Change in housing status among currently and formerly homeless individuals using emergency shelters, temporary housing and permanent housing services in Quebec, Canada: Predictors and Typology

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LIST OF ABBREVIATIONS

ACT = assertive community treatment

ASSSM = Agence de la santé et des services sociaux de Montréal-Centre

CCHS = Canadian Community Health Survey

CMHC = Canada Mortgage and Housing Corporation

COH = Canadian Observatory on Homelessness

DV = dependent variable

ED = emergency department

HF = Housing First

ICM = intensive case management

IUD = L'Institut universitaire sur les dépendances

IV = independent variable

LCA = latent class analysis

LCSC = local community service centre

MHCC = Mental Health Commission of Canada

MHD = mental health disorders

MMFIM = Mouvement pour mettre fin à l'itinérance à Montréal

MSSS = Ministère de la Santé et des Services sociaux

PH = permanent housing

QOL = quality of life

RAPSIM = Réseau d'aide aux personnes seules et itinérantes de Montréal

RISQ = Recherche et intervention sur les substances psychoactives – Québec

SDSS = Service de la diversité sociale et des sports (de la Ville de Montréal)

SHQ = la Société d'habitation du Québec

SSHRC = Social Science and Humanities Research Council of Canada

SUD = substance use disorders

TH = temporary housing

ABSTRACT

Background: Over 235,000 people experience homelessness per year in Canada. With annual costs of homelessness now estimated at $7 billion in Canada, including social and healthcare costs, addressing homelessness is a top government priority. Different housing services help homeless individuals along their transition towards stable, affordable housing, including emergency shelters, temporary housing (TH) and permanent housing (PH). Evaluative research on homelessness services have been using housing stability as a key outcome. Housing stability has typically been defined on a fixed duration of maintaining accommodation, which does not fully capture the change in housing status among homeless individuals. Few studies have assessed factors predicting change in individual housing trajectories, especially health and social service use variables. Moreover, housing trajectories across different housing types have rarely been examined to establish a typology of the homeless population.

Objectives: The purpose of the present thesis was to gain a better understanding of trajectories towards housing stability of individuals who are currently or formerly homeless using different housing services (shelters, TH, PH) in Quebec. This research posed two specific objectives: 1) to identify predictors for maintenance or improvement of housing status and 2) to develop a typology based on change in housing status over 12 months.

Methods: Participants, recruited from 27 community or public organizations, were interviewed between January and September 2017 and again 12 months later. Sociodemographic variables, housing history, health conditions, services use and satisfaction were measured. Directors and program coordinators from the selected organizations also completed a baseline questionnaire measuring housing resource variables. Independent variables were organized into predisposing, needs and enabling factors, based on the Gelberg-Andersen Behavioral Model. Logistic regressions, cluster analysis and comparison analyses were conducted.

Results: Predisposing factors (PH at baseline, being female, having children) most strongly predicted positive change in housing status over 12 months in this study, followed by enabling factors (having consulted a psychologist, use of public ambulatory services), and lastly needs factors (not having physical illnesses). Moreover, the typology identified three of five groups which showed maintenance or improvement of housing status over 12 months that seem to require

suitable types and frequencies of health and social services (enabling factors), that are well adapted to the nature and the complexity of health problems (needs factors).

Conclusion: The study findings suggested some practical implications enabling access towards PH or maintain stable housing. These strategies include enhancing case management across all housing programs, improving access to public ambulatory care services, and increasing implementation of PH in efforts to permanently end homelessness.

RÉSUMÉ

Contexte : Chaque année, plus de 235 000 personnes se retrouvent en situation d'itinérance au Canada, pour des coûts annuels associés de 7 milliards de dollars, incluant les coûts sociaux et des services de santé. La lutte contre l'itinérance est l'une des grandes priorités du gouvernement. Différents services de logement aident les personnes en situation d'itinérance tout au long de leur transition vers un logement stable et abordable, y compris les refuges d'urgence, les logements temporaires (LT) et les logements permanents (LP) avec ou sans soutien. La recherche évaluative sur les services aux personnes en situation d'itinérance a utilisé la stabilité résidentielle comme un indicateur clé d'efficacité. La stabilité résidentielle a généralement été définie en fonction d'une durée fixe de maintien en logement. Cette définition ne tient néanmoins pas suffisamment compte de l'évolution de la situation résidentielle de ces personnes. Peu d'études ont évalué les facteurs déterminant les changements dans les trajectoires résidentielles des personnes en situation d'itinérance, en particulier reliés à l'utilisation des services de santé et des services sociaux. De plus, les trajectoires résidentielles, tenant compte de différents types d'hébergement, ont rarement été examinées afin d'établir une typologie de la population en situation d'itinérance.

Objectifs : Le but général de la présente thèse a été de mieux comprendre les trajectoires de stabilité résidentielle des personnes qui sont en situation d'itinérance ou l'ont récemment été, qui sont hébergés en LT ou en LP ou utilisent les refuges au Québec. La thèse a poursuivi les objectifs spécifiques suivants : 1) identifier les prédicteurs du maintien ou de l'amélioration des conditions résidentielles et 2) développer une typologie basée sur l'évolution de la situation résidentielle de ces personnes sur 12 mois.

Méthodologie : Les participants, recrutés dans 27 organismes communautaires ou publics, ont été interrogés entre janvier et septembre 2017 et 12 mois plus tard. Des variables

sociodémographiques, trajectoires de logement, conditions de santé, ainsi que l'utilisation des services et la satisfaction des participants ont été mesurés. Les directeurs et les coordonnateurs de programme de ressources des organisations sélectionnées ont également rempli un questionnaire lors du premier temps de la collecte des données, s'intéressant au fonctionnement des ressources (refuges, LT, LP). Les variables indépendantes ont été organisées en facteurs prédisposant, de besoins et facilitants, basés sur le modèle d'analyse comportemental de Gelberg-Andersen. Des régressions logistiques, des analyses par grappes et des analyses comparatives ont été effectuées.

Résultats: Des facteurs prédisposants (être dans un LP au départ, être une femme, avoir des enfants) ont le plus fortement prédit un changement positif de la situation résidentielle après 12 mois, suivi des facteurs facilitants (consultation d'un psychologue, utilisation de services ambulatoires publics) et enfin des facteurs de besoins (de ne pas avoir de maladies physiques). Quant à la typologie, elle a identifié trois groupes sur cinq qui ont maintenu ou amélioré leur stabilité en logement sur la période de 12 mois. Ces résultats favorables étaient reliés à la diversité et la fréquence appropriés de services de santé et de services sociaux (facteurs facilitants), adéquatement adaptés à la nature et à la complexité des problèmes de santé (facteurs liés aux besoins).

Conclusion: Les résultats de l'étude suggèrent quelques recommandations qui devraient faciliter l'accès en LP ou le maintien ou l'amélioration des conditions résidentielles des personnes en situation d'itinérance. Ces stratégies comprennent la consolidation de la gestion de cas dans l'ensemble des programmes de logement, l'amélioration de l'accès aux services publics de soins ambulatoires et la mise en œuvre accrue du LP dans les efforts visant à mettre fin à l'itinérance.

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CONTRIBUTION OF AUTHORS

As first author of both manuscripts, I, **Gesthika Kaltsidis**, made a significant contribution to the design of the thesis portion of the study, including the conceptual framework, data analyses plan, interpretation of results, and writing of both articles. Furthermore, all other chapters of my thesis manuscript, excluding the two articles, are my original writing.

Dr. Marie-Josée Fleury, as supervisor (and principal investigator of the larger longitudinal project from which this thesis study was from), provided overall supervision and guidance on the design of the study, and contributed significantly to the interpretation of results and revisions of both articles and thesis manuscript. She is also the corresponding author for both articles.

Dr. Guy Grenier provided supervision and guidance on the preparation of both articles and contributed significantly to interpretation of results and revisions.

Zhirong Cao contributed significantly to data analyses for both articles.

Karine Bertrand contributed to interpretation of the results and revisions for the first article.

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ETHICS APPROVAL

The research ethics board of the Douglas Mental Health University Institute approved the multi-site study protocol (IUSMD 16/35). Written informed consent was obtained from all participants at the beginning of the study.

CHAPTER 1: INTRODUCTION

Homelessness is a growing concern in many countries worldwide, including Canada. The detrimental effects of homelessness to individuals and communities, public health and services, society and economy are alarming. Considerable efforts are being made to combat homelessness with emphasis on long-term outcomes. In order to grasp the pertinence addressing homelessness, this chapter introduces the background on homelessness and the objectives of this thesis research.

1.1 Background on Homelessness

This section presents the background on homelessness outlining the prevalence, definitions, causes, prevention efforts in Canada, and Quebec's policy context with respect to combatting homelessness.

1.1.1 Prevalence of Homelessness

Global prevalence of homelessness was last estimated in 2005 with 100 million people homeless and at least 1.6 billion people who lacked adequate housing worldwide (United Nations, 2005). A more recent global survey has not been attempted since capturing an accurate reality of homelessness on a global scale has posed challenges. Even comparing between the US and Canada has depicted vast differences in homelessness statistics. In the US, from a total population of about 326 million, it was most recently estimated in 2017 that more than 553,700 Americans were homeless on any given night (The US Department of Housing and Urban Development, 2017), with at least 40 million people living under the national poverty threshold (Office of the High Commissioner United Nations Human Rights, 2017). These estimates were made from annual point-in-time counts (also referred to as "street counts" or "homeless counts", measuring the number of unsheltered homeless individuals on a specific day or duration of time) conducted in communities throughout the country (Fazel, Geddes, & Kushel, 2014). In contrast, Canada with about 36 million people (around a tenth of the total US population), at least 35,000 Canadians were estimated to be homeless on any given night with more than 235,000 people in 2016 (Gaetz, Dej, Richter, & Redman, 2016). Counts in Canada have typically been collected through the number of individuals using shelters annually, but recent efforts have shifted towards conducting point-in-time counts in communities across all provinces and territories (Hunter, 2019).

In fact, the second Pan-Canadian point-in-time count took place between March and April 2018 where 35,000 people were reported being homeless on a single night across 61 designated Canadian communities (Hunter, 2019). In the province of Quebec, 5,789 people were visibly homeless (i.e. sheltered in provisional accommodations such as transitional or temporary housing (TH), emergency shelters, addiction treatment or rehabilitation centres, women's shelters, crisis centres, detention facilities, inpatient hospital wards), of which 3,149 people resided in Montreal and 545 in Quebec City, the two largest urban centres (Ministère de la Santé et des Services sociaux [MSSS], 2019). The "hidden homeless" (individuals who do not use homeless services, but relocate frequently, couch-surf with strangers or acquaintances, or reside in settlements inadequate or unintended for shelter) were counted in at 670 across the province, which represents only a fraction of the population who remain unseen without adequate shelter (MSSS, 2019).

Although the point-in-time counts provide a ballpark figure for the number of homeless people on a given night, these estimates tend to be lower than the total number of people who experience homelessness episodes throughout the year, so it is expected that homeless populations in Montreal, Quebec City and other Canadian communities are higher than reported. Moreover, homelessness in Canada was mainly prevalent among single older men, however nowadays, the homeless population has become more diverse with many more women, families, youth and Indigenous people (Gaetz, Dej, Richter, & Redman, 2016; Hunter, 2019). Prevalence estimates of homelessness (counts) at the provincial/territorial level contribute valuable data to the regional profile of people experiencing homelessness, specifically with respect to sociodemographic information, history of homelessness, recent service use and perceived needs (Gaetz, Dej, Richter, & Redman, 2016; Hunter, 2019).

1.1.2 Definitions of Homelessness

Homelessness has been defined differently across jurisdictions, with no universal definition adopted among countries around the world. In this dissertation, the Canadian definition of homelessness, adopted in all provinces and territories across Canada, will be discussed. Definitions of homelessness from the US, UK, Australia and Europe were reviewed in the establishment of Canada's definition of homelessness (Canadian Observatory on Homelessness [COH], 2012).

According to the COH, homelessness refers to "the situation of an individual, family or community without stable, safe, permanent, appropriate housing, or the immediate prospect, means and ability of acquiring it" (COH, 2017). Homelessness is generally viewed and perceived as a negative experience marked with distress, insecurity, instability, social exclusion and even danger to health and survival. It is understood to encompass a dynamic trajectory of physical living situations that can change depending on individual and socioeconomical circumstances people are experiencing. Moreover, homelessness is not usually a desired choice, but rather the result of a complex interplay of both individual and structural factors along with systemic failures that push people out of their homes (COH, 2017).

1.1.3 Causes of Homelessness

Homelessness among individuals and families is hardly ever the result of a single cause. Recent perspectives view homelessness as a cumulative, complex interplay of structural and individual factors along with systemic failures contributing to both its causes and consequences (Fazel et al., 2014; Gaetz, Donaldson, Richter, & Gulliver, 2013). Common to all individuals and families experiencing homelessness are structural contributors, like the lack of affordable housing, poverty, and unemployment (Fazel et al., 2014; Gaetz, Donaldson, et al., 2013). Meanwhile individual factors, including personal characteristics, needs, and behaviours, may also predispose people towards homelessness, particularly those in precarious conditions and financially unstable (Fitzpatrick, 2005). Moreover, systemic failures, especially across criminal justice, healthcare and social services, often underlie the unfavourable individual and structural factors associated with homelessness (Gaetz, Donaldson, et al., 2013). Some examples of systemic failures in a Canadian context include poor discharge planning to facilitate social reintegration of individuals (usually with mental health problems) leaving prisons or hospitals, inadequate support for individuals transitioning out of the child welfare system, and limited resources allocated to immigrants and refugees (Gaetz, Donaldson, et al., 2013).

Specifically, in Quebec some principal reasons for loss of housing reported by the visible homeless individuals during the 2018 point-in-time count include, mental health or substance use problems, inability to make rent or mortgage payments, marital or domestic conflict, and unemployment (MSSS, 2019). Yet conditions that induce and perpetuate a state of homelessness are the result of mutually reinforcing interactions between socioeconomic structure and individual

circumstances. For example, an individual with a severe mental illness may have great difficulty obtaining or maintaining adequate employment, leading to use of welfare and housing services. However, if survival depends on receiving financial and housing support from the public services, it becomes more difficult for the individual to find a job, regain financial independence and return to a more stable housing situation. Undeniably, it creates and sustains a vicious cycle where people who are financially insecure struggling to meet basic needs, like food and housing, fall deeper into homelessness (Gaetz, Donaldson, et al., 2013; Shier, Jones, & Graham, 2016).

1.2 Addressing Homelessness in Canada

This section discusses content related to how homelessness is being addressed in Canada, with a focus on homelessness prevention, affordable housing, Housing First (HF), and Quebec's policy context.

1.2.1 Homelessness Prevention

During the last few decades, Canada has been primarily responding to homelessness through emergency shelters and soup kitchens addressing only the immediate needs of the homeless people (Gaetz, 2010). However, emergency responses have been critiqued for their high cost, estimated at an annual $7 billion to the Canadian economy (Gaetz, Donaldson, et al., 2013). More importantly, the limited temporary provision of food and shelter has been ineffective at reducing homelessness in the long-term (Culhane, 2008; Gaetz, 2010; Larimer et al., 2009; M. Patterson, Somers, MacIntosh, Shiell, & Frankish, 2007). In fact, some people rely on emergency services so extensively to the point it traps them and becomes very difficult to seek affordable housing. Yet a safe, affordable and adequate home is a human right in Canada, along with many other governments around the world who have signed international treaties and agreements on human rights [e.g. International Covenant on Economic, Social and Cultural Rights (ICESCR) (Office of the High Commissioner. United Nations Human Rights, 1966)] (Gaetz & Dej, 2017). Therefore, it would be important for people to continue living in a home and to stop from becoming homeless in the first place – prevention.

Recent policies and practices addressing homelessness in Canada have been making progress towards a prevention-focused approach (Gaetz & Dej, 2017; Greater Victoria Coalition to End Homelessness, 2008; The Alberta Secretariat for Action on Homelessness, 2008). Good

evidence for successful homelessness prevention strategies has already been demonstrated in other countries (Busch-Geertsema & Fitzpatrick, 2008; Shinn, Greer, Bainbridge, Kwon, & Zuiderveen, 2013; Spinney & Blandy, 2011). Moreover, success depends on multidisciplinary collaboration of the non-profit and several other sectors (e.g. health, social services, justice) with all levels of government to take responsibility towards a common goal of homelessness prevention (Gaetz & Dej, 2017).

The findings above have contributed to the making of *"A New Direction: A Framework for Homelessness Prevention"* published by the COH (Gaetz & Dej, 2017). According to this framework, *homelessness prevention* comprises of "policies, practices and interventions that reduce the likelihood that someone will experience homelessness…[including] providing those who have been homeless with the necessary resources and supports to stabilize their housing, enhance integration and social inclusion, and ultimately reduce the risk of the recurrence of homelessness" (Gaetz & Dej, 2017). The framework highlights the importance of understanding the complex interactions of individual, structural and systemic factors that contribute to homelessness, and provides guidance on implementing strategies that address these factors to prevent homelessness (Gaetz & Dej, 2017). It has become a national reference point to direct policymakers, researchers, and service providers in Canada for preventative initiatives on ending homelessness.

1.2.2 Affordable Housing

As part of prevention initiatives to end homelessness in the long-term, there is an emphasis on increasing the availability and accessibility of affordable housing and supports. This is largely in response to the affordable housing crisis in Canada that emerged over the past two decades after a substantial number of affordable homes were reduced due to economic cuts in national social housing programs (Housing Services Corporation, 2014). Gradually, affordable housing initiatives are being implemented in attempt to reverse the crisis, for instance, the Canada Mortgage and Housing Corporation (CMHC) have provided housing programs through Affordable Housing Initiative, (2001-2011) and the Investment in Affordable Housing (2011-2014, 2014-2019) (CMHC, n.d.).

According to CMHC, *affordable housing* refers to "housing provided by the private, public and not-for-profit sectors as well as all forms of housing tenure (i.e. subsidized, rental, ownership, and cooperative ownership)…[with affordability standards met when] a household spends less than 30% of its pre-tax income on adequate shelter [i.e. housing that is safe, sufficient in living space and does not require major repairs]" (CMHC, 2012). In 2010, CMHC estimated that over a third of Canadian households were spending more than 30% of income on housing that may or may not be adequate to their living situations (CMHC, n.d.). Affordable housing encompasses a housing continuum of emergency shelters, TH, permanent housing (PH) with support, affordable rental housing and home ownership, as well as market rental housing and home ownership (CMHC, n.d.). Within the housing continuum, a diversity of emergency shelters, TH and PH services have been critical strategies to support people experiencing homelessness (Gaetz, Dej, Richter, & Redman, 2016; Pauly, Carlson, & Perkin, 2012).

1.2.3 Housing First (HF) in Canada

Over the last decade, Housing First (HF) has emerged as one of the dominant affordable housing models across PH services, and widely recognized internationally including in Canada (Gaboardi et al., 2019; Goering et al., 2014; Tsemberis & Eisenberg, 2000). HF is based on the principle that housing is a human right so placing people into housing is prioritized, then followed up with support services (Gaetz, Scott, & Gulliver, 2013). There are generally three kinds of support services: 1) *housing supports*, aimed to help clients obtain and maintain housing – e.g. rent subsidy assistance, landlord-tenant mediation; 2) *clinical supports*, refer to healthcare or treatment services to help clients better manage physical or mental health problems – e.g. mental health or addiction treatment; and 3) *complementary supports*, with the goal to improve overall quality of life and promote community integration – e.g. employment assistance, income supports (Gaetz, Scott, et al., 2013). With the diversity of available supports in HF programs, the ultimate aim has been to support clients in achieving housing stability and long-term independent living.

In fact in 2008, as part of national initiatives to end homelessness, the Canadian federal government delegated the Mental Health Commission of Canada (MHCC) to implement a nationwide HF pilot project called *At Home/Chez Soi* (2009-2013) under a $110 million budget (Nelson et al., 2014). The main purpose of this project was to reproduce the HF model in a Canadian context, following a client-centred recovery paradigm, where all decisions and

interventions are focused on the clients' needs (Piat et al., 2009). This project offered three principal services for homeless individuals or those at risk of becoming homeless: 1) affordable housing; 2) assertive community treatment (ACT), multidisciplinary community-cased support for clients with severe mental health disorders (MHD) and substance use disorders (SUD) that eases access to psychiatric services and; 3) intensive case management (ICM), individualized case management approach for clients with less severe MHD and SUD to assist with achieving housing stability and good quality of life (Goering et al., 2011). Five communities across Canada were selected: Vancouver, Winnipeg, Toronto, Moncton, and Montreal and at the end of this pilot project, provincial governments of these respective communities were expected to adopt the program into provincial mandates in combatting homelessness (Goering et al., 2011).

1.2.4 Quebec's Policy Context

During MHCC's implementation of the At Home/Chez Soi project in Montreal, there were already political tensions between the Quebec and Canadian governments (Fleury, Grenier, & Vallée, 2014). Despite health and social services mandated as a provincial jurisdiction in Canada, the federal government's involvement with nationwide health initiatives in recent years, resulted in an extra burden placed on the provinces which has not been well received by Quebec (Fleury, Grenier, & Vallée, 2014). Moreover, with respect to dealing with homelessness, Quebec already had a strong history with a broad range of health and social service initiatives. In 2005 the province had passed a health reform, the *Quebec Mental Health Care Action Plan (2005-2010),* that targeted housing services supported by ACT and ICM teams as key interventions to support people with severe MHD experiencing or at risk of homelessness (MSSS, 2005). Later in 2008, the Quebec government also formed a parliamentary commission and an *Interministerial Action Plan on Homelessness (2010-2013)* that promoted the importance of PH towards combatting homelessness, including HF as a promising long-term solution, that fit with the province's changing mental health care context (Gouvernement du Québec, 2009).

Although there is no single public program that addresses the Quebec's homeless population, it has been essential for provincial and municipal sectors to collaborate among an intricate network providing services to meet basic needs of food, health care and accommodation (Fleury, Grenier, Lesage, Ma, & Ngui, 2014; Milward & Provan, 2006). Especially within Montreal, numerous partnerships between the public and community sectors have formed over the

past couple of decades, engaging in initiatives to serve the homeless population and combat homelessness (Agence de la santé et des services sociaux de Montréal-Centre [ASSSM], 2009; Réseau d'aide aux personnes seules et itinérantes de Montréal [RAPSIM], 2008). Many non-profit organizations have been on the frontline for providing food to the homeless population through soup kitchens and food banks, whereas health needs, as with any individual are addressed through the public health care system (Provan, Veazie, Staten, & Teufel-Shone, 2005). Regarding accommodation, public and community organizations have mostly been running emergency shelters and TH services. Quebec's housing agency, in partnership with other municipal housing boards in Montreal, has also been managing access to affordable housing, including PH facilities (RAPSIM., 2008).

The most recent action plan to combat homelessness in Montreal "*Plan d'action montréalais en itinérance 2018-2020"* has outlined its aim to prioritize the development and maintenance of public and community services in efforts to improve quality of life in those affected by homelessness, and to provide longer-term solutions to combat homelessness (Service de la diversité sociale et des sports de la Ville de Montréal [SDSS], 2018). One of the key axes of intervention has been "to provide housing for exiting the streets and preventing homelessness" (SDSS, 2018). To address this axis, current efforts have comprised of increasing affordable housing for individuals at risk or experiencing homelessness and actively targeting services towards vulnerably housed individuals to prevent homelessness (SDSS, 2018). In fact, to date 1,569 homeless individuals in Montreal have already received housing placements, according to Le *Mouvement pour mettre fin à l'itinérance à Montréal* (MMFIM, n.d.), a multidisciplinary coalition of representatives from community, private, public and academic sectors working towards ending homelessness in Montreal. As such, collective efforts seen in Montreal, have centred on helping individuals experiencing or at risk of homelessness achieve housing stability – an essential element to a permanent exit from and prevention of homelessness.

1.3 Thesis Rationale & Objectives

Within the Canadian context, the prevention-focused approach in combatting homelessness has placed importance on the attainment and maintenance of housing stability among the homeless population. To closely capture the diverse trajectories along the continuum from homeless to housed, it would be important to examine individuals using different housing services, as this

thesis will allow studying people using shelters or integrated in TH or PH. A *change in housing status over time* would be a valuable indicator of housing stability across this heterogenous housing sample. Several variables associated with the homeless population and housing stability from the literature in health and social science fields will be considered. The present thesis aims to gain a better understanding of trajectories towards housing stability of individuals who are currently or formerly homeless using different housing services in Quebec. This research poses two specific objectives:

1) to identify predictors for maintenance or improvement of housing status, and;
2) to develop a typology based on change in housing status over 12 months.

The study also proposes to be in line with knowledge translation of homelessness research in Dr. Marie-Josée Fleury's team. This study contributes to knowledge dissemination through publication of findings in peer-reviewed journals. Each specific objective of this thesis has become the main objective of a scientific article. In total, two articles have been written according to a standard scientific article format, submitted and currently under review. The articles are presented in Chapter 4 of this thesis:

- The first article entitled, *"Predictors of change in housing status over 12 months among individuals from emergency shelters, temporary housing, or permanent housing in Quebec, Canada"* has been submitted to the journal, *Health & Social Care in the Community.*
- The second article entitled, *"Change in housing status among homeless and formerly homeless individuals in Quebec, Canada: A profile study*" is under review in the journal *BMC Public Health*.

Knowledge generated from this longitudinal follow-up of a heterogenous homeless sample will support towards making recommendations for improving health and social services addressing homelessness in Quebec.

CHAPTER 2: LITERATURE REVIEW

Canada recognizes that building a systemic response to end homelessness requires knowledge and insight into the existing services, their networks and the population using the services (Gaetz & Dej, 2017). The emphasis has been placed on homelessness prevention by creating interventions, rather than homelessness management through emergency responses shelters and day programs. However, the homeless population is not a homogenous population (Gaetz, Dej, Richter, & Redman, 2016), thus there may be specific needs among some subgroups of individuals that require attention. Therefore, in order to figure out what kind of intervention works for which subgroup of homeless people, evaluative research has been a key element of program development and implementation of homelessness interventions. This chapter will review the literature of the homeless population, interventions for homelessness and the evaluative research in this field.

2.1 Homeless Population

This section describes the literature on the homeless population, focusing on patterns of homelessness, housing stability, factors associated with homelessness and typologies.

