Impact of criminal justice involvement profiles on the effectiveness and cost-effectiveness of Housing First among homeless people with mental illness

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Abstract

People who experience homelessness and have mental illness are at increased risk of involvement with the criminal justice system that comes at significant personal, social and economic cost. While there is strong evidence that Housing First increases residential stability, the literature suggests that Housing First does not, on average, have any impact on justice outcomes. This thesis seeks to explore if this absence of impact is due to a heterogenous intervention effect, both in terms of profiles of criminal justice involvement and in terms of the nature of the offense, using data from the multisite randomized controlled trial At Home/*Chez soi*. In a prior paper, we empirically identified five profiles: Non/Infrequent Offenders (very few offences, but some single violent offences), Moderate Offenders (higher mean number of offences, longest duration of homelessness), Antisocial Offenders (highest means of violent and nuisance offences), Versatile Subsistence Offenders (highest mean of all offences and highest means of subsistence-related offences – e.g., theft), and Drug Offenders (highest mean number of drug-related offences).

The first manuscript explores whether the absence of impact of Housing First on criminal charges overall was due to heterogenous intervention effects. The Risk-Needs-Responsivity model of offender rehabilitation suggests that individuals with certain risk factors of criminal justice involvement would be more likely to experience a reduction in criminal justice involvement as a result of Housing First, while others could experience an increase. For example, people for whom offending is in part driven by poverty and homelessness (Moderate Offenders) or by substance abuse (Drug Offenders) before coming into the program would be more likely to experience a reduction in offending as a result of increased residential stability and a harm reduction approach to substance abuse than Antisocial Offenders and Versatile Subsistence Offenders, whose criminogenic needs might not be addressed as part of the intervention. For these profiles, the intervention could even have a deleterious effect. Results showed that the impact of Housing First on violent charges differs by profiles. Moderate and

Drug Offenders were more likely to experience fewer charges for violent crimes from Housing First (-0.40 [95% CI: -0.70, -0.10] and -0.53 [95% CI: -1.01, -0.05] new charges over two years, respectively). There was no impact of Housing First on subsistence charges and charges related to the administration of justice for any profile.

The second manuscript assessed, first, the association between CJI profiles and days stably housed as well as costs. Second, it tested whether the effect of Housing First and its net benefit differed according to profile. On average, controlling for group assignment and other variables, Antisocial Offenders spent 48 fewer nights annually (95% CI: -72.1, -23.0) in stable housing than Non/Infrequent Offenders. Versatile Subsistence and Moderate Offenders engendered greater costs (1.33 [95% CI: 1.11, 1.59] and 1.21 [95% CI: 1.07, 1.36] times, respectively). However, the effectiveness and cost-effectiveness of the intervention did not differ by profile.

Findings suggest that Housing First, when provided to homeless individuals with mental illness who have an ongoing risk of offending, may need to target the criminogenic needs of the participants in order to observe an overall reduction in criminal justice involvement. Future research could, for example, develop and test voluntary adjunctive interventions for specific groups of offenders who want to reduce their criminal justice behaviour. However, neither the effectiveness, in terms of residential stability, nor the cost-effectiveness of Housing First compared to usual services varied by profile. Our findings suggest that there is no ground for selective admission into Housing First programs based on criminal history.

Résumé

Les personnes en situation d'itinérance vivant avec une maladie mentale sont plus à risque de judiciarisation, ce qui entraîne d'importants coûts personnels, sociaux et économiques. Bien que Logement d'abord augmente la stabilité résidentielle, la littérature suggère que l'intervention n'a pas d'impact, en moyenne, sur la judiciarisation. Ce mémoire cherche à explorer si cela ne serait pas dû à une hétérogénéité de l'effet de l'intervention, à la fois en termes de profils de judiciarisation et de nature des délits, en utilisant les données de l'essai randomisé Chez Soi. Dans un manuscrit précédent, nous avons identifié cinq profils de judiciarisation: peu ou pas de criminalité (individus ayant peu ou pas de délits, certains ayant un délit violent); criminalité modérée (individus ayant un plus grand nombre de délits, ayant vécu une plus longe période d'itinérance); criminalité antisociale (individus ayant des délits violents ou de nuisance); criminalité versatile (individus ayant des délits liés à la subsistance et qui ont une criminalité variée); criminalité liée aux drogues.

Le premier manuscrit explore la possibilité qu'aucun impact globalement de Logement d'abord sur les mises en accusation n'ait été identifié à cause d'effets hétérogènes de l'intervention. Le modèle du risque, des besoins et de la responsivité suggère que les personnes dont le comportement criminel est en partie motivé par la pauvreté et l'itinérance (criminalité modérée) ou par l'abus de substance (criminalité liée aux drogues) pourraient connaître une réduction du nombre de mises en accusation grâce à une augmentation de la stabilité résidentielle ou grâce à l'approche de réduction des méfaits par rapport à l'abus de substance. Les individus dont les facteurs de risque plus complexes ne sont pas ciblés dans le cadre de l'intervention pourraient ne pas connaître une telle réduction, voire même connaître une augmentation. Les résultats montrent que l'impact de Logement d'abord sur les mises en accusation pour crimes violents diffère selon le profil. Les participants avec une criminalité modérée et ceux avec une criminalité liées aux drogues connaissaient une réduction des mises en accusation pour crimes violents grâce à Logement d'abord (-0.40 [95% CI: -0.70, -0.10] et -0.53 [95% CI: -1.01, -0.05]

nouvelles mises en accusation sur deux ans). Il n'y avait pas d'impact de Logement d'abord sur les crimes liés à la subsistance ou liés à l'administration de la justice.

Le deuxième manuscrit mesure en premier lieu l'association entre les profils et les jours en logement stable ainsi que les coûts. En deuxième lieu, il teste si l'efficacité et la coût-efficacité de Logement d'abord varie selon le profil. En moyenne, les participants avec une criminalité antisociale ont passé 48 jours de moins en logement stable que les participants avec peu ou pas de criminalité (95% CI : -72.1, -23.0). Les participants avec une criminalité versatile ou modérée entraînent des coûts totaux plus élevés (1.33 [95% CI: 1.11, 1.59] et 1.21 [95% CI: 1.07, 1.36] fois, respectivement). Le profil n'avait pas d'influence sur l'efficacité ou la coût-efficacité de l'intervention.

Les résultats suggèrent que Logement d'abord, lorsqu'offert aux personnes itinérantes ayant une maladie mentale et qui sont à risque de judiciarisation, devrait cibler les besoins criminogènes des participants afin d'observer une réduction globale de la judiciarisation. Les futurs projets de recherche sur Logement d'abord pourraient développer et évaluer des services complémentaires offerts sur une base volontaire pour certains groupes de personnes souhaitant réduire leur comportement criminel. Nos résultats suggèrent que l'efficacité, en termes de stabilité résidentielle, et la coût-efficacité de Logement d'abord comparé aux services habituels ne varient toutefois pas en fonction des profils. Selon nos résultats, il n'y a pas raison de restreindre l'accessibilité au programme sur la base de la judiciarisation.

Preface

This manuscript-based thesis contains three manuscripts and is divided into 7 chapters. The first chapter is the introduction. The second chapter provides an overview of the literature on homelessness and on criminal justice involvement in homeless people with mental illness, as well as on Housing First. The third chapter briefly presents the objectives of the two manuscripts. The fourth chapter describes the data and the methods used. The fifth chapter presents the first manuscript: in this chapter, I test whether the effect of Housing First on various types of criminal charges varies by criminal justice involvement profile. The sixth chapter is the second manuscript and examines the impact of these profiles on residential stability, on costs, as well as on the effectiveness and cost-effectiveness of the intervention. Each manuscript is preceded by a short preface that describes the rationale for the manuscript and how it is linked to the whole thesis. Finally, the seventh chapter summarizes the results and findings from the two manuscripts and discusses policy and clinical implications.

Authorship

As first author of all manuscripts, I conceptualized the research questions and elaborated the analytic procedures with the collaboration of my supervisors. I undertook, for the first manuscript, the data management tasks and all data analyses for both manuscripts. The unit costs and the syntax for the multiple imputation had already been developed by Dr Eric Latimer's team. I drafted the manuscripts, and the co-authors reviewed them. Dr Eric Latimer provided guidance for the development of the analytical strategy of all manuscripts and insightful methodological feedback. As health economist, Dr Latimer was also instrumental in the interpretation of the results, especially for the second manuscript. Dr Anne Crocker provided important assistance in the conceptualization of the research questions and on the interpretation of results in light of forensic theory and research, especially for the first manuscript. Ashley Lemieux undertook the identification of empirically-defined profiles of criminal justice involvement, which I used in the two manuscripts. Her assistance with the data management for

the first manuscript was also instrumental, and her insights in interpreting the results were meaningful. Dr Laurence Roy and Dr Tonia Nicholls both lent their substantial expertise in criminal justice involvement among homeless people for the first manuscript and helped guide the interpretation of results.

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Acronyms

Acronym	Definition
ACT	Assertive Community Treatment
AH/CS	At Home/*Chez Soi*
CJI	Criminal justice involvement
FACT	Forensic Assertive Community Treatment
HF	Housing First
HSJSU	Health, social, and justice service use (questionnaire)
ICM	Intensive Case Management
NCRMD	Not Criminally Responsible on account of Mental Disorder
RTLFB	Residential Time-Line Follow-Back (questionnaire)
TAU	Treatment as usual
VTLFB	Vocational Time-Line Follow-Back (questionnaire)
$Can	Canadian dollars

Chapter 1 Introduction

People who experience homelessness and have mental illness are at increased risk of involvement with the criminal justice system (Roy, Crocker, Nicholls, Latimer, & Ayllon, 2014), which leads to important societal and personal costs (Caton, Dominguez, Schanzer, Hasin, Shrout, Felix, McQuistion, Opler, Hsu, et al., 2005; Frounfelker, Glover, Teachout, Wilkniss, & Whitley, 2010; Latimer et al., 2017; McGuire & Rosenheck, 2004; Poremski, Whitley, & Latimer, 2014). The Housing First model is increasingly put forward by policy-makers and researchers alike as an important component in attempting to end homelessness (Gaetz, Scott, & Gulliver, 2013; Katz, Zerger, & Hwang, 2017). While there is strong evidence that Housing First increases residential stability and results in important cost offsets (Aubry et al., 2016; Beaudoin, 2016; Ly & Latimer, 2015; Stergiopoulos et al., 2015), the literature suggests that Housing First does not, on average, have much if any impact on criminal justice outcomes. The Risk-Needs-Responsivity model of offender rehabilitation (Bonta & Andrews, 2007) highlights the importance for interventions to target the specific dynamic risk factors of clients in order to observe a reduction in criminal justice outcomes, and identifying profiles may assist in the identification and targeting of these risk factors (Hodgins, 2001). Understanding how and for whom Housing First is effective will shed light on potential adaptations so that, ultimately, the needs of all can be addressed.

Using data form the At Home/*Chez Soi* randomized controlled trial, I explore the possibility that the absence of impact of Housing First on criminal charges may be due to offsetting and heterogenous intervention effects: Housing First may reduce certain crimes (e.g., subsistence-related) but increase others (e.g., justice administration-related, due to being easier to find by probation officers or more likely to be reported by landlords to the police for disturbing the peace). Housing First may also have a different impact on participants with different profiles of criminal justice involvement, increasing criminal justice involvement for some and decreasing it for others, based on their risk factors.

Furthermore, I test the hypothesis that the effectiveness (in terms of days stably housed and costs) and the cost-effectiveness of the intervention may differ based on these profiles .

I discuss the results in light of well-established forensic theories and research results, such as the effect of interventions that specifically target criminogenic needs and the Risk-Needs-Responsivity model, as well as implications for the organization of services.

Chapter 2 Literature Review

2.1 Homelessness: The Scope of the Problem

Homelessness has many faces and establishing a definition is a necessary first step before discussing the scope of the problem. In 2012, the Canadian Homelessness Research Network proposed a comprehensive definition according to which people are homeless if they are "without stable, permanent, appropriate housing, or the immediate prospect, means and ability of acquiring it" (Canadian Homelessness Research Network, 2012).

This definition encompasses a diverse population in terms of severity with varying visibility and different needs (Gaetz, Gulliver, & Richter, 2014). It includes, first, people who are "unsheltered": those who live or sleep in public places (e.g., parks, subway stations), in private spaces without consent (e.g., squatting) or in spaces not intended for housing (e.g., a vehicle). It also includes people who are "emergency sheltered", i.e., access overnight shelters or shelters for victims of domestic violence. A third group comprises people who are "provisionally accommodated": they have no permanent housing but may have interim housing, temporary stay with family or friends, make temporary rental arrangements (e.g., motels, rooming houses) or be institutionalized (e.g., prisons, mental health institution) and expected to be homeless upon discharge. Finally, people "at-risk of homelessness" experience a precarious financial situation or currently live in substandard housing (Canadian Homelessness Research Network, 2012; Gaetz et al., 2014). People who are unsheltered are often grouped in the literature with people who are emergency-sheltered and described as absolutely homeless (Gaetz, Dej, Richter, & Redman, 2016).

Individuals who experience or have experienced homelessness can also be classified according to the length and frequency of homelessness episodes. Using shelter use data, Kuhn and Culhane (1998) identified three clusters: transitionally, episodically, and chronically homeless. The vast majority (between 88% and 94% in various Ontarian cities) (Aubry, Farrell, Hwang, & Calhoun, 2013) of people

who experience homelessness are transitionally homeless, which means that they are without housing and use shelters for a small number of short-term periods (usually as a single event), possibly as a result of temporary crises. The second cluster is composed of people who are episodically homeless. These people would experience at least three episodes of homelessness in a given year (Government of Canada, n.d.). Finally, people from the third cluster are chronically homeless: they are unsheltered or emergency-sheltered for extended periods of time (Aubry et al., 2013; Kuhn & Culhane, 1998). Because of their more complex psychosocial history and because they are the heaviest multi-system service users, most interventions focus specifically on episodic and chronic homelessness (Gaetz et al., 2014).

Because of these multiple, overlapping ways that people experience homelessness, homelessness cannot be measured or described simply. The homeless population in Canada has been estimated to be around 235,000 in a given year and 35,000 on a given night (Gaetz, Donaldson, Richter, & Gulliver, 2013; Gaetz et al., 2014), using data from average shelter beds occupation, including in shelters for survivors of domestic violence, as well as estimations of the number of people unsheltered or in temporary institutional accommodation. Point-in-Time counts found the following prevalences: about 5,250 homeless people were counted for in Toronto on a single night (City of Toronto, 2013), 1,600 in Vancouver (Durant, Graves, Mauboules, & Hale, 2013) and 3,600 in the Metropolitan Vancouver region (BC Non-Profit Housing Association & M. Thomson Consulting, 2017), and approximately 3,000 in Montreal (Latimer, McGregor, Méthot, & Smith, 2015). All of these reports emphasized that these numbers represent a conservative estimate of homeless individuals on a given night and are in no way comprehensive. We should also refrain from summing these figures given the differences in definitions of homelessness used by each city.

Because it is virtually impossible to count and characterize the population of people who experience homelessness over a year (especially if people who are provisionally homeless are included), accurate estimates of the total costs of homelessness in Canada do not exist. Per-person estimates

suggest however that people who have had a recent experience of homelessness and who have a mental illness engender significant costs to society. Average annual costs per person in the three largest Canadian cities over the two years subsequent to recruitment ranged from Can$53,000 to Can$59,000 when taking into account shelter use, supportive housing, substance use treatment, ambulatory visits, emergency department visits and ambulance, hospital stays for physical and psychiatric reasons, police services, court appearances, incarceration, and social assistance or disability benefits (Latimer et al., 2017).

Risk factors of homelessness. Causes for homelessness can be divided into three major categories: structural factors, system failures, and individual factors (Gaetz, Donaldson, et al., 2013). In general, these factors interact together to create circumstances that disrupt residential stability and result in increased vulnerability to homelessness.

Structural factors include poverty, poor access to affordable housing, stigma and discrimination (Gaetz, Donaldson, et al., 2013; Hulchanski, Campsie, Chau, Hwang, & Paradis, 2009; O'Grady, Gaetz, & Buccieri, 2011). People who have experienced homelessness emphasize that inadequate access to safe housing was an important barrier to exiting homelessness, and that the housing they could access was in drug-involved, crime-prone neighbourhoods (Piat et al., 2015). Stigma related to prior homelessness and systemic discrimination against Indigenous people and other racialized minorities are also listed as structural risk factors for ongoing homelessness (Piat et al., 2015).

Gaps between systems also lead to homelessness (Gaetz, Donaldson, et al., 2013). Discharge from institutions such as psychiatric or correctional facilities increases the risk of homelessness, which results in a revolving door phenomenon (Doran et al., 2013; Kushel, Hahn, Evans, Bangsberg, & Moss, 2005; Metraux & Culhane, 2004). Inadequate discharge planning from institutions, or aging out of foster care, has been pointed out by many as a contributing factor to homelessness (Piat et al., 2015).

Finally, individual risk factors, such as family violence, low educational level, mental illness[1] and substance abuse (Mago et al., 2013; Novac, 2006; Piat et al., 2015), may lead to homelessness, even more when present together. People with lived experience of homelessness have described how substance use problems emerged from, or resulted in, severe family conflicts, or how they abused substance to cope with the symptoms of mental illness. Many attributed entry into homelessness to the financial problems caused by the substance abuse, which was often facilitated by a disintegrating support network (Piat et al., 2015). Among mental health service users with severe mental illness, a diagnosis of schizophrenia or of substance use disorder increase the odds of homelessness by 2.4 (95% CI 2.0-2.8) and by 5.3 (4.7-6.0) respectively (Folsom et al., 2005).

A meta-analysis of the prevalence of mental illness and substance use disorders among homeless people in various countries (United States, the United Kingdom, Germany, Australia, France, The Netherlands, and Greece) reported the following random effects pooled prevalences: 12.7% (95% CI 10.2%-15.2%) for psychotic illnesses, 11.4% (95% CI 8.4%-14.4%) for major depression, 37.9% (95% CI 27.8%-48.0%) for alcohol dependence, and 24.4% (95% CI 13.2%-35.6%) for drug dependence (Fazel, Khosla, Doll, & Geddes, 2008). The prevalence of psychotic illnesses is almost four times as high as that of the general population, which is around 3% (Perälä et al., 2007).

2.2 Criminal Justice Involvement among Homeless People with Mental Illness

Homeless people, in particular those with mental illness, often come into contact with the criminal justice system. A systematic review on the prevalence of criminal justice involvement among homeless people with mental illness found that lifetime arrest rates ranged between 63% and 90%, lifetime conviction rates between 52% and 80%, and lifetime incarceration rates between 48% and 67% (Roy, Crocker, Nicholls, Latimer, & Ayllon, 2014). Both homelessness and mental illness are associated

[1] In the context of this literature review, mental illness excludes developmental and substance use disorders. Severe mental illness refers specifically to psychotic spectrum disorders, bipolar disorder, and major depression.

with criminal justice involvement, and the interplay of these two risk factors results in complex and heterogenous needs.

Criminal justice involvement in homeless people. Recent homelessness is frequent in jail populations. Data from a national study of jail inmates in the United States showed that homelessness is 7.5 to 11.3 times more prevalent in the jail population than in the general population (Greenberg & Rosenheck, 2008).

