CHARACTERIZING COMMUNITY HOARDING CLIENTS

by

Kate Kysow

B.A., University of British Columbia, 2015

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF ARTS

in

The Faculty of Graduate and Postdoctoral Studies

(Psychology)

THE UNIVERSITY OF BRITISH COLUMBIA

(Vancouver)

August 2018

© Kate Kysow, 2018
The following individuals certify that they have read, and recommend to the Faculty of Graduate and Postdoctoral Studies for acceptance, a thesis/dissertation entitled:

Characterizing Community Hoarding Clients

submitted by Kate Kysow in partial fulfilment of the requirements for

the degree of Master of Arts

in Psychology

Examing Committee:

Sheila Woody, Psychology Supervisor

Amori Mikami, Psychology Supervisory Committee Member

Victoria Savalei, Psychology Supervisory Committee Member
Abstract

Understanding the complexity of hoarding cases is a challenge faced by clinicians and communities alike. Although classified as a mental disorder, the clutter generated by hoarding behaviours does not solely affect the individual; these behaviours are of great concern for society in general. The two approaches to assessing and responding to hoarding disorder taken by research and communities are considerably different. Research has focused on assessing the internal experience of those with hoarding disorder, as well as developing treatments to reduce hoarding behaviours. In contrast, communities across North America have been focused on assessing the public safety threats posed by hoarding cases and responding through a harm reduction approach. The current study bridged the gap between these approaches through a research collaboration with the Vancouver-based Hoarding Action Response Team.

Due to the complexity of cases, community-based hoarding teams use a case-by-case approach to address hoarding-related problems. This study conducted a cluster analysis to identify subgroups of hoarding cases and propose intervention targets. Data were collected from the team’s work (e.g., health records, team triage meetings, fire data management system). The current study identified five clusters: Cohabiting in Squalor, Socially Engaged, Isolated at Home, Medically Complex, and Difficult to House. All clusters had a similar degree of clutter, but presented distinct challenges necessitating different interventions. Results from this study will lead to more efficient triaging, network coordination, and evidence-based decision-making on the part of policymakers.
Lay Summary

Hoarded homes pose a public safety threat, as the risk of fire hazards, pest infestations and noxious odours is heightened in both the home and neighbouring dwellings. Community teams across North America are responding to these public safety concerns through a harm reduction approach. Often, these teams deal with the most severe cases of hoarding, those who have not voluntarily sought help. As current research typically uses voluntary samples, little is known about these community clients. This study used a research collaboration with the Vancouver-based Hoarding Action Response Team to fill this gap. Cluster analysis was used to characterize community hoarding clients. Five subgroups were identified: Cohabiting in Squalor, Socially Engaged, Isolated at Home, Medically Complex, and Difficult to House. These findings describe community clients and will help teams develop a more targeted approach to case assessment and intervention.
Preface

In collaboration with my advisor, Dr. Sheila Woody, I am responsible for data collection, data cleaning, analysis, and authorship of the work presented in this thesis. The overall project was designed by Sheila Woody, Christiana Bratiotis, and Nathanael Lauster. Sheila Woody was also responsible for securing funding and obtaining ethical approval for the access to in-home assessment data collected by staff from the Hoarding Action Response Team. One research assistant helped collect and clean the data.
# Table of Contents

Abstract........................................................................................................................................... iii

Lay Summary....................................................................................................................................... iv

Preface................................................................................................................................................. v

List of Tables ....................................................................................................................................... ix

List of Figures ...................................................................................................................................... x

Acknowledgments .............................................................................................................................. xi

Dedication ........................................................................................................................................... xii

Introduction.......................................................................................................................................... 1

Gaps Between Research and Community ......................................................................................... 2

Characterization of Community Hoarding Clients ............................................................................ 9

Individual Characteristics .................................................................................................................. 11

   Age .................................................................................................................................................... 11

   Cognitive Functioning .................................................................................................................. 11

   Medical Complexity ..................................................................................................................... 12

Health Factors Directly Relevant to Hoarding .................................................................................. 12

   Social Connection ......................................................................................................................... 13

   Behavioural Factors .................................................................................................................... 14

   Insight into Hoarding ................................................................................................................... 14

Environmental Complexity .............................................................................................................. 15