2.1.1 Patterns of homelessness

Homelessness can be described through patterns in the trajectories of physical living situations over time. In general, there are three identified patterns of homelessness: 1) *chronic homelessness*, when an episode of homelessness lasts more than a year or a person experiences four episodes of homelessness within two years; 2) *intermittent or episodic homelessness*, when there are repeated episodes alternating between states of homelessness and housing or institutional care (e.g. jails, hospitals, addiction treatment centres); and 3) *crisis or transitional homelessness*, when an episode of homelessness results from an unexpected life crisis (e.g. sudden unemployment, eviction, divorce) but lasts a shorter time period (one year or less) and occurs only once or twice in a person's lifetime (Fazel et al., 2014; Gaetz, Donaldson, et al., 2013; Kuhn & Culhane, 1998).

Among the three patterns of homelessness, transitional homelessness is the most common due to poverty and shortage of affordable housing, but consequences are less severe and enduring (Fazel et al., 2014; Gaetz, Donaldson, et al., 2013; Kuhn & Culhane, 1998). On the contrary, people who are chronically and episodically homeless dwell in harsher living conditions that tend to result in more severe consequences (e.g. physical and mental health crises, frequent legal issues, social

discrimination) (Fazel et al., 2014; Gaetz, Donaldson, et al., 2013; Kuhn & Culhane, 1998). Even though this group is evaluated to represent less than 15% of the homelessness population in Canada, they consume more than 50% of resources and services allocated to address homelessness (e.g. emergency shelters and day programs) (Gaetz, Donaldson, et al., 2013). Therefore, strategies to combat homelessness have reason to prioritize support for chronically and episodically homeless people towards more stable housing.

2.1.2 Housing Stability – Housing Status from Homeless to Stably Housed

Although definitions of homelessness have varied from country to country (Busch-Geertsema, Culhane, & Fitzpatrick, 2016), being homeless can be seen as a status portrayed by a range of physical living situations, spanning from people on the streets to those who are insecurely housed (COH, 2017). Therefore, housing stability also corresponds with housing status along this continuum, such that people living in affordable housing independently or in PH are more stably housed; those using TH services, residing in housing of inadequate quality (i.e. do not meet public health and safety standards) or experiencing economic difficulties that may jeopardize their living situation, are less stably housed; and lastly those who are lodging in places unintended for shelter or using emergency shelters would be considered unstably housed (COH, 2017).

As such, housing stability has been a key outcome in many studies evaluating housing services for homeless populations (Aubry, Klodawsky, & Coulombe, 2012; Kerman, Sylvestre, Aubry, & Distasio, 2018; Wooden et al., 2012). However, recent systematic reviews have highlighted that studies differ in how they objectively define stable housing, basing the definition of housing status on only a few dimensions such as: the type of accommodation (e.g. living in one's own place, or permanent supportive housing, etc.) and the duration an individual is housed (e.g. 90 consecutive days, or longer duration) (Baxter, Tweed, Katikireddi, & Thomson, 2019; Boland, Slade, Yarwood, & Bannigan, 2018). Participants in those studies were also often categorized dichotomously, as either housed or homeless at the time of interview (Aubry, Duhoux, Klodawsky, Ecker, & Hay, 2016; Maureen. Crane, Warnes, & Coward, 2012; Spicer, Smith, Conroy, Flatau, & Burns, 2015), when housing stability is more complex and multi-dimensional along a continuum (Frederick, Chwalek, Hughes, Karabanow, & Kidd, 2014). As such there is a need to examine housing stability non-dichotomously especially accounting for changes in housing status (e.g. from TH to PH).

2.1.3 Factors Associated with Homelessness

Individual and structural factors closely intertwined and are shaped by the socioeconomic and political climate that may lead to and sustain a state of homelessness. Individual factors may predispose individuals or families to experience unfavourable circumstances, resulting in homelessness or iteratively, the same individual factors can be consequences induced or worsened by homelessness. These individual factors may include: *personal histories* of adverse early childhood experiences, including having been in the child welfare system, criminal justice involvement, family conflict or domestic violence (Dworsky, Napolitano, & Courtney, 2013; Fazel et al., 2014; Gaetz, Donaldson, et al., 2013; Greenberg & Rosenheck, 2008b, 2010; Roos et al., 2013); *crisis situations,* like sudden unemployment, divorce, house fire or natural disaster (Gaetz, Donaldson, et al., 2013; Shier et al., 2016); and *serious health problems* such as chronic physical illnesses or disabilities, as well as MHD and SUD (Fazel et al., 2014; Feodor Nilsson, Laursen, Hjorthøj, & Nordentoft, 2018; Greenberg & Rosenheck, 2010; Hwang et al., 2013).

Of these, serious health problems are considerably persistent among the homeless population, both as risk factors in triggering and perpetuating homelessness, and as poor outcomes from enduring harsh, stressful living conditions. Mental health is particularly afflicted by homelessness, evident from the higher rates of MHD and SUD prevalent among the homeless compared to the general population (Fazel et al., 2014; Feodor Nilsson et al., 2018; Hwang et al., 2013). It is estimated that MHD affects 30-60% of the homeless population with at least half who have comorbid MHD-SUD (Jego, Abcaya, Ștefan, Calvet-Montredon, & Gentile, 2018; Woollcott, 2008). In fact, people who are chronically homeless, especially those with MHD and history of criminal activity, are extremely more prone to having SUD, either before entering or reinforced by homelessness (Michelle L. Patterson, Somers, & Moniruzzaman, 2012).

Poor physical health is also characteristic of the homeless population (Fazel et al., 2014; Gaetz, Donaldson, et al., 2013). About 46-85% of homeless individuals are affected by acute or chronic physical illness (e.g. tuberculosis, human immunodeficiency virus-HIV) (Beijer, Wolf, & Fazel, 2012; Hwang, Aubry, et al., 2011; Zlotnick & Zerger, 2009). Other poor health outcomes experienced among people who are homeless include nutritional deficiencies, infectious diseases, cardiovascular and metabolic diseases, unintentional injuries or accidents, and smoking-related diseases (Beijer et al., 2012; Fazel et al., 2014; Frencher et al., 2010; Porter, Houston, Anderson,

& Maryman, 2011; Sprake, Russell, & Barker, 2014). However, despite the poor health status, homeless individuals often face barriers accessing primary or preventative care, resulting in increased emergency department (ED) visits and hospitalizations (Stergiopoulos, Gozdzik, et al., 2015). Inadequate access to health care can exacerbate poor health outcomes of the homeless population, ultimately contributing to higher mortality rates and lower overall life expectancy compared to the general population (Davis, Tamayo, & Fernandez, 2012; Feodor Nilsson et al., 2018; Nusselder et al., 2013).

Structural factors are socio-economic issues that can limit opportunities for societal success and survival, inducing and perpetuating homelessness, especially among people with predisposing individual factors (Fazel et al., 2014; Gaetz, Donaldson, et al., 2013). Some key issues in Canada include poverty and income inequality (due to local and national economic shifts), reduced benefits and welfare for low income individuals and families, lack of affordable housing, poor access to health and social service supports, social exclusion and discrimination (Gaetz, Donaldson, et al., 2013; Shier et al., 2016; Marybeth Shinn, 2007; Stergiopoulos et al., 2014).

Currently, Canada has a nationwide shortage of affordable housing so a growing number of people are unable to afford a home, further contributing to homelessness as a societal problem (Gaetz, Donaldson, et al., 2013). Especially individuals and families who are vulnerably housed, allocating more than a third of their income to housing, are at great risk for homelessness (Gaetz, Donaldson, et al., 2013). Furthermore, those who are more exposed to discrimination (i.e. racial and sexual minorities) are more likely to experience fewer socioeconomic opportunities due to challenges in accessing employment, housing and other support services (Gaetz, Donaldson, et al., 2013; Omerov, Craftman, Mattsson, & Klarare, 2020).

2.1.4 Typologies of the Homeless Populations

In Canada, the sociodemographic representation of the homeless population has been changing and diversifying. Historically, the homeless were predominantly represented by older, single men, but recently, there are more women, youth and seniors, families, indigenous people, and veterans experiencing homelessness (Gaetz, Dej, Richter, & Redman, 2016). Especially for some sub-groups (e.g. women, and immigrants) who may experience social discrimination and further disadvantage associated with their minority status, the consequences to their health and social

functioning may become severely compromised (Hankivsky & Cormier, 2009; Loppie Reading & Wein, 2009; Pauly et al., 2012). Therefore, it would be important to identify different profiles of the heterogenous homeless population in order to consider differences in age, gender, ethnicity, health status etc. when developing solutions that aim to better meet clients' needs (Aratani, 2009; Burt, 2010; Klodawsky, 2010; Menzies, 2006; Pauly et al., 2012).

Traditionally, the way to identify different profiles within a population has been by typology. Within the context of homelessness, establishing typologies that identify subgroups of individuals provides insight to the specific needs present so that housing and other services can be tailored to address those needs. Over the past few decades, several typology studies have been conducted within a *general homeless population* (Adair et al., 2017; Aubry et al., 2012; Bonin, Fournier, & Blais, 2009; Dennis Culhane, Metraux, Park, Schretzman, & Valente, 2007; Fortin, Cao, & Fleury, 2018; Gentil, Grenier, Bamvita, Dorvil, & Fleury, 2019; Kuhn & Culhane, 1998; Tsai, Edens, & Rosenheck, 2011) or in subpopulations such as *youth* (Altena, Beijersbergen, Vermunt, & Wolf, 2018; Coward Bucher, 2008; Hodgson, Shelton, & van den Bree, 2015; Kort-Butler & Tyler, 2012; Tevendale, Comulada, & Lightfoot, 2011; Tyler & Ray, 2019) and *veterans* (Byrne, Montgomery, & Fargo, 2016; Goldstein, Luther, Jacoby, Haas, & Gordon, 2008).

Three studies have reported typologies of *housing trajectories* on a general adult homeless population (Adair et al., 2017; Aubry et al., 2012; Lee et al., 2016), with notable differences and similarities between subgroups found. Two Canadian studies have followed their participants over two years (Adair et al., 2017; Aubry et al., 2012), whereas the study conducted in the US differed in study design as it is a cross-sectional study asking participants to recall their living situation six months prior (Lee et al., 2016). Although all studies recruited participants with homelessness experience, sampling procedures were very different such that one of the studies had additional criteria, like having MHD since it aimed to evaluate a specific intervention (Adair et al., 2017), whereas another study used quota sampling to have more equally distributed groups for age and sex (Aubry et al., 2012). Moreover, the studies used diverse analytical methods to establish typologies, which included cluster analysis (Lee et al., 2016), latent class analysis (Aubry et al., 2012), and growth mixture modeling (Adair et al., 2017). However, despite these differences in research design, all three studies examined a large range of variables including sociodemographic (e.g. age, sex, homelessness history), clinical (e.g. MHD, SUD) and acute health service use (e.g.

ED visits, hospitalizations) (Adair et al., 2017; Aubry et al., 2012; Lee et al., 2016). Several findings were supported with respect to housing stability, such that groups in stable housing status were more likely to be female and experience shorter duration of homelessness (Adair et al., 2017; Lee et al., 2016). Whereas people who had difficulty exiting homelessness were more likely to be male with low income and longer histories of homelessness (Adair et al., 2017), or have SUD (Aubry et al., 2012).

On a different note, several variables have been rarely considered in typological research with respect to housing stability among the homeless population. Some of these lesser studied variables are: suicidal behaviour and functional disability, both very prevalent in homelessness (Fazel et al., 2014); use of public primary care or health and social services, such as having a family doctor (Gentil, Grenier, Bamvita, & Fleury, 2019; Khandor et al., 2011); strictness in residential code for living/conduct in different housing models (Dickson-Gomez et al., 2017; Pearson, Montgomery, & Locke, 2009), i.e. enforcing stringent abstinence policies against substance use in some TH programs, as opposed to the harm reduction policies characteristic of HF (Stergiopoulos, Hwang, et al., 2015; Tsemberis, 2010). Although these variables would provide enriching profiles of subgroups that further highlight clinical needs and patterns of service use, no typology to our knowledge has included these variables and identified profiles based on change in housing status.

2.2 Strategies Addressing Homelessness

This section describes some principal strategies that are part of the national and provincial efforts combatting homelessness, including emergency shelters, TH, PH, and systems integration.

2.2.1 Emergency Shelters

Despite the growing awareness and initiatives towards homelessness prevention, in many Canadian communities today, emergency shelters remain as a primary response to provide homeless people a place to sleep (Gaetz, Donaldson, et al., 2013). Emergency shelters are part of the emergency or crisis response often run by local government agencies, non-profit and community organization, or faith groups. An emergency response to homelessness is comprised of a range of services providing food, shelter, outreach, including drop-in centres, soup kitchens, food and clothing banks, etc. Although there will always be a demand for emergency services

including shelters, they are currently aimed to provide only a short-term fix for homelessness. In order to adopt more long-term solutions to homelessness, emergency services will need to be reoriented with a broadened aim to support exit from homelessness and towards supported accommodation.

However, currently in Canada, emergency shelters are often viewed as a distinct response from prevention strategies that help people attain stable affordable housing. By contrast, in other countries like the UK and Australia, emergency shelters are part of a continuous supported housing trajectory that facilitate homelessness prevention, mobility of people into affordable housing, and eventually stable independent living (Evans, Neale, Buultjens, & Davies, 2011; Pawson, 2007). Therefore, it would be important for Canada to repurpose service delivery of emergency shelters with the goal to support both prevention and intervention for affordable housing within a continuum of care framework. The integration of emergency shelter services with TH and PH services has been a recent suggestion, so shelter users have better access and opportunity to attain stable affordable housing (Gaetz & Dej, 2017). However, there is yet to be research conducted to better understand trajectories towards housing stability along the housing continuum of shelters, TH and PH.

2.2.2 Temporary Housing (TH)

Temporary housing (TH), also known as transitional or interim housing, refers to a type of supported accommodation that acts as an intermediary service between emergency shelters and permanent housing, for a limited duration usually between three months to three years (Novac, Brown, & Bourbonnais, 2004). In contrast to emergency shelters, traditionally, TH has always been viewed as part of the housing continuum that bridges prevention strategies and stable housing attainment. In fact, TH programs can be more individualized and service-intensive than shelters, with the objectives to provide service users the structure and support necessary to deal with factors contributing to their homelessness, as well as to acquire skills and competence to be better prepared and qualified for PH tenure (Novac et al., 2004). Therefore, compared to emergency shelter users, there is a higher expectation for people who successfully complete a TH program to be capable of attaining more stable housing and exiting homelessness.

Since TH programs serve a diverse group of people with different needs to exit homelessness, the services can vary extensively in the rigor of expectations demanded from its users. Low demand TH programs have more lenient admission requirements and non-obligatory services offered with the aim to attract chronically homeless clientele from the streets and only gradually encourage them to adapt behaviour favourably (e.g. accepting health care, improving personal hygiene) (Barrow & Zimmer, 1999). Whereas high demand TH programs have more specific eligibility criteria and stricter abiding rules in a more service-intensive or "treatment-first" approach towards behaviour modification (e.g. sobriety) (Barrow & Zimmer, 1999). These intensive TH programs are often designed to serve individuals and families facing multiple serious health, financial and interpersonal issues (Barrow & Zimmer, 1999). TH programs with their targeted services have benefitted many groups of people, including people with physical disabilities or MHD or SUD, youth in transition from foster care system, victims of trauma (i.e. domestic violence, sexual abuse), families in crises, immigrants in need of employment and financial support, and even recently discharged prisoners reintegrating into society (M. Burt et al., 1999; Nesselbuch, 1998; Sprague, 1991). In fact, compared to standard care (e.g. emergency shelters), TH has been shown to be more effective in helping homeless individuals achieve housing stability and improve their living conditions (Fitzpatrick-Lewis et al., 2011; McGuire, Rosenheck, & Kasprow, 2011). As such the success of a TH program often depends on how well the program design, duration and service delivery match the users needs.

Yet, despite TH preparing its users with life skills and support to improve their housing situation for longer term, recently it has become a controversial service model on the housing continuum (Burt et al., 2002). On one hand, until affordable housing becomes widely accessible across Canada, there will always be a need for TH along the continuum of care to serve individuals in difficult life circumstances (Gaetz, Gulliver, & Richter, 2014; Goering et al., 2014). For example, according to *Rue des Femmes* (a non-profit organization in Montreal serving women who are experiencing or at risk of homelessness), for some homeless individuals, attaining PH too early may result in premature exit from PH and therefore TH may prove to be a more favourable option to undergo necessary preparations until PH arrangement can be readily received (Rue des Femmes., 2010). TH could also be more cost-effective for supporting a greater number of homeless individuals at a time compared to PH (Hawthorne et al., 2005). On the other hand, PH programs like HF that do not require applicants to demonstrate the ability to maintain tenancy prior to

placement, have successfully shown achievement in housing stability among its users, even those with MHD or SUD (Palepu, Patterson, Moniruzzaman, Frankish, & Somers, 2013; Tsemberis, 2010; Woodhall-Melnik & Dunn, 2016). Therefore, some critics have expressed that resources should be allocated towards PH with support services rather than on TH programs (Barrow & Zimmer, 1999; Burt et al., 2002).

However, some studies that compared the effectiveness of TH vs PH services on housing outcomes have reported inconclusive findings, commonly due to short study duration and challenges in discerning profiles of service users (Kertesz, Crouch, Milby, Cusimano, & Schumacher, 2009; Sun, 2012; Tsai, Mares, & Rosenheck, 2010). And in general, considerably little research on TH has been documented in the literature, let alone TH studies considering a wide range of variables, that include personal characteristics of the homeless individuals and organizational factors related to support towards attaining PH. As the controversy of TH as an effective service model remains, there is a need for more evaluative research examining housing trajectories of service users across the housing continuum in TH as well as PH and shelters.

2.2.3 Permanent Housing (PH)

Typically following TH on the housing continuum when affordable housing is available, direct access to permanent housing (PH) is a viable option that involves independent rental or rental-assisted housing combined with housing-related services and individual case management for referral towards services in health, employment, finances, etc. (Gaetz et al., 2014). PH with support has been recognized as a critical strategy towards housing stability, providing housing as a basic human need essential to the health, wellbeing and social integration of people (Aubry, Duhoux, et al., 2016). Greater housing stability with PH allows individuals experiencing homelessness to engage more autonomous way of living by exerting better control over their circumstances, establishing healthy routines and planning for their futures (Pankratz, Nelson, & Morrison, 2017).

PH has been implemented with different philosophical approaches to intervention through various combinations of accommodation arrangements and supports. The HF philosophy with its client-centred approach has gained global interest and popularity in recent years (Gaboardi et al., 2019; Tsemberis, Gulcur, & Nakae, 2004), inspiring housing services to gradually move away from traditional approaches that prioritized “residential treatment first” (a step-wise model that

promoted acquisition of life skills and autonomy in TH before accessing PH) (Henwood, Derejko, Couture, & Padgett, 2015; Henwood et al., 2018). And although some PH programs enforce strict abstinence for admission similar to many TH services, other PH services offer more flexible harm reduction intervention approach (Leff et al., 2009).

Moreover, PH has been provided through diverse accommodation settings including, *scattered-site housing* (private independent rental units dispersed across the municipality, offering PH clients benefits of more autonomy and community integration, which may also be less stigmatizing as HF); *congregate or community housing* (several independent rental units concentrated within a building or neighbourhood, allowing for on-site supports [e.g. 24h access to a case manager] and programming [e.g. communal brunch] which fosters a sense of community); and *social housing* (low cost rental units often managed by community-based or municipal organizations) (Gaetz, Scott, et al., 2013). Delivery support services like case management can be provided through individual home visits or within a community-based setting (Gaetz et al., 2014). However, the types of PH services available varies depending on the region. In Canada, as well as the US and Europe, many PH programs offer scattered-site housing from the private rental market along with rent subsidy and individual follow-up through case management (Gaetz, Scott, et al., 2013; Greenwood et al., 2019; Tsemberis & Eisenberg, 2000). Follow-up services are usually provided by an organization different from one that manages housing arrangements. In contrast, in Australia, most PH services come in the form of community or social housing and support is commonly offered in a community setting, usually by a case manager on-site (Verdouw & Habibis, 2018).

Meanwhile, in Quebec, the government has implemented a variety of PH with support services to meet the needs of the homeless population in the province, including the HF model, community housing run by community-based organizations, and social housing (referred to as low rent housing or *habitations à loyer modiques [HLM]*) managed by the municipal agencies (MSSS, 2014). Moreover, la Société d'habitation du Québec (SHQ), the provincial government agency for housing needs of residents, has mandated development of social and community housing units for individuals currently or at high risk of becoming homeless as part of the *Accès-Logis* programme (SHQ, 2020). And since 2018 the city of Montreal has taken on a three-year initiative to provide

at least 950 social or community housing units to accommodate the homeless population (SDSS., 2018). As such, PH has been an integral part of Quebec's response to combatting homelessness.

The importance of PH services has been well-noted as an effective strategy to address homelessness. Particularly, with HF being the one of most popular PH models, its success has been repeatedly demonstrated among several countries (Gaboardi et al., 2019; Goering et al., 2014; Tsemberis & Eisenberg, 2000). In Canada, the extensive randomized control trial of HF in several communities (At Home/Chez Soi project), was a landmark contribution to homelessness intervention research and policy (Goering et al., 2014). The study showed that 80% of previously chronically homeless individuals were able to maintain housing after the first year, along with other positive outcomes like decrease use of acute health services and reduced involvement with law enforcement (Goering et al., 2014). Studies comparing HF to other programs with "residential treatment first" approach and found superior outcomes among HF users (Aubry, Goering, et al., 2016; Gaboardi et al., 2019; Rog et al., 2014). However, evaluative research on other models of PH have also demonstrated health and social benefits such as decreases in hospitalizations, criminal justice involvement, and emergency shelter use (Martinez & Burt, 2006; Rosenheck, Kasprow, Frisman, & Liu-Mares, 2003), as well as improvement in housing stability (Leff et al., 2009). Although so far the research has demonstrated strong evidence for PH services as an effective means to improve housing stability and combat homelessness, not all service users remain in PH. Given that there is still little understanding on homeless individuals' trajectories along the housing continuum, this warrants a need to examine factors associated with changes in housing status, like of those individuals who may lose their PH and move to TH or shelter services.

2.2.4 Systems Integration

People who follow a housing trajectory using emergency shelters, TH or PH have multiple and complex needs that require attention as part of the continuum of care – a systems integrated approach to service delivery established by collaborations among various organizations (Evans et al., 2011; Wong, Park, & Nemon, 2006). Interorganizational collaboration in the homelessness service system would involve both governmental and community-based agencies providing housing and homeless support services, as well as services in health, education, employment and justice sectors (Lake, 2005). Continuum of care in the homelessness service system has been essential with the aim to deliver long-term favourable outcomes for both service users and the

system itself through improved accessibility to services and continuity of care, efficient service delivery and referral to appropriate service sectors, reduced service return rates, duplications and costs, as well as greater focus on early intervention and prevention strategies (Evans et al., 2011; Isett & Ellis, 2007; Konrad 1996; Patterson, 2000; Provan & Milward, 2001; Randolph, Blasinsky, Leginski, Parker, & Goldman, 1997).

However, current service delivery with the continuum of care approach has been criticized for several reasons (Evans et al., 2011). First, the lack of affordable housing has been a widely acknowledged structural factor that impedes people from attain permanent housing (Gaetz & Dej, 2017; Gaetz, Donaldson, et al., 2013). Second, even along the housing continuum, various TH and PH programs have specific admission criteria that exclude potential clients, creating exit points in the homeless service system (Wong et al., 2006). As such, the inaccessibility to permanent housing may result in people becoming stagnant on the housing continuum or regressing to homelessness, contributing to a systemic bottleneck. Furthermore, support services for clients along the continuum of care also face barriers to system integration. In fact, since organizations tend to collaborate with groups that have similar operations and philosophies, the necessary cross sector collaborations to meet the diverse needs of the clientele become difficult to establish (Isett & Ellis, 2007).

In places that have adopted an integrated systems approach, such as in Australia, evaluative research has shown that cross sector collaborations can be facilitated through efficient coordination between organizations that directly provide housing and related support services and those of sectors outside immediate housing support services (e.g. health, justice, education) (Evans et al., 2011). Some Canadian communities, such as Medicine Hat, Alberta, have shown considerable improvement in reducing homelessness after implementing a systems integration approach (Medicine Hat Community Housing Strategy, 2015). Service integration at the systemic level seems to be a promising direction towards addressing homelessness in Canada and evaluative research will play an essential role in facilitating those efforts.

2.3 Evaluative Research on Homelessness & Interventions

This section briefly presents an overview of current approaches to evaluative research on homelessness interventions and an applicable model used in evaluation research, the Gelberg-Andersen Model.

2.3.1 Current Approaches to Evaluating Homelessness Interventions

According to a systematic review by Pauly et al. (2012) on current approaches in the evaluation of homelessness strategies, more than half of the studies have focused on PH evaluations whereas fewer TH programs and shelters were evaluated. Furthermore, evaluations have primarily emphasized indicators that reflected outcomes of individual change. For example, housing status (i.e. defined differently among studies according to housing type and duration housed) was the most common indicator used in studies assessing PH and TH, reflecting a measure of program success – housing stability in PH evaluations or the likelihood to exit homelessness and or to attain PH in TH evaluations (Pauly et al., 2012). Other common indicators among evaluative research of PH and TH programs include physical and mental health conditions, substance use, service use (i.e. in health, social and justice sectors), and quality of life (Pauly et al., 2012).

In contrast, indicators that reflected outcomes of structural or systemic changes are less emphasized in evaluations. There have been some studies that have included variables like cost of programs/services, client and or staff perceptions of program success, or service integration measures (Pauly et al., 2012). However, several researchers have expressed the need to re-consider the approach to evaluating interventions to take into account contextual factors since the socioeconomic and political climate may influence both program implementation and success (Dunn, van der Meulen, O'Campo, & Muntaner, 2013; Fitzpatrick, 2005; Gaetz, Donaldson, et al., 2013; Nelson et al., 2014; O'Campo et al., 2009). In fact, knowledge of the specific context to which a program was implemented would be valuable to better identify conditions required to produce successful outcomes and also allow for improved systems integration (Dunn et al., 2013).