One of the most well-documented explanations for this overrepresentation is the criminalization of homelessness hypothesis, which refers to the phenomenon whereby policing and the criminal justice system are key responses to homelessness (O'Grady et al., 2011). This criminalization takes several forms. First, laws and statutes penalize or criminalize behaviours associated with homelessness, especially income-generating strategies, such as panhandling and squeegeeing (e.g., Safe Streets Acts) (Chesnay, Bellot, & Sylvestre, 2013). This penalization adds to the one experienced when some people who are homeless use survival strategies that are criminal in nature, such as prostitution, drug dealing, theft, and fraud. Second, laws and statutes are enforced in discriminatory manners (Hermer & Mosher, 2002). Specifically, because the definition of unlawful soliciting is vague and broad, police officials may scrutinize or enforce the laws in discriminatory manners (Chesnay et al., 2013), which has been called "social profiling" (Sylvestre & Bellot, 2014). Third, homelessness increases the odds of being detained following a court appearance and decreases the odds of having all charges withdrawn (Kellough & Wortley, 2002), which leads to increased incarceration of homeless people. The presence of mental illness and substance abuse makes the situation more complex: offenders with co-occurring severe mental illness and substance use disorder are incarcerated longer than others for similar offences (McNiel, Binder, & Robinson, 2005).

The criminal justice involvement of homeless people has important personal and economic costs. Law enforcement and justice administration costs (police contacts, court appearances,

incarceration) range between Can$7,000 and Can$15,000 per year per homeless individual with mental illness in various Canadian cities (Latimer et al., 2017). Furthermore criminal justice involvement is associated with poorer reemployment outcomes (Frounfelker et al., 2010; Poremski et al., 2014), longer duration of homelessness (Caton, Dominguez, Schanzer, Hasin, Shrout, Felix, McQuistion, Opler, Hsu, et al., 2005; McGuire & Rosenheck, 2004), and greater risk of violent victimization (Nicholls, Petersen, Crocker, & Pritchard, 2014; Roy, Crocker, Nicholls, Latimer, & Reyes-Ayllon, 2014).

Criminal justice involvement of people with mental illness. There is no doubt that people with mental illness are overrepresented in the criminal justice system (Fazel & Danesh, 2002; Fazel, Hayes, Bartellas, Clerici, & Trestman, 2016; Steadman, Osher, Robbins, Case, & Samuels, 2009). Explanations have evolved through time (Hiday, 1997; Hiday & Wales, 2011). The criminalization of mental illness hypothesis developed in the 1970s as a result of the ongoing deinstitutionalization movement, where psychiatric hospitals were (and still are being) downsized with the expectation that mental health services would be delivered in the community or in general hospitals (Sealy & Whitehead, 2004). In addition, restricted access to civil commitment (Ambrosini & Joncas, 2013) resulted in more people with mental illness living in the community, which coincided with an increase in encounters with the police (Draine, Salzer, Culhane, & Hadley, 2002). The hypothesis was the following: because psychiatric institutions could no longer be used to hide the disruptive symptoms of mental illness from the public view, prisons would now play that role through the criminalization of disturbing behaviours and symptoms (Abramson, 1972). Police officers, the argument goes, would arrest people displaying symptomatic behaviours for misdemeanors, such as nuisance offences (e.g., disturbing the peace for talking to voices in public). Four decades of research have, however, failed to produce evidence for this hypothesis (Lurigio, 2013). Researchers have failed to identify a clear association between the incarceration of people with mental illness and the availability of community mental health services (Fisher, Packer, Simon, & Smith, 2000), the presence of a public mental health system (Norton, Yoon,

Domingo, & Morrisey, 2006), and the closure of psychiatric beds (Rosenheck, Banks, Pandiani, & Hoff, 2000; Steadman, Monahan, Duffee, Hartstone, & Robbins, 1984), at least in high income countries (Large & Nielssen, 2009; Mundt et al., 2015). Instead, the risk of being incarcerated most likely increased proportionally for those with mental illness and for those without mental illness as a result of "tough on crime" policies (Frank & Glied, 2006).

The argument for the criminalization of mental illness later evolved with the publication of studies suggesting a relation between severe mental illness, especially schizophrenia, and violence. Data from a Danish birth cohort showed that individuals hospitalized for a severe mental illness were more likely to have been convicted of a criminal offence, especially of a violent criminal offence, than individuals who had never been hospitalized for psychiatric reasons (Hodgins, Mednick, Brennan, Schulsinger, & Engberg, 1996). The same data suggested that schizophrenia increased the odds of a violent arrest by 4.6 (95% CI 3.8-5.6) in men and by 23.2 (95% CI 14.4-37.4) in women (Brennan, Mednick, & Hodgins, 2000). Similar associations were found in data from an American Epidemiologic Catchment Area survey (Swanson, Holzer, Ganju, & Jono, 1990), from a Finnish birth cohort (Tiihonen, Isohanni, Rasanen, Koiranen, & Moring, 1997), and from a New Zealander birth cohort (the Dunedin Study) (Arseneault, Moffitt, Caspi, Taylor, & Silva, 2000). Observers hypothesized that unmanaged psychotic symptoms caused aggressive behaviour and violence and lead to incarceration, whereas hospitalization would have been more appropriate (Torrey, 1995).

But is there evidence for a causal association at all? Confounding factors are likely to be involved in the association between severe mental illness and general or violent offending. Severe mental illness and criminal justice involvement have many risk factors in common, including complex psychosocial histories marked by poverty and unemployment (Baron & Salzer, 2002; Hudson, 2005; Raphael & Winter-Ebmer, 2001; Sharkey, Besbris, & Friedson, 2017), crime-prone neighbourhood (Silver, Mulvey, & Swanson, 2002), and traumatic neglect and/or abuse during childhood (Farrington, 2005; Rosenberg, Lu,

Mueser, Jankowski, & Cournos, 2007). Fazel's systematic reviews and meta-analyses (Fazel, Gulati, Linsell, Geddes, & Grann, 2009; Fazel, Langstrom, Hjern, Grann, & Lichtenstein, 2009) illustrate well the complexity of the association between severe mental illness and violence, especially in the presence of substance misuse and antisocial traits. For example, individuals with a psychotic disorder and a concomitant substance abuse disorder had similar risk of violence than those with a substance abuse disorder without psychosis (Fazel, Gulati, et al., 2009). Indeed, people with schizophrenia and concomitant substance abuse have 4.4 times the odds (95% CI 3.9-5.0) of violent crime compared to the general population, but people with schizophrenia without concomitant substance abuse have only slightly higher odds (OR = 1.2, 95% CI: 1.1-1.4). When adjusting for confounding related to family factors (using unaffected siblings as controls), the odds of violence among substance-abusing schizophrenia patients decreased to 1.8 times that of their siblings (95% CI: 1.4-2.4) (Fazel, Langstrom, et al., 2009). Similarly, psychotic symptoms such as hypomania, strange experiences and hallucinations are only associated with violent behaviour in the presence of an antisocial personality disorder. Only paranoid ideation is a significant predictor of violence even in the absence of antisocial personality disorder (Coid, Ullrich, Bebbington, Fazel, & Keers, 2016).

The relevance of profiles of criminal justice involvement. Skeem and colleagues (Skeem, Manchak, & Peterson, 2011) suggest that the etiology of criminal behaviour among people with mental illness may be quite similar to that among people without mental illness, with all the heterogeneity that it entails. They suggest a three-etiology model, in which two etiological mechanisms complement the one where criminal behaviour arises from unmanaged mental illness symptoms.

The first etiological mechanism proposed by Skeem et al. is that, for some, poverty explains in large part the association between mental illness and criminal behaviour (Draine et al., 2002). Low socioeconomic status is strongly associated with mental illness (Hudson, 2005), and that may lead people with mental illness to live in neighbourhoods that are crime-prone, victimization-prone, rife with

substance abuse and family/domestic violence (Skeem et al., 2011). Neighbourhood factors predict recidivism and physical violence above and beyond individual-level characteristics (Chang, Wang, & Tsai, 2016; Kubrin & Stewart, 2006; Seto, Charette, Nicholls, & Crocker, 2018). Victimization is also on the causal pathway between depression and violence (Yu et al., 2017). Skeem et al. thus hypothesize that these people thus may not offend specifically because of their mental illness, but because of their low socioeconomic status and disadvantaged living conditions. The second etiological mechanism suggests that mental illness is a distal factor that may result in poorer satisfaction with employment and relationships, which in turn favours the development of procriminal friends, antisocial personality traits (e.g., poor self-control), and procriminal attitudes. This antisociality is the direct cause of the criminal behaviour (Andrews & Bonta, 2006; Bonta, Blais, & Wilson, 2014; Bonta, Law, & Hanson, 1998; Skeem, Winter, Kennealy, Eno Louden, & Tatar, 2014). This mechanism may be especially relevant for individuals whose onset of offending precedes the onset of mental illness (Crocker, Martin, Leclair, Seto, & Nicholls, 2018; Jones, Van den Bree, Ferriter, & Taylor, 2010; Mueser et al., 2006; Simpson, Grimbos, Chan, & Penney, 2015; van Dongen, Buck, Barendregt, et al., 2015; van Dongen, Buck, & van Marle, 2015). These two etiological mechanisms of criminal behaviour complement, rather than completely replace the criminalization of mental illness hypothesis. While it is largely accepted that the criminalization of mental illness symptoms is not the main cause behind the criminal justice involvement of most offenders with mental illness, or that unmanaged mental health symptoms do not generally drive violent behaviour, there is some evidence that it applies to a very small subgroup of offenders (Junginger, Claypoole, Laygo, & Crisanti, 2006; Peterson, Skeem, Kennealy, Bray, & Zvonkovic, 2014), such as those whose onset of criminal behaviour comes years after the onset of the mental illness (Crocker et al., 2018).

This three-etiology model by Skeem and colleagues (Skeem et al., 2011) is echoed in another seminal text published in the same year. Hiday & Wales (Hiday & Wales, 2011) developed a theoretical

five-group typology of people who have mental illness and who come into contact with the justice system. The first two groups fit the criminalization hypothesis as described above: the first group is primarily arrested for nuisance offences as a result of harmless symptomatic behaviours occurring in public spaces, and individuals in the second group become aggressive and violent as a result of their psychotic symptoms. The next two groups fit the poverty-mediated association hypothesis. In the third group, poor living conditions (e.g., poverty, crime-prone neighbourhood, repeated victimization) mediate the association between mental illness and criminal behaviour, which often takes the form of subsistence-related offences. The fourth group misuses substances as an attempt to self-medicate, because of the omnipresence of drugs in their environment or because of painful life experiences. This concomitant substance abuse increases the risk of offending. Coping with specific mental illness symptoms or with a general psychological distress was the main cited reason by people with lived experience of homelessness and mental illness for using drugs. They also highlight that substance use was normative in their neighbourhood or in their social or family environment, which led them to getting "caught up" in substance misuse (Henwood & Padgett, 2007). Finally, the fifth group is motivated by antisocial personality traits, antisocial cognitions, and antisocial peers. The mental illness symptoms are coincidental and do not drive their criminal behaviour (Hiday & Wales, 2011).

2.3 Solutions to Homelessness and Housing First

In a systematic review of the literature, Leff and colleagues (Leff et al., 2009) identified three distinct housing models for persons with mental illness who experience residential instability: the residential treatment model, the residential continuum model, and the permanent supported housing model.

The first two models may be thought of as "high-demand-high-readiness" housing model (Leff et al., 2009). The residential treatment model provides housing, supervision, and on-site treatment services, not unlike those that would be provided without a traditional hospital setting (Nelson &

Caplan, 2017). Residents are required to participate in the services and must abstain from alcohol and drugs. Therefore, clients must be willing to follow strict rules and be sober. The residential continuum model housing resembles the residential treatment model in that typically, in a given setting, rules and sobriety are emphasized but a sense of "normality" and independence is also fostered. Accordingly, services are provided off-site and residents are expected to leave the premises to engage in their daily activities (e.g., treatment, work, school). The residential continuum model also implies step-wise progression, along a "staircase" (Sahlin, 2005), as clients are expected to move from one housing model to the next as they progress in their rehabilitation (Ridgway & Zipple, 1990). The first step of this model may be in line with the residential treatment model (Nelson & Caplan, 2017). In these models, residents may progress "up" in more autonomous settings but may also progress "down" into settings with greater supervision (Leff et al., 2009; Sahlin, 2005).

The permanent supported housing model was developed in response to the failures and lack of accessibility of the two other models. Models promoting step-wise progressions were deemed antithetical to the paradigm of recovery: they destabilize living arrangements and relationships, fail to acknowledge that recovery involves cycling back and forth rather than progressing linearly, and are inherently unable to provide a sense of normalcy to the residents. In the permanent supported housing model, residents are provided with a permanent apartment (i.e., they will not be forced to move out based on their progress in treatment or community functioning) and wraparound support services. In comparison with the two other models, this model promotes a less restrictive environment, with few rules. There are two interventions that belong to the permanent supported housing model category: Housing Ready provides permanent supported housing to people who are willing to engage in treatment and abstain from alcohol and drugs, whereas Housing First has no prerequisites and adopts an harm-reduction approach (Leff et al., 2009). In recent years, the Housing First model has been put forward by researchers and policy makers alike as an important component of a pragmatic plan to end

homelessness (Katz et al., 2017). Housing First may follow the congregate-site approach or the scattered-site approach, such as the 'Pathways to Housing' approach.

'Pathways to Housing' is based on five core principles (Gaetz, Scott, et al., 2013; Tsemberis, 2010). First, like all Housing First programs, it provides immediate access to permanent housing. There are no prerequisites or expectations regarding participation in mental health or addiction treatment or regarding sobriety. Second, it emphasizes consumer-choice principles. Clients may choose, within the limits of availability and affordability, the location and type of apartment where they will live, as well as which services they want to engage with. This component is specific to 'Pathways to Housing'. Third, it adopts recovery-oriented, harm reduction principles. The notion of recovery is multidimensional and, according to one account, involves clinical recovery (e.g., reduction of mental illness symptoms), existential recovery (e.g., sense of agency, empowerment, hope), functional recovery (e.g., employment, residential stability), physical recovery (e.g., physical health, healthy lifestyle), and social recovery (e.g., meaningful relationships, community integration) (Whitley & Drake, 2010). Housing First seeks to support clients in their recovery path in each of these dimensions. Fourth, it adopts a client-driven approach and tailors the support services to individual needs. Fifth, it promotes community integration. Accordingly, it promotes a clear separation of housing and support services, notably through off-site support services, and favors scattered-site housing.

Support services are usually provided either in the form of Assertive Community Treatment or case management. Assertive Community Treatment teams are multidisciplinary, offer integrated treatment, rehabilitation and support services with a low client-to-staff ratio (Bond, Drake, Mueser, & Latimer, 2001). Case management typically differs from Assertive Community Treatment in that follow-up is less intensive, and by a single case manager rather than the whole team using a shared caseload approach.

Housing First has been the subject of much research in recent years and has been shown to

increase housing stability (Beaudoin, 2016; Woodhall-Melnik & Dunn, 2016) and result in significant cost offsets (Ly & Latimer, 2015). A multi-site randomized controlled trial in Canadian cities of various sizes, At Home/*Chez Soi* (Goering et al., 2011), tested Pathways to Housing among homeless people with mental illness (Aubry et al., 2016; Stergiopoulos et al., 2015). Based on psychiatric diagnosis, presence of substance use disorder, criminal justice involvement, and community functioning, participants of At Home/*Chez Soi* were categorized as having high needs or moderate needs. Participants with high needs received support in the form of Assertive Community Treatment, whereas participants with moderate needs received support in the form of Intensive Case Management. Housing First participants with high needs spent more time in stable housing over the two-year follow-up than usual services participants (adjusted difference of 42%) (Aubry et al., 2016). Housing First participants with moderate needs also spent more time in stable housing than their usual services counterparts, with adjusted differences ranging from 33% to 50%, depending on the site (Stergiopoulos et al., 2015). Cost offsets in the At Home/*Chez Soi* trial were more important among participants with high needs than among participants with moderate needs. The average annual cost of Housing First with Assertive Community Treatment was Can$22,257 per participant, with cost offsets representing 96% of the cost of the intervention (Aubry et al., 2016). The average annual cost of Housing First with Intensive Case Management was Can$14,177 per participant, with cost offsets representing 34% of the cost of the intervention (Stergiopoulos et al., 2015).

There is strong evidence that Housing First increases residential stability, and it has been hypothesized that the benefits may also include a reduction in criminal justice involvement (Gaetz, Scott, et al., 2013). The evidence suggests that, on average, Housing First has no impact on criminal justice outcomes. Among observational studies that examined the impact of Housing First on criminal justice outcomes among people with mental illness, only two studies reported a decrease in criminal justice contacts compared to treatment as usual (Gilmer, Stefancic, Ettner, Manning, & Tsemberis, 2010)

or compared to residential treatment first (Tsai, Mares, & Rosenheck, 2010). The At Home/*Chez Soi* randomized controlled trial reported no intervention effect on self-reported arrests, with both groups experiencing similar decreases in arrest rates (Aubry et al., 2016; Stergiopoulos et al., 2015).

Incarceration and jail mental health services costs follow similar patterns, with the At Home/*Chez Soi* trial of Housing First for participants with high needs (of which 43% reported criminal justice involvement at baseline) (Aubry et al., 2016) and one other study (Gilmer et al., 2010) reporting cost offsets while the At Home/*Chez Soi* trial of Housing First for participants with moderate needs (of which 30% reported criminal justice involvement at baseline) did not report cost offsets (Stergiopoulos et al., 2015). This is likely explained by the fact that participants with high needs were more likely to be justice-involved at baseline, and thus to engender greater justice costs, than participants with moderate needs, as justice involvement was among the criteria for determination of need level.

Given the size and the strength of the At Home/*Chez Soi* trial, the null finding on arrests should not be dismissed. A literature review of the cost offsets of Housing First programs for individuals with mental illness and/or substance use disorder found that nonrandomized studies reported decreases in justice costs, but not randomized controlled trials (Ly & Latimer, 2015). The state of the scientific literature thus suggests that Housing First does not, on average, have much if any impact on criminal justice outcomes. Of the interventions described in the studies identified, none directly address the criminal risk factors of their participants beyond substance abuse. Instead, reduction in criminal justice involvement is expected as an incidental consequence of increased residential stability and better access to mental health treatment.

2.4 The Importance of Criminogenic Needs

Risk factors for criminal justice involvement are usually divided into two categories: static risk factors (e.g., criminal history) and dynamic risk factors (e.g., substance abuse). These dynamic risk factors are those that can be changed and that may thus be an intervention target (Latessa &

Lowenkamp, 2005). Among all offenders, the criminogenic needs that most strongly predict recidivism, both general and violent, are called the "Big Four" factors: antisocial personality patterns, procriminal relationships, procriminal attitudes and cognitions, and antisocial behaviour or criminal history (the only static criminogenic risk factor of the Big Four). Substance abuse, poor family or marital relationships, poor satisfaction at work/school, lack of involvement in leisure activities are called the "Moderate Four" and complete the "Central Eight" factors (Andrews et al., 2012; Andrews & Bonta, 2006). In the general male offending population, the "Big Four" are deemed stronger predictors of recidivism than the "Moderate Four" (Andrews et al., 2012; Andrews & Bonta, 2010).

The "Central Eight" factors have been validated in offenders with mental illness (Bonta et al., 2014; Skeem et al., 2014), although the relevance of the distinction between the "Big Four" and the "Moderate Four" is less clear among this population (Bonta et al., 2014) and among other subgroup of offenders, such as women (Andrews et al., 2012). In an updated meta-analysis of 126 studies reporting on 96 unique samples (N = 23,900), Bonta and colleagues (2014) found that these criminogenic needs predicted both general and violent recidivism among offenders with mental illness. More specifically, substance abuse was the strongest predictor of general recidivism whereas antisocial personality pattern was the strongest predictor of violent recidivism. Overall clinical factors (such as psychosis, prior hospitalization, diagnosis of schizophrenia, diagnosis of mood disorder) did not predict any type of recidivism.