   Vulnerable Cohabitants .............................................................................................................. 15

   Safety ............................................................................................................................................ 15
<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor Housing Conditions</td>
<td>16</td>
</tr>
<tr>
<td>Housing and Financial Stability</td>
<td>17</td>
</tr>
<tr>
<td>Housing</td>
<td>17</td>
</tr>
<tr>
<td>Risk of Eviction</td>
<td>17</td>
</tr>
<tr>
<td>Financial Resources</td>
<td>18</td>
</tr>
<tr>
<td>Current Study</td>
<td>18</td>
</tr>
<tr>
<td><strong>Method</strong></td>
<td>19</td>
</tr>
<tr>
<td>Study Context</td>
<td>19</td>
</tr>
<tr>
<td>Procedure</td>
<td>22</td>
</tr>
<tr>
<td>Data Sources</td>
<td>24</td>
</tr>
<tr>
<td>3-1-1.</td>
<td>24</td>
</tr>
<tr>
<td>Triage Spreadsheet</td>
<td>24</td>
</tr>
<tr>
<td>Primary Access Regional Information System (PARIS)</td>
<td>25</td>
</tr>
<tr>
<td>Fire Data Management (FDM) Database</td>
<td>26</td>
</tr>
<tr>
<td>Clutter Image Rating</td>
<td>26</td>
</tr>
<tr>
<td>Health of the Nation Outcome Scales</td>
<td>27</td>
</tr>
<tr>
<td>Participants</td>
<td>28</td>
</tr>
<tr>
<td>Data Analysis</td>
<td>31</td>
</tr>
<tr>
<td><strong>Results</strong></td>
<td>34</td>
</tr>
<tr>
<td>Case Intervention</td>
<td>34</td>
</tr>
<tr>
<td>Selection of Variables</td>
<td>35</td>
</tr>
<tr>
<td>Cluster Solution</td>
<td>36</td>
</tr>
<tr>
<td>Further Characterization of Clusters</td>
<td>44</td>
</tr>
</tbody>
</table>
List of Tables

Table 1  Constructs Assessed in Hoarding Treatment Studies .............................................5
Table 2  Variables Used to Assess Hoarding Case Complexity .............................................22
Table 3  Health of the Nation Outcome Scales ......................................................................27
Table 4  Demographics of Cases Meeting Criteria for Intervention ....................................30
Table 5  Variables Included in the Cluster Analysis .............................................................32
Table 6  Frequencies of Fire Violations (N = 61) .................................................................34
Table 7  Distance Coefficient by Cluster Solution .............................................................38
Table 8  Profiles of Client Clusters .....................................................................................40
Table 9  Frequencies of Variables Not Included in the Cluster Analysis .............................44
Table 10 Frequencies of HoNOS Problems (N = 24) .........................................................48
## List of Figures

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 1</td>
<td>Theoretical Model of Community Hoarding Case Complexity</td>
<td>10</td>
</tr>
<tr>
<td>Figure 2</td>
<td>Case Flow</td>
<td>29</td>
</tr>
<tr>
<td>Figure 3</td>
<td>Client Cluster Dendrogram</td>
<td>37</td>
</tr>
<tr>
<td>Figure 4</td>
<td>Hoarding Case Complexity by Client Cluster</td>
<td>41</td>
</tr>
<tr>
<td>Figure 5</td>
<td>Clutter Image Rating by Client Cluster</td>
<td>47</td>
</tr>
<tr>
<td>Figure 6</td>
<td>HoNOS Total by Client Cluster</td>
<td>49</td>
</tr>
</tbody>
</table>
Acknowledgments

Thank you to everyone who helped get me to this finished product. You all mean so much to me and I really appreciate everyone’s part in the journey.

Thank you to my supervisor, Sheila Woody, for allowing me the opportunity to pursue community research and for understanding its value. I am grateful to have such a dedicated supervisor. Thank you for your commitment, care, and attention to detail.

Thank you to my committee members, Vika Savalei and Amori Mikami, for agreeing to be on my committee and for their thoughtful feedback.

Thank you to my parents for supporting me and being interested in what I do. Thank you for all the time you spent giving me feedback; I’m really lucky to have you both. Thank you to my older brother, Luke, for looking out for me when I needed it the most.