2.3.2 Gelberg-Andersen Behavioral Model

One model applied in health service evaluation is the Gelberg-Andersen Behavioral Model for Vulnerable Populations (Gelberg, Andersen, & Leake, 2000), which is useful in analyzing risk

factors, health care service use, and outcomes in vulnerable populations, including homeless populations (Gabrielian, Hamilton, Alexandrino, Hellemann, & Young, 2017; Gentil, Grenier, Bamvita, & Fleury, 2019; Petrovich, Hunt, North, Pollio, & Roark Murphy, 2019; Petrovich, Pollio, & North, 2014; Stein, Andersen, Robertson, & Gelberg, 2012). In this model, variables are classified into *predisposing factors* (i.e., socio-demographics: age, sex…), *needs factors* (i.e., clinical variables: types and numbers of disorders…) and *enabling factors* (i.e., service use variables, including having a family doctor or frequency of hospitalization) (Gelberg et al., 2000). Moreover, each factor of this model has included a vulnerable domain, with variables particularly related to differences in social structure and enabling resources in the vulnerable population as compared with the general population (Gelberg et al., 2000). However, studies on homelessness that have used the Gelberg-Andersen Model have been situated mostly in the US and have evaluated subgroup populations like veterans (Gabrielian et al., 2017; Petrovich et al., 2014), women (Doran et al., 2014; Stein, Andersen, & Gelberg, 2007), men in shelters or on the streets (Petrovich et al., 2019) and hepatitis B/C positive individuals (Stein et al., 2012). To our knowledge only one Canadian study has used the model to identify predictors of service satisfaction (Gentil, Grenier, Bamvita, & Fleury, 2019). And, no study has examined housing stability among individuals in different status on the housing continuum using the Gelberg-Andersen Model as a conceptual framework.

CHAPTER 3: METHODOLOGY

The present study was a part of an ongoing longitudinal project from 2017, entitled *« Efficacité du logement transitoire pour les personnes en situation d'itinérance »* under the direction of Dr. Marie-Josée Fleury, Professor of Psychiatry, McGill University and Researcher at the Douglas Hospital Research Centre. The overall research project aimed to better understand long-term changes in residential stability, social integration and associated factors among currently or formerly homeless individuals using shelters, TH and PH services in Quebec. The thesis research investigated residential stability, specifically the change in housing status over a 12-month period for this sample.

3.1 Study Design

This section presents the study design, including the setting, sample, data collection and ethics.

3.1.1 Setting

The study was conducted in the two largest urban centres of Quebec, Montreal and Quebec City. A total of 27 community or public organizations were initially contacted regarding participation in the study, 22 in Montreal and five in Quebec City. Of these, 20 organizations provided housing services: three with PH units (173 beds), 12 with TH (about 20 beds per organization) and five with emergency shelters (29 beds per shelter on average). The remaining seven organizations offered other services, such as food banks, day centers, leisure activities, employment and housing integration services, and financial or material support. As shown in the flow diagram in **Figure 1**, data were collected from two sources: service users and organizations' directors and program coordinators.

3.1.2 Sample

Service users from the above-mentioned organizations were recruited using the following strategies: posters displayed in common areas of the selected organizations; onsite, in-person recruitment by the project coordinator, or referrals by housing staff who attended information meetings on the study given by researchers. In order to be eligible, participants had to be at least 18 years old, with current or previous experience of homelessness, and residing in either subsidized PH for two years or less, in TH (mostly 3 to 12-month residency), or currently using emergency

shelters. All eligible individuals were included; but anyone intoxicated or otherwise unfit to be interviewed was accommodated later. In addition to service user participants, directors and program coordinators at the 20 selected organizations were surveyed to obtain data on the housing resources. The seven organizations providing support services, but no housing, were excluded, two of which were in Montreal and five in Quebec City.

3.1.3 Data Collection

Baseline structured interviews (T0) were conducted with service users between January and September 2017 on the same day or shortly after initial contact with each participant. Interviews were administered by trained research assistants at the selected organisations, participant apartments, or local cafés and lasted about 75 minutes. Participants were followed up 12 months later (T1). The follow-up interviews tended to be shorter, about 55 minutes in duration, as questions pertaining to sociodemographics and health conditions were asked only if participants indicated any change on these indicators since T0. Questionnaires for directors and program coordinators were self-administered using an online software *LimeSurvey* between November 2017 and March 2018. Online questionnaires took about 45 minutes to complete with questions pertaining to housing resources of the organizations.

3.1.4 Ethics

All participants provided informed written consent prior to contributing to the research. This study was approved by the research ethics board of the Douglas Mental Health University Institute. Following completion of their interviews, participants received a gift card or a modest financial contribution as acknowledgement of their time and contribution to the research.

3.2 Conceptual Framework & Study Variables

The section presents the study's conceptual framework based on an adapted Gelberg-Andersen Model, then describes the dependent variable in detail, followed by the independent variables organized according to the three conceptual blocks – predisposing, needs and enabling factors (with enabling factors divided into two parts: service user and housing resource variables).

3.2.1 Conceptual Framework: Gelberg-Andersen Model

The study was conducted using the conceptual framework based on the Gelberg-Andersen Behavioral Model for Vulnerable Populations (Gelberg et al., 2000) presented in *Chapter 2.4.2* of this manuscript. A large number of variables were included in this study, based on the model and the literature on homelessness. The adapted Gelberg-Anderson Model of the current study is presented in **Figure 2** and **Table 1** summarizes the study variables and instruments used.

3.2.2 Dependent Variable (DV): Change in Housing Status over 12 months

The dependent variable (DV) was "change in housing status over 12 months", a proxy for housing stability as an indicator of success for housing services. Given that homeless individuals utilize a range of housing services (emergency shelters, TH, PH), change in housing status over time would better capture their housing trajectory. Since homeless people are also a heterogenous group, various factors related to their housing status may improve, deteriorate or remain stable over time.

Housing status was measured using an adapted Canadian Community Health Survey (CCHS), in terms of type of accommodation (emergency shelter, TH, PH with or without support) at T0 and T1, which occurred 12 months later. As shown in **Figure 2**, change in housing status consisted of four categories:

1) **Stable-PH:** participants who maintained PH at T0 and T1, suggesting highest housing stability over 12 months;

2) **Improvement:** participants who changed housing status between T0 and T1, moving from shelters to TH or PH, or from TH to PH, suggesting increased housing stability over the study period;

3) **Stable-TH:** participants who remained in TH at both T0 and T1, suggesting no change in housing stability over 12 months;

4) **Deterioration:** participants who moved from PH or TH to shelter, from PH to TH, or who remained in shelters suggesting decreased housing stability over 12 months.

As the Stable-PH and Improvement categories described change toward more favourable housing status, participants in these categories were considered to have experienced a **positive change** in

housing status over 12 months. By contrast, participants in the Stable-TH and Deterioration categories at T1 were viewed as experiencing **negative change** in housing status over the 12 months.

3.2.3 Independent Variables (IV): Variables Associated with Housing Status

Variables in Predisposing Factors

Housing Status at T0: Emergency shelters, TH, and PH offer a different range and varying degree of access to resources which may influence health and social functioning of service users. The current study has controlled for housing status at T0 to examine whether baseline housing affects housing trajectory over a 12-month period.

Age: Previous research has shown older age to be associated with housing stability among participants in HF (Collins, Malone, & Clifasefi, 2013; Tsemberis & Eisenberg, 2000) and in other PH services (Warnes, Crane, & Coward, 2013; Wong, Poulin, Lee, Davis, & Hadley, 2008). However, one study conducted in shelters found a negative association between age and housing stability, indicating that older adults tended to remain homeless for longer periods (Caton et al., 2005). Canadian reports have noted an increase in shelter use by older adults (50-64 years) and seniors (65+ years) even accounting for aging of the overall population (Gaetz, Dej, Richter, & Redman, 2016; Segaert, 2012). The present study focused on middle-age and older adults in measuring the influence of age on change in housing status.

Sex: Findings related to stable housing by sex have been mixed. Some PH studies reported no significant association between sex and housing stability (Collins et al., 2013; Warnes et al., 2013), whereas others have produced typologies showing that stably-housed individuals were more likely to be female, one with a HF sample (Adair et al., 2017) and another with a community sample (Lee et al., 2016). Men represented a greater proportion of shelter users than women, which may have contributed to their different housing trajectories (Segaert, 2012). This study aimed to identify whether, and how, sex may predict change in housing status over 12 months, particularly for subgroups in the study sample.

Country of Birth: The influence of country of origin has also varied, where, on one hand, foreign-born users of PH service with the HF model have been shown to benefit more than native-born counterparts (Stergiopoulos, Gozdzik, et al., 2015). Yet in a different homeless population, foreign-born and native-born individuals shared similar risk factors for homelessness (Tsai & Gu, 2019). The present research has included country of birth as a standard sociodemographic measure to examine its influence on change in housing status.

Marital Status: Marital status has been associated with mental health service use among homeless individuals (Mares, Greenberg, & Rosenheck, 2008), but no study has reported a direct association with housing stability. This study has examined the association between marital status and change in housing status over 12 months.

Having Children: Having dependent children has been shown to be a protective factor for maintaining stable housing and preventing homelessness (Orwin, Scott, & Arieira, 2005). Yet the association between having children (no longer dependent) and housing outcomes in middle-aged or older groups has rarely been examined. The present study includes whether individuals with children in older groups are more likely to experience a positive change in housing status over 12 months.

Education: Given the recognized value of education for access to employment, higher income, and positive social identity, homeless services have offered educational and skills training to facilitate reintegration into society (Nicholls, 2010; Shinn, 2015). Although most studies include education as a key sociodemographic variable, no study to our knowledge has identified level of education at baseline as strongly predictive of housing stability. In fact, one study had suggested the lack of association between education and housing stability may be due to a great majority of participants in the sample (89%) having a high school education or less, regardless of stable housing status (Aubry, Duhoux, et al., 2016). This current research has examined the association between education and change in housing status over 12 months to determine whether education contributed to housing stability in this sample.

Employment: Current or recent work and engagement in routine activities have been identified as beneficial towards achieving housing stability in a study of shelter users (Caton et al., 2005), and

further confirmed by longitudinal studies with community samples in shelter and supportive housing services (Crane & Warnes, 2007). The present study has attempted to verify whether this positive association holds in relation to change in housing status.

Monthly Income: Previous studies have shown that higher income related to housing stability among HF residents (Adair et al., 2017) as well as among individuals in shelters or other temporary accommodations (single occupancy hotels, rooming houses) (Aubry, Duhoux, et al., 2016; Caton et al., 2005). This study has aimed to identify whether higher income predicts a positive change in housing status over 12 months, and whether differences emerge among subgroups.

Foster Care: While studies with homeless youth have identified foster care experience as a potential risk factor for homelessness (Dworsky et al., 2013; Keane, Magee, & Kelly, 2016; Kort-Butler & Tyler, 2012), this association has not been established among homeless adults. This study with adults has examined the link between former foster care experience and change in housing status over 12 months.

Arrests: Past studies conducted with community samples of current or former shelter users found that more stably-housed individuals were less likely to have criminal justice system involvement, including arrests than others (Caton et al., 2005; Van Straaten et al., 2017; Walsh et al., 2019). This study has tested for a possible negative association between arrest history and change in housing status over 12 months.

Chronic Homelessness: Although people with experience of chronic homelessness have been shown to achieve housing stability in HF (Goering et al., 2014), other studies revealed greater difficulties in maintaining housing stability following chronic homelessness as compared with those experiencing fewer episodes or shorter durations of homelessness (Adair et al., 2017; Volk et al., 2016). This study has examined the association between chronic homelessness and change in housing status over 12 months.

Variables in Needs Factors

Mental Health Disorders (MHD): While prevalence rates for MHD are higher for homeless individuals than in the general population (Fazel et al., 2014), previous research with residents in

PH, including HF, have shown that having MHD does not reduce the likelihood of maintaining stable housing (Collins et al., 2013; Crane, Collins, Hall, Rochester, & Patch, 2012; Lee, Wong, & Rothbard, 2009). Other studies on individuals with MHD living in PH identified positive associations between housing stability and mood disorders (Tsemberis & Eisenberg, 2000), and schizophrenia (Wong et al., 2008). An Australian study on outreach programs, shelters and TH services found that MHD at baseline did not predict housing status one year later (Spicer et al., 2015). The current study considered a wide list of psychiatric disorders, including common MHD (major depressive episodes; posttraumatic stress disorder; generalized anxiety disorders), severe MHD (bipolar disorder; psychotic disorders, mood disorders with psychotic features) and personality disorders. This study has tested for associations between MHD and change in housing status over 12 months for the different subgroups.

Substance Use Disorder (SUD): Similar to MHD, SUD and related comorbidities are more prevalent among homeless individuals than in the general population. In PH and HF studies, people with SUD (alcohol or drug abuse) have been found capable of maintaining housing stability (Collins et al., 2013; Crane et al., 2012). Those who maintained stable housing were less likely to have had SUD (Aubry, Duhoux, et al., 2016). Another PH study (supported independent living arrangement) found that participants with a history of SUD were significantly more likely to exit the program and return to unstable housing conditions, although abstinence policies may have influenced the findings (Lee et al., 2009). The present research has investigated whether SUD predicts negative change in housing status over 12 months.

Suicidal Behaviours: Among homeless individuals, suicidal behaviour has been a greater focus in studies on homeless youth than in other age groups (Barnes, Gilbertson, & Chatterjee, 2018; Cleverley & Kidd, 2011). One Canadian study examined suicidal behaviour among homeless adults in HF (Aquin et al., 2017). Although this study reported no evidence that HF helped reduce suicidal symptoms among participants, the influence of this variable on housing stability was not examined (Aquin et al., 2017). This study has considered the association of suicidal behaviours, both ideation and attempt, in the previous 12 months and change in housing status among adults using different types of housing services.

Physical Illnesses: Homeless individuals also have a relatively higher prevalence of physical health problems such as *chronic* physical illnesses like hypertension, heart/liver/kidney diseases, cancer, diabetes, HIV/AIDS, and *other* medical conditions like ulcers (Fazel et al., 2014). A study by Adair et al. (2017) identified a subgroup of individuals living in HF with high physical health needs, while the same group had the best outcomes in terms of obtaining PH within six months and sustaining their housing for 12-18 months. The present study has examined whether physical illness is associated with change in housing status over 12 months, especially among the subgroups.

Functional Disability: Functional disability in homelessness has been reportedly much higher than in the general population, reflecting the high physical and mental health needs of individuals in harsh, stressful living situations (Fazel et al., 2014). However, little research has examined the influence of functional disability with respect to housing outcomes. This study included a functional disability measure to investigate associations with change in housing status over 12 months for those in different housing services.

Variables in Enabling Factors

Service User Variables

Social Supports (Family or Friends): Studies on homeless individuals living in different situations have reported that regular contact with family or friends is significantly associated with attaining more stable housing (Aubry, Duhoux, et al., 2016; Gabrielian, Young, Greenberg, & Bromley, 2018; Patterson & Tweed, 2009; Pickett-Schenk, Cook, Grey, & Butler, 2007; Warnes et al., 2013). Studies have also shown that social isolation and lack of social support negatively affect housing stability, in TH (Fotheringham, Walsh, & Burrowes, 2013) and in PH (Patterson, Rezansoff, Currie, & Somers, 2013). The present study has tested the number of social supports (family or friends) in association with change in housing status over 12 months.

Quality of Life (QOL): Research has consistently shown that previously homeless people who are stably housed tend to have higher QOL than those unstably-housed (Gentil, Grenier, Bamvita, Dorvil, et al., 2019; Nelson, Aubry, & Lafrance, 2007; Palepu et al., 2013). In fact, several studies have found that individuals living in PH, including HF, had higher QOL compared to emergency

shelter users, TH residents or people in other inadequate forms of accommodation (Hwang, Gogosis, et al., 2011; MSSS., 2014; Tsemberis et al., 2004). However, no study to knowledge has found QOL to be predictive of housing stability. This current study tested QOL as a predictor of change in housing status over 12 months.

Having a Family Doctor: Health service research of homeless populations has rarely focused on access to primary care services, such as a family doctor or primary care provider. In contrast, the use of secondary care or acute health services, like ED visits and hospitalization, have received considerably more attention in research on homeless populations (Hwang, Gogosis, et al., 2011; Jaworsky et al., 2016; Stergiopoulos et al., 2017; Tsai et al., 2010; Tsemberis et al., 2004). This is likely due to the remarkably high use of acute health services among homeless individuals (Fazel et al., 2014), a phenomenon globally present in jurisdictions with or without universal health care and regardless of available access to primary care services (Hwang et al., 2013; Kushel, Vittinghoff, & Haas, 2001; Riley, Harding, Underwood, & Carter, 2003). Yet in the few studies that have investigated primary care services among homeless individuals have shown that less than half of the samples reported having a family doctor, despite primary care services identified as protective and more cost effective than acute health services (Gentil, Grenier, Bamvita, Dorvil, et al., 2019; Kessell, Bhatia, Bamberger, & Kushel, 2006; Khandor et al., 2011). However, the influence of having access to a family doctor on housing stability remains unclear. This study has examined whether having a family doctor predicts change in housing status over 12 months, and whether there are differences among subgroups on this variable.

Having a Case Manager: Previous research has demonstrated some evidence for case management as an important factor contributing to client success in housing programs (Chen, 2014; Clark, Guenther, & Mitchell, 2016; Jost, Levitt, & Porcu, 2011; O'Connell, Kasprow, & Rosenheck, 2008). PH studies have shown that both ACM and ICM are associated with improved housing outcomes, including individuals who have experienced chronic homelessness, MHD and or SUD (Mares & Rosenheck, 2011; Nelson et al., 2007; Stergiopoulos et al., 2019). Meanwhile, case management in TH services have also been acknowledged as a key service component, however, it is unclear whether having a case manager is predictive of clients attaining more stable housing (Chen, 2014; Novac, Brown, & Bourbonnais, 2009). This present study tested for having

a case manager as a predictor of change in housing status over 12 months and for the subgroup differences on this variable.

Having Consulted a Professional (Health & Social Services), Public Ambulatory and Community-Based Service Use: Since homeless individuals have higher needs than the general population (Fazel et al., 2014), formal or professional support through health and social services, including clinicians and social services workers, are viewed as protective towards the clients' well-being and essential to meeting those needs (Gabrielian et al., 2018). Some research has examined primary care service use among homeless and unstably housed individuals (Hwang, Gogosis, et al., 2011; Jaworsky et al., 2016; Stergiopoulos, Hwang, et al., 2015), yet few studies have considered the wide range of health and social services often run by large networks of public and community-based organizations. Moreover, little is known whether the use of health and social services, as well as the type (e.g. public vs community-based) and frequency of service use, have an influence on housing trajectories among individuals using housing services. The present research has aimed to identify associations of change in housing status over 12 months with in the previous 12 months: having consulted a professional (a general practitioner, psychiatrist, nurse, psychologist, and social worker), as well as the frequency of service use for a wide range of public ambulatory and community-based services.

ED Visits & Hospitalizations (Acute Health Service Use): Several studies on PH, particularly HF, have consistently shown that being stably housed reduces acute health service use including both ED visits and hospitalizations (Goering et al., 2014; Holmes et al., 2017; Stergiopoulos et al., 2017; Tsai et al., 2010; Tsemberis et al., 2004). Other studies focused on high ED users (4+ ED visits per year) have identified homelessness as a significant predictor of frequent ED users, suggesting that individuals living on the streets or shelters use ED disproportionately (Capp et al., 2013; Lindamer et al., 2012; Tsai & Rosenheck, 2013). Although it remains unclear whether ED use is associated with housing status (Gabet, Grenier, Cao, & Fleury, 2019), previous hospitalization has been found to predict poor housing trajectory in some subgroups of homeless individuals (Adair et al., 2017). More research is needed to investigate the influence of acute health service use specifically on housing trajectories of individuals using services along the housing continuum. The current study has examined whether frequency of ED visits and hospitalizations in previous 12 months predicts change in housing status over 12 months.

Service Satisfaction: Service satisfaction is also known to be associated with health needs and other types of service use, but only for specific groups of homeless and formerly homeless individuals, including women (Swanson, Andersen, & Gelberg, 2003), youth (Hughes et al., 2010), and veterans (Jones et al., 2015). One recent study focused on a general sample (Gentil, Grenier, Bamvita, & Fleury, 2019). The present study has examined associations between service satisfaction and change in housing status over 12 months.

Housing Resource Variables (Data from Directors & Program Coordinators)

Strictness in Residential Code of Living/Conduct: Stringent policies have affected program adherence, as demonstrated in previous studies of treatment-first service models, generally TH programs, in which service users failed to comply with program requirements leading to premature dropout (Dickson-Gomez et al., 2017; Pearson et al., 2009). Yet many PH programs, including HF, promoting harm reduction approaches (e.g. abstinence from substance use) have demonstrated improved housing and mental health outcomes (Gaetz, Scott, et al., 2013; Stergiopoulos, Hwang, et al., 2015; Tsai et al., 2010; Tsemberis & Eisenberg, 2000). A possible explanation for the success of HF may be residents' sense of greater mastery and control over their living situation with the relaxing of restrictions (Gaboardi et al., 2019; Greenwood, Schaefer-McDaniel, Winkel, & Tsemberis, 2005; O'Campo et al., 2009). This current study has investigated strictness in residential code of living/conduct for associations with change in housing status over 12 months.

Intensity of Interorganizational Collaboration: Studies have also suggested the importance of collaboration among different services and sectors in delivering housing and supports to service users experiencing homelessness as this population as extensive needs (Black et al., 2018; Evans et al., 2011; Luchenski et al., 2018; Tsai et al., 2017). With the present research sample derived from many different housing service organizations, this study has investigated the intensity of interorganizational collaboration as a potential factor influencing change in housing status over 12 months for service users.

Overall Budget: It would be expected that organizations with higher budgets and more resources are able to offer more diverse, higher quality services with greater networking capacity with other services, yet this topic has not been well studied with respect to housing outcomes for service

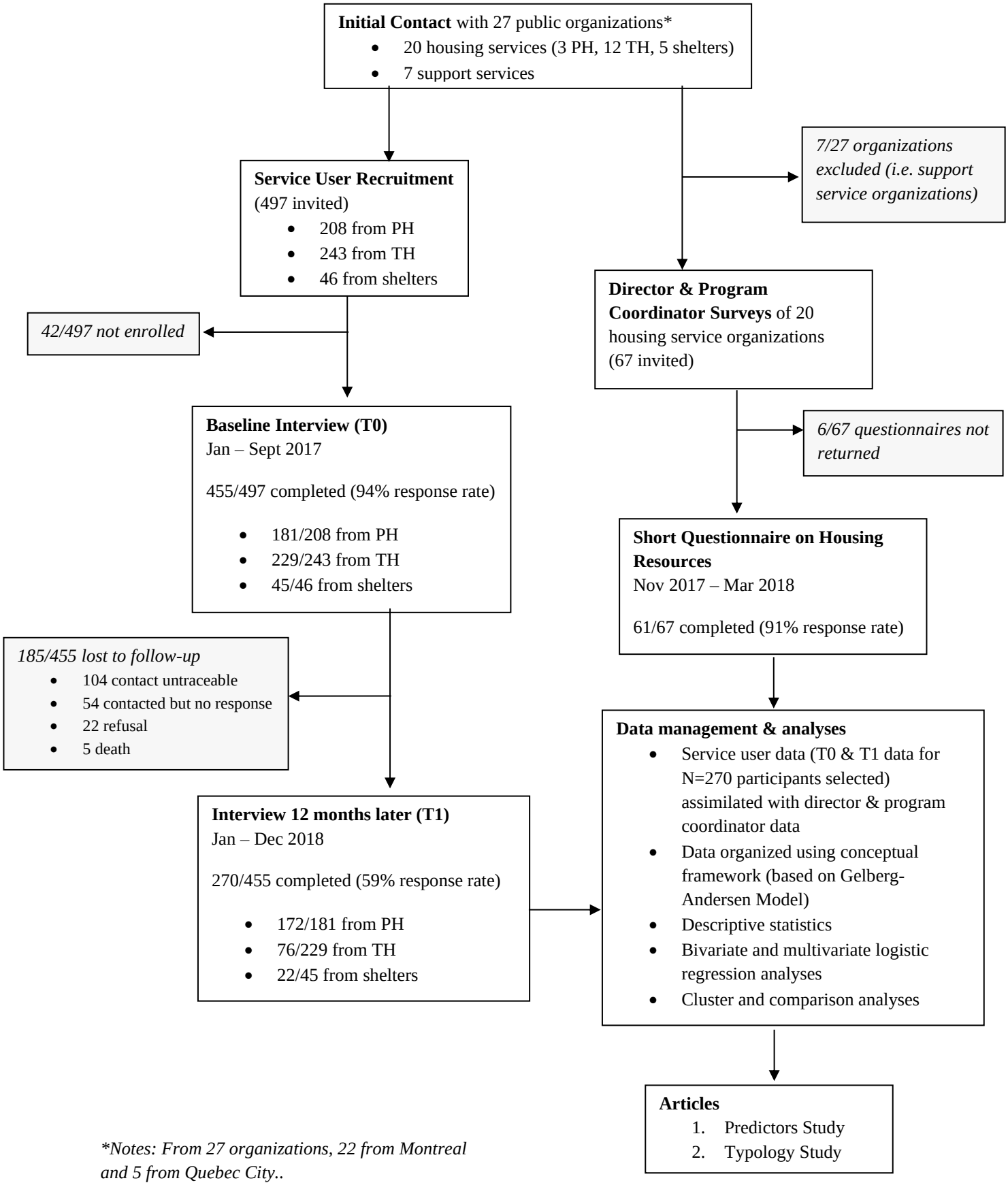
users. This study has examined whether overall organizational budget influenced change in housing status over 12 months for service users.