According to the Risk-Needs-Responsivity model of offender rehabilitation (Bonta & Andrews, 2007), the services provided to a justice-involved individual, including those who have severe mental illness (Skeem, Steadman, & Manchak, 2015), should assess and target specifically the dynamic risk factors, or criminogenic needs, of an individual in order to reduce reoffending. These dynamic risk factors may include, for example, substance abuse or procriminal attitudes. Residential instability may

not be a central criminogenic need for most justice-involved homeless individuals, and a reduction of criminal justice involvement may thus not be expected as a result of a housing intervention alone.

Given the various potential etiologies of criminal involvement in homeless individuals with mental illness, the criminogenic needs of this population are heterogeneous and one-size-fits-all interventions are unlikely to be the most effective in reducing criminal justice involvement. The criminal justice involvement of this population could therefore be best addressed, both through prevention and intervention, by identifying profiles of criminal behaviour. It would assist in the identification of specific dynamic risk factors, which could then be targeted as part of the intervention (Hodgins, 2001).

2.5 Next Steps?

Thus, it is possible that individuals with unique patterns of criminal justice involvement may respond differently to being housed. For example, people whose offending is situational and poverty-driven may be more likely to experience positive outcomes from being housed than those whose criminogenic needs more closely align with the Big Four. Because criminal justice involvement has an impact on residential stability and on costs (e.g., costs for court appearances, police contacts, incarceration) (McGuire & Rosenheck, 2004), these profiles of criminal justice involvement may also influence the effectiveness and the cost-effectiveness of the intervention. Furthermore, Housing First may have a differential impact on certain types of crime. Offences related to subsistence, for example, such as shoplifting or sleeping outside, may very well decrease as a result of increased housing stability, whereas violent crimes may not. Better understanding how and for whom Housing First is effective will be helpful in the development and implementation of potential adaptations.

Chapter 3 Study Objectives

The overarching objective of the study was to understand whether the effectiveness and cost-effectiveness of Housing First among homeless people with mental illness differ according to criminal justice involvement profiles. This global objective was addressed in two manuscripts.

The goal of the first manuscript was to explore whether the absence of impact of Housing First on criminal charges overall was due to a heterogeneous intervention effect. I assessed the impact of Housing First, for each profile of criminal justice involvement, on three types of criminal charges: violent, subsistence-related, and related to the administration of justice. As per the Risk-Needs-Responsivity model (Bonta & Andrews, 2007), I hypothesized that offenders whose criminal justice involvement was driven by poverty and substance abuse would experience a reduction in all types of charges as a result of Housing First to a greater extent than offenders with more severe patterns of criminal justice involvement. The latter reflect more complex criminogenic needs, unlikely to be addressed as part of the intervention. I expected that these offenders, especially those displaying greater criminal versatility and committing offenses against a person, could even experience an increase in criminal justice involvement, thus masking the reduction among other profiles. I also hypothesized that Housing First would be more successful in reducing subsistence-related charges than violent and justice administration charges – the latter might even increase due to increased surveillance because they may simply be easier to find by probation officers or more likely to be reported by landlords to the police for disturbing the peace.

The second manuscript had two objectives: First, to assess the association between criminal justice involvement profiles and residential stability and costs; and second, to examine whether the effectiveness (in terms of days stably housed), total costs and cost-effectiveness of Housing First differed according to criminal justice involvement profiles. I hypothesized that profiles would be associated with residential stability and costs, with individuals with more severe patterns of criminal justice involvement

engendering greater costs and spending fewer days in stable housing, but I expected no difference in terms of the effectiveness or the cost-effectiveness of Housing First, suggesting that all profiles would benefit from the intervention.

Chapter 4 Study Methodology

4.1 Overview of the At Home/*Chez Soi* Trial

Data for the two empirical manuscripts were extracted from the At Home/*Chez Soi* trial: a randomized controlled trial evaluating the effects of the Housing First model among a sample of homeless people living with mental illness in five major Canadian cities (Goering et al., 2011). To be eligible, participants had to be: (1) legal adults; (2) absolutely homeless or precariously housed (i.e., living in a rooming house, in a single-room, a hotel/motel room, and at least two episodes of absolute homelessness in the past year); and (3) have at least one mental disorder (either major depressive episode, panic disorder, manic or hypomanic episode, post-traumatic stress disorder, mood disorder with psychotic features, or psychotic disorder), with or without a comorbid substance use disorder, as determined by DSM-IV criteria on the Mini International Neuropsychiatric Interview (Sheehan et al., 1997). Exclusion criteria included: (1) not being a legal resident of Canada, a refugee claimant or a landed immigrant; and (2) being a client of an Assertive Community T or ICM team. Participants were stratified into high needs (HN) and moderate needs (MN) groups before randomization. Participants were identified as HN if they had a bipolar disorder or a psychotic disorder, if they scored under 62 on the Multnomah Community Ability Scale (Barker, Barron, McFarland, & Bigelow, 1994), and met at least one of the following criteria: hospitalized at least twice in a year in the past five years, had a diagnosis of substance abuse or dependence, or had been arrested or incarcerated in the prior six months. Participants with high needs were randomized to receive either Housing First with ACT or usual services, whereas participants with moderate needs were randomized to receive either Housing First with ICM or usual services.

Allocation was performed by a central data collection system that used an adaptive randomization algorithm, concealed from both researchers and participants. The adaptive randomization optimized the balance between the two groups by adjusting the probability of

assignment to one group or the other according to the number of participants already assigned to each group. Assignments were revealed to the participants at the end of the first interview. Because of the nature of the intervention, blinding was not possible.

4.2 Profiles of Criminal Justice Involvement

Both manuscripts use profiles of criminal justice involvement, which were identified from a prior paper (in preparation) to which I significantly contributed (see Appendix A for summary and authorship details). This paper examined a subsample of At Home/*Chez Soi* participants from the Montreal, Vancouver, Toronto and Moncton sites that had consented to administrative justice data collection (no administrative justice data were available for Winnipeg participants).

We used lifetime (up to study enrollment) criminal charges identified using criminal records from the Royal Canadian Mounted Police (RCMP). We grouped the criminal charges into five categories: violent, nuisance, substance-related, subsistence, and administration of justice. Violent charges included assaults of all severity levels, sexual assaults, homicides or attempted murder, violations resulting in the deprivation of freedom, robbery, threats of violence, and violations related to offensive weapons. Nuisance offences included vandalism, disturbing the peace and traffic violations. Substance-related offences included possession, possession for the purpose of traffic, traffic and production of controlled drug and substances. Subsistence-related offences included acquisitive property crimes, fraud, gaming and betting, and prostitution. Finally, offences related to the administration of justice included breach of probation, failure to comply with conditions, and failure to attend court.

We identified profiles of criminal justice involvement through latent class analysis (LCA), using the lifetime sum of criminal charges in each category (Winsorized at the 98^{th} percentile) as the five indicator variables. LCA seeks to identify the number and the nature of the latent subpopulations within a population (Kline, 2015). We tested solutions ranging from two to seven classes. Based on entropy, the Bayesian Information Criterion, the Bootstrap likelihood ratio test, the sample size in each class, as well

as prior knowledge regarding typology of offending among offenders with mental illness (Hiday & Wales, 2011; Skeem et al., 2011), the 5-class solution emerged as the superior model (see Appendix A, Table 1). The model was taken to be measured without error.

The five profiles identified were the following (see Appendix A, Table 2): The first class comprised the vast majority of the sample and was characterized by lower mean number of offences of all categories than for the overall sample. Accordingly, we called them "Non/Infrequent Offenders". The second class had higher means in all offence types than "Non/Infrequent Offenders", but no single type of offence characterized the class. We thus refer to them as "Moderate Offenders". The third class had substantially high means for violent and nuisance offences, whereas the fourth class had substantially high means for subsistence offences. Therefore, we called these two classes "Antisocial Offenders" and "Versatile Subsistence Offenders", respectively. Finally, the fifth class was composed of individuals who resembled the "Moderate Offenders", with the exception of a high number of substance-related offences and offences related to the administration of justice. We called them "Drug Offenders". Throughout the thesis, for the sake of clarity, I capitalize the profiles.

We then compared the five profiles based on several sociodemographic and clinical history characteristics (see Appendix A, Table 3), using a more stringent alpha of 0.01. Non/Infrequent Offenders had the largest proportion of women and had less complex psychosocial histories in terms of education, prior employment, and lifetime duration of homelessness. They had the highest impulse control and the lowest proportion of individuals with a substance use disorder and with an alcohol use disorder, along with Drug Offenders. They also have the highest proportion of lifetime charges resulting in a verdict of Not Criminally Responsible on account of Mental Disorder (1.4% compared to 0.1-0.4% for all four other profiles). When examining this profile more closely, we found that there was a subgroup

(38%) that had a few violent offences[2]. Nearly half of all (15 of 34) people who had been found Not Criminally Responsible on account of Mental Disorder (NCRMD) in their lifetime belonged to this subgroup. About 44% of this subgroup (9 out of the 15 with a NCRMD verdict) had a diagnosis of a psychotic disorder, and half had a history of psychiatric hospitalization (11 out of the 15 with a NCRMD verdict). This leads us to think that the Non/Infrequent Offenders comprise a "forensic subgroup" that fit the criminalization of mental illness hypothesis. Moderate Offenders had a high proportion of individuals identifying as white and had the longest duration of homelessness, although they did not differ in terms of prior employment from Non/Infrequent Offenders. They had low impulse control and substance use disorder (related to drugs) was frequent (76%). We hypothesized that the criminal behaviour of this profile may be driven by poverty. Antisocial Offenders and Versatile Subsistence Offenders resembled each other: they both had complex psychosocial histories and did not differ significantly from one another in any regards when using a more stringent alpha of 0.01. These are the two profiles with the most extensive criminal justice involvement, and we hypothesized that they had the most complex criminogenic needs. As expected, Drug Offenders had the highest proportion of individuals with a substance use disorder (which differed significantly from Non/Infrequent Offenders and Antisocial Offenders), and the lowest proportion with an alcohol use disorder, along with Non/Infrequent Offenders. We hypothesized that the criminal behaviour of this profile may be driven by substance abuse. Finally, a diagnosis of psychotic disorder and a history of psychiatric hospitalization did not distinguish the classes.

4.3 Data and Analyses

Data and analyses for manuscript 1. For the first manuscript, I used data from the At Home/*Chez Soi* participants from Montreal, Toronto, and Vancouver who had consented to

[2] Because these subgroups did not emerge empirically, we did not do any hypothesis testing and instead we use this knowledge to better understand the Non/Infrequent Offenders.

administrative justice data collection. I was unable to include participants from Moncton because the police records data (which I used as a source for the outcome measures) had not been collected. I excluded 107 participants from a substudy in Vancouver testing congregate setting because the intervention was substantially different from the scattered-site setting otherwise used. For example, in congregate-site Housing First, support services were on-site (and thus potential surveillance higher, which could have biased the results regarding the impact on criminal justice involvement).

The three outcome measures were the sum of (1) violent, (2) subsistence-related, and (3) justice administration-related criminal charges over the two year follow-up. I computed the total number of contacts resulting in a charge two years prior to baseline and two years following baseline. (When a single individual police contact had resulted in multiple charges, only the most severe charge was coded by the research assistants at the time of data collection.) Because there are delays before criminal charges appear in RCMP criminal records, we used police records. Using RCMP criminal records would have biased the sum of charges two-years post-baseline. (We were able to use RCMP criminal records to identify profiles because we used the lifetime sum of charges, up to study enrollment only.)

I used generalized linear models, assuming a negative binomial distribution. I tested the main effects of intervention, CJI profile, need level, and study site, and used a two-way interaction term intervention x CJI profile to identify evidence of heterogenous intervention effect. I computed average marginal effects of Housing First per profile to measure the program impact. In sensitivity analyses, I also adjusted for age at study enrollment and conducted complete case analysis.

Table 1

Summary of the variables used in the two manuscripts

Outcome	Main effects		Interaction terms
	Exposure	Covariates	
Manuscript 1			
1) Violent criminal charges (sum) 2) Subsistence-related criminal charges (sum) 3) Justice administration-related criminal charges (sum)	Intervention (dichotomous) CJI profile (5-level nominal)	Need level (dichotomous) Study site (3-level nominal)	Intervention x CJI profile
Manuscript 2			
1) Days in stable housing over two years post-baseline 2) Total costs over two years post-baseline	Intervention (dichotomous) CJI profile (5-level nominal)	Need level (dichotomous) Study site (4-level nominal)	1) None 2) Intervention x CJI profile

Data and analyses for manuscript 2. For the second manuscript, I used data from the At Home/*Chez Soi* participants from Montreal, Toronto, Vancouver, and Moncton who had consented to use of their administrative justice data (i.e., I included participants for whom criminal justice involvement profiles were available). As for the first manuscript, I excluded the participants to the congregate-site substudy.

The three outcomes measured were: (1) the average annual number of days stably housed over the two-year study period; (2) the total costs over the two-year study period; and (3) the average annual net benefit over the two-years study period. We ascertained the days stably housed in the previous 3 months using the Residential Timeline Follow-Back (RTLFB) questionnaire (Tsemberis, McHugo, Williams, Hanrahan, & Srefancic, 2007). We defined stable housing as living in one's own room, apartment or house, or with one's family, and expecting to remain in this residence for at least six months, or having tenancy rights. Incarceration was considered unstable housing. To capture service use costs and income, we used the RTLFB as well as the Health, social, and justice service use (HSJSU) and

the Vocational Time-Line Follow-Back (VTLFB) (Latimer et al., 2006) questionnaires. All three questionnaires were administered in person at baseline, and then every 6 months for a period of 24 months. In addition, the RTLFB and the VTLFB were administered every three months, often by phone. Unit costs were already calculated (Latimer et al., 2017) and expressed in 2016 Canadian dollars. I applied a discount rate of 3%, and discount rates of 0% and 5% as sensitivity analyses. I applied the net benefit framework to explore the impact of criminal justice involvement profiles on cost-effectiveness, using several willingness to pay values between $0 and $100.

For the number of days in stable housing and the total costs, I estimated 2 models: (1) without interaction terms, and (2) with the two-way interaction intervention x CJI profile to identify evidence of a heterogenous intervention effect (see Table 3). I tested the main effects of intervention, CJI profile, needs level, study site, and time. For the net benefit, I only estimated the model with the two-way interaction intervention x CJI profile.

I estimated generalized linear models assuming a Gaussian distribution with an identity link function for days stably housed and net benefits, and assuming a gamma distribution with a log link function for total costs. I selected those based on Akaike information criterion (Barber & Thompson, 2004; Pregibon, 1980). Because days stably housed and total costs at baseline were measured imprecisely, I did not include them in the main analysis. However, I included them in sensitivity analyses.

Chapter 5 Manuscript 1: Effect of Housing First on criminal justice outcomes among homeless people with mental illness and different patterns of criminal justice involvement

5.1 Preface to Manuscript 1

The literature review suggests that Housing First does not, on average, have much if any impact on criminal justice outcomes. It also made it clear that Housing First does not systematically address criminogenic needs. Given this, individuals with unique patterns of criminal justice involvement (and who thus show unique criminogenic needs) may respond differently for different types of offending. To address this gap in the literature, I used data from the multisite randomized controlled trial At Home/*Chez Soi* to assess whether the effect of Housing First on three types of criminal charges varies by criminal justice involvement profiles.

Effect of Housing First on criminal justice outcomes among homeless people with mental illness and different patterns of criminal justice involvement

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Abstract

Background: While there is strong evidence that Housing First increases residential stability, the literature suggests that it does not, on average, have much if any impact on criminal justice outcomes. Objectives: To explore whether the absence of impact of Housing First on criminal charges overall masks a heterogenous intervention effect by examining the impact of Housing First on three types of criminal charges (violent, subsistence-related, justice administration-related) differs according to pre-identified criminal justice involvement profiles. Methods: This study examined a subsample of participants (n = 1359) recruited for the Canadian At Home/Chez Soi randomized controlled trial. Criminal charges were identified from police records for participants in Montreal, Toronto and Vancouver, from two years before study enrolment to two years after. Results: The impact of Housing First on violent charges varies by criminal justice involvement profile. Participants with less extensive criminal justice involvement driven by poverty or residential instability or criminal justice involvement related to substance offending experienced a decrease in charges for violent crimes (of the magnitude of about 0.40 [95% CI: -0.70, -0.10] and 0.53 [95% CI: -1.01, -0.05] fewer new charges over two years), whereas participants with no or infrequent criminal history experienced a small increase of the magnitude 0.08 new charges over two years (95% CI: 0.01, 0.15). Conclusions: There is evidence of a heterogenous intervention effect based on profiles of criminal justice involvement and nature of offending. Our findings highlight that interventions available to homeless individuals with mental illness, who have a history of criminal justice involvement and an ongoing risk of offending, must target the criminogenic needs of participants specifically, in order to observe an overall reduction in criminal justice outcomes.

Effect of Housing First on criminal justice outcomes among mentally ill homeless people with different patterns of criminal justice involvement

People who experience mental illness as well as homelessness are at increased risk of involvement with the criminal justice system (Roy, Crocker, Nicholls, Latimer, & Ayllon, 2014), which leads to important societal and personal costs. In addition to longer duration of homelessness (Caton, Dominguez, Schanzer, Hasin, Shrout, Felix, McQuistion, Opler, Hsu, et al., 2005; McGuire & Rosenheck, 2004), greater risk of violent victimization (Nicholls et al., 2014; Roy, Crocker, Nicholls, Latimer, & Ayllon, 2014), and poorer reemployment outcomes (Frounfelker et al., 2010; Poremski et al., 2014), the criminal justice involvement of homeless people with mental illness engenders costs between CAD$7,000 to CAD$15,000 per person per year in Canadian cities of various sizes (Latimer et al., 2017). The criminalization of mental illness adds to the complexity of the issue: people with mental illness are twice as likely to be arrested as people without mental illness for similar offences (Charette, Crocker, & Billette, 2014), and many symptoms, especially those arising from psychotic disorders and leading to disorganized behaviour, are criminalized when they result in peace disturbance or threats of violence (Hiday & Wales, 2011). Further, there is growing evidence that behaviours associated with homelessness (e.g., panhandling/begging, drinking in public) are increasingly penalized (Chesnay et al., 2013) and criminalized (B. A. Lee, Tyler, & Wright, 2010).

The Housing First model is increasingly put forth by policy makers and researchers alike as an important, pragmatic component of plans to end homelessness (Katz et al., 2017). Housing First seeks to provide immediate access to subsidized housing along with support services and adopts a harm reduction to substance use, with no expectations of engagement in treatment. The Pathways to Housing adaptation of Housing First (Tsemberis, 2010) emphasizes consumer-choice principles, and thus provides independent, private-market apartments in scattered sites to participants with off-site support services. Housing First has been the subject of much research in recent years and has been shown to increase

housing stability (Beaudoin, 2016; Woodhall-Melnik & Dunn, 2016) and result in significant cost offsets (Ly & Latimer, 2015). A multi-site randomized controlled trial in Canada, At Home/*Chez Soi* (Goering et al., 2011), demonstrated that these positive results extend to people who are both mentally ill and homeless (Aubry et al., 2016; Stergiopoulos et al., 2015). While there is strong evidence that Housing First increases residential stability, the existing evidence on the effectiveness of Housing First in terms of criminal justice outcomes is inconclusive. Some observational studies found that Housing First decreased criminal justice involvement or criminal justice costs among homeless people with mental illness, compared to treatment as usual (Gilmer et al., 2010; McLaughlin, 2011; Tsai et al., 2010), but the multi-site At Home/*Chez Soi* trial failed to show an intervention effect in terms of arrests (Aubry et al., 2016; Stergiopoulos et al., 2015). Given the sample size and the methodological strength of the At Home/*Chez Soi* trial, this null finding should not be dismissed.