Thank you to my friends for all the fun and happiness you have brought into my life. I would never have been able to do this without an outlet for silliness, partying, and laughter.

Thank you to HART for your work, patience, and courage in tackling such a challenging problem.

Finally, thank you to all my lab members for your support and feedback over the years. A special thanks to Christiana Bratiotis; your warmth and kindness are so appreciated. Thank you for paving the way for this work to be done and for being my mentor in community work.
Dedication

To Jay, this thesis was only possible because of you. I am amazed at the dedication and heart you put into your work every day; your clients are well looked after. Thank you for welcoming my questions and forever encouraging me along this line of research.
Introduction

Hoarding disorder is characterized by the persistent difficulty or unwillingness to part with possessions others would likely discard, intentional saving of those items, and the significant presence of clutter (American Psychiatric Association, 2013). Prevalence in the general population is estimated to be 2.3% to 5.8% (Ierovlino et al., 2009; Mueller, Mitchell, Crosby, Glaesmer, & de Zwaan, 2009; Timpano et al., 2011). Although classified as a mental disorder, the clutter generated by hoarding behaviours does not solely affect the individual; these behaviours are of great concern for society in general. Hoarded homes pose a public safety threat, as the risk of fire hazards, pest infestations and noxious odours is heightened in both the home and neighbouring dwellings (Bratiotis, 2013; Lucini, Monk, & Szlatenyi, 2009). Further, large amounts of clutter and possessions blocking passageways in and around the home can cause delays in receiving emergency care from medical personnel or fire fighters, leading to an increased risk of injury or death (Gonzalez, Wu, & Baweja, 2016). As the problem of hoarding is of concern for the individual, neighbours, and society, many disciplines have a stake in responding to hoarding cases (Bratiotis, Sorrentino Schmalisch, & Steketee, 2011). A diversity of professional input and resources is needed to successfully address problems related to hoarding (Gonzalez et al., 2016; Raeburn, Hungerford, Escott, & Clearly, 2015).

Various communities across North America are responding to hoarding cases that come to public attention by developing multidisciplinary teams and task forces (Bratiotis et al., 2011). At their best, these teams aim to provide a coordinated intervention response for individuals, families, and communities affected by hoarding behaviour (Bratiotis, 2013). Using the approach of harm reduction, the immediate goal is not to decrease hoarding behaviours but rather to decrease the harmful consequences of the behaviours (Tompkins & Hartl, 2009). Often, these
teams deal with the most severe cases of hoarding, those who have not voluntarily sought help (Bratiotis, 2013). Enforcement actions alone, such as cleanouts, are considered inferior to taking a less-intrusive approach that recognizes the mental health context of hoarding (Bratiotis, 2013). Many teams involve enforcers, coming from law enforcement or fire prevention, as well as supporters, mental health teams or social workers. The diversity of disciplines involved alludes to the complexity of the disorder. It seems obvious for most mental disorders to be primarily managed by mental health, but because the consequences of hoarding disorder create problems for neighbours, landlords, and society (Gonzalez et al., 2016), it is unclear which discipline should be primarily responsible. Also, mental health treatment is only rarely mandated; usually it is voluntary and optional. In contrast, different factors related to hoarding, such as safety risks, pest infestations, and housing stability, might require involuntary compliance with intervention.

**Gaps Between Research and Community**

Our current understanding of hoarding disorder has largely been based on work done by scientist-practitioners in psychology and social work. In 2013, hoarding disorder was codified in the DSM-5, establishing Frost and Hartl’s (1996) symptom criteria as the official diagnostic criteria to be used and providing an opportunity to synthesize the current literature base. Psychologists and social workers have also begun to establish evidence-based treatments for hoarding disorder; currently the gold standard treatment is specialized CBT for hoarding, which incorporates home visits alongside the standard office-based CBT approach (Steketee & Frost, 2007). Clinicians have also begun to identify common barriers to treatment, establishing poor insight and low motivation as key factors (Frost, Tolin, & Maltby, 2010; Tolin, 2011). While these contributions are invaluable, the research has not been informed by the work going on in the communities, which is problematic for several reasons.
First, researchers have mainly studied voluntary samples – individuals who have signed up for research studies or who have sought treatment (McGuire, Kaercher, Park, & Storch, 2013), whereas communities generally are dealing primarily with non-voluntary clients, those who have been reported because their hoarding behaviours are a community problem or whose family members have sought intervention. These two populations differ in fundamental ways; for example, voluntary clients are more likely than non-voluntary clients to recognize that there is a problem and to be considering change. Individuals who participate in research studies may not be representative of the larger population of individuals with hoarding disorder.