3.3 Data Analysis

All analyses in the study were performed using STATA 15. A Power estimate showed adequate power for a sample size of n=246 in terms of the number of housing conditions and groups (>80% at the 5% significance level) (Chow, Shao, & Wang, 2008). The data sets for service users who completed interviews at both T0 and T1 and housing resource data, from directors and program coordinators of the organizations, were combined and entered into the database according to the service organization from which participants were associated with at interview time-points. Missing data were treated with Multiple imputation techniques, then subsequent analyses were conducted as follows:

1. Univariate analyses were conducted to produce descriptive statistics on participant characteristics. For categorical variables, frequency distributions were produced and for continuous variables, mean values with standard deviations were calculated.
2. Bivariate analyses were performed for associations between each IV and the DV. To assess statistical differences between identified groups or profiles, Chi-square or Fisher's exact tests were used for categorical variables, and T-tests or the Wilcoxon rank-sum test for continuous variables.
3. Multivariable analyses using logistic regression were carried out to identify the model with best fit to explain the influences of IVs on the DV. Odds ratios were calculated for each IV. Using forward selection and the Akaike Information Criterion (AIC) (Akaike, 1973), a set of multiple regression models were compared and the model with the smallest AIC chosen for the adjusted analysis.
4. Cluster analysis was performed to develop a typology of participants based on similar characteristics. The k-means group algorithm with Gower dissimilarity coefficient was used and the five-group solution was identified as most distinct as compared with other possible solutions (Ali & Massmoudi, 2013).

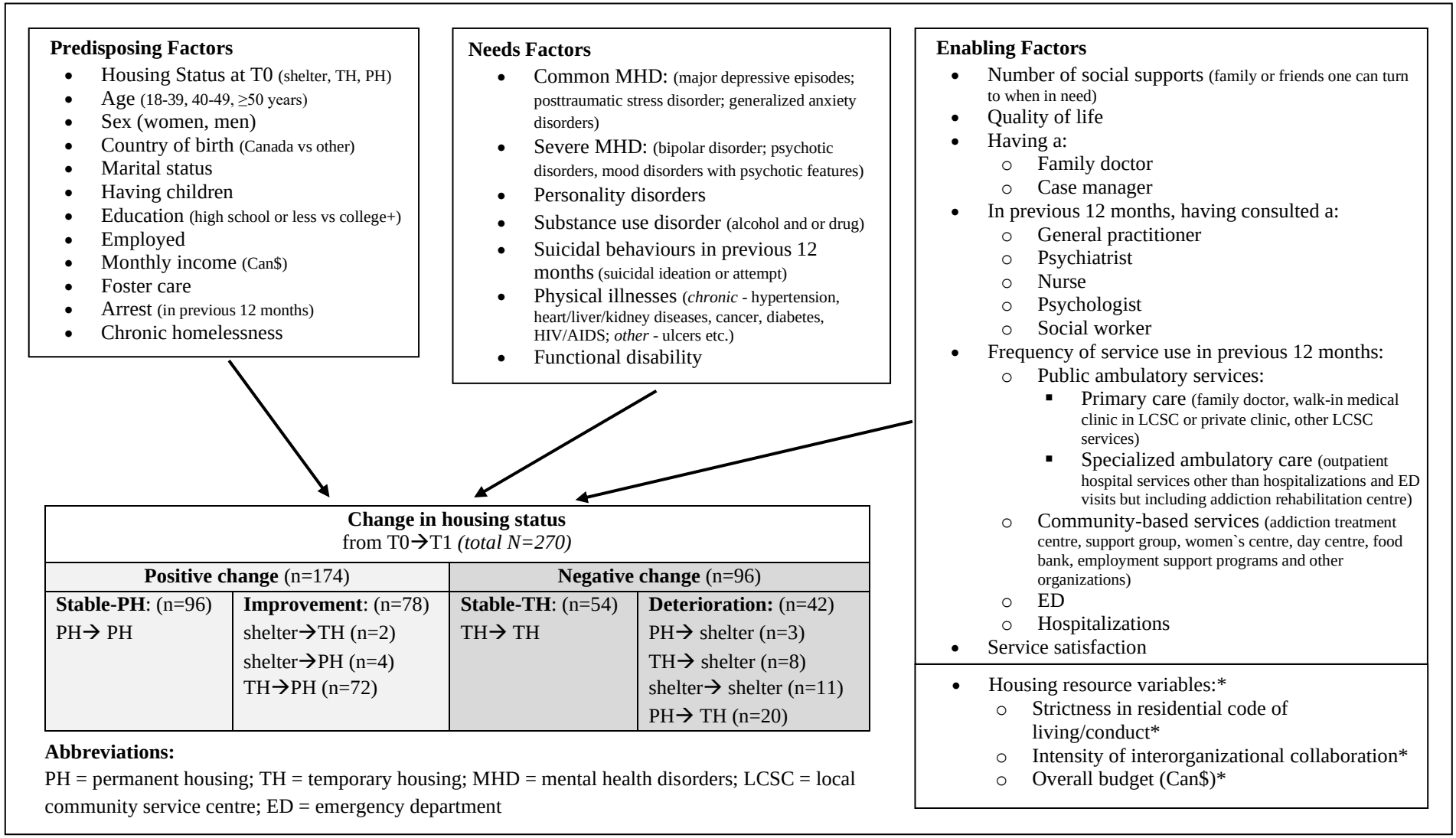
Figure 1. Study design flow diagram



**Notes: From 27 organizations, 22 from Montreal and 5 from Quebec City..*

Figure 2. Overall conceptual framework of study based on the Gelberg-Andersen Behavioral Model (Gelberg et al. 2000)

Data collection from service users at T0 (January-September 2017) and T1 (January-December 2018). Study variables organized into predisposing, needs, and enabling factors on variable of interest, change in housing status over 12 months (T0→T1) – negative change (stable-TH, deterioration) vs positive change (stable-PH, improvement). Some data assimilated from organizations' directors and program coordinators (*)



Abbreviations:

PH = permanent housing; TH = temporary housing; MHD = mental health disorders; LCSC = local community service centre; ED = emergency department

Table 1. List of all instruments used in study

Instrument	Variable(s) Tested	Description	Psychometric Properties
Canadian Community Health Survey (CCHS) – adapted (Statistics Canada, 2002)	Housing Status	three types of housing (emergency shelter, temporary housing, permanent housing with or without support)	N/A
	Age	numerical value calculated from date of birth	
	Sex	two-point scale (male = 1, female = 2)	
	Country of birth	two-point scale (Canada-born = 0; foreign-born = 1)	
	Marital status	two-point scale (single/divorced/widowed and living alone = 0; married and living as a couple = 1)	
	Having children	two-point scale (no = 0; yes = 1)	
	Education	two-point scale (high school or less = 1, college or more = 2)	
	Employed	two-point scale (no = 0; yes = 1)	
	Monthly income	numerical value of average revenue per month in Canadian dollars	
	Foster care	refers to having experienced welfare system in childhood; two-point scale (no = 0; yes = 1)	
	Arrest	includes theft, violence, drugs, etc. in the past 12 months, two-point scale (no = 0; yes = 1)	
	Chronic homelessness	refers to a single homeless episode of at least 12 months, or 4 homeless episodes within a 3-year period (Byrne & Culhane, 2015); two-point scale (no = 0; yes = 1)	
	Suicidal behaviours	refer to suicidal ideation or attempt; two-point scale (no = 0; yes = 1)	
	Physical illnesses	refers to any reported chronic or acute physical illness at time of interview; two-point scale (no = 0; yes = 1)	
	Having a family doctor	two-point scale (no = 0; yes = 1)	
	Having a case manager		
	Number of social supports	*social support* refers to family or friends that one can rely on when in need; numerical value	
M.I.N.I International Neuropsychiatric Interview 6.0 (Sheehan et al., 1998)	Mental health disorders (MHD)	120-item structured diagnostic interview for DSM-IV and ICD-10 psychiatric disorders; two-point scale (no = 0; yes = 1)	Kappa Cohen = 0.50-0.84
Standardized Assessment of Personality Abbreviated Scale (Moran et al., 2003)	Personality disorders	8-item semi-structured interview from Standardized Assessment of Personality; two-point scale (no = 0; yes = 1)	Cronbach's alpha = 0.68
Alcohol Use Disorders Identification Test (AUDIT) (Bohn, Babor, & Kranzler, 1995)	Substance use disorder (alcohol)	10-item self-report scale to measure alcohol consumption; with zero to four-point scoring for multiple-choice questions; rating: 0–50 where higher = greater level of SUD for alcohol	Cronbach's alpha = 0.74

Drug Abuse Screening Test (DAST) (Skinner, 1982)	Substance use disorder (drug)	28-item self-report scale used as a screening tool for drug consumption; two-point scale (no = 0; yes = 1); rating: 0–20 where higher = greater level of SUD for drugs	Cronbach's alpha = 0.88
WHO Disability Assessment Schedule 2.0 (Ustun et al., 2010)	Functional disability	12-item short version assessment used for all diseases (physical illness and MHD); across 6 domains of functioning (cognitive, mobility, self-care, getting along, life activities, and participation); five-point scale (1 to 5); rating: 0 to 60 where 0 = no disability and 60 = full disability	Cronbach's alpha = 0.93-0.94
Satisfaction with Life Domains Scale (SLDS) (Caron, Mercier, & Tempier, 1997)	Quality of life (QOL)	20-item self-report scale on subjective QOL; across 5 domains (daily life and social relations, housing, neighbourhood, personal relationships, spare-time activities, autonomy); five-point scale (1 to 5); rating: 20 to 100 where higher = better QOL	Cronbach's alpha = 0.92
Service Utilization Questionnaire (SUQ) adapted from CCHS (Gravel & Beland, 2005)	Having consulted a professional	*professional* refers to a general practitioner, psychiatrist, nurse, psychologist, or social worker; two-point scale (no = 0; yes = 1)	N/A
	Frequency of public ambulatory & community-based service use	*ambulatory and community-based services* refer to a wide range of health and social services; numerical value based on previous 12 months	
	Hospitalizations	numerical value based on previous 12 months	
	Emergency department visits		
	Service satisfaction	overall satisfaction with services; five-point scale (1 to 5) based on previous 12 months where higher = more satisfied with services	
Questionnaire for organizations providing housing and support services completed by directors/program coordinators	Strictness in residential code of living/conduct	14-item evaluation on organization's strictness in residential code of living/conduct; completed by program coordinators at housing service organizations; two-point scale (no = 0; yes = 1) where higher = stricter program rules for living/ conduct	N/A
	Intensity of interorganizational collaborations	evaluation on organization's collaboration with other services and organizations for a potential network of 200 collaborators; two-point scale (no = 0; yes = 1) where higher = greater collaboration with other organizations	
	Overall budget	numerical value of organization's average annual overall budget in 1,000s of Canadian dollars	

CHAPTER 4: RESULTS OF THE STUDY

This chapter presents the research findings by means of two scientific articles accepted for publication in peer-reviewed journals. Each article addressed one of the two specific objectives of this thesis: Article 1 focused on the first objective, identifying predictors for maintenance or improvement in housing status over 12 months and is in press in the journal *Health & Social Care in the Community* as of August 2020; and Article 2 undertook the second objective, developing a typology based on the change in housing status over 12 months and has been published in the *International Journal of Environmental Research and Public Health* also in August 2020.

Both articles used the data generated from the same sample of currently or formerly homeless individuals using shelters, TH, or PH services (N=270). A wide range of sociodemographic, clinical, service use variables were collected from the service users, and housing resources variables were obtained from directors and program coordinators. Data from the two sources were merged and all variables were organized into predisposing, needs and enabling factors based on an adapted Gelberg-Andersen Model as a conceptual framework. Data analyses were conducted differently in each article, according to the research objective being addressed. Several authors contributed to the production of the two articles:

I, **Gesthika Kaltsidis**, was first author for both articles, and contributed to the analytical plans and interpretation of results.

Dr. Marie-Josée Fleury was responsible for overseeing the overall research project, including data collection and revisions, and was the corresponding author for both articles.

Dr. Guy Grenier contributed to the analytical plan, interpretation of results and revisions for both articles.

Zhirong Cao provided the quantitative analyses and statistical support for both articles.

Dr. Karine Bertrand contributed to the revisions for the first article.

4.1 Article 1 – Predictors Study

Predictors of change in housing status over 12 months among individuals from emergency shelters, temporary housing, or permanent housing in Quebec, Canada

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Conflict of Interest

The authors declared no competing interests.

Abstract: Homelessness is an ongoing societal and public health problem in Canada and other countries. Housing services help homeless individuals along the transition towards stable housing, yet few studies have assessed factors that predict change in individual housing trajectories. This study identified predictors of change in housing status over 12 months for a sample of 270 currently or formerly homeless individuals using emergency shelters, temporary housing, or permanent housing resources in Quebec. Participants recruited from 27 community or public organisations were interviewed between January and September 2017, and again 12 months later. Sociodemographic variables, housing history, health conditions, service use and client satisfaction were measured. Directors and program coordinators from the selected organisations also completed a baseline questionnaire measuring strictness in residential codes of living/conduct, interorganisational collaboration and overall budget. Independent variables were organised into predisposing, enabling and needs factors, based on the Gelberg-Andersen Behavioral Model. Multilevel logistic regressions were used to test associations with the dependent variable: change in housing status over 12 months, whether positive (e.g. shelter to temporary housing) or negative (e.g. permanent housing to shelter). Predictors of positive change in housing status were: residing in permanent housing, being female, having children (predisposing factors); having consulted a psychologist, higher frequency in use of public ambulatory services (enabling factors); and not having physical illnesses (needs factor). The findings support strategies for helping this clientele obtain and maintain stable housing. They include deploying case managers to promote access to public ambulatory services, mainly among men or individuals without children who are less likely to seek help; greater use of primary care mental health teams; the establishment of more suitable housing for accommodating physical health problems; and reinforcing access to subsidized permanent housing programs.

What is known about this topic?

- Homelessness is a significant public health concern in Canada and worldwide.
- Various housing services and programs aim to assist homeless individuals to achieve housing stability.
- Few studies have assessed predictors of change in housing status over 12 months among individuals using emergency shelters, temporary housing or permanent housing services.

What this paper adds?

- Residing in permanent housing, being female, and having children, most strongly predicted positive change in housing status over 12 months.
- Enabling factors (consulting a psychologist and use of public ambulatory services) were other predictors of positive change in housing status.
- Having a physical illness predicted negative change in housing status.

Keywords: homelessness, housing status, housing stability, emergency shelter, temporary housing, permanent housing, predictors

1. INTRODUCTION

Homelessness is a growing societal and public health concern in Canada and other nations, especially in urban areas (Gaboardi et al., 2019; Tsai, O'Toole, & Kearney, 2017). Each year, about 235 000 Canadians experience homelessness (Gaetz, Dej, E., Richter, T., & Redman, M., 2016), defined as a lack of minimally adequate housing that is safe, stable and affordable (Busch-Geertsema, Culhane, & Fitzpatrick, 2016). Homeless individuals face numerous social challenges including unemployment (Poremski et al., 2016; Shier, Jones, & Graham, 2016), poverty (Shier et al., 2016), food insecurity (Seale, Fallaize, & Lovegrove, 2016), social exclusion (Stergiopoulos et al., 2014) and stigma (Friesinger, Topor, Bøe, & Larsen, 2019; van Boekel, Brouwers, van Weeghel, & Garretsen, 2013). As a result of harsh and stressful living conditions, homeless individuals are more likely to experience acute or chronic physical illnesses (e.g. liver disease, HIV), mental health disorders (MHD) and substance use disorders (SUD) compared with the general population (Fazel, Geddes, & Kushel, 2014; Hwang et al., 2013). They often encounter barriers in accessing quality social and healthcare services that address their various needs (Baggett, O'Connell, Singer, & Rigotti, 2010; Barrett, Fogel, Garrett, & Young, 2011; Zur & Jones, 2014), resulting in higher mortality rates and reduced overall life expectancy (Davis, Tamayo, & Fernandez, 2012; Fazel et al., 2014).

Efforts to combat homelessness in most Western countries have included the establishment of three types of housing services: 1) *emergency shelters*, short-term lodging that addresses immediate basic needs (e.g. meals, warmth, a bed, etc.) (Gaetz et al., 2012); 2) *temporary or transitional housing (TH)*, mid-term accommodation offered by public or community

organisations. TH is usually based on the ”residential treatment first” model that emphasizes treatment of MHD or SUD and the acquisition of skills for autonomous living and social reintegration before entry into permanent housing (Tsai, Mares, & Rosenheck, 2010); and 3) *permanent housing (PH)*, long-term residences that usually offer case management support (Tsemberis, 2010). Among PH programs, the Housing First model is currently most popular, offering homeless individuals direct access to PH with no obligation to follow treatment for MHD or SUD as conditional to program acceptance (Tsemberis, 2010).

Some experts have criticized emergency shelters as an inefficient and costly approach that fails to reduce chronic or cyclical patterns of homelessness (Gaetz, 2010). The management of homelessness has thus been shifting from use of emergency shelters towards TH, and, more recently, PH (Gaetz, 2010; National Alliance to End Homelessness, 2006; Pauly, Carlson, & Perkin, 2012). Along with a more prevention-focused response to homelessness, more emphasis is now given to the evaluation of housing services.

Studies evaluating TH programs have resulted in reduced emergency shelter use, while supporting access to PH as the desired outcome for improvement in housing status (Burt, 2010; Novac, Brown, & Bourbonnais, 2004). Yet given the variability in TH program designs and service delivery (i.e. public vs private funding, duration, intensity, quality of services offered, etc.), meaningful comparisons involving individual and structural factors across programs in terms of successful housing change pose challenges (Novac, Brown, & Bourbonnais, 2009). By contrast, assessments of PH programs have relied on housing stability as a key indicator of success (Pauly, Wallace, & Perkin, 2014; Tsemberis, 2010). A substantial literature on PH programs has emerged in recent years, particularly studies based on the Housing First model as an effective evidence-based intervention for achieving housing stability among individuals with severe MHD, SUD, and history of chronic homelessness (Aubry, Goering, et al., 2016; Davidson et al., 2014; Gaboardi et al., 2019). A recent systematic review on how different housing services (TH and PH) promote the transition from homelessness to stable housing underlined that individuals enrolled in housing programs showed improved housing status or achieved housing stability, regardless of program type (Iaquinta, 2016). Yet, to our knowledge, no study has evaluated changes in housing status across a sample that included shelters users, TH residents and PH tenants, as a more accurate

reflection of residential trajectories leading to a permanent exit from homelessness and achievement of housing stability.

Research on housing in the homeless population has rarely used a conceptual framework to organise the wide range of potentially associated factors. Gabrielian et al. (2016; 2017) examined variables associated with housing stability among homeless US veterans living in PH using the Gelberg-Andersen Behavioral Model for Vulnerable Populations (Gelberg, Andersen, & Leake, 2000). This model consists of *predisposing factors* (sociodemographic variables, e.g., age and sex); *needs factors* (clinical variables, specifically types and number of disorders); and *enabling factors* (service use variables, e.g., having a family doctor, frequency of hospitalization) (Gelberg et al., 2000). US veterans who didn`t succeed in PH programs tended to have histories of chronic homelessness (predisposing factor), MHD or SUD (needs factors), to make low use of primary care services, high use of emergency departments (ED) and have high hospitalization rates (enabling factors). Given the shift toward preventing and ending long-term homelessness (Gaetz, 2010; National Alliance to End Homelessness, 2006; Pauly et al., 2012), enabling factors such as consultation with various health and social service professionals, intensity of interorganisational collaboration, and strictness in residential codes of living/conduct should be considered, yet these variables have not been previously studied.

This study aimed to identify predictors of change in housing status over a 12-month period for a sample of 270 currently or formerly homeless individuals using or residing in different types of accommodation (emergency shelters, TH, PH) in Quebec, using the Gelberg-Andersen Model as a conceptual framework. Based on related literature (Gabrielian et al., 2016; Gabrielian et al., 2017; Pauly et al., 2012), it was hypothesized that positive change in housing status over 12 months would be more strongly influenced by enabling factors than by needs or predisposing factors.

2. METHODS

2.1 Study Setting & Data Collection

The study was conducted in Montreal and Quebec City, the two largest urban centres in Quebec (Canada). Prospective study participants had to be at least 18 years old, with current or previous experience of homelessness, residing in either subsidized PH within the past two years, or in TH

(mostly 3-12-month residency), or currently using emergency shelters. Recruitment took place in 27 community or public organisations, 20 providing housing services and seven offering ancillary services like food banks, day centers, soup kitchens, etc. Participants were recruited on-site by the project co-ordinator, referred by housing staff following information sessions given by researchers, or self-referred in response to posters displayed in common areas of selected organisations. While all eligible individuals were included, interviews for anyone intoxicated or otherwise unfit to participate were postponed. Participants provided written informed consent prior to their interviews.

Interviews were administered at the selected organisations, participant apartments, or local cafés by trained research assistants. Baseline interviews, lasting about 75 minutes, occurred on the same day or shortly after initial contact with each participant between January and September 2017 (T0). Follow up interviews, about 55 minutes in duration, occurred 12 months later, throughout 2018 (T1). Interviews included a questionnaire addressing socio-demographics (e.g. age, education), housing history (e.g., chronic homelessness), health conditions (e.g. MHD, SUD, physical illness), perceived quality of life, service use (e.g. having consulted a psychiatrist, frequency of hospitalization), and satisfaction with services. Participants received a gift card after completing the two interviews.

Organisation directors and program coordinators (N=67) were also asked to complete self-administered baseline questionnaires through an online platform (Lime Survey software), between November 2017 and March 2018. The questions addressed housing resources: strictness in residential code of living/conduct protocols (e.g. related to alcohol or drug use); intensity of interorganisational collaboration (i.e. number of collaborations with health and social services, intersectoral organisations [e.g. municipalities, police], and other community organisations [e.g. shelters, youth foster care] involving a potential network of about 200 collaborators); and their overall budgets. The research ethics board of the Douglas Mental Health University Institute approved the multisite study protocol.

2.2. Conceptual Framework, Variables & Instruments

The dependent variable was change in housing status over 12 months (T0 to T1). Positive change in housing status was defined as a change from shelter to TH or PH, from TH to PH, or maintenance

in PH. Negative change in housing status included maintenance in TH, continued use of shelters, or deterioration in housing status (from PH to TH or shelter, TH to shelter).

The selection of independent variables was guided by previous studies and relevance to the literature (Adair et al., 2017; Aubry, Duhoux, Klodawsky, Ecker, & Hay, 2016; Boland, Slade, Yarwood, & Bannigan, 2018; Caton et al., 2005; Van Straaten et al., 2017). Independent variables were measured using ten standardized instruments listed in **Table 1** and organised into predisposing, needs, and enabling factors (Gelberg et al., 2000) as shown in **Figure 1.** Predisposing factors included age, sex, country of birth, marital status, having children, education, employment, monthly income, foster care, and chronic homelessness defined as a single homeless episode of at least 12 months, or 4 homeless episodes within a 3-year period (Byrne & Culhane, 2015). Needs factors included: common MHD (e.g. major depressive episodes, anxiety disorders), severe MHD (e.g. bipolar disorder, psychotic disorders), personality disorders, SUD (alcohol and/or drugs), physical illnesses (e.g. hypertension, heart/liver/kidney diseases, cancer), and functional disability. Enabling factors included: having a family doctor or case manager, having consulted a professional (general practitioner, psychiatrist, nurse, psychologist, social worker) in the previous 12 months, sources of social support (family or friends), quality of life, frequency of service use in the previous 12 months (public ambulatory services [both primary & specialized care], community-based services, hospitalizations, ED visits), service satisfaction, and housing resource variables (strictness in residential code of living/conduct, intensity of interorganisational collaboration, and overall budget).