Housing First interventions rarely address the criminogenic needs of their participants (see Chapter 2 – Literature review). Criminogenic needs are dynamic risk factors associated with criminal behaviours. The criminogenic needs that have been shown to be most strongly associated with recidivism – the so-called "Central Eight" – are antisocial personality traits, antisocial behaviour history, procriminal relationships, antisocial cognitions, poor family or marital relationships, lack of satisfaction with work or school, lack of involvement in leisure activities and substance abuse (Andrews & Bonta, 2006).

Thus, it is possible that Housing First may have a differential impact on certain types of crime. Offences related to subsistence, for example, such as shoplifting or sleeping outside, may very well decrease as a result of more housing stability, whereas violent crimes may not. The number of charges related to the administration of justice, such as breaches of probation, may on the contrary rise as a result of increased surveillance. Furthermore, participants with unique patterns of criminal justice involvement may respond differently to housing. Participants whose offending is situational and

poverty-driven may be more likely to experience positive outcomes from being more stably housed than participants whose criminogenic needs more closely align with the Central Eight factors. Testing for the existence and understanding the nature of intervention effect heterogeneity will shed light on potential adaptations of Housing First so that, ultimately, the criminogenic needs and risk of people with different profiles can be appropriately addressed.

Different processes and factors might be at play in the criminal justice involvement of homeless people. For some, homelessness seems to be a secondary outcome following criminal justice involvement. For instance, incarceration may result in disruptions in housing stability, family relationships, employment, and mental health services (Dupuis, Mackay, & Nicol, 2013; Freudenberg, 2001; Kushel et al., 2005). The criminogenic needs of this subgroup may be very different from those of people who experienced criminal justice involvement following their first episode of homelessness, where offending is more likely to be situational and driven by subsistence needs and absence of a dwelling-house to carry out every day activities (Barrett A. Lee & Schreck, 2005; Roy, Crocker, Nicholls, Latimer, & Isaak, 2016). Finally, there are risk factors, such as substance abuse, that increase both the likelihood of experiencing homelessness and of becoming involved with the criminal justice system (Bonta et al., 1998; Elbogen & Johnson, 2009; Fazel, Gulati, et al., 2009; Fazel et al., 2008).

Given the various potential pathways to criminal involvement in homeless individuals with mental illness, the criminogenic needs of this population are heterogeneous and one-size-fits-all interventions are unlikely to reduce criminal justice involvement. The Risk-Needs-Responsivity model (Bonta & Andrews, 2007) highlights the importance of matching the intensity of an intervention to the level of risk of the individual and of targeting the specific criminogenic needs of the individual in treatment. The criminal justice involvement of this population could thus be best addressed through the identification of profiles of criminal justice involvement, as these different subgroups of individuals may respond differentially to interventions.

Profiles of criminal justice involvement

Identifying profiles of criminal justice involvement makes it possible to identify the fundamental issue that drives the offending of people with mental illness. For example, people who start offending before the onset of their mental illness tend to show more typical criminogenic needs and a more complex psychosocial history than people who offend after the onset of their illness (Crocker et al., 2018; Hodgins, 2008). Profiles of criminal justice involvement in homeless people with mental illness (CJI profiles) used in these analyses were empirically identified in a prior paper (see Appendix A). Using lifetime (up to study enrollment) violent, nuisance (e.g., vandalism, disturb the peace), substance-related, subsistence (e.g., acquisitive property crime, prostitution), and administration of justice (e.g., breach of probation) as indicator variables in a latent class analysis, we identified five classes: Non/Infrequent Offenders, Moderate Offenders, Antisocial Offenders, Versatile Subsistence Offenders, and Drug Offenders. For the sake of clarity, we capitalize the names of the profiles throughout the paper.

Non/Infrequent Offenders had very few lifetime criminal charges in all categories and the least complex psychosocial history in terms of duration of homelessness, education, and prior employment. The Non/Infrequent Offenders also comprised a "forensic subgroup", with people who had very few violent offences and a high proportion of verdict of Not Criminally Responsible on Account of Mental Disorder compared to others. Moderate Offenders had higher means in all offence types than Non/Infrequent Offenders, and no single type of offence emerged as characterizing the profile. With the longest duration of homelessness of all profiles and a relatively small proportion of members who had their first criminal charge prior to the first episode of homelessness, this profile may be the most likely to be in contact with the criminal justice system as a result of homelessness, in line with the "criminalization of homelessness" hypothesis. Antisocial Offenders were characterized by a high mean number of violent and nuisance criminal charges, whereas Versatile Subsistence Offenders were

characterized by high mean number of subsistence-related charges (e.g., theft, fraud, prostitution). Both groups had complex psychosocial histories and were the oldest. Finally, Drug Offenders had the highest mean number of substance-related charges (e.g., possession, traffic) and, as expected, were the group with the largest proportion of individuals with substance use disorders.

The objective of this paper was to explore whether the absence of impact of Housing First on criminal charges on average was due to intervention effect heterogeneity. We thus assessed the impact of Housing First, in comparison to treatment as usual, on (1) violent criminal charges, (2) subsistence-related criminal charges, and (3) criminal charges related to the administration of justice, for each profile of criminal justice involvement and across profiles. We expected evidence of a heterogenous intervention effect. More specifically, we hypothesized that Housing First would reduce subsistence-related criminal charges, but not charges for violent crimes nor charges related to the administration of justice. We also expected that offenders whose criminal behaviour may be driven by poverty (Moderate Offenders) or substance abuse (Drug Offenders) would experience a greater reduction in all types of criminal charges as a result of Housing First than offenders with more extensive criminal justice involvement and more complex criminogenic needs (Bonta & Andrews, 2007; McGuire & Rosenheck, 2004).

Methods

Study Design

This study examined a subsample of participants recruited for the Canadian At Home/*Chez Soi* study (Goering et al., 2011): a multi-site randomized controlled trial evaluating the effects of the Housing First model among a sample of homeless people living with mental. Administrative justice data was available for 95% of the participants from three sites to assess the impact of scattered-site Housing First on various types of criminal charges: Toronto (n = 549), Montreal (n = 468), and Vancouver (n =

342), for a total of 1,359 participants. A total of 741 participants were allocated to Housing First, and 618 to treatment as usual. There were 41 known deaths during the study period. We included the outcomes of these participants up to when they died.

To be eligible, participants had to be absolutely homeless or precariously housed (with at least two episodes of absolute homelessness in the past year), and had to have a diagnosis of mental disorder (major depressive episode, panic disorder, manic or hypomanic episode, post-traumatic stress disorder, mood disorder with psychotic features, or psychotic disorder), with or without a comorbid substance use disorder. Participants were stratified based on their need level based on a diagnosis of severe mental illness (bipolar disorder or psychotic disorder), community functioning, substance use disorder, hospitalization history and recent criminal justice involvement. Participants with high needs were randomized to receive either Housing First with Assertive Community Treatment or treatment as usual, whereas participants with moderate needs were randomized to receive either Housing First with intensive case management or treatment as usual. All participants allocated to the intervention groups were provided scattered-site housing[3]. The participants used up to 30% of their monthly income to pay for their rent, and the rest was paid by the program to the landlord in the form of a monthly rent supplement.

Details on the eligibility criteria, on the classification of participants based on their level of needs, and on the randomization and allocation procedure are available in the registered protocol (Goering et al., 2011). The study protocol was approved the appropriate research ethics board at all participating institutions. Additional ethics approval was obtained for the use of administrative justice data. All participants provided written informed consent.

[3] The Vancouver site allocated 107 participants to congregate housing in the context of a substudy. Given that the intervention differs significantly from the 'Pathways to Housing' variation of Housing First otherwise tested, we excluded this subsample from our analyses.

Outcomes

We defined criminal justice involvement as formal criminal charges identified through police records. When there were multiple charges during the same incident, the most severe was coded. We also computed the total number of contacts resulting in charges two years prior to baseline and two years following baseline. We examined separately (1) violent criminal charges, (2) subsistence criminal charges (defined as acquisitive property crimes, prostitution, and gaming and betting), and (3) justice administration criminal charges. We were unable to report on substance-related criminal charges given the low prevalence of such charges in our sample. Because we used administrative data, there were no missing data to account for.

Statistical Analysis

To assess the impact of Housing First on number of (1) violent charges, (2) subsistence charges, and (3) justice administration charges, we used generalized linear models ('glm' command in STATA V.15) assuming a negative binomial distribution. In all models, we tested the main fixed effects of intervention, needs level, CJI profile, and study site. To test whether there were heterogeneity in the effect of Housing First, we included a two-way interaction intervention x CJI profile. We computed the average marginal effect of Housing First per profile ('margins' command). Intent-to-treat analyses were performed.

We conducted sensitivity analyses to investigate the impact of 1) the difference in terms of age between profiles by adjusting for age as covariate; and 2) including the criminal justice outcomes of participants who died during the study by conducting complete case analyses. We present the results of sensitivity analyses in the text along with the main analyses. The coefficients from the regression models are available in the online supplement.

Results

Description of Participants

On average, participants were 41.8 years old (*SD* = 11.2), and 69% were men, 30% were women and the remaining 1% identified as other gender identities. Over half identified as white, 6% as Indigenous, and 39% as another ethnicity. Half had obtained a high school diploma or a higher educational level. The lifetime duration of homelessness was 58.3 months (*SD* = 70.0), and the mean age at first episode of homelessness was 32.3 (*SD* = 13.3). At baseline, 58% of the sample met the criteria for a diagnosis of major depressive episode; 38% for a diagnosis of psychotic disorder; 14% for a diagnosis of mood disorder with psychotic features; 10% for a diagnosis of manic or hypomanic episode; 21% for a diagnosis of post-traumatic stress disorder; and 17% for a diagnosis of panic disorder. In addition, 37% met the criteria for a comorbid alcohol use disorder and 52% for a comorbid substance use disorder.

Effect of Housing First

Table 1 shows that there is evidence of heterogeneity in the impact of Housing First on violent charges by CJI profiles. Average marginal effects of Housing First (see Figure 1) suggest that the intervention leads to a decrease in the number of violent criminal charges for Moderate Offenders (-0.40 new charges over two years, 95% CI: -0.70, -0.10) and for Drug Offenders (-0.53, 95% CI: -1.01, -0.05), but in a slight increase in Non/Infrequent Offenders (0.08 new charges over two years, 95% CI: 0.01, 0.15) – although the lower limit of the confidence interval is close to zero. It has no effect in Antisocial (-0.03, 95% CI: -0.33, 0.27) and Subsistence Offenders (0.31, 95% CI: -0.05, 0.66). Findings of interest were robust to complete case analysis (thus excluding participants who died during the study period) and adjustment for age at study enrollment (see online supplement).

TABLE 1

There was no evidence of heterogeneity in the impact of Housing First on subsistence-related charges and justice administration-related charges by CJI profiles, with most estimates of marginal effect being too imprecise to allow rejecting any null hypotheses regarding the impact of Housing First

for each profile. Figure 1 describes the magnitude and precision of the marginal effects. Findings were robust to sensitivity analyses.

FIGURE 1

Table 1

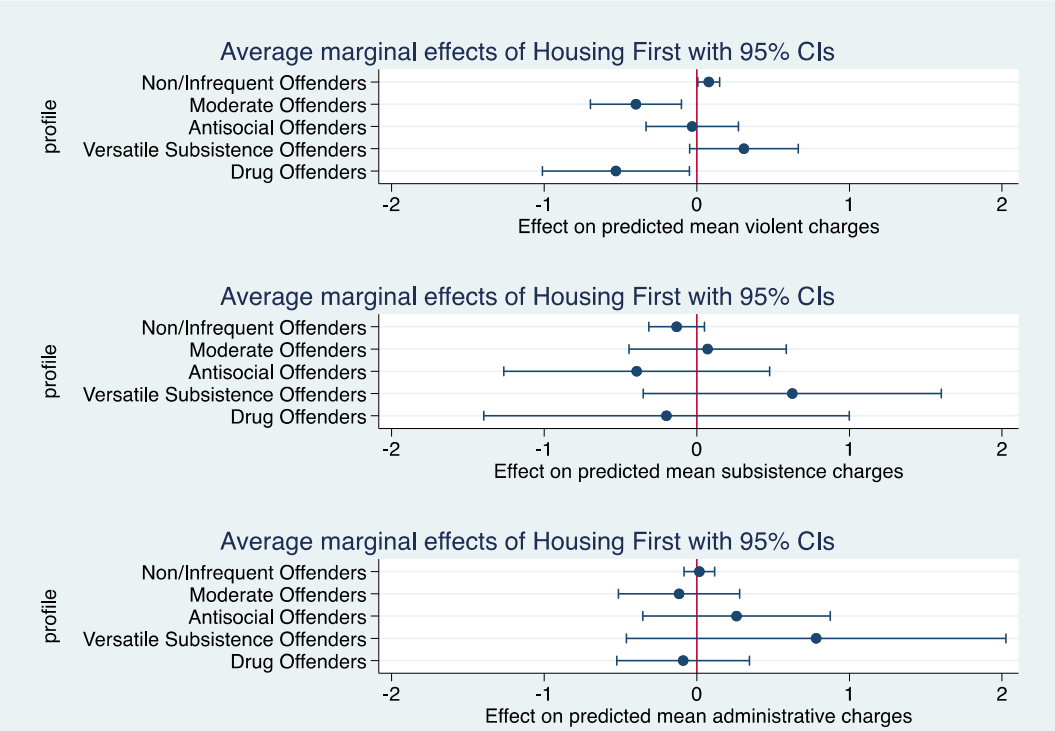
Results from generalized linear models for number of three types of criminal charges two years post-baseline (N = 1,359)

	Violent charges		Subsistence-related charges		Charges related to the administration of justice	
Covariates	β	95% CI	β	95% CI	β	95% CI
Constant term	-2.70	(-3.10, -2.30)	-1.61	(-1.93, -1.30)	-2.93	(-3.35, -2.51)
Site[a]						
Toronto	0.29	(-0.04, 0.63)	-0.34	(-0.64, -0.04)	0.45	(0.08, 0.82)
Vancouver	-0.09	(-0.49, 0.31)	-0.47	(-0.82, -0.12)	0.41	(0.01, 0.80)
Need level: High-needs[b]	0.09	(-0.21, 0.40)	0.04	(-0.22, 0.31)	0.74	(0.45, 1.03)
Number of charges two years pre-baseline	0.80	(0.64, 0.96)	0.58	(0.48, 0.68)	0.51	(0.38, 0.65)
Intervention: HF[c]	0.43	(0.05, 0.82)	-0.30	(-0.64, 0.04)	0.07	(-0.32, 0.45)
Profile[d]						
Moderate	1.41	(0.88, 1.95)	0.46	(-0.06, 0.98)	0.97	(0.44, 1.51)
Antisocial	0.89	(0.17, 1.62)	0.77	(0.09, 1.44)	0.66	(-0.13, 1.44)
Subsistence	0.26	(-0.68, 1.21)	0.44	(-0.25, 1.13)	1.12	(0.41, 1.83)
Drug	1.49	(0.74, 2.24)	0.98	(0.29, 1.66)	0.39	(-0.57, 1.36)
Intervention x Profile[e]						
HF x Moderate	-1.54	(-2.39, -0.68)	0.38	(-0.32, 1.08)	-0.26	(-1.02, 0.50)
HF x Antisocial	-0.52	(-1.49, 0.44)	-0.14	(-1.13, 0.84)	0.37	(-0.64, 1.37)
HF x Versatile Subsistence	0.54	(-0.61, 1.68)	0.88	(-0.01, 1.76)	0.64	(-0.29, 1.56)
HF x Drug	-2.17	(-3.63, -0.71)	0.14	(-0.87, 1.15)	-0.34	(-1.67, 0.98)

Note. HF: Housing First. TAU: Treatment as usual. CI: Confidence Intervals. Reference levels: [a] Montreal, [b] Moderate-needs, [c] Treatment as usual, [d] Non/Infrequent Offenders, [e] HF x Non/Infrequent Offenders

Figure 1

Average marginal effects of Housing First on three types of criminal charges by profile of criminal justice involvement



Discussion

Appraisal of Findings

The objective of this study was to examine whether the impact of Housing First on new charges among homeless men and women with mental illness varied according to criminal justice involvement patterns. We identified five profiles from prior analyses: Non/Infrequent Offenders, Moderate Offenders, Antisocial Offenders, Versatile Subsistence Offenders, and Drug Offenders (see Appendix A). We expected Moderate Offenders (whose offending may be more likely to be driven by homelessness) and Drug Offenders (who are more likely to have a substance use disorder and thus whose criminogenic needs are more likely to be addressed as part of the harm reduction approach of the intervention) to be more likely to experience a reduction in criminal justice involvement as a result of Housing First. Antisocial Offenders and Versatile Subsistence Offenders both have more extensive criminal justice involvement, which points towards more complex criminogenic needs that are unlikely to be addressed by a non-forensic intervention.

Our findings suggest that different profiles experience different trajectories as a result of Housing First in terms of violent charges. In line with the hypothesis, Moderate Offenders and Drug Offenders in the intervention arm incurred fewer violent charges post-baseline than those assigned to treatment as usual. This was expected from the Risk-Needs-Responsivity model (Bonta & Andrews, 2007) and the importance of targeting the specific criminogenic needs of individuals as part of an intervention. Substance abuse, which is one of the "Central Eight" dynamic risk factors (Andrews & Bonta, 2006) and among the most important risk factor in offenders with mental illness (Fazel, Langstrom, et al., 2009; Monahan et al., 2001; Volavka & Swanson, 2010), was more likely than others to be addressed as part of the intervention. In At Home/*Chez Soi*, there were no intervention effect of Housing First on substance use problems (Aubry et al., 2016; Stergiopoulos et al., 2015). However, case managers applied a harm reduction approach to substance use, working with the participants to

minimize the risky behaviours, including violent behaviours, previously associated with the use and abuse of substances.

Contrary to what we expected, Non/Infrequent Offenders in the Housing First arm experienced a small increase in violent charges compared to those in the treatment as usual arm. Although this finding may be counterintuitive several hypotheses may account for it. Having immediate access to subsidized housing may prove stressful for many and may result in increased mild aggressiveness among already vulnerable individuals. It may also be that Non/Infrequent Offenders were already committing these offenses but were not charged for them before. Because Housing First participants are housed in scattered, private-market apartments, there may be a change in victims: they may now victimize families and professionals who may be more likely to report the offense to the police. Finally, the lower limit of the confidence interval of the marginal effect approaches the null: the finding may be spurious. In any case, we do not consider that this specific finding points to the necessity of adjusting Housing First for these non-offenders or low risk offenders.

Implications for Risk Management and Organization of Services

The five-profiles model of criminal justice involvement among homeless individuals with mental illness is helpful in understanding offending trajectories and developing targeted intervention strategies. The absence of impact of Housing First on subsistence charges, and on violent charges in Versatile Subsistence Offenders and Antisocial Offenders, suggests that forensic knowledge should be taken upstream and incorporated into psychosocial support services. More specifically, Antisocial Offenders may benefit from interventions that address antisocial personality traits, procriminal attitudes, and procriminal social networks. Andrews and Bonta (2007) suggest that teaching anger management skills, building a prosocial identity, and valuing new relationships with prosocial peers are promising targets for intervention. In practice, this would involve using validated risk assessment measures to identify the specific criminogenic needs of the participant and using evidence-based risk

management strategies, such as the Risk-Needs-Responsivity model, among those at risk of criminal behaviour (Crocker, Livingston, & Leclair, 2017). The Risk-Needs-Responsivity is not a program model but rather the organization of principles of offender rehabilitation that have shown effectiveness. Various therapeutic interventions may thus integrate these principles (Looman & Abracen, 2013).

