http://www.housing.gov.bc.ca/pub/Vol3.pdf>
- Egbert, A. M., Reed, J. S., Powell, B. J., Liskow, B. I., & Liese, B. S. (1985). Alcoholics who drink mouthwash: the spectrum of nonbeverage alcohol use. *Journal of Studies on Alcohol, 46*(6): 473–481.

- Fazel, S., Khosla, V., Doll, H., & Geddes, J. (2008). The prevalence of mental disorders among the homeless in Western countries: Systematic review and meta-regression analysis. *PLOS Medicine*, 5(12), 1670–1681.
- Frencher, S., Benedicto, C., Kendig, T., Herman, D., Barlow, B., & Pressley, J. (2010). A Comparative Analysis of Serious Injury and Illness among Homeless and Housed Low Income Residents of New York City. *The Journal of Trauma: Injury, Infection, and Critical Care*, 69(10), 191–199.
- Gaetz, S., Donaldson, J., Richter, T., & Gulliver, T. (2013). The State of Homelessness in Canada: 2013. Toronto: Canadian Homelessness Research Network Press. Retrieved from: <http://www.homelesshub.ca/ResourceFiles/SOHC2103.pdf>
- Gaetz, S., Gulliver, T., & Richter, T. (2014). The State of Homelessness in Canada: 2014. Toronto: Canadian Homelessness Research Network Press. Retrieved from: <http://www.homelesshub.ca/SOHC2014>
- Hajdu, P. (2014). *Shelter House Thunder Bay: Business plan*. Thunder Bay, Ontario.
- Hasin, D., Hatzenbuehler, M., Keyes, K. & Ogburn, E. (2006). Substance use disorders: Diagnostic and Statistical Manual of Mental Disorders, fourth edition (DSM-IV) and International Classification of Diseases, tenth edition (ICD-10). *Addiction*, 101, S1, 59-75.
- Hibbs, J. R., Benner, L., Klugman, L., Spencer, R., Macchia, I., Mellinger, A., et al. (1994). Mortality in a cohort of homeless adults in Philadelphia. *New England Journal of Medicine*, 331(5): 304–309.
- Hwang, S. W. (2001). Homelessness and health. *Canadian Medical Association Journal*, 164(2), 229-233.
- Hwang S. W., Weaver J., Aubry T., & Hoch J. (2011). *Hospital Costs and Length of Stay among Homeless Patients Admitted to medical, Surgical and Psychiatric Services*. *Med Care*. 49: 350–354.
- Krushel, M., Perry, S., Bangsberg, R., & Moss, A. (2002). Emergency Department Use among the Homeless and Marginally Housed: Results from a Community-Based Study. *American Journal of Public Health*, 92(5), 7778–7784.
- Kushel, M. B., Vittinghoff, E., & Haas, J. S. (2001). Factors associated with the health care utilization of homeless persons. *The Journal of the American Medical Association*, 285: 200–206.
- Larimer, M., Malone, D., Garner, M., Atkins, D., Burlingham, B., Lonczak, H., Tanzer, K., Ginzler, J., Clifasefi, S., Hobson, W., & Marlatt, G. (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): 1349–1357.
- Mandelberg, J. H., Kuhn, R. E., & Kohn, M. A. (2000). Epidemiologic analysis of an urban, public emergency department's frequent users. *Academy of Emergency Medicine*, 7: 637–646.
- Marlatt, A. (1996). Harm reduction: Come as you are. *Addictive Behaviors*, 21(6), 779-788.
- Marlatt, G. A., & Witkiewitz, K. (2010). Update on harm-reduction policy and intervention research. *Annual Review of Clinical Psychology*, 6, 20.21-20.16.
- Martinez, T., & Burt, M. (2006). Impact of Permanent Supportive Housing on the Use of Acute Care Health Services by Homeless Adults. *Psychiatric Services*, 57(7), 992–999.
- Mental Health Commission of Canada. (2012). At Home/Chez Soi Interim Report. Retrieved from: http://www.mentalhealthcommission.ca/English/system/files/private/document/Housing_At_Home_Interim_Report_ENG.pdf
- Mental Health Commission of Canada. (2014). National Final Report: Cross-site At Home/Chez Soi Project. Retrieved from: <http://www.mentalhealthcommission.ca/English/initiatives-and-projects/home>
- Metraux, S., Marcus, S., & Culhane, D. (2003). The New York-New York Housing Initiative and Use of Public Shelters by Persons with Severe Mental Illness. *Psychiatric Services*, 54(1), 67–71.
- 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 (Review). *The Cochrane Library*, Issue 12.
- Ontario Ministry of Health and Long-Term Care. (2012a). Schedule A: 2012/13 Ontario hospital interprovincial per diem rates for inpatient services. Retrieved from: http://www.health.gov.on.ca/en/pro/programs/ohip/bulletins/na_45/na_45_20120430_att1.pdf
- Ontario Ministry of Health and Long-Term Care. (2012b). Interprovincial outpatient rates. Retrieved from: http://www.health.gov.on.ca/en/pro/programs/ohip/bulletins/na_47/na_47_20120717_att1.pdf
- Patrick, C. (2014). *Aboriginal Homelessness in Canada: A Literature Review*. Toronto: Canadian Homelessness Research Network Press.
- Patterson, M., Somers, J., & McIntosh, K. (2007). *Housing and Support for Adults with Severe Addictions and/or Mental Illness in British Columbia*. Victoria, Canada: British Columbia Ministry of Health Services. Retrieved from <http://www.ebrary.com>