Figure 1. Conceptual framework for change in housing status over 12 months based on the Gelberg-Andersen Behavioral Model (Gelberg et al. 2000)

Study variables organised into predisposing, needs, and enabling factors on change in housing status over 12 months (negative vs positive). Data collection at T0 (January-September 2017) and T1 (January-December 2018). **For Analysis:** Logistic regression of predisposing, needs and enabling factors @ T0 for change in housing status (taken @T1vs T0). Some data assimilated from: *Directors and program coordinators (n=61)

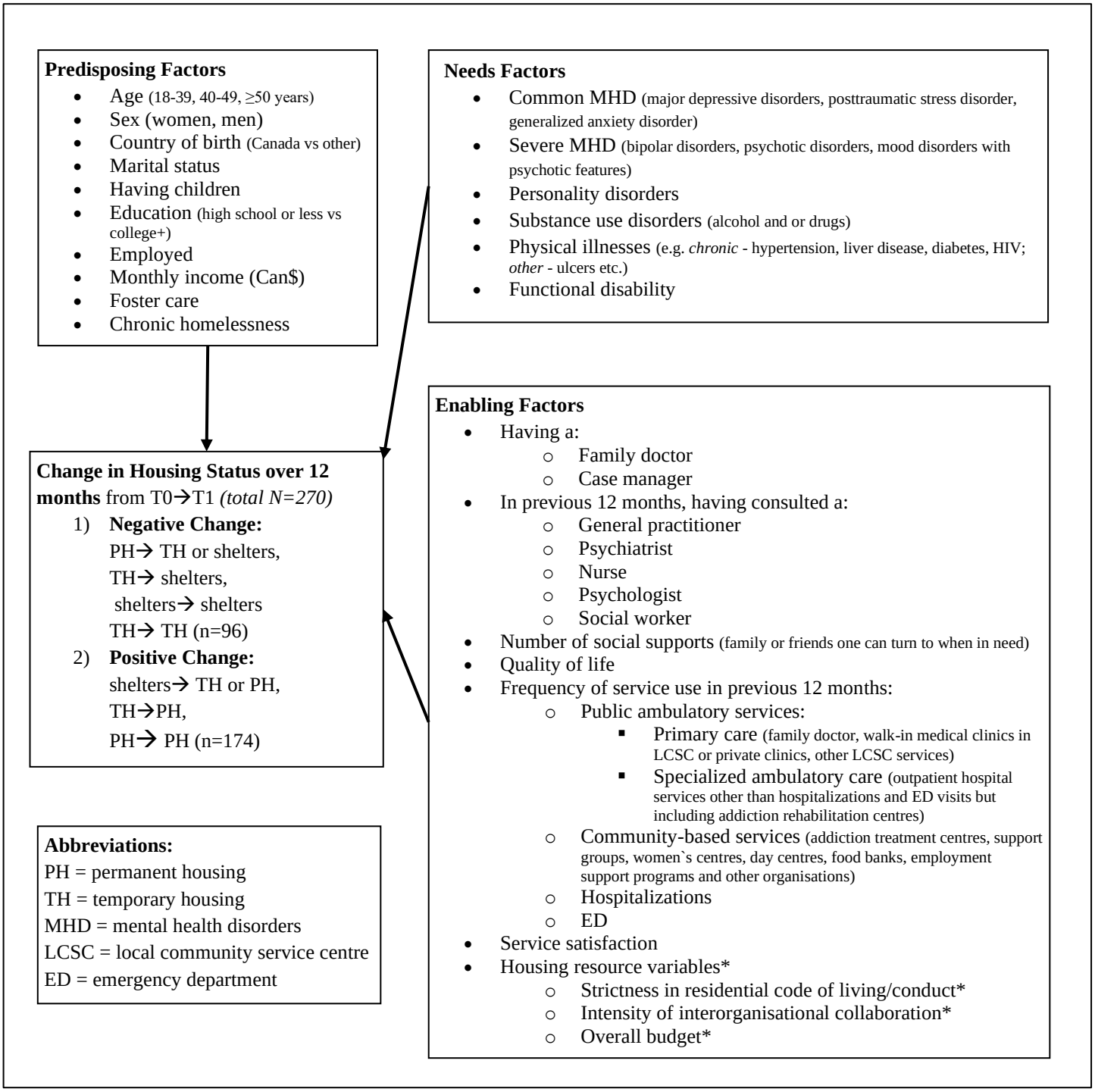

Table 1. Variables and instruments based on the Gelberg-Andersen Behavioral Model (Gelberg et al., 2000)

	Instruments & References	Description	Psychometric Properties
Dependent variable			
Housing status	Canadian Community Health Survey (CCHS) – adapted (Statistics Canada, 2002)	Self-report; three types of housing (emergency shelter, temporary housing, permanent housing with or without support)	N/A
Predisposing factors			
Age	CCHS (Statistics Canada, 2002)	Self-report; numerical value calculated from date of birth	N/A
Sex		Self-report; 2-point scale (men = 1, women = 2)	
Country of birth		Self-report; 2-point scale (Canada-born = 0; foreign-born = 1)	
Marital status		Self-report; 2-point scale (single/ divorced/ widowed and living alone = 0; married and living as a couple = 1)	
Having children		Self-report; 2-point scale (no = 0; yes = 1)	
Education		Self-report; 2-point scale (high school or less = 1, college or more = 2)	
Employed		Self-report; 2-point scale (no = 0; yes = 1)	
Monthly income		Self-report; numerical value of average revenue per month in Canadian dollars	
Foster care		Self-report; *foster care* refers to having experienced welfare system in childhood; 2-point scale (no = 0; yes = 1)	
Chronic homelessness		Self-report; *chronic homelessness* refers to a single homeless episode of at least 12 months, or 4 homeless episodes within a 3-year period (Byrne & Culhane, 2015); 2-point scale (no = 0; yes = 1)	
Need factors			
Mental health disorders (MHD)	M.I.N.I International Neuropsychiatric Interview 6.0 (Sheehan et al., 1998)	120-item structured diagnostic interview for DSM-IV and ICD-10 psychiatric disorders; 2-point scale (no = 0; yes = 1)	Kappa Cohen = 0.50-0.84
Personality disorders	Standardized Assessment of Personality Abbreviated Scale (Moran et al., 2003)	8-item semi-structured interview from Standardized Assessment of Personality; 2-point scale (no = 0; yes = 1)	Cronbach's alpha = 0.68
Substance use disorders (SUD)	Alcohol Use Disorders Identification Test (AUDIT) (Bohn et al., 1995)	10-item self-report scale to measure alcohol consumption; with two or multiple-choice questions; range: 0–50 where higher = greater level of SUD for alcohol	Cronbach's alpha = 0.74
	Drug Abuse Screening Test (DAST) (Skinner, 1982)	28-item self-report scale used as a screening tool for drug consumption; two-point scale (no = 0; yes = 1); range: 0–20 where higher = greater level of SUD for drugs	Cronbach's alpha = 0.88
Physical illnesses	CCHS (Statistics Canada, 2002)	Self-report; *Physical illnesses* refers to any reported physical illness at time of interview; 2-point scale (no = 0; yes = 1)	N/A

Functional disability	WHO Disability Assessment Schedule 2.0 (Ustun et al., 2010)	12-item short version assessment used for all diseases (physical illness and MHD); across 6 domains of functioning (cognitive, mobility, self-care, getting along, life activities, and participation); 5-point scale (1 to 5); range: 0–60 where 0 = no disability and 60 = full disability	Cronbach's alpha = 0.93-0.94
Enabling factors			
Having a family doctor	CCHS (Statistics Canada, 2002)	Self-report; 2-point scale (no = 0; yes = 1)	N/A
Having a case manager		Self-report; 2-point scale (no = 0; yes = 1)	
Number of social supports		Self-report; *social support* refer to family or friends that one can rely on when in need; numerical value	
Quality of life (QOL)	Satisfaction with Life Domains Scale (SLDS) (Caron et al., 1997)	20-item self-report scale on subjective QOL; across 5 domains (daily life and social relations, housing, neighbourhood, personal relationships, spare-time activities, autonomy); 5-point scale (1 to 5); range: 20–100 where higher = better QOL	Cronbach's alpha = 0.92
Having consulted a professional	Service Utilization Questionnaire (SUQ) adapted from CCHS (Gravel & Beland, 2005)	Self-report; *service use* refers to use services provided by professionals in health and social services; 2-point scale (no = 0; yes = 1)	N/A
Frequency of public ambulatory & community-based service use		Self-report; *public care and community services* refer to a wide range of health and social services; numerical value based on previous 12 months	
Hospitalizations		Self-report; numerical value based on previous 12 months	
Emergency department visits			
Service satisfaction		Self-report; overall satisfaction with services; 5-point scale (1 to 5) based on previous 12 months where higher = more satisfied with services	
Strictness in residential code of living/conduct	Questionnaire for organisations providing housing and ancillary services completed by directors/program coordinators	14-item evaluation on organisation's strictness in residential code of living/conduct; 2-point scale (no = 0; yes = 1) where higher = stricter program rules for living/conduct	N/A
Intensity of interorganisational collaboration		Evaluation on organisational collaboration with other services and organisations for a potential network of 200 collaborators; 2-point scale (no = 0; yes = 1) where higher = greater collaboration with other organisations	
Overall budget		Self-report value of organisation's overall budget in $1000Can per year	

2.3. Analysis

Comparative analyses were conducted using chi-square tests on categorical variables (e.g. sex) and t-tests on continuous variables (e.g. age, disability) to measure differences between T0 and T1. Missing values were lower than 5%, and multiple imputation with chained equations (20 imputations) was used to deal with missing data (Azur, Stuart, Frangakis, & Leaf, 2011). Multilevel mixed-effects logistic regressions were used for bivariate and multivariable analyses to account for clustering at the organization level, in association with the dependent variable (housing change over time). The reference category for the regression model was negative change in housing status. A set of predisposing, enabling and needs factors was selected for analysis, and odds ratios were calculated for each independent variable. In a forward model selection, significant independent variables (with Alpha set at 0.10) in bivariate analyses were entered sequentially into multivariable analyses. The Akaike Information Criterion (AIC) was used to compare of a set of multiple regression models, and the model with the smallest AIC was chosen for the adjusted analysis (Akaike, 1973). Odds ratios with 95% CI (Alpha set at 0.05) were calculated. The Rubin's combination rules were used to obtain estimates from multiple imputed data (Rubin, 1987; Van Buuren, 2012). Statistical analyses were performed using Stata 15.

3. RESULTS

Of 497 individuals invited to participate, 208 were PH residents, 243 TH residents and 46 emergency shelter users. The response rate was 59%, with 270 participants followed up at 12 months (T1) of 455 enrolled at baseline (T0). No significant differences from comparative analyses were reported between T0 and T1 (sex: p=0518 age: p=0.126; disability score: p=0.677). Individuals retained (N=270) and those lost to follow-up (N=185), also showed no significant differences in terms of baseline characteristics for sex (p=0.199), education (p=0.689), and disability score (p=0.330). Of 67 directors and program coordinators contacted to participate in the study, 61 (74% women; mean age 45 years) completed the questionnaire for a response rate of 91%.

Participant characteristics (N=270) and bivariate analyses are reported in **Table 2,** while a detailed breakdown of change in housing status over 12 months is shown in **Table 3**. Regarding predisposing factors at baseline, 6% of participants used shelters, 50% resided in TH, and 44% in

PH. Most participants were 50 years old or older (57%), male (58%), and Canada-born (87%). Only 4% were married, while nearly half (46%) reported having children. Concerning needs factors, prevalence rates for various mental health problems were as follows: common MHD (43%), severe MHD (30%), personality disorders (69%), and SUD (37%). About 80% reported having a physical illness, mainly pain or problems involving muscles or joints (53%). Regarding enabling factors, about half of participants reported having a family doctor (57%) or case manager (50%), most had consulted a social worker (79%) or a nurse (50%), while some had seen a general practitioner (44%), psychiatrist (31%), or psychologist (18%) in the previous year. Participants also reported using public ambulatory services (e.g. walk-in medical clinic, family physician) eight times on average, community-based services (e.g. addiction treatment centre, soup kitchen) 80 times, being hospitalized once or not, and visiting the ED roughly twice. Regarding housing resource variables, strictness for residential code of living/conduct averaged 8.7/14.0; organisations had about 60 collaborations with a potential 200 organisations, and overall budgets averaged $4 432 120 annually among participating organisations **(Table 2).**

Among the 270 participants at T1, 174 (64%) showed a positive change in housing status; of 119 in PH at T0, 96 (81%) had remained in PH, while 72 of the 134 in TH at T0 (54%) had access to PH. Meanwhile 96 participants (36%) reported negative change in housing status, whereby 54 participants did not achieve PH but remained in TH and 20 left PH for TH. Most shelters users (11/17; 65%) did not show positive change in housing status at T1. Moreover, the number of participants in TH or PH who returned to shelters (N=11) was greater than the number of shelter users (N=6) who accessed TH or PH at T1 (**Table 3**).

The multilevel regression model (**Table 4)** showed that three predisposing factors (residing in PH at baseline, being female, and having children) strongly predicted positive change in housing status over 12 months. Two enabling factors were also significantly associated with positive change in housing status over 12 months: higher frequency of public ambulatory service use and having consulted a psychologist. Concerning needs factors, only one factor, having no physical illnesses, was significantly associated with positive change in housing status.

Table 2. Participant characteristics and bivariate analyses according to change in housing status over 12 months with *negative change in housing status* as reference group

Change in housing status	Negative change	N=96	Positive change	N=174	Total	N=270	Bivariate analyses	
	n/mean	%/SD.	n/mean	%/SD.	n/mean	%/SD.	Odds ratio	P_value
Predisposing Factors								
Housing status@T0: Shelters	11	11.46	6	3.45	17	6.3	0.09	<0.001***
TH	62	64.58	72	41.38	134	49.63	0.21	<0.001***
PH	23	23.96	96	55.17	119	44.07	1.00	.
Age : 18-39	5	5.21	9	5.17	14	5.19	1.00	.
40-49	37	38.54	66	37.93	103	38.15	1.23	0.764
≥50 years	54	56.25	99	56.9	153	56.67	1.40	0.633
Sex (women vs men)	19	19.79	95	54.6	114	42.22	4.37	0.001***
Country of birth (Canada vs other)	85	88.54	149	85.63	234	86.67	0.55	0.238
Marital status (single vs in couple)	3	3.13	9	5.17	12	4.44	1.03	0.965
Having children	30	31.25	93	53.45	123	45.56	2.13	0.016**
Education (college + vs high school or less)	33	34.38	55	31.61	88	32.59	0.86	0.646
Employed	6	6.25	15	8.62	21	7.78	1.16	0.810
Monthly income ($Cad) (mean/SD)	1034.31	1182.73	917.97	343.51	959.34	756.98	1.00	0.994
Foster care	23	23.96	59	33.91	82	30.37	1.13	0.724
Chronic homelessness	54	56.25	87	50	141	52.22	0.86	0.621
Need factors								
Common MHD	39	40.63	78	44.83	117	43.33	1.22	0.516
Severe MHD	24	25	55	31.61	79	29.26	1.27	0.492
Personality disorders	67	69.79	120	68.97	187	69.26	1.29	0.436
SUD (alcohol, drugs)	43	44.79	58	33.33	101	37.41	0.77	0.432
Physical illnesses	84	87.5	131	75.29	215	79.63	0.42	0.040**
Functional disability[1] (mean/SD)	20.68	7.16	20.61	6.26	20.64	6.58	0.98	0.339
Enabling factors								
Having a family doctor	52	54.17	101	58.05	153	56.67	1.16	0.638
Having a case manager	41	42.71	95	54.6	136	50.37	1.86	0.055*
Having consulted a:								
General practitioner	41	42.71	79	45.4	120	44.44	1.27	0.429
Psychiatrist	23	23.96	61	35.06	84	31.11	1.59	0.164
Nurse	45	46.88	89	51.15	134	49.63	1.30	0.393
Psychologist	11	11.46	37	21.26	48	17.78	2.72	0.031**
Social worker	71	73.96	142	81.61	213	78.89	1.75	0.136
Number of social support (mean/SD)	1.96	2.51	2.30	2.40	2.18	2.44	1.09	0.207
Quality of life[2] (mean/SD)	71.27	10.57	70.93	9.31	71.05	9.76	1.01	0.728
Service satisfaction[3] (mean/SD)	4.01	0.93	3.94	0.86	3.96	0.88	1.11	0.628
Frequency of service use:								
Public ambulatory services (mean/SD)	5.35	7.98	9.36	16.78	7.94	14.40	1.04	0.032**
Community-based services (mean/SD)	76.70	122.44	81.22	119.29	79.61	120.21	1.00	0.898
Hospitalization (mean/SD)	0.44	1.09	0.53	1.12	0.50	1.11	1.16	0.272

ED (mean/SD)	1.13	2.66	2.45	10.24	1.98	8.38	1.06	0.318
Housing resource variables:								
Strictness for residential code of living/conduct[4](mean/SD)	9.75	4.28	7.99	5.18	8.66	4.92	1.04	0.446
Intensity of interorganisational collaboration[5] (mean/SD)	49.24	32.40	64.70	34.38	58.82	34.40	1.01	0.399
Overall budget ($1000 Cad)[6] (mean/SD)	5906.47	4145.2	6153.71	4612.81	6059.11	4432.12	1.00	0.507

TH: temporary housing; PH: permanent housing; MHD: mental health disorders; SUD: substance use disorders; ED: emergency departments

Significance indicated by: $p<0.01$***; $p<0.05$**; $p<0.1$*

Notes:

1. *Functional disability*, higher score = greater disability in functioning
2. *Quality of life*, higher score = better quality of life
3. *Service satisfaction*, higher score = greater service satisfaction
4. *Strictness in residential code of living/conduct*, higher score = stricter program rules for living/conduct
5. *Intensity of interorganisational collaboration*, higher score = more collaborations with other organizations
6. *Overall budget ($1000 Cad)*, higher score = higher budget

Table 3. Breakdown of change in housing status over 12 months among participants

Change in housing status (T0-T1)	# of people	Percent of sample
Sample TOTAL	270	100
Positive		
Shelters to TH[a]	2	0.74
Shelters to PH[b]	4	1.48
TH to PH	72	26.67
PH to PH	96	35.55
TOTAL	**174**	**64.44**
Negative		
PH to shelters	3	1.11
TH to shelters	8	2.96
Shelter to shelters	11	4.07
PH to TH	20	7.41
TH to TH	54	20.00
TOTAL	**96**	**35.56**

a: Temporary housing

b: Permanent housing

Table 4. Multiple regression model for change in housing status over 12 months with *negative change in housing status* as reference group

	Odds Ratio	P_value	95% CI	
Predisposing factors				
Housing status@T0				
Shelters vs. PH	0.08	0.001	0.02	0.37
TH vs. PH	0.13	<0.001	0.04	0.39
Women	3.74	0.005	1.49	9.37
Having children	2.16	0.028	1.09	4.30
Needs factors				
Physical illnesses	0.40	0.047	0.16	0.99
Enabling factors				
Frequency of public ambulatory service use	1.04	0.029	1.00	1.08
Having consulted a psychologist	3.78	0.010	1.38	10.40
Having a case manager	0.49	0.102	0.21	1.15
Constant	6.76	0.014	1.46	31.27

PH: permanent housing; TH: temporary housing

4. DISCUSSION

This study identified predictors of change in housing status over 12 months in terms of predisposing, needs, and enabling factors, for a sample of 270 currently or formerly homeless individuals using different types of housing accommodations in Quebec. Positive change in housing status over 12 months was observed for 64% of the sample, coinciding with 12-month housing stability or positive change measures of 51-82% reported in the literature for PH (Durbin et al., 2019; Kerman, Sylvestre, Aubry, & Distasio, 2018; Palepu, Patterson, Moniruzzaman, Frankish, & Somers, 2013). With 81% of PH participants remaining in PH at T1, this result was similar to the 82% reported in Kerman et al. (2018). TH or shelter studies found 34-72% housing stability or access to PH (Ecker & Aubry, 2016; Johnstone, Parsell, Jetten, Dingle, & Walter, 2015; North, Eyrich-Garg, Pollio, & Thirthalli, 2010; To et al., 2016). Our results were thus within the norm, as 54% of TH participants accessed PH by T1. By contrast, the percentage of shelter users (35%) showing positive change in housing status at T1 was quite low, which may be partly explained by the fact that they were underrepresented in our sample. Shelter users are also known to receive fewer ambulatory health and social services than TH or PH residents (Thompson, Pollio, Eyrich, Bradbury, & North, 2004). Moreover, 12-month retention of 59% in this study was lower than the 63-94% rates reported elsewhere (Ecker & Aubry, 2016; Johnstone et al., 2015; North et al., 2010; To et al., 2016). The wide range of retention rates across studies, as with change in housing status over a 12-month period, may be attributed to heterogeneity in study samples among the housing programs examined, as well as in the variability of housing stability measures (Novac et al., 2009).

Surprisingly, results revealed that predisposing factors (N=3) were in fact most strongly associated with positive change in housing status over 12 months, not enabling factors (N=2) as initially hypothesized, and were followed by needs factors (N=1). The high proportion of study participants already in PH at baseline and accounted for in the predisposing factors may explain these results. Notably, participants already in PH may have been more likely to remain there, demonstrating positive housing status 12 months later. This is in line with previous research reporting good housing stability outcomes for PH (Boland et al., 2018; Davidson et al., 2014; Stergiopoulos et al., 2015). Regarding other predisposing factors, women were more likely than men to attain and maintain housing stability, as previously reported (Adair et al., 2017; Gentil, Grenier, Bamvita, Dorvil, & Fleury, 2019). As in help-seeking more generally, women have a

greater tendency to seek formal assistance (e.g. welfare, government subsidies and other social services), to display higher social functioning and seek more support from family and friends, than men (Iaquinta, 2016; Rich & Clark, 2005). Having children was also associated with achieving favourable housing status over 12 months, as in past studies (Orwin, Scott, & Arieira, 2005; Rog, Henderson, Lunn, Greer, & Ellis, 2017; Van Straaten et al., 2017). It is possible that being a parent with responsibility for one's own children, even when no longer dependent, acts as a strong motivator for attaining and maintaining stable housing (Orwin et al., 2005).

Among enabling factors, "having consulted a psychologist" also predicted favourable change in housing status, which represents an original contribution as studies have rarely focused on the use of specific professionals in this context. As in the recommendation of psychotherapy enhanced with medication as a best practice for treatment of MHD in stepped-care models (Archer et al., 2012; Huffman, Niazi, Rundell, Sharpe, & Katon, 2014), previous consultations with a psychologist in this study, where most participants had MHD, may have reinforced positive change in housing status. In general, psychosocial interventions or counseling have been shown to improve housing stability for people residing in PH (Hwang & Burns, 2014; Kreindler & Coodin, 2010; Stergiopoulos et al., 2019). Given that consulting a psychologist in private practice would be financially unfeasible for homeless individuals, access to a psychologist would likely have occurred through community-based primary mental healthcare teams, which have burgeoned in Quebec since the 2005 mental health reform (Ministère de la Santé et des Services Sociaux, 2005). Hospital psychiatric departments also tend to have psychologists on staff, offering more possibilities for psychotherapy or psychosocial support to homeless individuals with MHD. Moreover, the association between more frequent use of public ambulatory services, which include various health and social services, and positive change in housing status over 12 months seemed logical. Housing stability was found to modify service use patterns through better access to ambulatory health and social services (Kerman et al., 2018).

Among needs factors, having no physical illnesses was the single predictor of favourable change in housing status over 12 months in this study, whereas previous research has produced mixed results. A recent Housing First study by Adair et al (2017) reported that participants with physical comorbidities were able to maintain stable housing (2017). One reason why individuals in our study were forced to move out may have had to do with the nature of their physical health problems (i.e. cardiovascular, chronic pain or muscle and joint problems), and living in poorly

adapted buildings (e.g. absence of elevators or wheelchair access ramps) (Wallace, Pauly, Perkin, & Cross, 2019). However, it may also be argued that housing stability may facilitate better health outcomes, especially for those with chronic physical illnesses, by providing an environment more conducive to focus on personal health and well-being, even in terms of simply having an adequate physical space to manage the logistics of personal care (Chhabra et al., 2020; Jaworsky et al., 2016). Since housed individuals are spared the relentless daily struggle of seeking shelter and food, health needs can take more immediate priority for those formerly homeless who obtain more stable housing (O'Connell, 2004).

It was surprising that social support did not emerge as a significant predictor of change in housing status, despite previous findings on the protective effects of social support for housing stability (Ecker & Aubry, 2016; Greenwood et al., 2019; Van Straaten et al., 2017). One study did find that both stably and unstably housed individuals received social support (Gabrielian, Young, Greenberg, & Bromley, 2018). Yet, formal (e.g. case manager) and informal (e.g. family or friend) supports among unstably housed participants were often more negative or superficial (Gabrielian et al., 2018). Similarly, studies (Hwang et al., 2011; Tsemberis, Gulcur, & Nakae, 2004) found that homeless individuals living in PH with case management, as in Housing First, or those newly housed (Caton et al., 2005; Wolf, Burnam, Koegel, Sullivan, & Morton, 2001) had better quality of life, another finding that did not emerge in our results. A US study found that quality of life in Housing First increased only in particular areas related to living situation, family relations and finances (Henwood, Matejkowski, Stefancic, & Lukens, 2014). Finally, contrary to previous studies (Aubry, Duhoux, et al., 2016; Kreindler & Coodin, 2010; Spicer, Smith, Conroy, Flatau, & Burns, 2015) this study did not find a negative association between favourable change in housing status over 12 months and SUD. Being stably housed may reduce negative consequences for health and social functioning, even while alcohol or drug consumption continue. Other studies evaluating PH programs with a comprehensive harm reduction approach to substance use have shown that participants with SUD were able to maintain or improve housing stability and reduce problematic SUD-related outcomes (Appel, Tsemberis, Joseph, Stefancic, & Lambert-Wacey, 2012; Mares & Rosenheck, 2010; Tsemberis, Kent, & Respress, 2012).

This study has certain limitations. First, as the study was set in Quebec, with a specific configuration of health care and social services, findings may not be generalizable to other jurisdictions, especially those without universal health insurance (Hwang et al., 2013). Second,

middle-age or older people (age 40 and over) were overrepresented in our sample. Recruiting more younger participants would have allowed for better assessment of age effects as predictors of stable housing based on comparisons among age groups (Caton et al., 2005; Fazel et al., 2014). Third, emergency shelter users were also underrepresented. Fourth, our sample size did not allow us to analyse changes among the independent variables from T0 to T1. Finally, the data collected were based on participant self-report. Official documents or records could have been used to complement self-report data for factors such as MHD and for use of public ambulatory services.

5. CONCLUSION

This study is to our knowledge the first to identify predictors of change in housing status over 12 months for individuals with a history of homelessness residing in or using different types of housing, based on the Gelberg-Andersen Behavioral Model as a framework. The study considered a few novel or less studied variables in relation to housing status, identifying the following significant associations: physical illnesses, having consulted a psychologist, and frequency of public ambulatory services. Specific interventions may be recommended with a view toward strengthening positive change in housing status. For example, case managers should be more systematically deployed to encourage use of public ambulatory services among homeless or previously homeless individuals, mainly those less likely to seek and receive help like men and individuals without children. Primary mental healthcare teams may facilitate access to psychologists. Finally, existing PH facilities should be better adapted to the physical health problems of individuals experiencing homelessness, and PH programs could be financially supported through subsidies to further increase access.

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4.2 Article 2 – Typology Study

Change in housing status among homeless and formerly homeless individuals in Quebec, Canada: A profile study

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Article

Change in Housing Status among Homeless and Formerly Homeless Individuals in Quebec, Canada: A Profile Study

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Abstract: Housing stability is a key outcome in studies evaluating housing services for the homeless population. Housing stability has typically been defined dichotomously and based on a fixed duration of maintenance in housing accommodations, which does not fully capture change in housing status among homeless individuals. Moreover, few typologies have examined housing trajectories across different housing types. Cluster analysis was used to develop a typology of housing status change for 270 currently or formerly homeless individuals in Quebec (Canada) residing in shelters and temporary and permanent housing. Participants were interviewed at baseline (T0) and 12 months later (T1). The Gelberg–Andersen Model was used to organize housing-related variables into predisposing, needs and enabling factors. Comparison analyses were conducted to assess group differences. Three groups (Groups 1, 3 and 4) had more favorable and two (Groups 2 and 5) less favorable, housing status at T1. Findings suggest that maintenance or improvement of housing status requires suitable types and frequencies of service use (enabling factors) that are well adapted to the nature and complexity of health problems (needs factors) among homeless individuals. Specific interventions, such as outreach programs and case management, should be prioritized for individuals at higher risk for returning to homelessness.

Keywords: homelessness; type of housing; housing status; factors; typology; cluster analysis

1. Introduction

Homelessness and housing instability have serious impact on the health and the well-being of individuals [1]. Enabling homeless individuals to access and maintain permanent housing (PH) is therefore an essential factor in their recovery [1]. Housing stability is a key outcome in studies evaluating housing services for the homeless population [2–4]. Recent systematic reviews have highlighted the lack of consensus in definitions of housing stability [5,6]. Most studies categorize participants as either housed or homeless [7–9] and include relatively few dimensions in defining housing trajectories, such as type of accommodation (e.g., living with family or friends, in supportive housing, etc.) and housing duration (e.g., 90 consecutive days, or longer) [5,6]. However, restricting the definition of housing stability to time-limited duration of housing maintenance fails to capture the housing trajectories of homeless individuals that range along a continuum of short-, medium- and long-term services, from emergency shelters and temporary housing (TH, i.e., housing offering accommodation during a period usually for up to 24 months) [10] to PH. Moreover, considering the heterogeneity among homeless population, it is likely that various characteristics may relate to

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housing (TH, i.e., housing offering accommodation during a period usually for up to 24 months) [10] to PH. Moreover, considering the heterogeneity among homeless population, it is likely that various characteristics may relate to housing outcomes: whether the housing status of previously homeless individuals may improve, remain stable or deteriorate over time.