Forensic Assertive Community Treatment (FACT) has the specific goal of reducing reoffending by integrating key components of offender rehabilitation models, including the Risk Needs Responsivity model, to Assertive Community Treatment practices. Although more rigorous research is needed on the effectiveness of FACT teams (Jennings, 2009; Marquant, Sabbe, Van Nuffel, & Goethals, 2016), recent randomized controlled trials have shown that the intervention may result in fewer convictions, fewer jail bookings, and fewer days incarcerated than treatment as usual (Cusack, Morrissey, Cuddeback, Prins, & Williams, 2010; Lamberti et al., 2017). Future implementations of Housing First interventions may want to integrate a forensic component to Assertive Community Treatment in order to address the needs of justice-involved participants and reduce criminal justice involvement.

Strengths and limitations

At Home/*Chez Soi* was the largest multi-site randomized controlled trial of Housing First (Goering et al., 2011). The present study is the largest to examine the impact of Housing First on different types of criminal charges in homeless individuals with mental illness, and the first to examine how its impact varies by profiles of criminal justice involvement. We used previously defined empirically derived profiles of criminal justice involvement and obtained administrative data from police records to examine criminal justice outcomes (see Appendix A). Furthermore, we used the date of the police contact, which ensured that we did not misclassify an offence as post-baseline when it took place before the baseline, which may happen when one uses the date of the verdict or of incarceration as an outcome measure.

This study also has several limitations. First, findings may not be generalizable to jurisdictions other than Canada given potential differences in laws and arrest practices. Second, we elected to exclude participants housed in a congregate setting (n = 107) because of the differences in the nature of the intervention (for example, participants did not cook their own meals and support services were on-site). The extent to which our findings apply to all variations of Housing First interventions thus remains unclear. Third, given the non-availability of administrative justice data for the Winnipeg site, there were relatively few Indigenous people in our study. Because Indigenous service users experience systemic discrimination that transforms their experience of the criminal justice system (Roy et al., 2016), it is unclear to what extent our findings are applicable to them. Fourth, participants may have committed offences outside of their original site. Because we use local police data, these offences would not be available to us. However, follow-up rates were high (between 80% and 91%), which implies that participants stayed for the most part in their site of origin.

Conclusion

The impact of Housing First on violent criminal charges among homeless people with mental illness differs by profiles of criminal justice involvement. Moderate Offenders and Drug Offenders in the intervention arm have fewer violent charges than those receiving treatment as usual, whereas Non/Infrequent Offenders experience a small increase. Our findings suggest that Housing First is not sufficient to reduce criminal justice outcomes in participants with more complex criminogenic needs. Interventions for homeless individuals with mental illness, who have a history of criminal justice involvement and an ongoing risk of offending, may need to target the criminogenic needs of participants specifically in order to observe a reduction in criminal justice outcomes.

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Appendix/Online Supplement: Sensitivity analyses for the first manuscript

eTable 1

Results from generalized linear models for number of three types of criminal charges two years post-baseline, adjusting for age at baseline (N = 1,359)

	Violent charges		Subsistence-related charges		Charges related to the administration of justice	
Covariates	β	95% CI	β	95% CI	β	95% CI
Constant term	-1.42	(-2.14, 0.72)	0.06	(-0.55, 0.68)	-0.40	(-1.14, 0.34)
Age	-0.03	(-0.04, -0.02)	-0.04	(-0.05, -0.03)	-0.06	(-0.08, -0.05)
Site[a]						
Toronto	0.15	(-0.19, 0.49)	-0.47	(-0.78, -0.16)	0.26	(-0.12, 0.65)
Vancouver	-0.21	(-0.62, 0.20)	-0.59	(-0.95, -0.24)	0.23	(-0.18, 0.64)
Need level: High-needs[b]	0.03	(-0.27, 0.34)	-0.08	(-0.35, 0.19)	0.59	(0.30, 0.89)
Number of charges two years pre-baseline	0.77	(0.62, 0.92)	0.56	(0.47, 0.66)	0.54	(0.40, 0.68)
Intervention: HF[c]	0.43	(0.04, 0.82)	-0.27	(-0.61, 0.08)	-0.03	(-0.42, 0.37)
Profile[d]						
Moderate	1.42	(0.88, 1.96)	0.51	(-0.02, 1.04)	1.06	(0.51, 1.61)
Antisocial	1.11	(0.39, 1.84)	0.99	(0.31, 1.67)	0.95	(0.15, 1.75)
Subsistence	0.52	(-0.42, 1.45)	0.75	(0.04, 1.46)	1.51	(0.77, 2.25)
Drug	1.61	(0.86, 2.37)	1.04	(0.35, 1.74)	0.63	(-0.36, 1.63)
Intervention x Profile[e]						
HF x Moderate	-1.54	(-2.40, -0.68)	0.36	(-0.35, 1.07)	-0.32	(-1.10, 0.47)
HF x Antisocial	-0.63	(-1.59, 0.33)	-0.23	(-1.22, 0.76)	0.36	(-0.66, 1.38)
HF x Versatile Subsistence	0.53	(-0.61, 1.66)	0.82	(-0.08, 1.72)	0.86	(-0.08, 1.80)
HF x Drug	-2.18	(-3.64, -0.72)	0.21	(-0.82, 1.23)	-0.27	(-1.62, 1.09)

Note. HF: Housing First. TAU: Treatment as usual. CI: Confidence Intervals. Reference levels: [a] Montreal, [b] Moderate-needs, [c] Treatment as usual, [d] Non/Infrequent Offenders, [e] HF x Non/Infrequent Offenders.

eTable 2

Results from generalized linear models for number of three types of criminal charges two years post-baseline, using complete case analysis (N = 1,318)

	Violent charges		Subsistence-related charges		Charges related to the administration of justice	
Covariates	β	95% CI	β	95% CI	β	95% CI
Constant term	-2.63	(-3.03, -2.23)	-1.61	(-1.93, -1.29)	-2.90	(-3.32, -2.48)
Site[a]						
Toronto	0.24	(-0.10, 0.58)	-0.33	(-0.63, -0.03)	0.44	(0.07, 0.81)
Vancouver	-0.12	(-0.53, 0.29)	-0.42	(-0.77, -0.07)	0.43	(0.03, 0.82)
Need level: High-needs[b]	0.02	(-0.28, 0.33)	0.03	(-0.24, 0.30)	0.73	(0.44, 1.02)
Number of charges two years pre-baseline	0.82	(0.65, 0.98)	0.59	(0.49, 0.69)	0.51	(0.37, 0.65)
Intervention: HF[c]	0.40	(0.01, 0.79)	-0.29	(-0.63, 0.05)	0.09	(-0.30, 0.48)
Profile[d]						
Moderate	1.44	(0.91, 1.98)	0.46	(-0.06, 0.99)	0.98	(0.44, 1.52)
Antisocial	0.90	(0.17, 1.63)	0.77	(0.10, 1.45)	0.66	(-0.12, 1.45)
Subsistence	0.26	(-0.69, 1.21)	0.50	(-0.19, 1.19)	1.14	(0.42, 1.85)
Drug	1.50	(0.75, 2.26)	0.98	(0.29, 1.67)	0.40	(-0.56, 1.37)
Intervention x Profile[e]						
HF x Moderate	-1.50	(-2.36, -0.64)	0.39	(-0.32, 1.09)	-0.27	(-1.04, 0.49)
HF x Antisocial	-0.39	(-1.37, 0.58)	-0.24	(-1.27, 0.78)	0.37	(-0.64, 1.38)
HF x Versatile Subsistence	0.55	(-0.60, 1.70)	0.78	(-0.10, 1.67)	0.57	(-0.35, 1.50)
HF x Drug	-2.13	(-3.59, -0.67)	0.14	(-0.87, 1.16)	-0.36	(-1.69, 0.96)

Note. HF: Housing First. TAU: Treatment as usual. CI: Confidence Intervals. Reference levels: [a] Montreal, [b] Moderate-needs, [c] Treatment as usual, [d] Non/Infrequent Offenders, [e] HF x Non/Infrequent Offenders.

Chapter 6 Manuscript 2: Impact of criminal justice involvement on the effectiveness and the cost-effectiveness of Housing First for homeless individuals with mental illness

6.1 Preface to Manuscript 2

Because criminal justice involvement is associated with residential stability and costs, especially justice costs, the effectiveness and the cost-effectiveness of Housing First may differ according to criminal justice involvement profiles. Ending homelessness requires that the needs of subgroups of clients are adequately addressed. Understanding how and for whom Housing First is effective and cost-effective will shed light on potential adaptations. To answer this question, I used data from the multisite randomized controlled trial At Home/*Chez Soi* to assess the association of criminal justice involvement profiles with residential stability and costs overall, and to examine whether the effectiveness and cost-effectiveness of Housing First compared to usual services differ according to these profiles.

Impact of criminal justice involvement on the effectiveness and the cost-effectiveness of Housing First for homeless individuals with mental illness

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Abstract

Background. The criminal justice involvement of homeless people with mental illness engenders costs on average between CAD$7,000 to CAD$15,000 in various Canadian cities and is strongly associated with longer duration of homelessness. Because criminal justice involvement has an impact on residential stability and on costs, criminal justice involvement profiles may have an impact on the effectiveness and the cost-effectiveness of the intervention. Objectives. This paper seeks to (1) assess the association of pre-identified criminal justice involvement profiles with residential stability and costs, and (2) examine whether the effectiveness and cost-effectiveness of Housing First compared to treatment as usual vary according to these profiles. Methods. This study examined a subsample of participants recruited for the multi-site Canadian At Home/*Chez Soi* randomized controlled trial. Participants were followed-up over two years, and multiple imputation was used to account for missing data. Results. On average, controlling for group assignment and other variables, Antisocial Offenders spent 48 fewer nights annually (95% CI: -72.1, -23.0) in stable housing than Non/Infrequent Offenders. Versatile Subsistence and Moderate Offenders engendered greater costs (1.33 [95% CI: 1.11, 1.59] and 1.21 [95% CI: 1.07, 1.36] times, respectively). However, the effectiveness and cost-effectiveness of the intervention did not differ by profile. Conclusions**.** Homeless individuals with mental illness with more extensive criminal justice involvement experience greater residential instability and engender greater costs. However, people belonging to any of the profiles are likely to benefit from Housing First. There is thus no grounds generally for using criminal history as exclusion factor to access Housing First programs.

Impact of criminal justice involvement on the effectiveness and the cost-effectiveness of Housing First for homeless individuals with mental illness

Every year in Canada, about 235,000 individuals experience homelessness (Gaetz et al., 2016). A substantial proportion of this population, especially individuals with mental illness, come into contact with the criminal justice system (Roy, Crocker, Nicholls, Latimer, & Ayllon, 2014). This criminal justice involvement (CJI) engenders costs between CAD$7,000 to CAD$15,000 in various Canadian cities (Latimer et al., 2017) and is a strong predictor of a longer duration of homelessness (Caton, Dominguez, Schanzer, Hasin, Shrout, Felix, McQuistion, Opler, & Hsu, 2005; McGuire & Rosenheck, 2004) and poorer reemployment outcomes (Frounfelker et al., 2010; Poremski et al., 2014).

Research has shown that Housing First is an effective (Beaudoin, 2016; Woodhall-Melnik & Dunn, 2016) and likely cost-effective (Ly & Latimer, 2015) intervention to help people who are homeless and have mental illness regain stable housing (Aubry et al., 2016; Stergiopoulos et al., 2015). Housing First provides immediate access to subsidized housing in addition to support services and comes with no strings attached in terms of mental health and substance use treatment (Tsemberis, 2010).

Because criminal justice involvement is associated with residential instability (Caton, Dominguez, Schanzer, Hasin, Shrout, Felix, McQuistion, Opler, Hsu, et al., 2005; McGuire & Rosenheck, 2004) and costs (e.g., costs for court appearances, police contacts, incarceration), criminal justice involvement profiles (CJI profiles) may have an impact on the effectiveness and the cost-effectiveness of the intervention. For example, McGuire & Rosenheck (2004) found that a more extensive incarceration history was associated with higher residential care costs, total health costs, and criminal justice costs. In a prior paper (see Appendix B), we empirically identified five CJI profiles among homeless people with mental illness. Using lifetime (up to study enrollment) violent, nuisance (e.g., vandalism, disturb the peace), substance-related, subsistence (e.g., acquisitive property crime, prostitution), and administration of justice (e.g., breach of probation) as indicator variables in a latent class analysis, we

identified five classes. “Non/Infrequent Offenders” have very few charges in all categories and show less complex psychosocial histories in terms of education, prior employment, and lifetime duration of homelessness. They also have higher impulse control than other profiles and have very low proportions of individuals with substance use or alcohol use disorder. This profile includes a forensic subgroup, with very few violent offences, some for which they were found Not Criminally Responsible on Account of Mental Disorder. “Moderate Offenders” have higher means in all offence types than Non/Infrequent Offenders, but they are not characterized by a single type of offence. They are the profile with the longest lifetime homelessness. “Antisocial Offenders” and “Versatile Subsistence Offenders” are characterized by high means for violent and nuisance offences and for subsistence-related offences, respectively. They both have complex psychosocial histories. “Drug Offenders” have the highest mean of substance-related offences, and have the largest proportion of individuals with a substance use disorder (see Appendix A).

Ending homelessness requires that the needs of subgroups of clients are adequately addressed. Understanding how and for whom Housing First is effective and cost-effective could help shed light on potential adjustments to the model.

Objectives

The objectives of this study are the following: First, assess the association of CJI profiles with (1) residential stability and (2) costs. Second, examine whether the effectiveness (in terms of residential stability), the costs, and the cost-effectiveness (from the societal perspective) of Housing First compared to treatment as usual differ according to these profiles. We hypothesized that CJI profiles would be associated with differential residential stability and costs, with more extensive involvement being associated with lower residential stability and higher costs, but that profiles would benefit similarly from the intervention.

Methods

Study Design

This study draws from the Canadian At Home/*Chez Soi* study, a multi-site randomized controlled trial evaluating the effectiveness of Housing First among homeless individuals with mental illness (Goering et al., 2011). We used data from the four sites for which CJI profiles were available: Toronto (n = 514), Montreal (n = 464), Vancouver (n = 338), and Moncton (n = 186), for a total of 1,502 participants (92%). Participants who had not given their consent to administrative justice data collection, who were assigned to congregate-site Housing First instead of scattered-site or whose missing data was extensive (i.e., when the only datapoint available was the baseline) were not included in the analyses.

We conducted multiple imputation with chained equations ('mi impute chained' command in STATA V.15) to account for missing data due to participant withdrawal, loss to follow-up or refusal to answer a specific item. Missing data for people who died were imputed up to the point of their death. Twenty imputed data sets were created from the following variables: outcome variable collected at all sites, study site, age at time of enrolment, gender, ethnicity, and Indigenous status.

The design of the study has been described in detail elsewhere (Goering et al., 2011). Briefly, between 2009 and 2011, participants who were legal adults, were absolutely homeless or precariously housed with recent episodes of absolute homelessness, and had a mental disorder were recruited and classified as high need or moderate need before being assigned to either Housing First or treatment as usual. Eligible mental disorders, with or without substance use disorder, were the following: major depressive episode, panic disorder, manic or hypomanic episode, post-traumatic stress disorder, mood disorder with psychotic features, and psychotic disorder, as determined by DSM-IV criteria on the Mini International Neuropsychiatric Interview (Sheehan et al., 1997). Participants were classified as high need if they met the following criteria: (1) they scored below 62 on the Multnomah Community Ability Scale (Barker et al., 1994), (2) they had a bipolar disorder or a psychotic disorder, and (3) they were

hospitalized for psychiatric reasons in the prior five years, they had a substance use disorder, or they were in contact with the criminal justice system (arrest or incarceration) in the prior six months.

Participants assigned to the intervention were provided scattered-site housing with off-site support in the form of intensive case management for moderate need participants or Assertive Community Treatment for high need participants. They contributed up to 30% of their monthly income to pay for their rent, and the rest was paid through the program in the form of a monthly rent supplement. Participants allocated to treatment as usual had access to the existing services in their respective city.

Ethics

All participants provided written informed consent and the local research ethics board approved the study protocol at all participating institutions from the four included sites. In addition, ethics approval was obtained from the university-affiliated teaching hospital where the coordinating center is located (Goering et al., 2011). The trial was registered with the International Standard Randomized Control Trial Number Register (ISRCTN42520374).

Outcomes

Data collection occurred through in person interviews at baseline, and then every six months for a period of 24 months. In addition, every three months, the interviewers contacted the participants by phone to collect data regarding their recent housing history. Pre-baseline outcomes were thus measured at a single point in time and are thus less precise than post-baseline outcomes, which were measured at repeated intervals.

The number of days stably housed was ascertained using the Residential Timeline Follow-Back (RTLFB) questionnaire (Tsemberis et al., 2007). The RTLFB was used to reconstruct the timeline of places the participant had spent nights over the previous 3 months. Stable housing was defined as living in one's own room, apartment or house, or with one's family, and expecting to remain in this residence for

at least six months, or having tenancy rights. Days incarcerated were considered unstable housing. We annualized the number of days stably housed over the two years follow-up. We also estimated the annual number of days stably housed pre-baseline from the data on the three months pre-baseline. The Vocational Time-Line Follow-Back questionnaire (VTLFB) (Latimer et al., 2006) was administered simultaneously to the RTLFB questionnaire. The VTLFB asked about formal and informal income, as well as regular and casual work.

Service use was assessed using the Health, social, and justice service use (HSJSU) questionnaire and the RTLFB questionnaire. The HSJSU was developed specifically for the At Home/*Chez Soi* study to collect self-reported information about criminal justice contacts and health and social services contacts.

Economic analyses were carried out from a societal point of view. We used unit costs previously established for the At Home/*Chez Soi* study (Stergiopoulos et al., 2015) and described elsewhere (Latimer et al., 2017) and calculated the total costs for each participant according to the service used. All costs were expressed in 2016 Canadian dollars. We applied a discount rate of 3% for the main analyses and discount rates of 0% and 5% for sensitivity analyses.

Statistical Analysis

To assess the association of Housing First and CJI profile with number of days stably housed and total costs (including costs of the intervention) for the whole study period (two-year post-baseline), we estimated generalized linear models ('mi estimate: glm' command in STATA V.15). We applied the net benefit regression framework (Hoch, Briggs, & Willan, 2002) to explore whether the cost-effectiveness of the Housing First intervention compared to treatment as usual differed by profile, using days stably housed as the measure of effectiveness. We used the net benefit framework, in order to evaluate the impact of covariates on the cost-effectiveness of the intervention. Different values of society's willingness to pay (λ) are used in successive regressions. In this context, λ represents the society's willingness to pay for each additional day in stable housing. Net monetary benefit was calculated by

multiplying λ by the effect measure (annualized days stably housed over the two-year follow-up) and subtracting the annualized costs (including the intervention, over two-year follow-up), using λ values of $0, $20, $40, $60, $80, and $100. A net monetary benefit value larger than 0 signifies that the benefit outweighs the costs for this λ value.

For all outcomes, we tested main effects of CJI profile, intervention, need level, and study site, with and without the two-way interaction CJI profile x intervention. We also used regressions stratified by CJI profile to estimate the impact of Housing First on days stably housed for each profile. We compared Gaussian distribution with an identity link function and a gamma distribution with a log link function using the Akaike information criterion (Barber & Thompson, 2004; Pregibon, 1980). This led to the choice of a Gaussian distribution with an identity link function for days stably housed and net benefit, and gamma distribution with a log link function for total costs.