Second, most hoarding clients are not in mental health treatment. They have come to the attention of community nurses, property managers, or fire prevention inspectors. Due to limited training opportunities, these community professionals usually have little professional knowledge about hoarding and its potential treatments. Most are not experts in treating any mental health disorders, including hoarding. There is no research available to guide their policies and procedures. Clinicians, in contrast, have various treatment manuals, the DSM-5, and guidelines for ethical conduct to guide their practice (American Psychiatric Association, 2013; Gibson, Rasmussen, Steketee, Frost, & Tolin, 2010). Empirical research is sorely needed to guide the interventions of community-based hoarding teams and to improve outcomes for community clients.

Third, most research by psychologists and social workers has neglected variables of concern for community professionals (e.g., eviction risk, presence of squalor, details of the housing situation). As shown in Table 1, treatment studies tend to report basic demographic information, psychiatric comorbidities, and scores on self-report measures assessing hoarding thoughts and behaviours. In contrast, community professionals assess constructs relevant to the
overall functioning of the individual, for example, housing conditions (e.g., level of clutter, squalor), medical comorbidities, housing stability, and interpersonal conflict. As Table 1 shows, among 19 recent treatment studies, only seven reported the level of clutter in the home, four reported medical comorbidities, three reported interpersonal conflict, one reported eviction risk, and one reported housing type. None of the studies reported on the presence of squalor. As these community concerns are rarely assessed by researchers, the characteristics of community hoarding clients are not represented in the literature. Further research in this area should look towards consistency in assessed variables.
### Table 1

** Constructs Assessed in Hoarding Treatment Studies **

<table>
<thead>
<tr>
<th>Study</th>
<th>Basic demographics</th>
<th>Psychiatric comorbidity</th>
<th>Medical comorbidity</th>
<th>Clutter volume</th>
<th>Eviction risk</th>
<th>Housing type</th>
<th>Squalor</th>
<th>Interpersonal conflict</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ayers et al., 2011</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Ayers et al., 2014</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>DiMauro et al., 2014</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frost et al., 2011</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frost et al., 2012</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gilliam et al., 2011</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Mathews et al., 2016</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moulding et al., 2017</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Muroff et al., 2009</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Muroff et al., 2010</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Muroff et al., 2012</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Muroff et al., 2014</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Saxena &amp; Sumner, 2014</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Steketee &amp; Frost, 2007</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Steketee et al., 2000</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Steketee et al., 2010</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Study</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------------------</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tolin et al., 2007</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turner et al., 2010</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Worden et al., 2017</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
If researchers, who are primarily responsible for generating the evidence base for hoarding disorder, neglect factors relevant to communities, then the treatments created may fail to address such issues. For instance, Tolin (2011) introduced a special issue of the Journal of Clinical Psychology: In Session, devoted to understanding, assessing, and treating hoarding disorder. He presented the series of articles as providing a comprehensive picture of hoarding disorder and its treatment. Although community interventions were mentioned in the introduction, no research on these initiatives or non-voluntary samples was included. This perfectly illustrates the problem; researchers have yet to recognize community interventions are integral to treatment and contribute to a full understanding of the disorder.

Further, treatment studies that use inclusion criteria that better represent community clients (e.g., including individuals with past or present substance abuse or psychosis) point to these inclusion measures as the rationale for high dropout rates or small effect sizes (Mathews et al., 2016; Turner et al., 2010), implicitly acknowledging that current mental health treatments may not help these clients because they were not designed with these more complicated community clients in mind. Additionally, typical research exclusion criteria likely preclude some of the more severe community hoarding clients from participating in treatments. Worden (2017) required participants to meet clinical appropriateness for a group treatment format, excluding those with active suicidality, aggressive behaviour, severe personality pathology, and current substance dependence. Muroff et al. (2009) excluded two individuals because of severe comorbid mental health and neurological problems and physical disabilities; Tolin et al. (2007) excluded from analysis one participant for serious marital conflict and multiple cancelled sessions; and Turner et al. (2010) excluded one person for dementia and two because of severe personality features (e.g., aggression). In contrast, community teams have a duty to assess all
referred clients who fit their mandate and to offer interventions consistent with that mandate (e.g., harm reduction, tenancy preservation).