One way to identify housing trajectories (or change in housing status) among homeless individuals is by typology. Typological research may reveal similar characteristics among subgroups of homeless individuals, facilitating the implementation of housing and other services that address their specific needs. Some studies have attempted to classify homeless individuals within a broad population [2,11] or in subpopulations such as veterans [12,13] and youth [14–16]. Several typologies have been established based on previous life experience [17,18], physical or mental health problems [13,19,20], quality of life [21,22] and patterns of emergency shelter use [23]. Although some recent studies have identified typologies of housing trajectories or outcomes [2,20,24], no study to our knowledge has identified profiles of homeless individuals based on their trajectories across various types of housing accommodation (e.g., emergency shelter to TH or TH to PH). Examining changes in housing status among individuals living in different housing conditions, as well their specific socio-demographic, clinical and service use characteristics, may contribute to a better understanding of housing stability.

Cluster analyses with homeless individuals have been conducted using multiple variables: sociodemographic (e.g., age and sex), clinical (e.g., mental health disorders (MHD) and substance use disorders (SUD)) and service use (e.g., frequency of emergency department visits (ED) and hospitalizations) [2,17,20,25]. Some typologies have included risk factors (e.g., victimization and arrest history) and protective factors (e.g., social support and positive perceived health) as pertinent variables [15,22]. However, several variables have been less studied with respect to housing stability, including suicidal behavior and functional disability, both very prevalent in homelessness [26]; use of public primary care services, such as having a family doctor [27,28]; or required codes of living/conduct in different housing models [29,30], for example enforcing stringent abstinence policies against substance use as opposed to the harm reduction policies characteristic of Housing First, a PH model with case management [31,32], which offers direct access for homeless individuals with serious MHD and/or SUD to a PH without the obligation to participate in treatment [33].

Despite the wide range of variables used to distinguish classes of homeless individuals, few studies have used a conceptual framework. Bonin et al. (2009) developed a typology of homeless individuals with MHD using the Network-Episode Model [19], which considers individuals entering the healthcare system in social context and within support networks [34]. Another widely used model in health service evaluation is the Gelberg–Andersen Behavioral Model for Vulnerable Populations [35], in which variables are classified as predisposing factors (i.e., socio-demographics: e.g., age and sex), needs factors (i.e., clinical variables: types and numbers of disorders) and enabling factors (i.e., service use variables, including having a family doctor or frequency of hospitalization) [35]. Previous studies of homelessness using the Gelberg–Andersen Model have identified predictors of outcomes, such as satisfaction [27], exit from supported housing [36],and health service use [37]. However, to our knowledge, no typology exists for variables organized within the Gelberg–Andersen Model.

The objective of this study was to develop a typology for housing status change using an adapted version of the Gelberg–Andersen Model, for a cohort of 270 currently or formerly homeless individuals residing in different types of housing in Quebec (Canada). A typology of homelessness based on changes in housing status may contribute to current understanding of housing stability among homeless or formerly homeless individuals and should inform housing policies and services that address the specific needs of identified subgroups.

2. Materials and Methods

2.1. Study Setting and Data Collection

This multisite study was conducted in Quebec's two largest urban centers. Participants were recruited from 27 community or public organizations, 20 of which provided housing services. Five of them were emergency shelters; fourteen offered TH and three PH. Most TH involved 3–12-month residency. The remaining seven organizations offered other ancillary services: food banks, day centers, soup kitchens, etc.

Study participants had to be at least 18 years old, currently living in a shelter or TH or be previously homeless and living in HF within the past two years. In total, 497 individuals were invited to participate in the study: 46 emergency shelter users, 243 TH residents and 208 PH residents. While no individuals interested in the study who met eligibility criteria were excluded,

interviews were sometimes postponed to accommodate anyone intoxicated or otherwise unfit to be interviewed. Recruitment strategies included: posters displayed in common areas of the selected organizations, on-site recruitment by the project coordinator and referrals by housing staff who attended information meetings given by project researchers.

Interviews were administered by trained research assistants, closely supervised by the research team. Baseline interviews were managed from January to September 2017 (T0), usually the same day or shortly after initial contact. Follow-up data collection for participants interviewed at T0 occurred approximately 12 months later, between January and December 2018 (T1). T0 interviews usually lasted 75 min and T1 interviews were typically shorter, about 55 min, since some sociodemographic items remained unchanged in the 12-month interlude. Interviews were conducted at the selected organizations, participant apartments or local restaurants. Participants completed a questionnaire consisting of questions on socio-demographics (e.g., age and education); residential history (e.g., chronic homelessness); service use, including satisfaction with services (e.g., having a family doctor and emergency department use); and diagnoses (e.g., MHD, SUD and physical illness). Prior to the interview, each study participant provided written informed consent. After completing interviews, participants received a modest financial compensation for their time and contribution to the study.

Program coordinators in the participating housing resources (n = 47) also completed a short questionnaire concerning support programs they provided. This questionnaire included 14 items related to the nature of their code of living/conduct protocols for residents (e.g., alcohol or drug use and participation in community activities). This questionnaire was self-administered, available online through LimeSurvey software or was conducted in person by a trained research assistant between November 2017 and March 2018. The multisite study protocol was approved by the research ethics board of a Douglas Mental Health University Institute (IUSMD 16/35).

2.2. Conceptual Framework, Variables and Instruments

All study variables were based on the Gelberg–Andersen Model [35], as presented in Figure 1. Standardized instruments [38–45] used for both T0 and T1 interviews are listed in Table S1. The main variable of interest for the basis of the cluster analysis was change in housing status from T0 (baseline) to T1 (12 months). Housing status at both T0 and T1 was determined using an

adapted version of the Canadian Community Health Survey (CCHS) where participants reported one of three accommodation types: emergency shelters (overnight stays less than a week), TH (3–12 month residency) and PH (with apartment lease of usually 12 months renewable). Participants were then grouped into the following four conditions related to the change in housing status at T1: (1) deterioration (PH to TH or shelter, TH to shelter, shelter to shelter by T1); (2) stable-TH (no change); (3) stable-PH (no change); and (4) improvement (shelter to TH or PH, TH to PH).

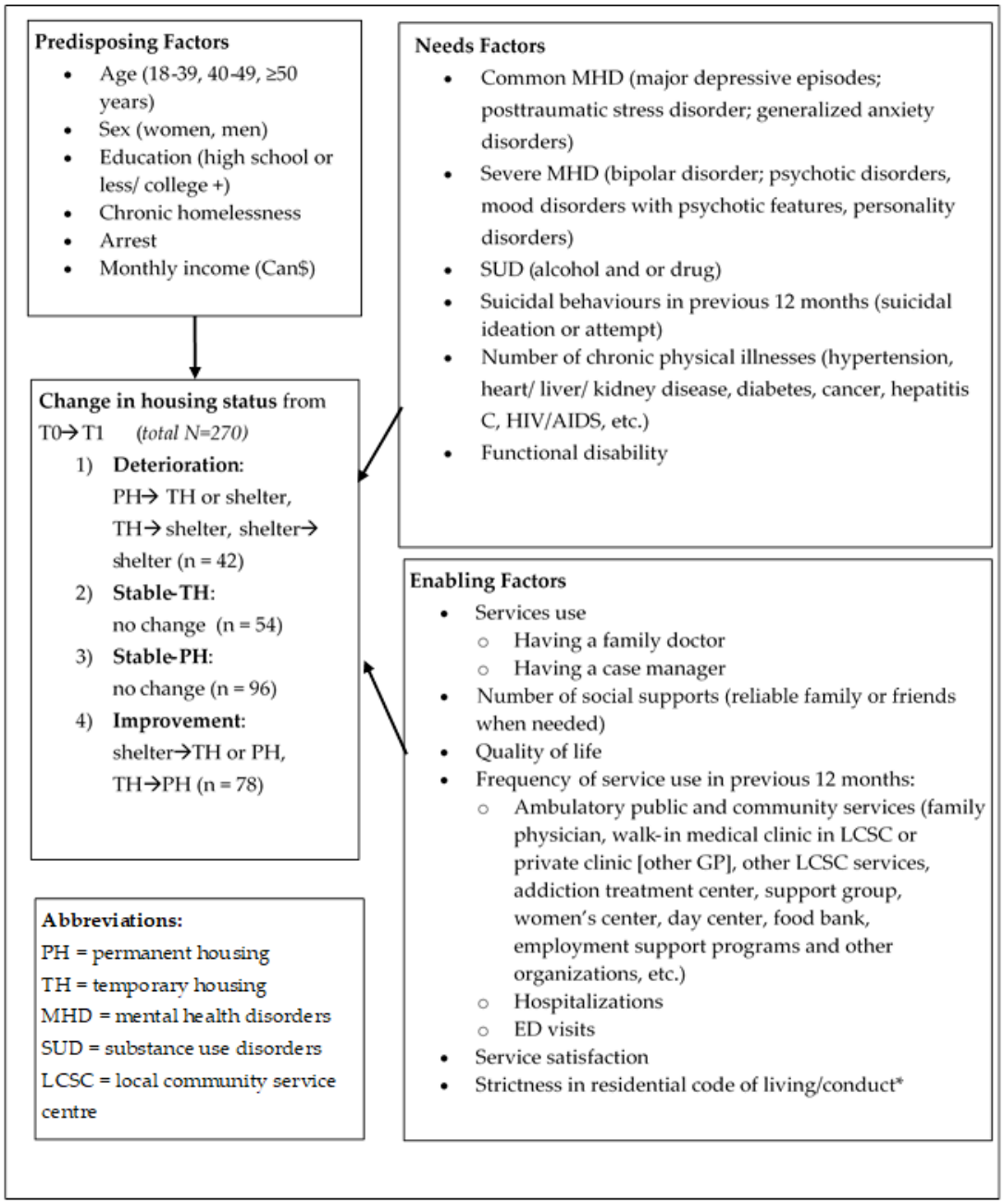

Figure 1. Conceptual framework for change in housing status based on the Gelberg–Andersen Behavioral Model for Vulnerable populations.

Independent variables were identified based on their relevance to the homelessness literature and organized into predisposing, needs and enabling factors according to the Gelberg–Andersen Model [35]. Predisposing factors included: age, sex, education, chronic homelessness, arrest (for theft, violence, drugs, etc.) and monthly income. Chronic homelessness was defined as a single homeless episode of at least 12 months or 4 homeless episodes within a 3-year period [46]. Needs factors for the previous 12 months included: common MHD (e.g., major depressive episodes and anxiety disorders), severe MHD (e.g., bipolar disorder, psychotic disorders and personality disorders), SUD (alcohol and/or drug), suicidal behavior, number of chronic physical illnesses (e.g., hypertension and kidney disease) and functional disability. Enabling factors referred to: having a family doctor or case manager, number of social supports (reliable family or friends when needed), quality of life, frequency of service use in the previous 12 months (ambulatory public and community services, hospitalizations and ED visits), service satisfaction score and strictness in residential code of living/conduct.

2.3. Analysis

Univariate analyses with all independent variables from T1 consisted of frequency distributions for categorical variables and mean values with standard deviations for continuous variables. Missing values (less than 5%) were randomly distributed and imputed by expectation maximization method [47]. Cluster analysis was conducted using the k-means group algorithm with Gower dissimilarity coefficient, and several k-means solutions with different numbers (3–7) of groups were computed [48]. The five-group solution had the largest Calinski–Harabasz pseudo-F value, indicating that the five-group solution was most distinct as compared with the other groups. Comparison analyses were conducted to assess statistical differences between groups: Chi-square or Fisher's exact tests were used for categorical variables, and T-tests or the Wilcoxon rank-sum test for continuous variables. Stata version 15 was used to conduct the group analyses.

3. Results

Of the 497 participants recruited, 455 enrolled at baseline (T0, 92%) and 270 at 12-month follow-up (T1), for a response rate of 59% at T1. Comparative analyses using cross tabulations on categorical variable showed no differences in gender between the T0 and T1 samples ($p = 0.518$). T-test was used for the continuous variables, age and disability, at T0 and T1 yielding no

significant differences (age: p = 0.126; disability: p = 0.677). No significant differences were found between individuals lost to follow-up (n = 185) and those retained (n = 270), in terms of baseline characteristics for sex (p = 0.199), education (p = 0.689) and disability (p = 0.330). In addition, of 47 program coordinators contacted to participate in the study, 44 completed the questionnaire (79% women; mean age 42 years) for a response rate of 94%.

Among the 270 participants at T1, 96 (36%) were in stable-PH and 54 (20%) in stable-TH, while change in housing status reflected improvement for 78 (29%) and deterioration for 42 (16%). Among the 78 participants whose housing status had improved, 72 (98%) moved from TH to PH, 4 (1.5%) from emergency shelters to PH and 2 (0.5%) from emergency shelter to TH. Among the 42 participants whose housing status had deteriorated at T1, 20 (48%) moved from PH to TH, 11 (26%) used emergency shelters throughout the 12-month period, 8 (19%) moved from TH to emergency shelters and 3 (7%) from PH to emergency shelters.

Participant characteristics at T1 are presented in Table 1. Regarding predisposing factors, 57% were 50 years old or over, 58% were men and 67% had high school education or less. About half (52%) had experienced chronic homelessness; 16% were arrested in the previous 12 months; and average monthly income was $959.34. Concerning needs factors, 72% of participants reported severe MHD or personality disorders, 43% common MHD, 37% SUD and 24% suicidal behavior. Thirty-five percent of participants had at least one chronic physical illness for an average of 0.60 chronic physical illnesses. Participants had a mean score of 21 on the 60-point disability scale, indicating moderately compromised functionality. Regarding enabling factors, 57% reported having a family doctor, and 50% a case manager. Participants received social support from an average of two people, and mean quality of life score was 71 on a 100-point scale. In the previous 12 months, participants reported using ambulatory public and community services 88 times, visited the ED twice and were hospitalized 0.50 times on average. Mean service satisfaction score was 4.0/5.0. Strictness in residential code of living/conduct was assessed as 8.7/14.

Table 1. Participant characteristics at T1 (12-month follow-up; n = 270).

Variables	Min	Max	*n*/Mean	%/SD.
			270	100.00
Sample size				
Change in Housing Status				
Deterioration			42	15.56
Stable-TH			54	20.00
Stable-PH			96	35.56
Improvement			78	28.89
Predisposing Factors				
Age (mean/SD)	19	76	49.52	11.23
18–39 years			14	5.19
40–49 years			103	38.15
50 and over			153	56.67
Sex				
Women			114	42.22
Men			156	57.78
Education				
High school or less			182	67.41
College or more			88	32.59
Chronic homelessness			141	52.22
Arrest			44	16.3
Monthly income (CAD; mean/SD)	0	8880	959.34	756.98
Needs Factors				
Common MHD			117	43.33
Severe MHD including personality disorders			194	71.85
Substance use disorders			101	37.41
Suicidal behaviors			64	23.7
Number of chronic physical illnesses (mean/SD)	0	5	0.60	0.98
Functional disability [1] (mean/SD)	11	46	20.64	6.58
Enabling Factors				
Having a family doctor			153	56.67
Having a case manager			136	50.37
Number of social supports (mean/SD)	0	13	2.18	2.44
Quality of life [2] (mean/SD)	35	100	71.05	9.76
Frequency of ambulatory public and community service use [3] (mean/SD)	0	632	87.55	120.67
Hospitalizations (mean/SD)	0	7	0.50	1.11
ED visits (mean/SD)	0	100	1.98	8.38
Service satisfaction [4] (mean/SD)	1	5	3.99	0.76
Strictness in residential code of living/conduct [5] (mean/SD)	0	14	8.66	4.92

TH, temporary housing; PH, permanent housing; MHD, mental health disorders; ED, emergency department. [1] Functional disability: score with rating: 0 –60 where 0 = no disability and 60 = full disability. [2] Quality of life: score with rating: 20–100 where higher = better quality of life. [3] Ambulatory public and community services: general practitioners (both family doctors or any doctors in walk-in clinics), first line biopsychosocial services in local community service centers (LCSC), ambulatory care in hospitals, addiction treatment centers, support group, women's center, day center, food bank, employment support programs, etc.). [4] Service satisfaction: score based on previous 12 months where higher = more satisfied with services. [5] Strictness in residential code of living/conduct: score completed by program coordinators at housing services organizations where higher = stricter program rules for living/conduct

Cluster analysis identified five groups related to change in housing status at T1 (Table 2). Detailed group comparison tests for each variable are shown in Table S2. Three groups (Groups 1, 4 and 3) had more favorable housing conditions at T1. Group 1 was the largest, representing 25% of the sample (n = 68/270) with 59% of participants showing improved housing status at T1 and 41% in stable-PH. Group 4 represented 23% of the sample (n = 61/270), 57% of whom showed improved housing status by T1 and 43% remained in stable-PH. Group 3 accounted for 17% of the sample (n = 47/270) with 81% in stable-PH, while 13% experienced housing status deterioration and 6% housing status improvement at T1. The two remaining groups (Groups 2 and 5) had less favorable housing status at T1. Group 2 included 20% of the sample (n = 54/270) with half in stable-TH, 43% experiencing housing status deterioration and 7% in stable-PH. Finally, Group 5, the smallest group, included 15% of the sample (n = 40/270) with 68% in stable-TH and 33% experiencing housing status deterioration by T1.

Table 2. Cluster analysis of change in housing status over 12 months.

Variables	Group 1		Group 2		Group 3		Group 4		Group 5	
	***n*/Mean**	**%/SD**	***n*/Mean**	**%/SD**	***n*/Mean**	**%/SD**	***n*/Mean**	**%/SD**	***n*/Mean**	**%/SD**
Group size	68	25.19	54	20.00	47	17.41	61	22.59	40	14.81
Change in Housing Status										
Deterioration	0	0.00	23 [1,3,4]	42.59	6 [1,2,4,5]	12.77	0	0.00	13 [1,3,4]	32.50
Stable-TH	0	0.00	27	50.00	0	0.00	0	0.00	27	67.50
Stable-PH	28 [2,3,5]	41.18	4	7.41	38	80.85	26 [2,3,5]	42.62	0	0.00
Improvement	40	58.82	0	0.00	3	6.38	35	57.38	0	0.00
Predisposing Factors										
Age										
18–39 years	0	0.00	0	0.00	0	0.00	9	14.75	5	12.50
40–49 years	0	0.00	0	0.00	16	34.04	52 [1,2,3]	85.25	35 [1,2,3]	87.50
50 and over	68 [3,4,5]	100	54 [3,4,5]	100	31 [1,2,4,5]	65.96	0	0.00	0	0.00
Female	31 [2,4]	45.59	10 [1,3,4]	18.52	18 [2,4]	38.30	44 [1,2,3,5]	72.13	11[4]	27.50
Education (college or more)	22	32.35	18	33.33	12	25.53	22	36.07	14	35.00
Chronic homelessness	33	48.53	32	59.26	26	55.32	29	47.54	21	52.50
Arrest	6 [5]	8.82	8	14.81	10	21.28	10	16.39	10 [1]	25.00
Monthly income (CAD; mean/SD)	917.11 [5]	347.34	1257.64 [5]	1534.39	851.28 [5]	188.94	958.45 [5]	420.43	756.74 [1,2,3,4]	221.43
Needs Factors										
Common MHD	26 [3]	38.24	21	38.89	27[1]	57.45	25	40.98	18	45.00
Severe MHD including personality disorders	41 [3]	60.29	39	72.22	39 [1]	82.98	46	75.41	29	72.5
Substance use disorders	23	33.82	23	42.59	18	38.3	20	32.79	17	42.5
Suicidal behaviors	7 [3,4,5]	10.29	10 [3]	18.52	18 [1,2]	38.3	19 [1]	31.15	10 [1]	25.00
Number of chronic physical illnesses (mean/SD)	0.63 [4]	0.96	0.98 [4,5]	1.12	0.70 [4]	1.12	0.25 [1,2,3]	0.62	0.45 [2]	0.90
Median (IQR)	0.00	(0,1)	1.00	(0.2)	0.00	(0.1)	0.00	(0.0)	0.00	(0.1)
Functional disability (mean/SD)	18.85 [3,4]	4.45	20.46	7.45	22.77 [1]	7.98	21.06[1]	6.04	20.77	6.82

Enabling Factors										
Having a family doctor	42	61.76	37 [5]	68.52	26	55.32	30	49.18	18 [2]	45.00
Having a case manager	33	48.53	25	46.3	30	63.83	30	49.18	18	45.00
Number of social supports (mean/SD)	2.34	2.64	1.54 [4]	2.18	1.98	1.81	2.56 [2]	2.47	2.45	2.89
Quality of life (mean/SD)	71.21	8.96	72.89	11.32	71.98	11.03	69.57	8.48	69.45	8.92
Frequency of ambulatory public and community service use (mean/SD)	68.50 [3]	102.27	87.02 [3]	134.63	120.00 [1,2,5]	128.00	98.13	133.62	66.38 [3]	92.18
Median (IQR)	29.00	(5,63)	19.00	(5.98)	66.00	(23.205)	43.00	(8.150)	34.00	(10.81)
Hospitalizations (mean/SD)	0.54	1.25	0.28 [4]	0.71	0.36	0.85	0.66[2]	1.12	0.63	1.46
Median (IQR)	0	(0,1)	0	(0.0)	0	(0.0)	0	(0.1)	0	(0.1)
ED visits (mean/SD)	2.53	10.74	0.76 [3,4]	1.66	1.40[2]	2.19	3.28[2]	12.97	1.38	3.54
Median (IQR)	0	(0,2)	0	(0.1)	1	(0.2)	1	(0.2)	0	(0.1)
Service satisfaction score (mean/SD)	4.13 [3,4]	0.63	4.18 [3,4]	0.75	3.80 [1,2]	0.93	3.88 [1,2]	0.66	3.92	0.82
Strictness in residential code of living/conduct (mean/SD)	11.04 [2,3]	1.75	9.53 [1,3,4,5]	3.92	0.13 [1,2,4,5]	0.88	11.29 [2,3]	1.58	11.56 [2,3]	2.38

TH, temporary housing; PH, permanent housing; MHD, mental health disorders; ED, emergency department, Superscript numbers indicate significant differences at $p < 0.05$, Profiles – **Group 1**: "Older individuals with fewer MHD, less disability and fewer arrests, residing in stable-PH or experiencing housing status improvement." **Group 2**: "Older men with poorer physical health, housing status deterioration at T1 or stable-TH, but having a family doctor and using fewer services." **Group 3**: "Middle-age to older individuals with high health needs and service use, residing mainly in stable-PH, and whose residences had lower strictness in residential codes of living/conduct." **Group 4:** "Middle-age women with high social support, few chronic physical illnesses, residing in stable-PH or experiencing housing status improvement at T1, but elevated disability and risk for suicidal behavior, high frequencies of hospitalization and ED visits." **Group 5**: "Middle-age men with low income and low ambulatory service use, more previous arrests, residing in stable-TH or experiencing housing status deterioration at T1."

Group profiles are described below in order of more favorable change in housing status over 12 months (Groups 1, 4 and 3), followed by those in less favorable housing status (Groups 2 and 5). Group 1 differed significantly from Groups 2 and 5 (less stable-PH) as well as Group 3 (more stable-PH). All Group 1 individuals were 50 years old or older and had low risk of suicidal behavior, differing from those in Groups 3–5. Men and women were represented almost equally in Group 1, unlike Groups 2 and 4. Disability and service satisfaction scores were more favorable for Group 1 than Groups 3 and 4. Group 1 participants were less affected by common or severe MHD or personality disorders and used fewer ambulatory public and community services than those in Group 3. Group 1 had fewer arrests than Group 5 and lived in housing with more strict codes of living or conduct than those in housing where Group 2 and 3 participants lived. Group 1 was labeled: "Older individuals with fewer MHD, less disability and fewer arrests, residing in stable-PH or experiencing housing status improvement."

Group 4 participants all experienced housing status improvement or lived in stable-PH and consisted mainly of women. Group 4 had more individuals in their 40s and fewer with chronic physical illnesses relative to Groups 1–3. Group 4 participants reported more suicidal behavior and higher disability scores than in Group 1. Social support was higher in Group 4, as was the number of hospitalizations and ED visits relative to Group 2. The Group 4 service satisfaction score was lower than those for Groups 1 and 2, and the score for strictness of residential code of living/conduct was higher than scores for Groups 2 and 3. Group 4 was labeled: "Middle-age women with high social support, few chronic physical illnesses, residing in stable-PH or experiencing housing status improvement at T1, but elevated disability and risk for suicidal behavior, high frequencies of hospitalization and ED visits."

Group 3 individuals were in their 40s or older and lived predominantly in stable-PH. Their housing had the lowest scores for strictness in residential code of living/conduct. They made greater use of ambulatory services than Groups 1, 2 and 5, but had more ED visits than Group 2 only. Service satisfaction score for Group 3 was lower than those of Groups 1 and 2. The proportion of women in Group 3 was higher than Group 2, but lower than Group 4. Suicidal behavior was more prevalent in Group 3 compared with Groups 1 and 2. Group 3 participants were more likely to be affected by common or severe MHD or personality disorders and had higher disability scores compared with Group 1. Group 3 was labeled: "Middle-age to older individuals with high health needs and service use, residing mainly in stable-PH, and whose residences had lower strictness in residential codes of living/conduct."

Group 2 had more men, and worse housing status at T1 compared with Groups 1, 3 and 4; half lived in stable-TH. All Group 2 individuals were 50 years of age or older. Group 2 registered a higher number of chronic physical illnesses than Groups 4 and 5. Both suicidal behavior and ambulatory service use were reported less in Group 2 than in Group 3. Strictness in residential code of living/conduct was low, differing from all other groups, while service satisfaction score was higher than in those for Groups 3 and 4. Group 2 participants also made fewer ED visits than did Groups 3 and 4 and fewer hospitalizations than Group 4. Participants were more likely to have a family doctor than those in Group 5 and had lower number of social supports than in Group 4. Group 2 was labeled: "Older men with poorer physical health, housing status deterioration at T1 or stable-TH, but having a family doctor and using fewer services."