We carried out analyses based on intent-to-treat. As sensitivity analyses, we adjusted for baseline days in stable housing and costs. We also varied the discount rate, using discount rates of 0% and 5%. Results from the adjustment for baseline differences are presented in the text, along with the main analyses, as well as in the tables for days in stable housing and total costs. Coefficients from net benefit regression models are available in the online supplement along with those from the models using discount rates of 0% and 5% (see Online supplement).

Results

Table 1 shows the unadjusted mean annualized total costs as well as the mean annualized ambulatory visits costs, psychiatric hospitalizations costs, and justice-related costs (police and court appearances costs and incarceration costs) by CJI profile and intervention assignment. The annualized net cost of the Housing First intervention was similar for all CJI profiles: about $9,730 (95% CI: 9,050 to 10,410) for Non/Infrequent Offenders; $9,770 (95% CI: 7,630 to 11,920) for Moderate Offenders; $9050

(95% CI: 6,570 to 11,530) for Antisocial Offenders; $10,430 (95% CI: 6,890 to 13,980) for Versatile Subsistence Offenders; and $9,170 (95% CI: 6,560 to 11,780) for Drug Offenders.

Association of CJI Profiles with Days Stably Housed and Total Costs

Results from models without an interaction term show that CJI profile is associated with days stably housed (see Table 2) and total costs overall (see Table 3). On average, over the two-year follow-up, Antisocial Offenders spent 48 fewer days in stable housing annually than Non/Infrequent Offenders, holding all other predictors fixed. Moderate and Versatile Subsistence Offenders engendered greater costs than Non/Infrequent Offenders. Drug Offenders were similar to Non/Infrequent offenders both in terms of residential stability and costs. Results were robust to the adjustment for baseline differences (see Table 2) and to the use of discount rates of 0% and 5% (see online supplement).

Effectiveness and Cost-Effectiveness by CJI Profile

The models with the two-way interaction presented in Table 2 and Table 3 show that there is no evidence of heterogeneity of the impact of Housing First on days in stable housing and total costs, with or without adjustment for baseline differences, according to CJI profile. Stratified regressions, adjusting for baseline differences, by CJI profiles show that Housing First was associated with an increase in days stably housed compared to treatment as usual for all profiles: about 166 days (95% CI: 154, 179) for Non/Infrequent Offenders; 133 days (95% CI: 100, 166) for Moderate Offenders; 142 days (95% CI: 91, 192) for Antisocial Offenders; 154 days (95% CI: 106, 201) for Versatile Subsistence Offenders; and 203 days (95% CI: 155, 251) for Drug Offenders.

Net benefit regressions, at λ = $0, $20, $40, $60, $80, and $100, with a two-way interaction involving CJI profile and intervention assignment were conducted (see Table 4). The cost-effectiveness did not differ by CJI profile. This finding was robust to adjusting for baseline differences and to using discount rates of 0% and 5% (see online supplement).

Table 1

Unadjusted mean annualized total costs and main cost elements per participant over the two years follow-up per criminal justice involvement profile and intervention, with 95% confidence intervals

Profile	Ambulatory visits	Psychiatric hospital stays	Justice-related services		Total
			Police and court appearances	Incarceration	
Non/Infrequent (n = 1,137)	5,419 (4,899 – 5,938)	7,835 (6,229 – 9,440)	5,265 (4,593 – 5,937)	969 (710 – 1,228)	48,691 (46,550 – 50,832)
TAU	7,437 (6,406 – 8,468)	7,928 (5,333 – 10,523)	5,804 (4,718 – 6,890)	1,027 (640 – 1,413)	45,328 (41,875 – 48,781)
HF	3,795 (3,399 – 4,190)	7,759 (5,744 – 9,774)	4,831 (3,995 – 5,668)	923 (567 – 1,278)	51,397 (48,776 – 54,019)
Moderate (n = 163)	7,271 (5,654 – 8,889)	6,297 (2,718 – 9,875)	12,152 (9,015 – 15,289)	6,544 (4,139 – 8,949)	60,776 (54,756 – 66,796)
TAU	9,192 (6,243 – 12,141)	5,096 (1,195 – 8,997)	14,266 (8,541 – 19,991)	6,984 (3,145 – 10,823)	56,235 (47,847 – 64,622)
HF	5,552 (4,079 – 7,024)	7,372 (1,550 – 13,193)	10,259 (7,245 – 13,274)	6,151 (3,125 – 9,176)	64,843 (56,374 – 73,311)
Antisocial (n = 77)	5,741 (3,647 – 7,836)	8,801 (1,975 – 15,627)	13,542 (7,928 – 19,156)	6,029 (2,922 – 9,136)	64,288 (53,045 – 75,531)
TAU	8,602 (4,115 – 12,890)	16,009 (901 – 31,117)	17,346 (6,803 – 27,890)	6,001 (1,121 – 10,881)	70,547 (48,189 – 92,905)
HF	3,778 (2,109 – 5,447)	3,675 (-370 – 7,721)	10,836 (4,914 – 16,759)	6,049 (2,022 – 10,075)	59,837 (48,998 – 70,677)
Versatile Subsistence (n = 69)	8,602 (3,770 – 13,434)	6,106 (-1,687 – 13,898)	12,773 (8,818 – 16,728)	10,174 (5,902 – 14,447)	69,346 (56,923 – 81,768)
TAU	12,625 (2,909 – 22,340)	12,090 (-3,759 – 27,939)	11,131 (5,668 – 16,595)	11,384 (4,395 – 18,374)	71,388 (47,804 – 94,972)
HF	4,914 (2,807 – 7,022)	620 (-2,367 – 3,607)	14,278 (8,538 – 20,017)	9,065 (3,888 – 14,242)	67,474 (56,940 – 78,007)
Drug (n = 56)	4,812 (3,106 – 6,518)	2,677 (-7 – 5,361)	14,780 (7,936 – 21,624)	5,175 (663 – 9,687)	56,048 (45,597 – 66,499)
TAU	5,625 (2,493 – 8,757)	1,787 (-2,539 – 6,113)	9,967 (4,754 – 15,181)	9,217 (-249 – 18,683)	49,197 (35,640 – 62,754)

HF	4,108 (2,461 – 5,755)	3,449 (85 – 6,813)	18,951 (7,057 – 30,846)	1,671 (366 – 2,977)	61,985 (46,625 – 77,346)

Note. Only the three main cost elements are detailed, which is why they do not add up to the total. HF: Housing First. TAU: Treatment as usual.

Table 2

Results from generalized linear models for annualized number of days in stable housing over two years post-baseline (N = 1,502)

	Without adjustment for baseline differences				**With adjustment for baseline differences**			
	Without interaction		With two-way interaction (Intervention x Profile)		Without interaction		With two-way interaction (Intervention x Profile)	
Covariates	β	95% CI	β	95% CI	β	95% CI	β	95% CI
Constant term	163.1	(146.5, 179.8)	160.0	(143.0, 177.0)	154.4	(137.1, 171.6)	151.5	(133.9, 169.1)
Site[a]								
Montreal	-43.1	(-60.7, -25.5)	-42.8	(-60.4, -25.2)	-39.0	(-56.8, -21.2)	-38.8	(-56.5, -21.0)
Toronto	-24.9	(-42.4, -7.5)	-24.5	(-41.9, -7.0)	-20.1	(-37.9, -2.3)	-19.8	(-37.5, -2.0)
Vancouver	-51.9	(-70.7, -33.1)	-51.5	(-70.3, -32.7)	-47.9	(-67.1, -28.8)	-47.6	(-66.8, -28.5)
Need level: High-need[b]	-25.8	(-36.7, -14.8)	-25.6	(-36.6, -14.7)	-24.7	(-35.7, -13.8)	-24.7	(-35.6, -13.7)
Profile[c]								
Moderate	-19.1	(-36.1, -2.0)	0.6	(-24.3, 25.4)	-19.5	(-36.5, -2.5)	-0.7	(-25.4, 23.9)
Antisocial	-47.5	(-72.1, -23.0)	-29.6	(-67.3, 8.1)	-46.4	(-70.8, -22.0)	-30.1	(-67.4, 7.3)
Versatile Subsistence	-31.7	(-57.0, -6.3)	-24.8	(-61.8, 12.2)	-29.5	(-54.7, -4.3)	-21.3	(-58.1, 15.6)
Drug	-11.5	(-39.1, 16.2)	-29.0	(-69.6, 11.6)	-9.5	(-37.1, 18.1)	-25.8	(-66.4, 14.9)
Intervention: HF[d]	161.7	(151.1, 172.4)	166.7	(154.4, 179.0)	161.8	(151.3, 172.4)	166.7	(154.5, 179.0)
Intervention x Profile[e]								
HF x Moderate			-37.0	(-70.8, -3.3)			-35.3	(-68.8, -1.8)
HF x Antisocial			-31.0	(-79.9, 17.9)			-28.4	(-76.9, 20.2)
HF x Versatile Subsistence			-13.0	(-63.3, 37.3)			-15.7	(-65.8, 34.4)
HF x Drug			32.8	(-22.6, 88.2)			30.3	(-24.9, 85.5)

Note. HF: Housing First. CI: Confidence Intervals. Reference levels: [a] Moncton, [b] Moderate-need, [c] Non/Infrequent Offenders, [d] Treatment as usual, [e] HF x Non/Infrequent Offenders.

Table 3

Results from generalized linear models for annualized total costs over two years post-baseline (N = 1,502)

	Without adjustment for baseline differences				**With adjustment for baseline differences**			
	Without interaction		With two-way interaction (Intervention x Profile)		Without interaction		With two-way interaction (Intervention x Profile)	
Covariates	β	95% CI	β	95% CI	β	95% CI	β	95% CI
Constant term	10.91	(10.79, 11.03)	10.89	(10.77, 11.01)	10.82	(10.70, 10.94)	10.81	(10.69, 10.93)
Site[a]								
Montreal	0.38	(0.26, 0.50)	0.38	(0.26, 0.50)	0.35	(0.24, 0.47)	0.35	(0.24, 0.47)
Toronto	0.43	(0.31, 0.55)	0.43	(0.31, 0.55)	0.33	(0.21, 0.45)	0.34	(0.22, 0.45)
Vancouver	0.34	(0.21, 0.47)	0.34	(0.21, 0.47)	0.29	(0.16, 0.42)	0.29	(0.16, 0.42)
Need level: High-need[b]	0.36	(0.29, 0.44)	0.36	(0.29, 0.44)	0.27	(0.20, 0.35)	0.28	(0.20, 0.35)
Profile[c]								
Moderate	0.19	(0.07, 0.30)	0.21	(0.04, 0.38)	0.19	(0.08, 0.30)	0.21	(0.05, 0.37)
Antisocial	0.20	(0.04, 0.37)	0.37	(0.11, 0.62)	0.19	(0.03, 0.35)	0.31	(0.07, 0.55)
Versatile Subsistence	0.29	(0.11, 0.47)	0.37	(0.11, 0.63)	0.28	(0.11, 0.45)	0.31	(0.06, 0.57)
Drug	0.12	(-0.08, 0.31)	0.13	(-0.15, 0.41)	0.13	(-0.05, 0.31)	0.15	(-0.12, 0.42)
Intervention: HF[d]	0.16	(0.08, 0.23)	0.18	(0.10, 0.27)	0.17	(0.10, 0.24)	0.19	(0.11, 0.27)
Intervention x Profile[e]								
HF x Moderate			-0.04	(-0.27, 0.19)			-0.04	(-0.26, 0.18)
HF x Antisocial			-0.30	(-0.63, 0.03)			-0.22	(-0.54, 0.10)
HF x Versatile Subsistence			-0.16	(-0.52, 0.19)			-0.06	(-0.40, 0.28)
HF x Drug			-0.03	(-0.41, 0.35)			-0.04	(-0.41, 0.32)

Note. HF: Housing First. CI: Confidence Intervals. Reference levels: [a] Moncton, [b] Moderate-need, [c] Non/Infrequent Offenders, [d] Treatment as usual, [e] HF x Non/Infrequent Offenders.

Table 4

Net benefit regression estimates with interaction for different willingness to pay (λ) values with 95% confidence intervals (N = 1,502)

	λ = $0	λ = $20	λ = $40	λ = $60	λ = $80	λ = $100
Constant	-22,386 (-28,368, -16,404)	-19,186 (-25,263, -13,109)	-15,986 (-22,175, -9,796)	-12,786 (-19,104, -6,467)	-9,585 (-16,048, -3,123)	-6,385 (-13,006, 0,236)
Site[a]						
Montreal	-17,026 (-23,220, -10,831)	-17,882 (-24,172, -11,592)	-18,738 (-25,141, -12,335)	-19,594 (-26,128, -13,060)	-20,450 (-27,130, -13,770)	-21,306 (-28,148, -14,465)
Toronto	-20,057 (-26,215, -13,899)	-20,547 (-26,799, -14,294)	-21,036 (-27,401, -14,672)	-21,526 (-28,019, -15,033)	-22,016 (-28,654, -15,378)	-22,506 (-29,303, -15,708)
Vancouver	-13,999 (-20,636, -7,363)	-15,030 (-21,762, -8,298)	-16,061 (-22,907, -9,214)	-17,091 (-24,070, -10,112)	-18,122 (-25,251, -10,993)	-19,152 (-26,448, -11,857)
Need level: High-need[b]	-19,986 (-24,032, -15,940)	-20,499 (-24,608, -16,390)	-21,012 (-25,194, -16,830)	-21,525 (-25,791, -17,260)	-22,038 (-26,396, -17,680)	-22,551 (-27,011, -18,091)
Profile[c]						
Moderate	-8,886 (-17,773, 0,002)	-8,874 (-17,894, 146)	-8,862 (-18,040, 316)	-8,850 (-18,209, 509)	-8,838 (-18,401, 725)	-8,826 (-18,615, 0,962)
Antisocial	-23,172 (-36,405, -9,940)	-23,765 (-37,218, -10,311)	-24,357 (-38,070, -10,645)	-24,949 (-38,957, -10,942)	-25,542 (-39,878, -11,206)	-26,134 (-40,830, -11,438)
Versatile Subsistence	-22,857 (-36,225, -9,489)	-23,354 (-36,907, -9,800)	-23,850 (-37,626, -10,073)	-24,346 (-38,381, -10,311)	-24,842 (-39,169, -10,515)	-25,338 (-39,989, -10,687)
Drug	-3,637 (-18,217, 10,943)	-4,217 (-19,023, 10,589)	-4,797 (-19,870, 10,276)	-5,377 (-20,755, 10,001)	-5,957 (-21,677, 9,762)	-6,537 (-22,632, 9,557)
Intervention: HF[d]	-7,563 (-11,866, -3,260)	-4,228 (-8,600, 143)	-894 (-5,347, 3,559)	2,441 (-2,106, 6,987)	5,775 (1,124, 10,426)	9,109 (4,344, 13,875)
Intervention x Profile[e]						
HF x Moderate	-1,001 (-13,025, 11,023)	-1,741 (-13,942, 10,459)	-2,482 (-14,893, 9,929)	-3,223 (-15,876, 9,431)	-3,963 (-16,890, 8,964)	-4,704 (-17,933, 8,526)
HF x Antisocial	19,174 (1,845, 36,503)	18,555 (953, 36,156)	17,936 (13, 35,859)	17,317 (-974, 35,608)	16,697 (-2,006, 35,400)	16,078 (-3,078, 35,234)

HF x Versatile	8,970	8,710	8,450	8,191	7,931	7,671
Subsistence	(-9,396, 27,335)	(-9,933, 27,353)	(-10,520, 27,421)	(-11,154, 27,535)	(-11,832, 27,694)	(-12,551, 27,894)
HF x Drug	-4,576	-3,919	-3,262	-2,606	-1,949	-1,292
	(-24,219, 15,067)	(-23,850, 16,012)	(-23,538, 17,014)	(-23,280, 18,069)	(-23,072, 19,174)	(-22,912, 20,328)

Note. A net monetary benefit value larger than 0 signifies that the benefit outweighs the costs for this λ value. Coefficients adjusted for the baseline differences are available in the online supplement. HF: Housing First. Reference levels: [a] Moncton, [b] Moderate-need, [c] Non/Infrequent Offenders, [d] Treatment as usual, [e] HF x Non/Infrequent Offenders.

Discussion

Appraisal of Findings

The first objective of this paper was to measure the association of CJI profiles with residential stability and total costs in a large sample of homeless individuals with mental illness from four Canadian cities. As expected, we found that residential stability and total costs differ by CJI profile. More specifically, we found that, overall, Antisocial Offenders spent fewer nights in stable housing over the 24 months of the study period than Non/Infrequent Offenders. The finding that individuals belonging to one of the two profiles with the most extensive criminal justice involvement history were more susceptible to residential instability is consistent with the literature (McGuire & Rosenheck, 2004). They may be more likely to spend time incarcerated and thus not in stable housing. This may also indicate that this profile has more complex needs regarding maintaining housing (see Appendix A). Furthermore, we found that Moderate Offenders and Versatile Subsistence Offenders engender greater costs than Non/Infrequent Offenders. Unadjusted means of main cost elements suggest that these differences emerge mainly in the justice costs, more specifically police contacts and court appearances, as well as incarceration. Prior analyses of data from the treatment as usual participants had found that the presence of an arrest in the six months before study entry was not a significant predictor of total costs at alpha = 0.01 (Latimer et al., 2017). This implies that patterns of extensive criminal justice involvement, such as in the case of Versatile Subsistence Offenders, may be more relevant than the mere presence of criminal justice involvement when evaluating the impact on total costs.

Notably, Drug Offenders did not differ from Non/Infrequent Offenders, both in terms of days stably housed and total costs. Unadjusted means of justice costs show that although Drug Offenders engender greater costs in terms of police contacts and court appearances (they engender similar costs to Subsistence, Antisocial, and Moderate Offenders), they do not engender significantly greater incarceration costs.

The second objective of this study was to examine whether the impact of Housing First on residential stability, total costs, and net benefit differed by CJI profile. Despite differences in residential stability and costs, CJI profiles did not generally impact the effectiveness or the cost-effectiveness of the intervention. All profiles benefited from the intervention to a similar extent. These conclusions are in line with those of prior studies (Malone, 2009; Tsai & Rosenheck, 2013). The results from the At Home/*Chez Soi* study show that selective admission in to Housing First programs based on profile of prior criminal justice involvement is unwarranted. CJI profiles do not impact the success or the monetary benefit of Housing First.

Implications for Organizations of Services and Research

One of the most important findings of this paper is that Antisocial Offenders experience more residential instability than people with non or infrequent offending. The reason behind this association remains unclear, but several hypotheses can be put forward. The first is that they are simply more likely to commit crimes, such as violent offences, that result in incarceration. Unavoidably, there is an inverse relationship between the number of days spent in jail and the number of days spent in stable housing. If there were no other barriers to accessing and/or maintaining housing, we would expect that a reduction in recidivism would result in an increase in days stably housed. The second hypothesis is that the association is confounded by other factors, such as complex psychosocial history (in terms of education, prior employment, for example) and substance or alcohol use disorder. If this is true, we would expect the association to disappear when adjusting for these factors. However, prior analyses of the At Home/*Chez Soi* found that substance use disorder had no impact on the effectiveness of Housing First, but that it reduces residential stability in both arms (Urbanoski et al., 2018). Also, Drug Offenders did not experience lesser residential stability than Non/Infrequent Offenders, which we would expect if this hypothesis was true. Finally, there may be systemic barriers that prevent them from access to housing and maintaining housing, such as stigma and systematic background checks (Ispa-Landa & Loeffler,

2016; Thacher, 2008). Future research should explore the reasons for this association, so that we may better respond to their needs.