Certainly, community-based research is challenging and requires a great deal of researcher flexibility and patience. For instance, the operation, mandate, and interventions of community teams may differ considerably from city to city, resulting in a lack of researcher control regarding the data that are available to collect. To this end, Rodriguez et al. (2016) stated that they excluded hoarding task forces from their survey on the acceptability of treatments and services for hoarding because they were unable to create a succinct description that would generalize to all communities. This is unfortunate as the paper aimed to explore the acceptability of currently available services. In many communities, task forces are the only available professional service that is affordable and knowledgeable about hoarding.

Research derived from community-based teams is important and should form part of the academic literature on hoarding in order to provide a more complete picture. As documented by McGuire et al. (2013), information provided by community professionals (e.g., fire, police, nursing, legal, public health) on the severity and characteristics of hoarding cases may be important to consider in mental health treatments. Further, as hoarding impacts multiple aspects of daily life, especially in older adulthood, embracing a multidisciplinary approach is important for managing these impairments (Ayers et al., 2013).

The present study bridges the gap between the research and community approaches through a research collaboration with the Hoarding Action Response Team, a multidisciplinary team based in Vancouver. The team’s primary aims are to promote public safety, provide health referrals, and preserve tenancy. As the team consists of a fire prevention inspector and a psychiatric nurse, my research is able to characterize hoarding through a different lens than
psychology has previously studied. Further, as HART’s cases are referred by community members (e.g., family, property managers, first responders), the current study had the rare opportunity to examine a sample that was mostly not help-seeking. (As will be seen below, only 5% of clients were self-referred.)

**Characterization of Community Hoarding Clients**

Hoarding is likely not the only problem for which community clients need assistance. Beyond the level of clutter and the presence of vulnerable cohabitants, such as frail elderly or children, a range of risks requires assessment. Although complicating factors, such as age (Reid et al., 2011), comorbidity (Samuels et al., 2008) and social support (Medard & Kellett, 2014) have previously been studied in the literature, their co-occurring presence in community cases has yet to be studied. Figure 1 illustrates a theoretical model of three areas relevant to community-based interventions for hoarding: individual characteristics, environmental characteristics, and housing and financial stability. The model draws upon existing research describing hoarding case complexity, but also includes variables relevant to communities.
Figure 1. Theoretical Model of Community Hoarding Case Complexity

**Individual Characteristics**

- Advancing Age
- Cognitive Functioning
- Medical Complexity
- Health Factors Directly Relevant to Hoarding
- Social Connection
- Behavioural Factors
- Insight into Hoarding

**Environmental Characteristics**

- Vulnerable Cohabitants
- Safety
- Poor Housing Conditions

**Housing and Financial Stability**

- Housing
- Explicit Risk of Eviction
- Financial Resources

### Individual Characteristics

- Adult Guardianship Status
- Cognitive Decline
- Hospitalizations
- Use of Mobility Aid
- Social Network
- Drug/Alcohol Use
- Medical comorbidity
- Personal Hygiene Concerns
- Visitors to Home
- Verbal Aggression
- Active Health Referrals
- Risk of Falls
- Living Alone
- Violence
- Interpersonal Conflict

### Environmental Characteristics

- Vulnerable Cohabitants
- Old Adults
- Pets
- Children
- Safety
- Clutter Volume
- Domestic Squalor
- Pest Infestations
- Fire Code Violations
- Delayed Discharge from Hospital
- Household Problems Needing Attention
- Financial Resources
- Home Ownership
- Housing Type
- Social Housing
Due to the complexity of cases (as seen in Figure 1), community-based hoarding teams use a case-by-case approach to address hoarding-related problems. Team members rely on intuition and personal experience to guide their interventions, as minimal training opportunities or evidence-based protocols exist (McGuire et al., 2013). The current study took the first step towards bridging the research gap and helping to guide teams by characterizing community hoarding clients. Who are these clients? What do they need? What are the barriers communities face in helping them? Are there identifiable subgroups? The next section will go on to describe the aspects of the model that the current study was able to investigate. These areas later served as a basis to identifying subgroups of community hoarding clients. By using the subgroups identified in this research, teams could take a more targeted approach to case assessment and intervention.