Group 5 participants were all living in stable-TH or had experienced housing status deterioration at T1, which differed from results for Groups 1, 3 and 4. Group 5 individuals were men mainly in their 40s. The average monthly income for Group 5 was the lowest of the five groups. More Group 5 participants were arrested than in Group 1. They had fewer chronic physical illnesses and were less likely to have a family doctor than Group 2 participants. They used fewer ambulatory services than Group 3 and experienced more strictness in residential code of living/conduct compared with Groups 2 and 3. Group 5 was labeled: "Middle-age men with low income and low ambulatory service use, more previous arrests, residing in stable-TH or experiencing housing status deterioration at T1."

4. Discussion

This study established a typology for current or recently homeless individuals in Quebec based on change in housing status and across different housing types within a 12-month follow-up period. The great majority of participants maintained stable-PH or improved housing status by T1, which is comparable to results for HF studies reporting positive residential stability outcomes, even extending beyond 12 months [4,6,20]. Furthermore, few participants had experienced a deterioration of their housing status, representing a very positive result, which confirms the importance to offer to most homeless individuals a PH, as recommended in programs like Housing First.

Five groups were identified through cluster analysis, three (Groups 1, 3 and 4) showing more favorable housing status at T1 (stable-PH or improvement) and two (Groups 2 and 5) demonstrating less favorable housing status (stable-TH or deterioration) over the same period. Some groups showed similarities to those described in previous studies. For instance, studies identified a profile of homeless individuals living mainly in stable PH but having complex mental and physical health problems [2,20], similar to Group 3 in the present study. Adair et al. [20] also identified a group of homeless individuals with little housing stability, but relatively high monthly income and a high level of psychiatric symptoms, similar to the present Group 2. Another group mainly consisting of men with low monthly incomes and poor outcomes was quite similar to our Group 5 [20]. This latter group was probably the one that best represented the typical profile of homeless individuals as imagined by the general public. However, this group was the less numerous among the five identified by the cluster analysis. Bonin et al. [19] also identified a class

of mainly women, with considerable social support and high service use, quite similar to Group 4. In contrast to previous studies [2,49], we did not identify a group with few health problems, the closest being Group 1 in this study. In addition, we were unable to identify a group mainly affected by SUD, unlike previous studies [2,21].

The results reveal notable differences between groups in terms of predisposing, needs and enabling factors. Concerning predisposing factors, Groups 2 and 5 showed less favorable housing status and were predominantly men, while women were more numerous in groups with more favorable housing status. Previous studies have demonstrated links between female gender and housing stability [20,50]. No other predisposing, needs or enabling factors were solely associated with change in housing status.

Several differences characterized the three groups registering change to more favorable housing status. Groups 1 and 4 had similar distributions in housing status, with all participants demonstrating stable-PH or housing status improvement after 12 months despite very different profiles. Concerning predisposing factors, Group 1 individuals were 50 years of age or older, whereas those in Group 4 were more in their 40s. Concerning needs factors, the fewest chronic physical illnesses among Group 4 may have reflected their relatively younger age. Group 4 also had significantly more suicidal behavior and was more affected by functional disability. Associations between functional disability and suicide risk have been previously reported [51,52]. In terms of enabling factors, Group 1 participants used few ambulatory public and community services, but reported higher service satisfaction than did Groups 3 and 4, suggesting that their health needs may have been met despite lower frequency of health and social service use [53]. By contrast, the higher prevalence of individuals with suicidal behavior in Group 4 may explain their more frequent hospitalizations and ED use [54]. Moreover, the preponderance of women might explain greater social support in Group 4, as women tend to benefit from larger networks of family and friends [55,56]. Some studies have reported positive associations between social support and housing stability [7,50,57].

Group 3 had a rather distinct profile especially on enabling and needs factors. Concerning enabling factors, these participants had the lowest score on strictness in residential code of living/conduct, which seems logical, given that over 80% of Group 3 individuals lived in stable-PH, which generally does not impose strict sets of rules on residents regarding abstinence from

alcohol or drugs, as compared with residential codes in emergency shelters or TH. PH generally allows greater personal autonomy and provides a more agreeable living environment [29]. Moreover, Group 3 participants used more ambulatory public and community services yet had the lowest service satisfaction score. The combination of high service use and low satisfaction was likely due to greater prevalence of health problems (common and severe MHD, personality disorders, suicidal behavior and chronic physical illnesses) as well as in the highest level of functional disability. High health-related needs usually drive people to seek services more frequently. Moreover, Group 3 was the only group where most participants reported having a case manager (a perquisite in HF) and/or a family doctor, which facilitates health service use according to previous studies [58,59]. However, multiple health problems may lead to greater service dissatisfaction when services lack continuity or quality of care [60,61].

Groups 2 and 5, featuring individuals with less favorable housing status showed notable differences from participants in Groups 1, 3 and 4. Regarding predisposing factors, Group 5, predominantly male, reported the lowest monthly income and highest proportion of individuals arrested over the study period. As previously confirmed, being male [20,62], with a history of arrest [57,63] and/or low income [7,62], was associated with poorer housing stability. Concerning needs factors, the high prevalence of chronic physical illnesses reported by Group 2 was probably related to older age, physical health issues and associated frailty [26]. Despite the favorable housing status enjoyed by participants in Groups 1 and 3, a similar association was noted due to their numbers of older individuals with physical health problems, as compared with the younger Group 4. Regarding enabling factors, the main difference between Groups 2 and 5 was the proportion of individuals having a family doctor, lowest in Group 5 and highest in Group 2. The larger proportion of individuals having a family doctor in Group 2 may explain their lower frequency of ED visits and hospitalizations as well as their high service satisfaction score, with the family doctor acting as a protective factor [27,28]. However, Group 2 participants and those from Group 5 used few ambulatory public and community services, depriving them of valuable assistance in addressing their mental health problems. This may also have contributed to their housing status deterioration at T1. This underutilization of ambulatory public and community services may have resulted from the fact that less than 50% of participants of Groups 2 and 5 had a case manager. Furthermore, Group 2 was overrepresented by men who are usually least endowed with social support [55,56]. Finally, a surprising finding was that strictness in residential code of

living/conduct for Group 2 was significantly lower than that of Groups 1 and 4, suggesting that some TH where Group 2 participants were living had fairly relaxed codes of living/conduct.

Some limitations were present in this study. First, convenience sampling was used which implies that the sample may not be representative of the homeless population. Second, there were considerably fewer young people (under age 40) than middle-age or older people (age 40 and over) among participants. Better profiling of younger individuals experiencing homelessness would provide insight into their specific needs [26,57]. Third, as we have no information on the residential status of individuals who did not participate in T1, it is impossible to know if the profiles reported here were representative of the study's baseline (T0) sample. Fourth, as data were collected in Quebec, our results are specific to this area and may not be generalized, particularly to jurisdictions without universal health insurance [64]. Finally, the study relied on self-report data. For certain variables (e.g., arrest history, MHD and frequency of service use), clinical records could have been used to verify and complement information provided by participants.

5. Conclusions

This was the first known study to develop a typology based on change in housing status over 12 months for homeless individuals residing in three different types of accommodations. Findings revealed five groups, of which three groups (Groups 1, 3 and 4) showed more favorable and two groups (Groups 2 and 5) experienced less favorable change in housing status over 12 months. The study considered variables tested in relation to housing trajectory, some of them less studied or novel, such as suicidal behavior, chronic physical illnesses, functional disability, having a family doctor, service satisfaction and strictness in residential code of living/conduct. The results show that maintaining or improving housing status may be attained by homeless individuals with various profiles. The key element in housing status improvement or maintenance seems related to the type and frequency of service use (enabling factors) that need to be well adapted to the nature and complexity of health problems (needs factors) of the homeless population. Moreover, specific interventions adapted to the diverse profiles of this population are suggested. Considering Groups 2 and 5, which were those experiencing the worst deterioration in housing status and were mainly constituted of men, outreach programs or case management could be prioritized, with a view toward increasing access to services and better meeting their specific needs. For Group 2, mainly constituted of older men with chronic physical illnesses, the services of a nurse making home visits

could also be helpful. For Group 5, programs facilitating access to work would be appropriate in order to increase this group income. For Groups 3 and 4, which were mainly individuals in stable housing but with high health needs, adequate use of primary and specialized care services is essential to prevent a decline in their physical and mental health conditions that could put them at risk of returning to homelessness. The services of specialized educators may be useful especially for Group 3 because of their high functional disability. Concerning Group 4, a greater utilization of case managers may be necessary due to the high frequency of ED visits among these participants. Finally, for Group 1, a case manager and when needed of their family doctor are probably sufficient to satisfy their needs.

Supplementary Materials: The following are available online at www.mdpi.com/xxx/s1, Table S1: Supplementary Table 1. Variables and instruments based on the Gelberg-Andersen Behavioral Model., Table S2: Supplementary Table 2. Comparison tests between groups (p-values).

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Supplementary Table 1. Variables and instruments based on the Gelberg-Andersen Behavioral Model [35].

	Instruments & References	Description	Psychometric Properties
Main variable of interest			
Housing status (categorical)	Canadian Community Health Survey (CCHS)--adapted[38]	Self-report; three types of housing (emergency shelter, temporary housing, permanent housing with or without support)	N/A
Predisposing factors			
Age (categorical)	CCHS--adapted [38]	Self-report; numerical value calculated from date of birth	N/A
Sex (categorical)		Self-report; two-point scale (male = 1, female = 2)	
Education (categorical)		Self-report; two-point scale (high school or less = 1, college or more = 2)	
Chronic homelessness (categorical)		Self-report; *chronic homelessness* refers to a single homeless episode of at least 12 months, or 4 homeless episodes within a 3-year period [46]; two-point scale (no = 0; yes = 1)	
Arrest (categorical)		Self-report; *arrest* includes theft, violence, drugs, etc. in the past 12 months, two-point scale (no = 0; yes = 1)	
Monthly income (continuous)		Self-report; in Canadian $	
Need factors			
Mental health disorders (MHD) (categorical)	M.I.N.I International Neuropsychiatric Interview 6.0 [39]	120-item structured diagnostic interview for DSM-IV and ICD-10 psychiatric disorders; two-point scale (no = 0; yes = 1)	Kappa Cohen = 0.50-0.84
Personality disorders (categorical)	Standardized Assessment of Personality Abbreviated Scale [40]	8-item semi-structured interview from Standardized Assessment of Personality; two-point scale (no = 0; yes = 1)	Cronbach's alpha = 0.68
Substance use disorders (SUD) (categorical)	Alcohol Use Disorders Identification Test (AUDIT) [41]	10-item self-report scale to measure alcohol consumption; with two or multiple-choice questions; rating: 0–50 where higher = greater level of SUD for alcohol	Cronbach's alpha = 0.74
	Drug Abuse Screening Test (DAST) [42]	28-item self-report scale used as a screening tool for drug consumption; two-point scale (no = 0; yes = 1); rating: 0–20 where higher = greater level of SUD for drugs	Cronbach's alpha = 0.88

Suicidal behaviours (categorical)	CCHS)--adapted [38]	Self-report; *suicidal behaviours* refer to suicidal ideation or attempt; two-point scale (no = 0; yes = 1)	N/A
Number of chronic physical illnesses (continuous)		Self-report; *CPI* include hypertension, heart/ liver/ kidney disease, diabetes, cancer, hepatitis C, HIV/AIDS etc.; numerical value	
Functional disability (continuous)	WHO Disability Assessment Schedule 2.0 [43]	12-item short version assessment used for all diseases (physical illness and MHD); across 6 domains of functioning (cognitive, mobility, self-care, getting along, life activities, and participation); five-point scale (1 to 5); rating: 0 to 60 where 0 = no disability and 60 = full disability	Cronbach's alpha = 0.93-0.94
Enabling factors			
Having a family doctor (categorical)	CCHS--adapted [38]	Self-report; two-point scale (no = 0; yes = 1)	N/A
Having a case manager (categorical)		Self-report; two-point scale (no = 0; yes = 1)	
Number of social supports (continuous)		Self-report; *social support* refer to family or friends that one can rely on when in need; numerical value	
Quality of life (QOL) (continuous)	Satisfaction with Life Domains Scale (SLDS) [44]	20-item self-report scale on subjective QOL; across 5 domains (daily life and social relations, housing and neighbourhood, personal relationships, spare-time activities, autonomy); five-point scale (1 to 5); rating: 20 to 100 where higher = better QOL	Cronbach's alpha = 0.92
Frequency of ambulatory public & community service use (continuous)	Service Utilization Questionnaire (SUQ) adapted from CCHS [45]	Self-report; *Ambulatory public and community services* refer to a wide range of health and social services; numerical value based on previous 12 months	N/A
Hospitalizations (continuous)		Self-report; numerical value based on previous 12 months	
Emergency department visits (continuous)			
Service satisfaction (continuous)		Self-report; Overall satisfaction with services; five-point scale (1 to 5) based on previous 12 months where higher = more satisfied with services	
Strictness in residential code of living/conduct (continuous)	Questionnaire for organizations offering housing services	14-item evaluation on organization's strictness in residential code of living/conduct; completed by program coordinators at housing service organizations; two-point scale (no = 0; yes = 1) where higher = stricter program rules for living/ conduct	N/A

Supplementary Table 2. Comparison test between groups (p-values).

	Group 1 vs 2	Group 1 vs 3	Group 1 vs 4	Group 1 vs 5	Group 2 vs 3	Group 2 vs 4	Group 2 vs 5	Group 3 vs 4	Group 3 vs 5	Group 4 vs 5
Main variable of interest										
Change in housing status[1]	**<0.0001*** **	**<0.0001*** **	0.868	**<0.0001*** **	**<0.0001*** **	**<0.0001*** **	0.091	**<0.0001*** **	**<0.0001*** **	**<0.0001*** **
Predisposing factors										
Age[1]	---	**<0.0001*** **	**<0.0001*** **	**<0.0001*** **	**<0.0001*** **	**<0.0001*** **	**<0.0001*** **	**<0.0001*** **	**<0.0001*** **	0.748
Female	**0.002** **	0.437	**0.002** **	0.063	**0.027***	**<0.0001*** **	0.301	**<0.0001*** **	0.287	**<0.0001*** **
Education	0.909	0.431	0.657	0.778	0.392	0.759	0.866	0.243	0.336	0.913
Chronic homelessness	0.238	0.474	0.911	0.690	0.690	0.209	0.514	0.423	0.793	0.626
Arrest	0.302	0.058	0.193	**0.022***	0.397	0.816	0.215	0.517	0.681	0.288
Monthly income (Can$)	0.078	0.239	0.542	**0.010***	0.074	0.146	**0.044***	0.107	**0.034***	**0.006** **
Need factors										
Common MHD	0.941	**0.042***	0.750	0.490	0.062	0.819	0.552	0.090	0.247	0.690
Severe MHD (+ personal disorders)	0.168	**0.009** **	0.067	0.200	0.199	0.698	0.976	0.341	0.238	0.744
Substance use disorders	0.321	0.622	0.901	0.367	0.661	0.278	0.993	0.552	0.690	0.322
Suicidal behaviours	0.193	**<0.0001*** **	**0.003** **	**0.043***	**0.027***	0.120	0.448	0.438	0.186	0.504
Number of chronic physical illnesses[2]	0.074	0.964	**0.004** **	0.200	0.133	**<0.0001*** **	**0.010***	**0.008** **	0.237	0.182
Functional disability	0.140	**0.001** **	**0.019***	0.078	0.137	0.638	0.837	0.207	0.218	0.826
Enabling factors										
Having a family doctor	0.438	0.489	0.151	0.090	0.172	0.036	**0.022***	0.527	0.337	0.681
Having a case manager	0.806	0.105	0.941	0.723	0.078	0.757	0.901	0.129	0.078	0.681

Number of social supports	0.075	0.419	0.629	0.838	0.275	**0.021***	0.084	0.180	0.358	0.842
Quality of life	0.361	0.680	0.291	0.327	0.684	0.076	0.115	0.203	0.248	0.944
Frequency of ambulatory public & community services use[2]	0.998	**0.002****	0.164	0.520	**0.006****	0.265	0.553	0.080	**0.018***	0.550
Hospitalizations[2]	0.328	0.469	0.203	0.804	0.841	**0.026***	0.272	0.072	0.379	0.369
ED visits[2]	0.090	0.622	0.467	0.323	**0.037***	**0.025***	0.614	0.799	0.165	0.132
Service satisfaction	0.683	**0.028***	**0.031***	0.147	**0.028***	**0.025***	0.120	0.615	0.532	0.776
Strictness in residential code of living/ conduct	**0.010***	**<0.0001*****	0.450	0.229	**<0.0001*****	**0.006****	**0.007****	**<0.0001*****	**<0.0001*****	0.548

MHD: mental health disorders; ED: emergency department
Significance between groups at ***p<0.0001; **p<0.01; *p<0.05
[1]Fisher's exact test ; [2]Wilcoxon rank-sum test

CHAPTER 5: DISCUSSION & CONCLUSION

The main purpose of this thesis was to examine *change in housing status over 12 months* among a cohort of currently or formerly homeless individuals using different types of housing services (i.e. emergency shelters, TH, PH) in Quebec, Canada. The two studies presented aimed to: 1) identify predictors for maintenance or improvement of housing status and 2) develop a typology based on change in housing status over 12 months. This chapter presents: the originality and summary of the research, an integrated discussion of findings, limitations, future directions, implications for services, and conclusions.

5.1 Originality & Summary of Research

The original contribution of this research was to investigate change in housing status in a way that better captured the housing trajectories of individuals with current or previous experience of homelessness, residing in or using different types of housing services (i.e. emergency shelters, TH, PH). This was also the first known longitudinal analysis on this topic. The differences in levels of positive change in housing status over 12 months among participants were delineated by factors related to housing status and in group profiles based on shared characteristics and similarities in housing conditions.

The sample was comparable with samples from previous studies, but also unique in terms of the very high proportion of individuals who had experienced chronic homelessness (>50%), as compared with population estimates for chronic homelessness of 10-15% in the US (Mares & Rosenheck, 2011) and considerably lower at 2-4% in Canada (Gaetz, Donaldson, et al., 2013). This was noteworthy given the underrepresentation of emergency shelter users in this sample, who may be more likely to be chronically or episodically homeless (17%). However, another possible explanation for this overrepresentation of people with chronic homelessness experience may be that the majority of the sample were living in PH programs, which also tend to target chronically homeless individuals (Tsai et al., 2010).

The prevalence of chronic homelessness experience in participant trajectories may also explain their correspondingly high health and social needs and rates of service use, also typical in homelessness (Hwang et al., 2013; Poulin, Maguire, Metraux, & Culhane, 2010; Somers, Moniruzzaman, & Rezansoff, 2016). Participants made frequent use of both public ambulatory

care and community-based services, thanks to the availability of universal healthcare in Quebec, and diversity of available community organizations offering social services for homeless citizens. While US research also reported high public ambulatory service use (Kushel et al., 2001), the present findings related more closely to study findings in other countries with universal healthcare systems (Hwang et al., 2013). Comparisons on community service use could not be made, as no known studies of homeless individuals have assessed their use of these services.

The 12-month retention rate of 59% in this study was considerably lower than in studies of PH (HF) only, which have exceeded 88% (Durbin et al., 2019; Kerman et al., 2018; Palepu et al., 2013). Retention in this study was relatively low, even compared with the 63-94% rates reported in TH and shelter studies (Ecker & Aubry, 2016; Johnstone, Parsell, Jetten, Dingle, & Walter, 2015; North, Eyrich-Garg, Pollio, & Thirthalli, 2010; To et al., 2016). Considering that this study included three different types of housing services and in the PH group non-necessary for the majority the HF model, results further support the inference that the broad range of retention rates across studies may be due to heterogeneity in study samples across housing programs. Moreover, differences between the very high retention rates in PH compared with more variable rates for TH or shelters in studies may also reflect the greater diversity of program design and delivery of TH and shelter services (Novac et al., 2009).

It was notable that 64% of the total study sample had a positive change in housing status over 12 months. Overall, 81% of PH participants remained in PH, which was within the 51-82% range reported in the PH literature (Durbin et al., 2019; Kerman et al., 2018; Palepu et al., 2013). Among TH participants, 54% accessed PH while only 35% of shelter users improved their housing status at 12 months. Previous studies on TH and shelters supported these results, finding 34-72% housing stability or access to more stable housing (Ecker & Aubry, 2016; Johnstone et al., 2015; North et al., 2010; To et al., 2016). The variability in housing stability measures may also be explained by the heterogeneity of the sample, and perhaps the fact that housing service evaluations have not developed a standardized outcome measure for 12-month change in housing status (Novac et al., 2009).

This study also considered several variables tested in relation to housing trajectory using the Gelberg-Andersen Model as an organizing framework. The more novel variables were mostly enabling factors, including having a family doctor or consulting a professional (psychiatrist,

psychologist, social worker), service satisfaction, strictness in residential code of living/conduct and intensity of interorganizational collaboration. Less-studied needs factors included suicidal behaviour, physical illnesses, and functional disability. Findings from the two articles prepared are summarized in **Table 2**.

Article 1 identified predictors for maintenance or improvement in housing status over 12 months (objective 1) for a sample of individuals using different services on the Quebec housing continuum. Different from the initial hypothesis, predisposing factors (N=3) emerged as strong contributors to positive change in housing status: PH at baseline, female gender, and having children, over enabling factors (N=2) with having consulted a psychologist and higher frequency in use of public ambulatory services. Needs (N=1) also had a significant factor having physical illnesses.

Article 2 established a typology of individuals using different housing services (objective 2) based on change in housing status over 12 months. The identification of five groups based on cluster analysis underscored the heterogeneity of the sample. At 12 months, three groups (1, 3 and 4) had more favourable, and two (2 and 5) less favourable housing status, reflecting the diversity of socioeconomic backgrounds and health and social needs among participants. Although profiles varied across groups, the study suggested that improvement or maintenance in housing status may be related to how well adapted service use (enabling factors) is to the nature and complexity of the needs in this population.

5.2 Integrated Discussion of Findings

The following section presents findings integrated from the two articles, in the order of pertinence by conceptual block of the adapted Gelberg-Andersen Model framework (Gelberg et al., 2000). First, predisposing factors, with the most variables significantly associated to change in housing status is addressed, then followed by enabling factors and last, needs factors.

5.2.1 Predisposing Factors

Results underlined the importance of predisposing factors in housing stability, or positive change in housing status. Predisposing factors included sociodemographic variables and past histories of foster care, arrests and chronic homelessness. In the predictors study, three variables, *housing status in PH at baseline, being female* and *having children*, strongly predicted positive change in

housing status. In the typology study, sex distinguished some groups, but also *arrest history in the previous 12 months* and *monthly income* were associated with the dependent variable.

Concerning sociodemographic variables, residing in PH at baseline strongly predicted a positive change in housing status over 12 months. Previous studies have also shown similar outcomes of good housing stability in PH programs (Boland et al., 2018; Davidson et al., 2014; Stergiopoulos et al., 2015). However, it is important to note that PH programs may not be suitable for all service users, as seen in the study's small proportion of participants in PH at baseline that experienced a deterioration in housing status to TH or shelter at 12 months. In fact for some individuals, it may be challenging to meet the demands associated with maintaining a more independent lifestyle in PH compared to other housing services, and therefore they may prematurely exit PH and resort to TH or shelters, thereby undermining their stable housing trajectories.

Another important predictor of positive change in housing status over 12 months included being female. Women were most numerous in Group 4, comprised of mainly stable-PH participants or those showing improved housing status. By contrast, men predominated in Groups 2 and 5 where unfavorable change in housing status was higher. These findings are consistent with previous studies reporting that women were more likely than men to attain and maintain housing stability (Adair et al., 2017; Van Straaten et al., 2017). Gender differences may be related to help-seeking behaviours and social functioning (Iaquinta, 2016; Rich & Clark, 2005), as women tend to seek more formal and informal social support compared with men (Iaquinta, 2016; Rich & Clark, 2005). Bonin et al (2009) identified a cluster of women who enjoyed larger social networks and used more services compared to male-dominant groups, similar to Group 4 in the present typology study. An alternative explanation for gender differences in housing stability may related to arrest history. While not a strong predictor in the current study, Group 5 in the typology study, mainly including men in stable-TH or those whose housing status had deteriorated, also had the highest numbers arrested over the 12-month period. Previous studies have identified associations between men with poor housing stability and incarceration or arrest (Roy et al., 2016a; Walsh et al., 2019), affecting long term housing status for some individuals (CMHC, 2007; Greenberg & Rosenheck, 2008a; Montgomery, Szymkowiak, Marcus, Howard, & Culhane, 2016; Visher & Courtney, 2007).

Regarding other sociodemographic variables, the finding in the predictors study that having children was associated with positive change in housing status coincides with past studies suggesting that responsibility for children motivates people to strive for housing stability (Orwin et al., 2005; Rog, Henderson, Lunn, Greer, & Ellis, 2017; Van Straaten et al., 2017). Other research found that those with dependents have better access to housing services and supports such as welfare, which may facilitate towards housing stability (Novac et al., 2009; Orwin et al., 2005).

Interesting patterns were identified in the typology study regarding monthly income, as Groups 2 and 5, in which change in housing status was mainly unfavorable, had the highest and lowest average monthly incomes, respectively, compared with other groups. While the correlation between low income and poor housing is not surprising, and coincides with previous research (Adair et al., 2017), this same study also identified a group with little housing stability, but high monthly income, similar to Group 2 in the present study. Roy et al (2016b) suggested the further distinction that income obtained from the formal sector activity (full- or part-time job, welfare) was positively associated with housing stability compared to being involved in informal sector activities (e.g. money loaned from family or friends, sale of drugs or personal property, prostitution, begging, fraud) which predicted unstable housing, but in a young adult sample.

5.2.2 Enabling Factors

Following predisposing factors, this research also found enabling factors that were associated with change in housing status over 12 months. Key associations emerged for service use variables such as *having consulted a psychologist* and *use of public ambulatory services in the past 12 months*; housing resource variables like *strictness in residential code of living/conduct* also distinguished subgroups in the typology. By contrast, *having a case manager* or *social support* had very little influence on housing stability in these findings, unlike results of previous research (Gabrielian et al., 2018).