Strengths and Limitations

This paper uses the data collected as part of a randomized controlled trial in multiple Canadian cities to test the impact of empirically-defined CJI profiles on residential stability and on total costs, as well as on the effectiveness and cost-effectiveness of Housing First.

This study nevertheless has several limitations. First, findings may be specific to Canada and potential differences in population composition (the mentally ill homeless population comprises a large proportion of veterans in the United States but not in Canada, for example) and in access to services (universal health care, for example) may hinder generalizability to other jurisdictions. Second, because we established the CJI profiles a posteriori and did not account for these profiles during randomization, baseline differences were introduced between the intervention arm and the treatment as usual arm within Versatile Subsistence Offenders, with significant (at alpha = 0.05) higher baseline costs in the treatment as usual arm. However, we did conduct sensitivity analyses to control for baseline days stably housed and costs and findings were robust. Third, even though measures were put in place to limit recall error (Goering et al., 2011), all outcome measures were based on self-report. However, evidence from the At Home/*Chez Soi* trial suggests that self-report data is reliable (Aubry et al., 2016; Lemieux, Roy, Martin, Latimer, & Crocker, 2017; Somers et al., 2016; Stergiopoulos et al., 2015). Fourth, given that administrative justice data (from which we empirically identified criminal justice involvement) were not available for the Winnipeg site, which included a greater proportion of Indigenous people than any other site, it is unclear to what extent our findings are applicable to Indigenous people. Indigenous service users, because of systemic discrimination and White ethnocentrism, have specific experiences with both the criminal justice system (Roy et al., 2016) and residential instability (Patrick, 2014). The results of the analyses carried out in this paper might have been different had been done on a sample of

Indigenous people. Finally, incarceration and even court appearances may have taken place as a result of offences that took place before study enrollment, and both are major components of justice costs. This, along with the limited follow-up duration, may explain why there was no effect on costs.

Conclusions

Homeless individuals with mental illness who belong to the Antisocial Offenders profile experience greater residential instability, whereas those who belong to the Moderate Offenders and the Versatile Subsistence Offenders profiles, engender greater costs than Non/Infrequent Offenders. However the effectiveness or the cost-effectiveness of Housing First compared to treatment as usual do not differ according to CJI profiles. In fact, all profiles are likely to benefit from Housing First. There is no ground for selective admission into Housing First programs based on criminal history. More research should be conducted to identify strategies that could increase the residential stability of homeless individuals who belong to the Antisocial Offenders profile.

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Appendix/Online Supplement: Sensitivity analyses for the second manuscript

eTable 1

Results from generalized linear models for annualized total costs over two years post-baseline, using discount rates of 0% and 5% (N = 1,502)

	Discount rate of 0%				Discount rate of 5%			
	Without interaction		With two-way interaction (Intervention x Profile)		Without interaction		With two-way interaction (Intervention x Profile)	
Covariates	β	95% CI	β	95% CI	β	95% CI	β	95% CI
Constant term	10.23	(10.11, 10.35)	10.22	(10.09, 10.34)	10.21	(10.09, 10.33)	10.19	(10.07, 10.31)
Site[a]								
Montreal	0.38	(0.25, 0.50)	0.38	(0.25, 0.50)	0.38	(0.25, 0.50)	0.38	(0.25, 0.50)
Toronto	0.43	(0.30, 0.55)	0.43	(0.31, 0.55)	0.43	(0.31, 0.55)	0.43	(0.31, 0.55)
Vancouver	0.34	(0.21, 0.47)	0.34	(0.21, 0.47)	0.34	(0.21, 0.47)	0.34	(0.21, 0.47)
Need level: High-need[b]	0.36	(0.28, 0.44)	0.36	(0.28, 0.44)	0.36	(0.28, 0.44)	0.36	(0.28, 0.44)
Profile[c]								
Moderate	0.19	(0.07, 0.31)	0.21	(0.04, 0.38)	0.19	(0.07, 0.30)	0.21	(0.04, 0.38)
Antisocial	0.20	(0.04, 0.37)	0.37	(0.12, 0.63)	0.20	(0.04, 0.37)	0.38	(0.12, 0.63)
Subsistence	0.29	(0.10, 0.47)	0.37	(0.09, 0.65)	0.29	(0.10, 0.47)	0.37	(0.09, 0.65)
Drug	0.12	(-0.07, 0.31)	0.14	(-0.15, 0.42)	0.12	(-0.07, 0.31)	0.14	(-0.15, 0.42)
Intervention: HF[d]	0.15	(0.08, 0.23)	0.18	(0.10, 0.27)	0.15	(0.08, 0.23)	0.18	(0.10, 0.27)
Intervention x Profile[e]								
HF x Moderate			-0.03	(-0.27, 0.20)			-0.04	(-0.27, 0.19)
HF x Antisocial			-0.31	(-0.64, 0.02)			-0.32	(-0.65, 0.02)
HF x Versatile Subsistence			-0.17	(-0.54, 0.19)			-0.17	(-0.54, 0.19)
HF x Drug			-0.03	(-0.42, 0.35)			-0.03	(-0.42, 0.35)

Note. HF: Housing First. CI: Confidence Intervals. Reference levels: [a] Moncton, [b] Moderate-need, [c] Non/Infrequent Offenders, [d] Treatment as usual, [e] HF x Non/Infrequent Offenders.

eTable 2

Net benefit regression estimates with interaction for different willingness to pay (λ) values with 95% confidence intervals adjusting for baseline differences (N = 1,502)

	λ = $0	λ = $20	λ = $40	λ = $60	λ = $80	λ = $100
Constant	-19,128	-16,130	-13,131	-10,132	-7,133	-4,134
	(-25,177, -13,080)	(-22,282, -9,977)	(-19,406, -6,856)	(-16,547, -3,717)	(-13,704, -0,562)	(-10,877, 2,608)
Site[a]						
Montreal	-14,807	-15,593	-16,380	-17,166	-17,952	-18,739
	(-20,914, -8,699)	(-21,800, -9,386)	(-22,705, -10,054)	(-23,627, -10,705)	(-24,566, -11,339)	(-25,520, -11,958)
Toronto	-13,821	-14,255	-14,689	-15,123	-15,556	-15,990
	(-20,092, -7,551)	(-20,627, -7,883)	(-21,180, -8,198)	(-21,751, -8,495)	(-22,337, -8,775)	(-22,940, -9,041)
Vancouver	-10,204	-11,179	-12,154	-13,129	-14,105	-15,080
	(-16,727, -3,680)	(-17,802, -4,556)	(-18,897, -5,411)	(-20,012, -6,247)	(-21,144, -7,065)	(-22,294, -7,866)
Need level: High-need[b]	-14,806	-15,334	-15,861	-16,389	-16,917	-17,444
	(-18,879, -10,732)	(-19,476, -11,191)	(-20,084, -11,639)	(-20,702, -12,076)	(-21,330, -12,503)	(-21,967, -12,921)
Profile[c]						
Moderate	-9,189	-9,203	-9,217	-9,232	-9,246	-9,260
	(-17,792, -0,586)	(-17,937, -0,469)	(-18,107, -0,327)	(-18,302, -0,161)	(-18,519, 0,028)	(-18,758, 0,238)
Antisocial	-20,691	-21,310	-21,928	-22,547	-23,165	-23,784
	(-33,412, -7,971)	(-34,257, -8,363)	(-35,140, -8,716)	(-36,060, -9,034)	(-37,013, -9,317)	(-37,998, -9,570)
Subsistence	-21,280	-21,713	-22,145	-22,578	-23,011	-23,443
	(-34,278, -8,282)	(-34,902, -8,523)	(-35,564, -8,727)	(-36,261, -8,895)	(-36,992, -9,029)	(-37,755, -9,131)
Drug	-4,553	-5,058	-5,564	-6,069	-6,575	-7,080
	(-18,675, 9,569)	(-19,415, 9,299)	(-20,197, 9,069)	(-21,018, 8,879)	(-21,875, 8,726)	(-22,767, 8,607)
Intervention: HF[d]	-6,875	-3,545	-0,216	3,114	6,444	9,774
	(-11,039, -2,712)	(-7,781, 0,690)	(-4,536, 4,105)	(-1,303, 7,532)	(1,919, 10,969)	(5,130, 14,418)
Intervention x Profile[e]						
HF x Moderate	-0,143	-0,854	-1,564	-2,274	-2,984	-3,694
	(-11,848, 11,561)	(-12,740, 11,033)	(-13,666, 10,538)	(-14,624, 10,077)	(-15,614, 9,646)	(-16,632, 9,244)
HF x Antisocial	15,398	14,859	14,320	13,781	13,242	12,703
	(-1,187, 31,983)	(-2,012, 31,730)	(-2,887, 31,527)	(-3,809, 31,372)	(-4,776, 31,260)	(-5,785, 31,191)
HF x Versatile Subsistence	4,669	4,381	4,093	3,806	3,518	3,230
	(-13,168, 22,506)	(-13,741, 22,504)	(-14,365, 22,552)	(-15,036, 22,647)	(-15,752, 22,787)	(-16,509, 22,969)
HF x Drug	-3,390	-2,795	-2,199	-1,604	-1,009	-0,413
	(-22,329, 15,548)	(-22,035, 16,445)	(-21,799, 17,400)	(-21,618, 18,410)	(-21,488, 19,471)	(-21,406, 20,579)

Note. A net monetary benefit value larger than 0 signifies that the benefit outweighs the costs for this λ value. HF: Housing First. Reference levels: [a] Moncton, [b] Moderate-need, [c] Non/Infrequent Offenders, [d] Treatment as usual, [e] HF x Non/Infrequent Offenders.

eTable 3

Net benefit regression estimates with interaction for different willingness to pay (λ) values with 95% confidence intervals, using a discount rate of 0% (N = 1,502)

	λ = $0	λ = $20	λ = $40	λ = $60	λ = $80	λ = $100
Constant	-22,832	-19,634	-16,437	-13,240	-10,043	-6,846
	(-28,959, -16,704)	(-25,860, -13,409)	(-22,779, -10,096)	(-19,713, -6,767)	(-16,663, -3,423)	(-13,628, -64)
Site[a]						
Montreal	-17,108	-17,958	-18,809	-19,659	-20,509	-21,360
	(-23,437, -10,779)	(-24,383, -11,533)	(-25,347, -12,270)	(-26,329, -12,989)	(-27,327, -13,692)	(-28,340, -14,380)
Toronto	-20,184	-20,672	-21,161	-21,649	-22,137	-22,625
	(-26,496, -13,873)	(-27,078, -14,267)	(-27,677, -14,644)	(-28,292, -15,005)	(-28,924, -15,350)	(-29,570, -15,680)
Vancouver	-14,184	-15,210	-16,236	-17,262	-18,288	-19,315
	(-20,884, -7,483)	(-22,019, -8,401)	(-23,172, -9,300)	(-24,343, -10,181)	(-25,532, -11,045)	(-26,736, -11,893)
Need level: High-need[b]	-20,223	-20,729	-21,236	-21,743	-22,249	-22,756
	(-24,314, -16,131)	(-24,885, -16,574)	(-25,466, -17,006)	(-26,057, -17,428)	(-26,657, -17,841)	(-27,266, -18,246)
Profile[c]						
Moderate	-8,805	-8,788	-8,771	-8,754	-8,738	-8,721
	(-17,768, 0,158)	(-17,876, 0,300)	(-18,010, 0,468)	(-18,169, 0,660)	(-18,350, 0,875)	(-18,554, 1,112)
Antisocial	-23,757	-24,360	-24,963	-25,566	-26,169	-26,772
	(-37,190, -10,324)	(-38,015, -10,705)	(-38,878, -11,048)	(-39,777, -11,355)	(-40,710, -11,628)	(-41,675, -11,869)
Subsistence	-23,198	-23,718	-24,238	-24,758	-25,278	-25,798
	(-37,467, -8,929)	(-38,151, -9,284)	(-38,872, -9,603)	(-39,626, -9,889)	(-40,413, -10,142)	(-41,230, -10,365)
Drug	-3,881	-4,464	-5,046	-5,629	-6,211	-6,794
	(-18,871, 11,108)	(-19,683, 10,756)	(-20,535, 10,443)	(-21,425, 10,167)	(-22,350, 9,928)	(-23,309, 9,722)
Intervention: HF[d]	-7,622	-4,291	-960	2,371	5,701	9,032
	(-11,983, -3,262)	(-8,718, 135)	(-5,466, 3,545)	(-2,226, 6,967)	(1,002, 10,401)	(4,220, 13,845)
Intervention x Profile[e]						
HF x Moderate	-1,575	-2,319	-3,063	-3,808	-4,552	-5,296
	(-13,720, 10,570)	(-14,635, 9,996)	(-15,585, 9,458)	(-16,569, 8,954)	(-17,584, 8,480)	(-18,629, 8,037)
HF x Antisocial	19,807	19,187	18,567	17,947	17,328	16,708
	(2,159, 37,454)	(1,241, 37,133)	(274, 36,861)	(-739, 36,634)	(-1,794, 36,450)	(-2,890, 36,306)
HF x Versatile Subsistence	9,465	9,218	8,970	8,723	8,476	8,229
	(-9,440, 28,370)	(-9,924, 28,360)	(-10,459, 28,399)	(-11,041, 28,487)	(-11,669, 28,621)	(-12,340, 28,797)
HF x Drug	-4,545	-3,884	-3,224	-2,563	-1,903	-1,242
	(-24,643, 15,553)	(-24,261, 16,493)	(-23,936, 17,488)	(-23,664, 18,538)	(-23,443, 19,637)	(-23,269, 20,784)

Note. A net monetary benefit value larger than 0 signifies that the benefit outweighs the costs for this λ value. HF: Housing First. Reference levels: [a] Moncton, [b] Moderate-need, [c] Non/Infrequent Offenders, [d] Treatment as usual, [e] HF x Non/Infrequent Offenders.

eTable 4

Net benefit regression estimates with interaction for different willingness to pay (λ) values with 95% confidence intervals, using a discount rate of 5% (N = 1,502)

	λ = $0	λ = $20	λ = $40	λ = $60	λ = $80	λ = $100
Constant	-22,280	-19,083	-15,886	-12,689	-9,491	-6,294
	(-28,262, -16,298)	(-25,163, -13,003)	(-22,081, -9,691)	(-19,016, -6,361)	(-15,967, -3,016)	(-12,932, 0,344)
Site[a]						
Montreal	-16,729	-17,580	-18,430	-19,281	-20,131	-20,982
	(-22,909, -10,550)	(-23,855, -11,305)	(-24,820, -12,041)	(-25,802, -12,760)	(-26,801, -13,462)	(-27,815, -14,148)
Toronto	-19,793	-20,281	-20,769	-21,257	-21,745	-22,234
	(-25,952, -13,633)	(-26,534, -14,029)	(-27,133, -14,406)	(-27,749, -14,766)	(-28,381, -15,110)	(-29,028, -15,439)
Vancouver	-13,987	-15,013	-16,039	-17,065	-18,091	-19,118
	(-20,532, -7,441)	(-21,666, -8,360)	(-22,819, -9,259)	(-23,991, -10,140)	(-25,180, -11,003)	(-26,386, -11,850)
Need level: High-need[b]	-19,775	-20,282	-20,788	-21,295	-21,802	-22,308
	(-23,770, -15,780)	(-24,340, -16,223)	(-24,922, -16,655)	(-25,513, -17,077)	(-26,114, -17,490)	(-26,723, -17,894)
Profile[c]						
Moderate	-8,602	-8,585	-8,568	-8,551	-8,535	-8,518
	(-17,354, 0,151)	(-17,462, 292)	(-17,596, 0,460)	(-17,755, 653)	(-17,938, 0,869)	(-18,144, 1,108)
Antisocial	-23,370	-23,973	-24,576	-25,179	-25,782	-26,385
	(-36,473, -10,268)	(-37,297, -10,650)	(-38,159, -10,993)	(-39,059, -11,299)	(-39,994, -11,571)	(-40,961, -11,809)
Subsistence	-22,685	-23,205	-23,725	-24,245	-24,765	-25,285
	(-36,584, -8,786)	(-37,269, -9,141)	(-37,990, -9,460)	(-38,746, -9,744)	(-39,535, -9,995)	(-40,356, -10,214)
Drug	-3,764	-4,347	-4,929	-5,512	-6,094	-6,677
	(-18,404, 10,875)	(-19,215, 10,521)	(-20,067, 10,208)	(-20,958, 9,934)	(-21,884, 9,696)	(-22,845, 9,492)
Intervention: HF[d]	-7,440	-4,109	-778	2,553	5,884	9,215
	(-11,698, -3,181)	(-8,433, 215)	(-5,181, 3,625)	(-1,942, 7,048)	(1,286, 10,482)	(4,503, 13,927)
Intervention x Profile[e]						
HF x Moderate	-1,400	-2,144	-2,888	-3,632	-4,376	-5,120
	(-13,262, 10,462)	(-14,176, 9,888)	(-15,126, 9,350)	(-16,111, 8,846)	(-17,128, 8,375)	(-18,175, 7,934)
HF x Antisocial	19,705	19,086	18,466	17,846	17,226	16,607
	(2,492, 36,919)	(1,575, 36,596)	(608, 36,323)	(-405, 36,097)	(-1,462, 35,915)	(-2,560, 35,773)
HF x Versatile Subsistence	9,264	9,017	8,770	8,523	8,275	8,028
	(-9,178, 27,706)	(-9,662, 27,696)	(-10,197, 27,737)	(-10,782, 27,827)	(-11,413, 27,964)	(-12,088, 28,145)
HF x Drug	-4,509	-3,848	-3,187	-2,527	-1,866	-1,206
	(-24,143, 15,126)	(-23,761, 16,065)	(-23,435, 17,060)	(-23,165, 18,111)	(-22,945, 19,213)	(-22,775, 20,363)

Note. A net monetary benefit value larger than 0 signifies that the benefit outweighs the costs for this λ value. HF: Housing First. Reference levels: [a] Moncton, [b] Moderate-need, [c] Non/Infrequent Offenders, [d] Treatment as usual, [e] HF x Non/Infrequent Offenders.

Chapter 7 Discussion

7.1 Summary and Appraisal of Findings

Effectiveness and cost-effectiveness of Housing First by profile. One objective of this thesis project, across manuscripts, was to examine whether effectiveness and the cost-effectiveness of Housing First varied according to criminal justice involvement profiles. I examined four types of outcomes: (1) criminal justice outcomes (violent, subsistence-related, related to the administration of justice), (2) days stably housed, (3) total costs, and (4) net benefit, using the net benefit framework to examine the cost-effectiveness of the intervention.

Criminal justice outcomes. Prior analyses of At Home/*Chez Soi* data had found no intervention effect on self-reported arrests (Aubry et al., 2016; Stergiopoulos et al., 2015). We hypothesized that this could be because individuals could respond differently to the intervention. I found that the impact of Housing First on violent criminal charges differed according to pre-identified criminal justice involvement profiles (Non/Infrequent Offenders, Moderate Offenders, Antisocial Offenders, Versatile Subsistence Offenders, and Drug Offenders). Housing First resulted in a slight increase in violent charges for Non/Infrequent Offenders, and in more important decreases among Moderate Offenders and Drug Offenders. The psychosocial history of Moderate Offenders, especially the long duration of lifetime homelessness and the relatively low proportion of people who had their first charge before the first episode of homelessness, could lead us to think that this profile was the one for which residential instability and poverty played the largest role in their criminal justice involvement, and thus be considered a criminogenic need. The finding that violent charges in Drug Offenders, the group with the highest proportion of individuals with a substance use disorder, were lower in the Housing First arm was expected given that the intervention indirectly addresses problems related to substance abuse through a harm reduction approach. Substance abuse is one of the "Central Eight" criminogenic needs (Andrews & Bonta, 2006), and may take an even greater importance in offenders with mental illness (Bonta et al.,

2014). Studies have also found that the risk of violence among people with mental illness is in large part mediated by the presence of a concomitant substance use disorder (Fazel, Langstrom, et al., 2009; Steadman et al., 1998). While sobriety or participation in substance use treatment is not a prerequisite to Housing First and quantitative results have not shown an intervention effect on the frequency of problems related to substance use (Aubry et al., 2016; Stergiopoulos et al., 2015), the support teams promote an harm reduction approach, which may have helped in reducing the aggressive and violent behaviour associated with substance use. Strategies to improve the fidelity of future implementations to evidence-based practices (Bond, Drake, McHugo, Rapp, & Whitley, 2009), such as Integrated Dual Disorders Treatment and motivational interviewing which are both important component of the Pathways to Housing model (Tsemberis, 2010), may be needed to better address the substance abuse problems.