**Individual Characteristics**

**Age.** Researchers frequently cite advancing age as a factor that further complicates hoarding cases. In both clinical and community samples, hoarding has been found to occur more often among older adults (Reid et al., 2011; Samuels et al., 2008). In addition, studies have found that worsening chronic health conditions (Eckfield & Wallhagen, 2013), considerable comorbidity (Diefenbach, DiMauro, Frost, Steketee, & Tolin, 2013), and single marital status (Ayers & Dozier, 2014) were related to increased severity of hoarding behaviour among older adults. In older adults, features of both their hoarding behaviours and the functional limitations of their home environment may compound to increase barriers to community participation leading to social isolation (Vaughan, LaValley, AlHeresh, & Keysor, 2016).

**Cognitive Functioning.** Among older adults the co-occurring presence of hoarding with dementia has been discussed in the literature. Hwang, Tsai, Yang, Liu, and Lirng (1998)
estimated that 23% of dementia patients admitted to a geropsychiatric ward engage in hoarding behaviours. Lee et al. (2016) found that the rate of neurocognitive disorders due to Alzheimer's disease and vascular etiologies was twice as high in a squalor–hoarding sample compared to a squalor only sample. Based on this known relationship between dementia and hoarding, community case managers assess for cognitive decline in patients who hoard or who are self-neglecting. These situations may require a network of professions to coordinate care (Gonzalez et al., 2016). In British Columbia, the Adult Guardianship Act may be enacted in cases of self-neglect, or an individual may be certified under the Mental Health Act.

**Medical Complexity.** In hoarding, comorbidity is considered to be the rule, rather than the exception (Tolin, Frost, Steketee, Gray, & Fitch, 2008). Most hoarding clients will meet diagnostic criteria for major depressive disorder, social phobia, or generalized anxiety disorder (Frost, Steketee, & Tolin, 2011). Hoarding is also associated with obsessive compulsive, avoidant, and paranoid personality disorder traits (Samuels et al., 2008). In addition to mental health comorbidities, hoarding clients are more likely than the general population to report a broad range of chronic and severe medical concerns (e.g., arthritis, hypertension, chronic stomach problems; Tolin et al., 2008). Although the presence of other mental health and physical comorbidities is established, it is unclear as to the extent to which observed functional impairments are caused by hoarding behaviours versus other comorbid conditions (Tolin et al., 2008).

**Health Factors Directly Relevant to Hoarding.** Accumulated clutter is a heightened health and safety risk for those who use a mobility aid in their home, are prone to falls, or are neglecting personal hygiene. A client who uses a mobility aid is at increased risk in a hoarded home as narrow pathways may prevent the client from being able to safely navigate the home.
Further, a walker or a cane might cause a pile to shift and initiate an avalanche of clutter. Similarly, older adults who would be prone to falls even in a non-hoarded environment are at an increased risk in a hoarded one, especially if they live alone. Older adults often navigate a space at night by holding on to objects along a path, for example a couch or wall, but in a hoarded home this imparts a severe risk as holding on to keep one’s balance might lead to the pile falling over. In addition, clutter may obstruct access to medications or the ability to use medical equipment (such as a continuous positive airway pressure machine). Finally, personal hygiene concerns may be aggravated in a hoarded environment. Being unable to bathe due to a hoarded shower and increased risk of infection due to a dusty home environment are examples of red flags for medical professionals.