Among service use variables, the use of specific professionals has rarely been researched, yet “having consulted a psychologist in the previous 12 months” emerged in this study as a strong predictor of positive change in housing status. Individuals who had reported having consulted a psychologist were more likely to be in stable-PH or have improved housing status over the year. Given that most participants reported having MHD, receiving psychological intervention or

counseling, may have reinforced positive change in housing status, as previously shown in PH studies (Hwang & Burns, 2014; Kreindler & Coodin, 2010; Stergiopoulos et al., 2019). However, it is important to note that for a population receiving housing support, individuals would not have had the financial means to access private psychological services, but rather, the psychologists consulted were likely integrated into primary mental healthcare teams in the community or psychiatric teams in specialized outpatient services, which have become more available in Quebec after the provincial mental health reform of 2005 (MSSS, 2005).

In addition, the predictors study revealed a moderate association between frequent use of public ambulatory services, including both primary and specialized care, and positive change in housing status over 12 months. This association was also supported by patterns observed in the typology study for certain groups, such as Group 3 where participants in stable-PH with high health-related needs reported high use of public ambulatory services. As other research suggests, housing stability may facilitate access to health and social services (Kerman et al., 2018), relieving the immediate problems of meeting survival needs for shelter and food and assisting individuals with the logistics of seeking care (Chhabra et al., 2020; Jaworsky et al., 2016). Along the same lines, Groups 2 and 5, who showed more negative change in housing status, used fewer public ambulatory services despite having serious needs. Groups 2 and 5 included participants using shelters, and although shelter users were underrepresented in the study (<20% of the sample), it is known that shelter users receive fewer health and social services than residents in TH or PH (Thompson, Pollio, Eyrich, Bradbury, & North, 2004).

One explanation for the observed pattern of frequent public ambulatory service use in people who are more stably housed could be the influence of case management for some subgroups. Although in the predictors study, having a case manager did not emerge to be significantly associated to positive change in housing status, in the typology study, for Group 3 who were mostly high service users that had maintained PH status over the 12 months, having a case manager was a distinguishing characteristic. It is likely that some were PH residents in HF, which includes case management (Tsemberis & Eisenberg, 2000). Meanwhile, less than half of participants in Groups 2 and 5, many in stable-TH but reporting lower service use and greater deterioration in housing stability, had case managers. Therefore, these findings coincide with results of previous studies

where having a case manager facilitated service use through referrals (Leaf et al., 1985; Poremski et al., 2016) as having case management also helped maintain stable housing.

On a different note, another consideration in change in housing status over time is the interplay of enabling factors and needs. In the typology study, Group 1 participants, who were all in stable-PH or experienced improved housing status over the study period, reported using considerably fewer public ambulatory services, but also reported fewer needs (common MHD, severe MHD, suicidal behaviour, chronic physical illness, and functional disability) relative to other groups. Regardless of housing status, it would be expected that with fewer needs, less services would be sought out. Moreover, despite using fewer services, service satisfaction scores for Group 1 were significantly higher than those of Groups 3 and 4 who also showed favourable change in housing status. This suggests that needs in Group 1 were satisfied with lower service use despite similar housing status (Batbaatar, Dorjdagva, Luvsannyam, Savino, & Amenta, 2017). Therefore, high service use seems to have had relatively minor influence on change in housing status for certain subgroups in this study.

Similarly, *social support* was identified as positively associated with change in housing status in some subgroups but did not predict housing stability at 12 months in the study. Previous research has shown that individuals who benefited from formal (e.g. case managers, clinicians) or informal (e.g. family, friends) support were more likely to reside in, or attain, stable housing (Ecker & Aubry, 2016; Greenwood et al., 2019; Van Straaten et al., 2017). Findings from the typology study tended to confirm this association, as moderate positive associations between social support and change in housing status were identified. Group 4 participants reported high social support and lived mainly in stable-PH or had improved housing status at 12 months, whereas in Group 2 levels of social support were lowest and overall housing status was unfavourable. Another possibility is that participants reported less support due to negative perceptions, or ascribed little importance to social support (Gabrielian et al., 2018).

This study also made one of the first attempts to test housing resource variables as enabling factors in influencing change in housing status. Strictness in residential code of living/conduct was one variable that emerged as significant in the typology study. Most participants in programs where rules were more stringent tended to show less favourable change in housing status, as frequently observed particularly in TH programs aimed at changing behaviour or treatment practices (e.g.

stringent policies around program compliance from residents with SUD (Novac et al., 2009)). Such policies have frequently resulted in high drop-out rates (Aubry et al., 2015; Dickson-Gomez et al., 2017; Pearson et al., 2009). By contrast, relaxed residential codes more characteristic of PH than TH or shelters (Dickson-Gomez et al., 2017; Pearson et al., 2009) were associated with housing stability. In our typology study, 80% of Group 3 participants remained in stable-PH at 12 months while their scores on strictness of residential code were lowest. Person-centered PH programs, such as Housing First, have more relaxed rules around daily living (Baxter et al., 2019; Gaboardi et al., 2019; Kerman et al., 2018), increasing sense of personal autonomy among residents (Dickson-Gomez et al., 2017; Pearson et al., 2009), and supporting maintenance of their housing. In this context, it was surprising that housing stability deteriorated for Group 2 despite low strictness in codes of living/conduct, suggesting perhaps more variability in service design and delivery than is generally thought (Novac et al., 2009).

5.2.3 Needs Factors

Lastly after predisposing factors, this study identified some needs factors (clinical variables) that seem to influence change in housing status over 12 months. In the predictors study, *having no physical illness* was the only significant needs factor associated with positive change in housing status; while in the typology study, patterns occurred among the groups on *suicidal behaviour* and *functional disability*. Surprisingly, *SUD* did not emerge in the findings of either study despite its high prevalence in the homeless population, but would be noteworthy to discuss.

Concerning physical illnesses, having no physical illnesses, predicted positive change in housing status over 12 months, yet this pattern held only for some groups in the typology study. Group 4 participants reported fewer physical illnesses (particularly chronic in nature) and mainly favourable change in housing status, whereas Group 2 individuals who mostly showed unfavourable change in housing status, reported the most chronic physical illnesses. One explanation for this association may be that individuals affected by physical illnesses who were residing in stable housing, were forced to move out due to poorly adapted buildings (e.g. absence of elevators or wheelchair access ramps) not adequately meeting mobility needs and thereby, individuals remaining in housing are those who have better physical health needs (Wallace, Pauly, Perkin, & Cross, 2019). By contrast, stable housing allows individuals to focus more on health and well-being and provides a physical place more conducive to managing the logistics of seeking care

(Chhabra et al., 2020; Jaworsky et al., 2016). Moreover, other comparisons reveal that age may have mediated the association between physical illness and change in housing status. While individuals in Groups 1 and 3 were in stable-PH or had improved housing status, the higher prevalence of physical illnesses compared with Group 4 was probably related to older age, physical health issues and associated frailty (Fazel et al., 2014). A similar pattern occurred between Groups 2 and 5, with physical illnesses markedly more common in Group 2 where all participants were at least 50 years old compared to Group 5 composed of middle-aged individuals. Previous studies have also identified profiles of homeless individuals living mainly in stable-PH with complex mental and physical health problems who were still able to maintain stable housing, similar to Group 3 participants in the present study (Adair et al., 2017; Aubry et al., 2015).

While suicidal behavior, and functional disability were not significant in the predictors study, the typology study found that Groups 3 and 4, where most individuals lived in stable-PH or had improved housing status, included high proportions of individuals who reported suicidal behaviour. These groups also reported substantial functional disability, which may indicate an association between suicidal risk and functional disability as observed in previous studies (Buist-Bouwman et al., 2006; Lutz & Fiske, 2018). Group 4 participants also experienced frequent hospitalizations and ED use, which may also have been related to prevalence of suicidal behaviour. Thus, if suicidal behaviour and functional disability are addressed and managed, it appears to have no significant impact on achieving stable housing.

Finally, the present study was unable to identify associations between SUD and change in housing status, nor was any group of individuals identified as mainly affected by SUD, contrary to previous studies showing a link between SUD and housing outcomes (Nelson et al., 2015; Rhoades et al., 2018). One explanation for the lack of association may be that the health and social consequences of SUD had been mitigated among individuals living in more stable housing. In fact, studies have shown that individuals with SUD are capable of achieving more stable housing as problems related to SUD declined, which is viewed as a measure of success in PH programs using a harm reduction strategy to address substance misuse (Appel, Tsemberis, Joseph, Stefancic, & Lambert-Wacey, 2012; Mares & Rosenheck, 2010; Tsemberis, Kent, & Respress, 2012). From this perspective, our lack of association between SUD and change in housing status is in line with previous research.

5.3 Limitations of the Current Work

Despite this work contributing valuable insight on change in housing status among individuals using different housing services, the study presents some limitations. A first limitation of the study was that the sample may not have been representative of the homeless population in Quebec due to convenience sampling methods. For example, middle-age and older people (age 40 and over) were overrepresented, while emergency shelter users were underrepresented. Furthermore, despite the inclusion of several validated scales and surveys in the questionnaires, the data collected were based on participant self-report. The disadvantages associated with self-report include problems with honesty, misinterpretation of questions, subjectivity of rating scales, and inevitable biases such as response bias and social desirability. Also, the generalizability of the findings is limited by the Quebec context, where health care and social service networks are mainly organized within a public system. This may especially be true for countries, like the US, without universal health insurance (Hwang et al., 2013). And last, since there is variability in housing service design and delivery, having only three housing status (shelter, TH, PH) based on duration of residency may have been too simple in capturing an accurate 12-month snapshot of housing trajectories among users of different housing services. For example, PH residents in HF program compared to community housing models, may have distinct trajectories and associated factors that could not be identified in this study.

5.4 Future Directions for Research

A key focus for future research should be increase our understanding of the diverse needs of homeless individuals to continue to inform the development of interventions that address the complex problem of homelessness. This type of evaluative research will face ongoing challenges in recruitment and longitudinal follow-up of individuals, especially those who experience housing instability and greater transience. The socioeconomic landscape would also influence partnerships and collaboration among multiple stakeholders undertaking this type of research. Despite these challenges, research on the homeless population and related services is essential for knowledge translation and for developing more effective strategies to combat homelessness with long-term outcomes.

The limitations of this present study may be addressed in future work as follows. First, it would be interesting to modify sampling methods to allow for recruitment of younger participants

and more shelter users. More representative samples would improve participant profiling and enhance understanding of housing trajectories among those using shelters, while providing additional insight into their specific needs, service use patterns and predictors of stable housing (Caton et al., 2005; Fazel et al., 2014). Moreover, there is a need to complement and verify self-report data, for certain variables like arrest history, MHD, and frequency of service use, drawing upon official documents or records that could be collected and merged. For example, a previous study on ED use and hospitalization among homeless individuals with MHD collected data from both structured interviews and administrative databanks (Cheung et al., 2015). In addition, it would be interesting to conduct a similar study in multiple sites across Canada to examine whether these findings are generalizable at least within this country. While differences in the configuration of healthcare and social services regulated at the provincial level would exist, a Canada-wide study would provide valuable insight on variations in the current homeless population across the housing continuum as a national benchmark to measure progress in ending homelessness. Finally, distinguishing housing status in more categories to account for the diversity of TH and PH models may portray a more realistic view on housing trajectories, also with discerning predictors of housing stability and subgroup characteristics of homeless individuals.

In addition to expanding future research to examine multiple communities nationwide, extending the study duration of this work would be paramount for increasing our knowledge of the diverse needs within the homeless population. While the present study on change in housing status reported a 12-month follow-up of currently and formerly homeless individuals, many similar studies have reported findings for at least a 24-month period (Adair et al., 2017; Aubry, Duhoux, et al., 2016; Durbin et al., 2019; Kerman et al., 2018) or longer (Jaworsky et al., 2016; Roy et al., 2016b; Van Straaten et al., 2017). As this current work is part of a larger ongoing longitudinal study funded by SSHRC to examine housing stability for three-year and five-year follow-up, later findings may offer novel insight on long-term outcomes and housing trajectories among this sample of currently or formerly homeless individuals using different housing services in Quebec.

It may also be interesting to examine perceptions and psychological factors among homeless individuals with respect to their overall experience and their living situations that have rarely been studied with respect to housing status or trajectory. In particular, exploring variables like perceived unmet needs (Argintaru et al., 2013; Harris et al., 2019; Jaworsky et al., 2016),

satisfaction with housing (Van Straaten et al., 2017), neighbourhood attributes like proximity to shops and public transportation (Warnes et al., 2013), personal readiness or desire to change, with respect to living situation (Jost et al., 2011; Patterson & Tweed, 2009; Peterson, Antony, & Thomas, 2012), and sense of control for one's own life decisions (Kirkpatrick & Byrne, 2009; Padgett, 2007), may help to better understand how participant perspectives on their needs and living situations may play a role in attaining and maintaining housing status.

On another note regarding typological research, there has been a recent shift towards novel statistical approaches that may warrant consideration in applying new analytical methods to this research. These newer trends in statistics integrate both person-centered and variable-centered analyses through techniques like latent class analysis (LCA), latent class growth analysis and growth mixed modeling (Muthén & Muthén, 2000). These classifying techniques have some advantages over standard cluster analysis: class criterion is 1) more reliable since it is model-based approach with more rigorous classification criteria that allows for identification of the optimal number of classes; and 2) relatively simple to work with variables that have different scale types (Hagenaars, & McCutcheon, 2002). In fact, for the typology in this present study, LCA was attempted, but a good solution was not obtained with the data set. Other studies using LCA have suggested a sample of 500 to exhibit sufficient power for the model fit statistics (Henson, Reise, & Kim, 2007; Holmes Finch & Cotton Bronk, 2011; Wurpts & Geiser, 2014). Therefore, the present study with a smaller sample size, the K-means algorithm (which is still a solid clustering statistical method) was a logical choice to best represent the results. Nonetheless, the choice of method, whether cluster analysis or novel approaches, for establishing a typology depends on the specific research question being asked. As the field starts to favour these emerging statistical trends, approaching data analyses in future research with one of these newer techniques may offer a different interpretation to the findings.

Finally, researchers in the field have recently argued that the use of case study designs would be a valuable tool for evaluating services and interventions in homelessness (Pauly, Wallace, & Perkin, 2014), particularly in understanding how and why traditional experimental or quasi-experimental studies fail to answer certain questions (Yin, 2009). Multiple case study design, in particular, would allow for both an in-depth understanding of each case, and a broader insight of similarities and differences between cases (Stake, 2006). Therefore, this line of research should be

used to explore the phenomenon of housing trajectory and residential stability through cases of homeless individuals or even housing programs. Comparative analyses both within and between cases would create opportunities to better understand program outcomes across the social, political and economic contexts in which studies are conducted. Using such a qualitative approach, it would also be possible to gain more subjective, individual perspectives among those using homelessness services concerning organizations providing the services. Moreover, it would also be interesting to collect data not only from service users themselves, but also from other stakeholders including case managers, and family or friends, using this method. Gathering multiple perspectives would allow for data triangulation and further enrich our understanding of housing trajectories and broader interventions for homelessness within the overarching sociopolitical climate.

5.5 Implications for Services

Findings from the study suggested that improvement in or maintenance of housing status also depend on service use and housing resource factors (enabling), being well adapted to subgroups within the homeless population that differ in sociodemographic profile (predisposing) and health problems (needs). Principal strategies to facilitate service users towards PH and maintain stable housing include improving access to public ambulatory care services, enhancing case management across housing programs and increasing implementation of diverse PH services.

5.5.1 Improving access to public ambulatory care services

Improved access to public ambulatory care services would help the homeless population at any part of the housing continuum by addressing the high physical and mental health needs closely intertwined with housing needs (Hwang & Burns, 2014). For people in unstable housing, being able to access services may lead to better health outcomes and help individuals to better manage their housing situation, but also for those in stable housing, accessing services may result in maintenance of both stable health and housing status. For example, providing a family doctor to all homeless individuals using housing services may facilitate treatment of physical illnesses, and thereby reduce potential barriers to housing stability related to physical health. This would be especially pertinent for older individuals usually with greater physical health problems, who may be at higher risk of losing their housing should these problems prevail. Furthermore, greater access to family doctors in collaboration with other primary and community services would allow for routine follow-up and preventive care that may reduce the frequency of ED and hospitalization

commonly seen among homeless individuals. Primary care services tailored to the homeless individuals may also be more effective than standard care provided to the general population (Hwang & Burns, 2014). For instance, offering more primary mental healthcare teams may facilitate access to psychologists, which seemed to predict better housing trajectories for this study sample. Moreover, for individuals with severe MHD, coordinated ACT involving mobilization of multidisciplinary teams of healthcare professionals and social services workers should be recommended as an effective way to improve housing outcomes in terms of supporting stability (Aubry, Goering, et al., 2016). And last, outreach programs, particularly those for emergency shelter users, could also enhance access to health and social services.

5.5.2 Enhancing case management across housing programs

The importance of case management in facilitating access to health and social services, as well as establishing continuity of care for service users, especially among homeless individuals, has also been well documented (de Vet et al., 2013). Case managers can encourage their clients to use public ambulatory and community-based services, by allowing for greater collaborations between organizations (Evans, Neale, Buultjens, & Davies, 2011; Luchenski et al., 2018). A stronger collaborative network of organizations would also suggest service users would be more likely to achieve housing stability according to the findings of this study. Moreover, in PH services based on the HF model, case management is an essential component and targeted towards homeless individuals with MHD and or SUD (Tsemberis & Eisenberg, 2000). In fact, the provision of housing in HF coupled with case management through ACT or ICM has been demonstrated as an effective strategy for improving housing stability (Mares & Rosenheck, 2011; Nelson, Aubry, & Lafrance, 2007; Stergiopoulos et al., 2019). However, since HF users are able to exercise choice over what support services they receive they may not always opt-in for case management (particularly if the benefits of case management are not well understood), or they may discontinue case management prematurely if the support is no longer perceived as beneficial by the service user. Regardless of housing service model, upon admission, service users need to be well informed of the advantages in receiving support from a case manager, so they are more likely to accept and continue support services that ultimately lead to achieving housing stability. Moreover, the intensity and duration should be well adapted to provide continued support for the best user outcomes in housing. Case management could also be prioritized across all housing services for

individuals, including men and those without children, who are less likely to seek and receive help when struggling to maintain housing stability as found in this study. As such, enhancing case management to be more systematically deployed across all housing programs – PH, TH and shelters – may be important to facilitate service use and coordinate continued care in support of service users across the housing continuum towards stable housing.

5.5.3 Increasing implementation of diverse PH services

As case management, through housing support and referrals to other public and community-based services, ensures service user needs are more adequately met and relapse into unstable housing prevented, (de Vet et al., 2013), continuing to implement PH programs with support seems essential. The present study's findings showing individuals in PH at the start of the study seemed to have a greater likelihood of maintaining housing stability. Moreover, less stringent rules and policies (such as permitting alcohol and drug consumption) in PH maybe considered as more favourable in helping service users maintain housing stability and program adherence, so it would be important to have PH programs with an autonomy-focused approach valuing client choice like HF (Tsemberis & Eisenberg, 2000). However, given the heterogeneity in profiles established in the present typology of change in housing status, a variety of PH service models should be made available. PH services offering different housing options (private, community or social housing) combined with supports tailored to the service user through case management would help meet the diverse needs of subgroups. As PH services become widely accepted as an effective way to improve housing stability for homeless individuals (Goering et al., 2014; Greenwood et al., 2019; Tsemberis, 2010), increasing various PH programs with support may be the key to ending homelessness.

5.6 Conclusions

The present thesis was part of a larger longitudinal project studying the homeless population entitled « *Efficacité du logement transitoire pour les personnes en situation d'itinérance* ». Two hundred seventy (270) individuals who were currently or formerly recent homeless using shelters, TH and PH services in Montreal and Quebec City participated in the study. Directors and program coordinators from housing organizations also contributed towards housing resource data. Several variables associated with the homeless population and housing stability from the literature in health and social science fields have been organized based on an adapted Gelberg-Andersen Model as a

conceptual framework (Gelberg et al., 2000). More novel variables were also considered, which were mostly enabling factors, including having a family doctor or consulting a professional (psychiatrist, psychologist, social worker), service satisfaction, strictness in residential code of living/conduct and intensity of interorganizational collaboration. Other less studied needs factors included suicidal behaviour, physical illnesses, and functional disability.

The current study generated fresh insights into the trajectories towards housing stability among individuals with homelessness experience. This work was one of the first studies to follow-up a heterogenous sample of individuals using different housing services, and examines a wide range of variables based on a conceptual framework, in efforts to make recommendations that could improve health and social services addressing homelessness in Quebec. This research addressed two specific objectives centred on change in housing status over 12 months: 1) to identify its predictors, and 2) to develop a typology. Two scientific articles have been written and submitted to peer-reviewed journals as part of knowledge dissemination of the study. In light of these findings, some important conclusions can be drawn from this research:

- Predictors of maintenance or improvement in housing status over 12 months for this sample were: baseline housing status in PH, being female, having children (predisposing factors); having consulted a psychologist and higher frequency in use of public ambulatory services (enabling factors); and not having physical illnesses (needs factor)
- Among the sample of homeless individuals who differ in sociodemographic profiles (predisposing factors), three of five groups showed maintenance or improvement of housing status over 12 months that seem to require suitable types and frequencies of health and social services (enabling factors), that are well adapted to the nature and the complexity of health problems (needs factors)

Taken together, the study's findings suggest some practical implications for services to facilitate its users towards PH and maintain stable housing. These strategies include, improving access to public ambulatory care services, enhancing case management across all housing programs and increasing implementation of diverse PH services in efforts to permanently end homelessness.

Table 2. **Summary of findings from Article 1 (Predictors) and Article 2 (Typology).** Significant findings noted. Spaces filled in green refers to positive or favourable change in housing status, red refers to negative of unfavourable change in housing status over 12 months, and white spaces are for variables that were tested but were insignificant and not reported in manuscripts. *Data from directors and program coordinators. Abbreviations: PH = permanent housing; TH = temporary housing; MHD = mental health disorders; SUD = substance use disorders; ED = emergency department

Gelberg-Andersen Model Framework	Study Groups		Article 1 - Predictors		Article 2 - Typology				
			Positive Change in Housing Status over 12 months	Negative Change in Housing Status over 12 months	Favourable Change in Housing Status over 12 months			Unfavourable Change in Housing Status over 12 months	
					1	4	3	2	5
Dependent Variable	Housing Status	Stable-PH	Yes		41%	43%	81%	4%	
		Improvement	Yes		59%	57%	6%		
		Stable-TH		Yes				50%	68%
		Deterioration		Yes			13%	43%	32%
Predisposing Factors	Age				Older (50+)	Middle-age (40s)	Mid to Older (40+)	Older (50+)	Middle-age (40s)
	Sex		Women	Men		Women		Men	Men
	Country of birth								
	Marital status								
	Having children		Yes	No					
	Education								
	Employed								
	Monthly income (Can$)								LOWEST
	Foster care								
	Arrest				Few				MOST
	Chronic homelessness								
Needs Factors	Common MHD				Few		More		
	Severe MHD				Few		More		
	Personality disorders				Few		More		
	SUD								
	Suicidal behaviours in previous 12 months				Few		More	Few	
	Physical illnesses		No	Yes		Few		More	Few
	Functional disability				Low	High	High		

Enabling Factors	**Having a:**	**Family doctor**						Yes	No
		Case manager							
	In previous 12 months, having consulted a:	**General practitioner**							
		Psychiatrist							
		Nurse							
		Psychologist	Yes	No					
		Social worker							
	Number of social supports					High		Low	
	Quality of life								
	Frequency of service use in previous 12 months:	**Public ambulatory services (primary & specialized ambulatory care)**	High	Low	Low		High	Low	Low
		Community-based services			Low				
		Hospitalizations				High		Low	
		ED				High	High	Low	
	Service satisfaction				High	Low	Low		
	Housing resource variables:*	**Strictness in residential code of living/conduct***			High	Low	LOWEST	Low	High
		Intensity of interorganizational collaboration*							
		Overall budget (Can$)*							

CLOSING REMARKS

According to 2016 estimates, over 235,000 Canadians experience homelessness per year - homelessness as any individual or family without stable, safe, appropriate housing. Those who are chronically or episodically homeless experience much more severe consequences in health and social functioning, but also on services and the systems they access to support their needs. Most notably, serious health problems, including MHD and SUD, poverty, lack of affordable housing, and poor systemic integration of health, social services and justice sectors, are major contributing factors to homelessness.

Canada's new framework for strategies towards ending homelessness, shifts away from short-term emergency response in managing homelessness and favours homelessness prevention for long-term outcomes. Prevention involves moving people along the housing continuum towards stable housing – from the streets and shelters, through TH and PH services with support, and eventually to independent living with less support. Expanding PH programs has been a great focus for prevention efforts, especially HF which has been shown to effectively help people achieve housing stability and exit homelessness. Furthermore, implementing these strategies with a systems integration approach that promotes interorganizational collaboration across sectors will be essential in ending homelessness.

Over the past few decades, Quebec has been at the forefront with the combat against homelessness with a broad range of health and social services initiatives, including Montreal's HF implementation through the At Home/Chez Soi project in 2008, as well as the city's most recent *"Plan d'action montréalais en itinérance 2018-2020"* with a focus on increasing affordable housing with support for individuals at risk or experiencing homelessness and actively targeting services towards vulnerably housed individuals to prevent homelessness.

In view of homelessness in Canada affecting a diverse population, it has become imperative to address differences in sociodemographics, health status, service use behaviors, etc. Promoting a variety of housing service models may be essential in order to provide interventions that better meet specific needs of service users. As such, the development and implementation of strategies combatting homelessness have relied on evaluative research to provide insight into the needs of the homeless population.

In efforts to help improve health and social services addressing homelessness in Quebec, the current study has offered new insights into the diverse trajectories towards housing stability through follow-up of a heterogenous sample of currently and formerly homeless individuals using emergency shelters, TH and PH. This research has centred on change in housing status over 12 months, having identified its predictors and a typology. The study's findings are promising, such that enabling service users towards maintaining stable housing status can be achieved through better access to public ambulatory care services, case management and diverse PH programs. With continued collaborative efforts among researchers, policy makers, service workers, there is hope in finding long-term solutions to end homelessness.

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