- Pauly, B., Stockwell, T., Chow, C., Gray, E., Krysovaty, B., Vallance, K., Zhao, J., & Perkin, K. (2013). *Towards alcohol harm reduction: Preliminary results from an evaluation of a Canadian managed alcohol program*. Victoria, British Columbia: Centre for Addictions Research of British Columbia.
- Pearson, D., Bruggman, A., & Haukoos, J. (2005). Out-of-Hospital and Emergency Department Utilization by Adult Homeless Patients. *Annals of Emergency Medicine*, 50(6), 646-652.
- Podymow, T., Turnbull, 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): 45–49.
- Reading, J. (2009). The crisis of chronic disease among Aboriginal Peoples: A challenge for public health, population health and social policy. *Centre for Aboriginal Health Research*. Victoria, British Columbia: Canada.
- Rehm, R., Gschwend, P., Steffen, T., Gutzwiller, F., Dobler-Mikola, A. & Uchtenhagen, A. (2001). Feasibility, safety, and efficacy of injectable heroin prescription for refractory opioid addicts: a follow-up study. *The Lancet*, 358, 1417-1420.
- Rickards, L., McGraw, S., Araki, L., Casey, R., High, C., Hombs, M., & Raysor, R. (2010). Collaborative Initiative to Help End Chronic Homelessness: Introduction. *Journal of Behavioral Health Services and Research*, 37(2), 149–166.
- Riley, D., & O'Hare, P. (2000). Harm reduction: History, definition and practice. In J. Inciardi & L. Harrison (Eds.), *Harm reduction: National and International Perspectives*: Sage.
- Rosenheck, R., Frisman, L., & Neale, M. (1994). Estimating the capital component of mental health care costs in the public sector. *Administration and Policy in Mental Health*, 21(6): 493–509.
- Salit, S., Kuhn, E., Hartz, A., Vu, J., & Mosso, A. (1998). Hospitalization costs associated with homelessness in New York City. *New England Journal of Medicine*, 338(24), 1734–1740.
- Shelter House. (2013). Shelter House Annual Report: 2012-2013. Thunder Bay, Ontario. Retrieved from: <http://www.shelterhouse.on.ca/>
- Srebnik, D., Connor, T., & Sylla, L. (2013). A Pilot Study of the Impact of Housing First–Supported Housing for Intensive Users of Medical Hospitalization and Sobering Services. *American Journal of Public Health*, 103(2), 316–321.
- Statistics Canada. (September 2013). *Consumer Price Index Report*. Ottawa, Canada. Retrieved from: <http://www.statcan.gc.ca/pub/62-001-x/62-001-x2013009-eng.pdf>

- Thornquist, L., Biros, M., Olander, R., & Sterner, S. (2002). Health care utilization of chronic inebriates. *Academic Emergency Medicine* 9(4), 300–308.
- Tjepkema, M. (2004). How Healthy are Canadians? Annual Report: Alcohol and Illicit Drug Dependence. *Health Reports (Statistics Canada, Catalogue 82-003-31E)* 15(S):9–20.
- Tsemberis, S., Moran, L., Shinn, M., Asmussen, S., & Shern, D. (2003). Consumer preference programs for individuals who are homeless and have psychiatric disabilities: a drop-in center and a supported housing program. *American Community Psychology*, 32, 305–317.
- World Health Organization. (2004). Global Status Report on Alcohol 2004. Retrieved from: http://www.who.int/substance_abuse/publications/globalstatusreportalcohol2004_introduction.pdf.
- Williams, N. (2011). *Waiting and Working: Coping Responses of Individuals Enduring Homelessness When Accessing Alcohol and Shelter Accommodation*. Victoria, British Columbia: Centre for Addictions Research of British Columbia.
- Witkiewitz, K., & Marlatt, G. (2006). Overview of harm reduction treatments for alcohol problems. *The International Journal of Drug Policy*, 17, 285–294.

Appendix I

Service	At Home/Chez Soi		AHCS Differential	MAP Study			MAP Differential
	HF	TAU		MAP	MAP Prior	TAU	
Health and justice use							
ED visits	\$806	\$1,060	\$254	\$3,915	\$3,690	\$7,328	\$1,594
Detention in police cells	179	304	125	1,479	4,521	4,922	3,243
Outpatient consults	140	237	97				
Provider visits	0	3,006	3,006				
Overnight stays							
Shelter	1,964	4,732	2,768	0	5,690	5,572	5,631
Detox	307	558	251	184	3,378	3,712	3,361
Inpatient	8,215	10,398	2,183	4,673	8,136	7,575	3,183
Prison or jail	2,472	2,484	12				
Transitional housing	219	427	208				
Addiction treatment	297	643	246				
Total	\$14,599	\$23,849	\$9,250	\$10,251	\$25,415	\$29,109	\$17,011
Total for items included in MAP	\$11,471	\$17,052	\$5,581	\$10,251	\$25,415	\$29,109	\$17,011
Total for items not included in MAP	\$3,128	\$6,797	\$3,669				
Missing differentials							3,669
Total MAP average differentials plus AHCS study-based missing differentials							\$20,680

Note: At Home / Chez Soi costs can be found in Appendix F of: Mental Health Commission of Canada. (2012). *At Home/Chez Soi Interim Report*. Retrieved from:
http://www.mentalhealthcommission.ca/English/system/files/private/document/Housing_At_Home_Interim_Report_ENG.pdf.