**Social Connection.** Social support has consistently been shown as a critical resource for reducing psychological distress, such as depression or anxiety, during stressful situations (Lin, Ye, & Ensel, 1999; Sarason, Sarason, & Gurung, 1997; Taylor, 2011). In hoarding, better clinical prognosis may be achieved if improved social connections can occur alongside decluttering (Medard & Kellett, 2014; Muroff et al., 2009). Social connections manifest as the presence of a social network, inviting visitors to the home, or cohabitation with family or a loved one. Increased social isolation and limited social networks are common among those who hoard (Kim, Steketee, & Frost, 2001), and the absence of social support has been hypothesized to play a role in maintaining hoarding behaviour (Bratiotis et al., 2011). Even if these individuals do have a social network, they might be unwilling to invite visitors over to their home because of the shame they experience due to their home’s conditions (Frost & Hartl, 1996). Further, interpersonal impairment and strained family relationships are common in hoarding disorder (Drury, Nordsletten, Ajmi, Fernandez de la Cruz, & Mataix-Cols, 2015; Grisham, Steketee, &
Caregivers report frequent conflicts, often leading to the breakdown of relationships (Park, Lewin, & Storch, 2014). Conflicts regarding the clutter are also likely to occur with property managers, social agencies tasked to help, and neighbours.

**Behavioural Factors.** Behavioural factors such as alcohol or drug use, verbal aggression, and violence can pose barriers during an intervention. Samuels and colleagues (2008) found that the prevalence of alcohol dependence was substantially higher in individuals who hoard compared to those who do not. Extending these findings, Raines and colleagues (2017) found associations between symptoms of hoarding and alcohol use, even after accounting for depression and anxiety symptoms. The tendency to express hostility and anger, or to engage in aggressive behaviour, may also be associated with increased hoarding symptoms (Mathes et al., 2018). Finally, individuals who hoard may threaten violence when action is taken to clear space in their home. The prevalence of violence or aggression in these difficult confrontational situations has yet to be examined, but a qualitative survey of social service and code enforcement staff suggests these behaviours do occur with some clients (McGuire et al., 2013).

**Insight into Hoarding.** Across many disorders, poor insight has been shown to be an important variable to consider in treatment. For example, in schizophrenia, poor insight predicts low treatment compliance and poor therapeutic alliance (Lysaker, Pattison, Leonhardt, Phelps, & Vohs, 2018), in alcohol use disorder, good insight is related to abstinence (Kim et al., 2007), and in obsessive-compulsive disorder, poor insight is related to greater symptom severity and likelihood of only partial treatment response (Catapano et al., 2010). Relatedly, treatment research on hoarding disorder has consistently found poor insight to be a barrier to treatment success due to lower compliance and inconsistent motivation (McGuire et al., 2013; Tolin, 2011). In a study of family members of individuals who hoard, over half described their loved
one as having ‘‘poor insight’’ or ‘‘lacks insight/delusional’’ (Tolin, Fitch, Frost, & Steketee, 2010). DSM-5 provides a specifier for insight, but little research has been done to determine the prognostic value of that specifier. Community teams find low insight to be problematic because they are unable to convince the client of the urgency of fire or building code violations. As focusing on safety hazards is a key harm reduction strategy of community teams, poor insight can stall interventions. Importantly, community teams are more likely than researchers to encounter low-insight cases, as this subset is unlikely to volunteer for research (Drury et al., 2015).

Environmental Complexity

Vulnerable Cohabitants. Although the majority of people who hoard live alone, some cohabit with family or loved ones. Community teams assess whether cohabitants in a hoarded home are vulnerable persons such as frail elderly or children. In certain situations, social agencies take protective action to remove these vulnerable individuals from the hoarded environment. Tolin and colleagues (2008) reported that 0.1 - 3.0% of people with hoarding had had a child or elder removed from the home. Similarly, teams assess the wellbeing of pets in a hoarded home and determine whether animal protection services need to be involved.

Safety. The condition of the home is a hallmark feature in hoarding disorder, as one of the main criteria for the disorder is accumulated clutter. The Clutter Image Rating (CIR; Frost, Steketee, Tolin, & Renaud, 2008) is the most popular assessment tool of clutter volume. The CIR assesses clutter severity through photographs of progressively increasing clutter in the kitchen, living room, and bedroom. Whereas researchers often use the CIR scale as a screening measure, community teams primarily use the CIR to track progress towards decluttering goals. In addition, fire officials use degree of compliance with fire codes, such as those prohibiting excess
combustibles or blocked emergency exits, as an indicator of progress. The HOMES Multi-Disciplinary Hoarding Risk Assessment (Bratiotis et al., 2011) and the Uniform Inspection Checklist (Mathews, 2014) are examples of other measures that community-based human service professionals use to assess safety and conditions of the home.