There was also a small increase in violent charges among Non/Infrequent Offenders. Even positive experiences may cause stress, and transitioning into stable, subsidized housing may have created temporary aggressiveness. It is also possible that the subgroup of Non/Infrequent Offenders who commit rare but violent offenses committed one such offense after baseline but not in the two years before. Finally, these violent behaviours may have already been taken place but were not reported to the police. Now that the individuals are housed in scattered-site, private-market apartments, which foster integration into the community, they may victimize individuals who are likely to report to the police. In any case, we do not consider that this specific finding points to the necessity of adjusting Housing First for these non-offenders or low risk offenders.

Days stably housed, total costs, and net benefit. I found that the impact of Housing First on residential stability, total costs, and net benefit did not differ by profiles of criminal justice involvement. In other words, all profiles benefited to a similar extent from the intervention, which is in line with the

literature (Malone, 2009; Tsai & Rosenheck, 2013). This study suggests, then, that selective admission on the grounds of criminal justice involvement patterns in thus unwarranted.

7.2 Implications for the Organization of Services and Clinical Practice

The popularity of the criminalization of mental illness and criminalization of homelessness hypotheses have given way to interventions, including Housing First, that tend to conceptualize mental illness and homelessness as fundamental criminogenic needs. Observers have noted that such a conceptualization results in failures to provide offenders who have mental illness with evidence-based practices, relying instead on mental health treatment as cure-all solution (Draine et al., 2002; Skeem et al., 2011). Indeed, especially for offenders with mental illness, the policy response has been to use the criminal justice system to divert the individual to mental health services (e.g., forensic mental health services, Mental Health Courts, and other jail diversion programs based on case management) (Crocker, Livingston, & Leclair, 2017; Schneider, Crocker, & Leclair, 2016; Skeem et al., 2011), with the expectation that recidivism would be reduced. These interventions may successfully improve clinical measures, but they do not improve criminal justice outcomes (Skeem et al., 2011). While residential stability, symptoms reduction and improvement in community functioning have value in themselves, independent of any reduction in arrests, charges or incarceration they may achieve, integration of forensic knowledge into Housing First may be needed for it to reduce criminal justice involvement (Gaetz, Scott, et al., 2013).

The Risk-Needs-Responsivity model (Bonta & Andrews, 2007) is based on three principles. The 'risk principle' highlights the importance of matching the intensity of the intervention to the level of risk of a client. The level of risk of a client may be appropriately estimated using validated risk assessment measures. The most intensive forensic interventions should thus be reserved for people whose pattern of offending resemble that of Antisocial Offenders and Versatile Subsistence Offenders. Not only does that principle state that high risk offenders should receive high intensity interventions, but it also

suggests that delivering high intensity interventions to low risk offenders could be detrimental and actually increase criminal behaviour (Bonta, Wallace-Capretta, & Jennifer, 2000). The 'need principle' emphasizes the importance of, one, identifying the specific criminogenic needs of the client through risk assessment tools and, two, targeting especially criminogenic needs among the "Central Eight": antisocial personality pattern, procriminal attitudes, social supports for crime, antisocial history, substance abuse, poor family/marital relationships, poor performance or satisfaction at work or school, and lack of involvement in prosocial recreational or leisure activities. Examples of non-criminogenic needs are mental disorder symptoms and self-esteem (Bonta & Andrews, 2007). Although many needs may be worthy of attention, not all are such that responding to them is likely to result in a reduction in criminal behaviour. Finally, the 'responsivity principle' suggests that interventions must be adapted to the learning style, the cognitive skills, and the personal circumstances of the client (Bonta & Andrews, 2007). Because most Housing First participants have patterns of offending that resemble that of the Non/Infrequent Offenders and thus are at low risk of offending, these adjustments may take the form of voluntary adjunctive interventions specifically for justice-involved participants who want to reduce their criminal behaviour.

Community mental health services such as Housing First are potentially an important setting to put in place strategies to prevent criminal behaviour, given the growing number of people receiving Housing First. However, forensic knowledge may need to integrated into existing services in the form of risk assessment and risk management in order to address criminogenic needs and reduce criminal justice involvement. Stakeholders at the intersection of mental health, justice, and safety in Canada have identified this knowledge transfer and transfer as a key priority (Crocker et al., 2015). Partnerships between forensic and community mental health services must be strengthened in order to promote the use of evidence-based risk management strategies, such as the Risk-Needs-Responsivity model, among those at risk of criminal behaviour (Crocker et al., 2017). The Risk-Needs-

Responsivity is not a program model but rather the organization of principles of offender rehabilitation that have shown effectiveness. Various therapeutic interventions may thus integrate these principles (Looman & Abracen, 2013).

7.3 Strengths and Limitations

This is the first study to examine the impact of criminal justice involvement profiles on the effectiveness and cost-effectiveness of Housing First, using data from a multi-site randomized controlled trial. Its findings are important: they suggest that if an overall reduction in criminal justice outcomes is to be observed among Housing First participants, a more targeted approach will likely need to be applied. Furthermore, it suggests that selective admission based on patterns of criminal history, such as excluding clients with more extensive criminal justice involvement, is generally unwarranted.

There are nevertheless several limitations in the studies. First, results from the At Home/*Chez Soi* trial may not be generalizable to jurisdictions other than Canada given potential differences in laws and arrests practices, in population composition (e.g., veterans in the United States), and in access to services (e.g., universal health care). Second, I examined specifically the effectiveness of scattered-site Housing First and excluded the 107 participants who were housed in congregate-site setting. My findings may not apply to all variations of Housing First, especially congregate-site setting. Third, given the delays between an offense and the court appearances and incarceration that may result from this offense, the absence of effect on costs may be simply the result of a too short duration of follow-up. Fourth, I was unable to include data from the Winnipeg site due to the non-availability of administrative justice data, which were required for the identification of profiles. There are thus relatively few indigenous service users in our study. Because Indigenous people's experiences of homelessness and the criminal justice system are shaped by issues such as systemic discrimination, we cannot assume that our findings are generalizable to the needs and situations of members of this population. Fifth, we used criminal charges, both for the identification of profiles and for the outcome measures pertaining to

criminal justice outcomes. It is possible that, had we included offences to by-laws and other statutes, the results would have been different.

7.4 Directions for Future Research

To my knowledge, no studies have examined the specific criminogenic needs of people who are homeless, nor tested the effectiveness of the Risk-Needs-Responsivity model in reducing criminal justice involvement in this population. Because no risk assessments, nor measures of antisociality, were included in the participants interviews, we were unable to validate the criminogenic needs of this population. While the Central Eight risk factors have been validated in several offending subpopulations, we are confident that these are also important among justice-involved homeless people. However, other factors, such as residential instability could also be a criminogenic need for some. Substance abuse could also be especially important in this population, which could result in the "Big Five" risk factors, similarly to women offending populations (Andrews et al., 2012). Future research on Housing First may also benefit from developing voluntary adjunctive interventions in accordance with the principles of the Risk-Needs-Responsivity model and evaluate its effectiveness in reducing criminal justice outcomes.

7.5 Conclusions

Housing First may be effective in reducing criminal charges for violent offenses for individuals whose criminal justice involvement is driven by poverty or homelessness or by substance abuse. Voluntary adjunctive interventions that integrate evidence-based forensic principles of offender rehabilitation may be needed to reduce the criminal justice involvement of those who have more complex criminogenic needs. Selective admission based on criminal history is generally unwarranted however, since individuals belonging to any profiles are likely to benefit from Housing First in terms of increased residential stability.

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Appendix A: Profiles of criminal justice involvement among homeless individuals with mental illness

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Authorship

A. Lemieux and Dr. Crocker formulated the research question. A. Lemieux conducted the analyses. I coordinated and participated in the data collection, collaborated with A. Lemieux on the operationalization of the indicator variables for the latent class analysis, and provided assistance with the interpretation of the findings. A. Lemieux and I wrote the manuscript together, and Dr. Roy, Dr. Nicholls, and Dr. Crocker revised it critically. This paper is included in the manuscript-based thesis of A. Lemieux.

Summary

The objective of this paper was threefold: 1) describe the criminal justice involvement of the At Home/Chez Soi participants over their lifetime; 2) identify lifetime criminal justice involvement profiles; and 3) compare these profiles across psychosocial characteristics.

We examined a sample of participants recruited for the Montreal, Vancouver, Toronto and Moncton sites of the At Home/Chez Soi demonstration project of Housing First among homeless people living with mental illness. The sample size was 1,682 (230 for Moncton, 468 for Montreal, 549 for Toronto, and 435 for Vancouver). Criminal justice involvement was measured using criminal records from the Royal Canadian Mounted Police (RCMP) Finger Print Services. A latent class analysis was conducted by grouping lifetime criminal charges into five categories of charges, which were used as indicator variables: violent, nuisance, drug-related, subsistence-related, and administration of justice. Violent offences included violations causing death and attempting the commission of a capital crime, sexual assaults, assaults, violations resulting in the deprivation of freedom, robbery, other violations involving violence or the threat of violence, and violation pertaining to offensive weapons. Nuisance offences included disturbing the peace, traffic violations, and vandalism. Drug-related offences included

those pertaining to the possession, traffic or production of controlled drugs and substances act and food and drug act. Subsistence-related offences included acquisitive property crimes as well as offences relating to prostitution, gaming and betting. Administration of justice offences were those relating to failure to comply with conditions and failure to attend court and breach of probation. We computed the total number of lifetime charges (up to baseline) for each type of offence and Winsorized at the 98th percentile. Best fit indexes (entropy, Bayesian Information Criterion, and the Bootstrapped likelihood ratio test) were used to select the best model.

Results showed that 68.30% had at least one charge with an average number of 21.15 (SD = 23.45) and a median of 12 charges, ranging between 1 and 143. The five-class model emerged as the best model (see Table 2). Using chi-square tests and analyses of variance (ANOVAs), we compared the five groups on a list of sociodemographic and clinical characteristics, using a more stringent alpha of 0.01 to account of multiple comparisons (see Table 3).

Table 1
Model fit indexes for 2- to 7-class models

	2-class	**3-class**	**4-class**	**5-class**	**6-class**	**7-class**
BIC	43679.233	42534.252	41694.475	41167.348	40767.809	40434.835
BLRT	4043.497	1189.547	884.343	571.694	444.105	377.541
	p=0.0000	p=0.0000	p= 0.0000	p= 0.0000	p= 0.0000	p= 0.0000
Entropy	0.962	0.976	0.971	0.963	0.977	0.971
n (per class)	1400	1383	1326	1273	1267	1236
	282	217	200	178	140	123
		82	81	84	112	107
			75	84	61	65
				63	52	57
					50	49
						45

Note. BIC = Bayesian Information Criterion; BLRT = Bootstrapped likelihood ratio test. All models are significant, and all models have high entropy values (> 0.950). Although value of BIC decreases with every additional class, so does n per class. Percentage of sample in smallest class is, respectively, 16.77%, 4.88%, 4.46%, 3.75%, 2.97%, and 2.68.% There is no fixed guidelines regarding minimum class size. All models were examined in terms of means for each offence category. The five class model was selected, as distinct profiles emerged while keeping reasonable sample sizes.

Table 2

Mean lifetime number of offences of each type in each class and overall sample, with standard deviation

Offence type	Class 1 (n=1273)	Class 2 (n=178)	Class 3 (n=84)	Class 4 (n=84)	Class 5 (n=63)	Sample (n=1682)
Violent offences	1.33	7.93	14.90	12.54	8.11	3.52
	(2.47)	(5.93)	(11.12)	(10.52)	(6.82)	(6.23)
Causing or attempting to cause death	0.01	0.06	0.08	0.04	0.05	0.02
	(0.09)	(0.41)	(0.32)	(0.24)	(0.21)	(0.18)
Sexual violations	0.07	0.20	0.37	0.24	0.25	0.11
	(0.54)	(0.66)	(0.76)	(0.67)	(1.06)	(0.61)
Assaults	0.71	4.15	9.24	7.01	4.06	1.94
	(1.48)	(3.62)	(7.24)	(6.94)	(3.87)	(3.79)
Level 1	0.01	0.11	0.12	0.11	0.10	0.04
	(0.13)	(0.33)	(0.36)	(0.41)	(0.35)	(0.21)
Levels 2, 3	0.20	1.14	2.36	1.83	1.30	0.53
	(0.66)	(1.64)	(2.76)	(2.35)	(1.57)	(1.32)
Using firearm	0.03	0.14	0.11	0.12	0.03	0.05
	(0.19)	(0.46)	(0.38)	(0.49)	(0.18)	(0.29)
Against peace officer	0.06	0.38	1.17	0.86	0.30	0.20
	(0.31)	(0.85)	(1.53)	(1.61)	(0.80)	(0.71)
Other	0.02	0.17	0.56	0.55	0.30	0.10
	(0.18)	(0.47)	(1.14)	(1.09)	(0.71)	(0.47)
Deprivation of freedom	0.02	0.12	0.12	0.14	0.19	0.05
	(0.17)	(0.36)	(0.33)	(0.38)	(0.43)	(0.24)
Offensive weapons	0.12	0.93	1.10	1.67	1.19	0.37
	(0.48)	(1.37)	(2.15)	(2.50)	(1.52)	(1.10)
Other violent	0.40	2.48	4.00	3.44	2.37	1.03
	(1.01)	(2.64)	(4.06)	(3.35)	(2.39)	(2.10)
Nuisance offences	0.53	2.61	10.33	7.46	3.29	1.69
	(1.05)	(1.74)	(4.62)	(5.14)	(2.62)	(3.22)
Mischief	0.21	1.26	4.21	3.39	1.11	0.71
	(0.56)	(1.35)	(2.99)	(3.91)	(1.36)	(1.70)
Disturbing the peace	0.03	0.18	0.54	0.38	0.19	0.09
	(0.17)	(0.43)	(0.94)	(0.81)	(0.47)	(0.38)
Traffic violations	0.18	0.47	3.36	1.55	0.86	0.46
	(0.67)	(0.89)	(4.87)	(2.56)	(1.51)	(1.60)
Disruptive behaviour	0.12	0.70	2.22	2.14	1.13	0.43
	(0.42)	(0.95)	(2.19)	(2.11)	(1.52)	(1.08)
Substance-related offences	0.27	1.44	1.79	3.07	11.03	1.01
	(0.75)	(0.57)	(1.90)	(3.42)	(5.24)	(2.63)
Subsistence-related offences	1.07	9.84	7.26	35.30	9.83	4.34
	(2.02)	(5.43)	(4.82)	(14.25)	(6.95)	(8.94)
Acquisitive property crimes	1.01	9.20	6.81	33.52	9.00	4.10
	(1.95)	(5.35)	(4.52)	(14.81)	(6.43)	(8.60)
Prostitution, gaming and betting	0.03	0.28	0.29	0.64	0.48	0.12
	(0.33)	(1.02)	(0.98)	(3.35)	(2.96)	(1.07)
Other Acquisitive	0.03	0.36	0.17	1.04	0.35	0.13
	(0.16)	(0.81)	(0.53)	(1.96)	(0.92)	(0.62)

Administration of justice-related offences	0.90 (1.75)	8.33 (5.23)	12.18 (8.93)	13.93 (8.35)	10.92 (7.62)	3.28 (5.79)

Note. Class 1: Non/Infrequent Offenders, Class 2: Moderate Offenders, Class 3: Antisocial Offenders, Class 4: Versatile Subsistence Offenders, Class 5: Drug Offenders.

Table 3

Description of the criminal justice involvement profiles

Covariates	Non/ Infrequent (n = 1273)	Moderate (n = 178)	Antisocial (n = 84)	Versatile Subsistence (n = 84)	Drug (n = 63)	Statistical test
Age (*M*, *SD*)	40.97 (0.34)	40.67 (0.80)	43.84 (0.97)	45.77 (0.96)	42.75 (1.16)	30.30 ($p < .001$) [b, d, e, g, i]
Gender (%)						
Male	63.4	82.6	90.1	85.7	87.3	117.56 ($p <$ .001) [a, b, c, d]
Female	35.0	17.4	8.6	11.9	12.7	
Other	1.2	0.0	1.2	2.4	0.0	
Ethnoracial identity (%)						
White	57.4	63.8	65.1	56.6	49.4	29.99 ($p < .001$) [a, b]
Indigenous	5.2	10.0	13.5	14.2	12.6	
Other	37.5	26.2	21.3	29.3	38.0	
High school completion (%)	53.0	36.3	24.3	33.0	23.5	68.77 ($p < .001$) [a, b, c, d]
Prior employment (1+ year) (%)	72.3	66.9	60.4	61.4	55.4	14.42 ($p = .006$) [b, c, d]
Pre-homelessness offenders (%)	36.4	67.1	71.9	83.0	68.1	179.56 ($p <$ .001) [a, b, c, d, g]
Lifetime homelessness (months) (*M*, *SD*)	33.26 (1.61)	134.69 (7.50)	92.53 (14.70)	104.25 (10.70)	100.97 (12.71)	293.99 ($p <$ .001) [a, b, c, d, e, f, g]
Impulse control (*M*, *SD*)[1]	3.98 (0.03)	3.46 (0.10)	3.54 (0.12)	3.62 (0.12)	3.67 (0.12)	42.38 ($p < .001$) [a, b, c, d]
Psychotic disorder (%)	38.6	35.0	34.4	40.6	41.4	1.60 ($p = .809$)
Substance abuse or dependence (%)	45.6	76.5	67.2	71.2	83.1	104.98 ($p <$ .001) [a, b, c, d, j]
Alcohol abuse or dependence (%)	33.0	49.1	52.8	52.5	29.7	33.47 ($p < .001$) [a, b, d, f, i, j]
History of psychiatric hospitalization (%)	44.6	39.8	41.1	38.1	28.3	9.11 ($p = .058$)

[1] Values ranging from 1 to 5, with 1 indicating frequent and severe impulsive behaviours and 5 indicating no impulsive behaviour

[a] – Significant difference between Non/Infrequent Offenders and Moderate Offenders at $p < 0.01$

[b] – Significant difference between Non/Infrequent Offenders and Antisocial Offenders at $p < 0.01$

[c] – Significant difference between Non/Infrequent Offenders and Drug Offenders at $p < 0.01$

[d] – Significant difference between Non/Infrequent Offenders and Versatile Subsistence Offenders at $p < 0.01$

[e] – Significant difference between Moderate Offenders and Antisocial Offenders at $p < 0.01$

[f] – Significant difference between Moderate Offenders and Drug Offenders at $p < 0.01$

[g] – Significant difference between Moderate Offenders and Versatile Subsistence Offenders at $p < 0.01$

[h] – Significant difference between Versatile Subsistence Offenders and Antisocial Offenders at $p < 0.01$

[i] – Significant difference between Versatile Subsistence Offenders and Drug Offenders at $p < 0.01$

[j] – Significant difference between Drug Offenders and Antisocial Offenders at $p < 0.01$