**Poor Housing Conditions.** Squalor is relatively common in hoarded homes. A recent study on three diverse samples of community clients found 35-72% of hoarded homes also had squalor and that higher clutter volume and impaired access to bathrooms or kitchen facilities predicted the presence of squalor (Luu, Bratiotis, Lauster, Edsell-Vetter, & Woody, 2018). The development of mold or the presence of pests, characteristic of squalor, can increase the risk of health problems (Gonzalez et al., 2016). Additional research on squalor, occurring both alongside and separately from hoarding, is needed to better understand these two conditions.

Although large amounts of clutter and possessions can lead to delays in receiving emergency care from medical personnel or fire fighters (Gonzalez et al., 2016), no research has established the delays of individuals with hoarding disorder being discharged from hospital. Delayed discharge is defined as continued time spent in the hospital after a patient is deemed fit to leave, but is unable to do so for non-medical reasons (e.g., poor housing conditions, awaiting more appropriate home-based services; Expert Panel on Alternate Level of Care, 2006; Rojas-García et al., 2017). Costs associated with delayed discharge are significant, but the lack of available home-based services is equally frustrating. This is an area meriting future research because the poor housing conditions of hoarded homes may lead to recurrent health problems and re-hospitalization. Addressing these poor housing conditions needs to be a long-term priority in preventing a cycle of hospitalization, discharge and re-hospitalization.
Finally, housing problems left unresolved (e.g., leaky pipes, circuit overloads) due to the clutter or the shame involved in having a work person come into the home are also important to assess. These impairments can lead to substandard living conditions and poorer quality of life for the resident.

**Housing and Financial Stability.**

**Housing.** Although perhaps unimportant for clinicians, the type of housing and its ownership has important consequences for community teams dealing with non-voluntary clients. If a residence is privately owned and the client does not want to engage, a community team typically has no jurisdiction to compel the individual to comply, unlike a resident living in a rental or condominium that must comply with building codes. Further, the type of residence gives rise to differing stakeholders. For instance, if the resident is living in an apartment building, the community team may also have to navigate relationships with property managers, neighbours, or homeowners’ associations. Residents living in social housing often have access to tenant support workers who can be a useful partner in intervention. Residents in these buildings are perhaps more likely to preserve their housing if support staff are motivated to help those at risk for homelessness.

**Risk of Eviction.** One goal of community hoarding teams is to preserve tenancy, as hoarding behaviours may lead to housing instability (Rodriguez et al., 2012). Evictions are a significant cause of homelessness (Holl, Dries, & Wolf, 2016). The risk of eviction is of grave importance for low-income residents, but can also be a risk for those who rent and condominium homeowners (who can be subject to a forced sale of their property). Eviction notices are used by landlords and property managers as a tool to engage resistant tenants with hoarding behaviours and to communicate the severity of the situation (Glover & Moss, 2010). In one study on the
economic burden of hoarding, 8 - 12% of participants meeting criteria for hoarding had been evicted or threatened with eviction due to hoarding (Tolin et al., 2008). Research on interventions to prevent tenant eviction is scarce. Further research should focus on the effectiveness of community hoarding teams for tenants at risk of eviction. By building on the knowledge and experience of professionals working with households at risk of eviction, interventions to prevent tenant evictions could be improved.

**Financial Resources.** Financial capacity is of concern when individuals are at risk for eviction, but also when they are motivated enough to declutter. Decluttering services for hoarding can cost thousands of dollars, especially if the client wishes to be personally involved (as most do), thereby increasing staff time. As individuals with limited financial resources are unable to pay for decluttering services, progress towards their decluttering goals may be slower and may depend on the amount of volunteer help (from friends or family) they receive. Currently, the literature on financial resources and hoarding is scarce, however Samuels and colleagues (2008) found that the prevalence of hoarding was inversely related to household income.

**Current Study**

The current study aimed to bridge the gap between the research and community approach by characterizing community hoarding clients. To achieve this goal, I used cluster analysis to identify subgroups of clients based on a wide range of assessed risks. Data were collected from one community-based hoarding team based in Vancouver. The team’s assessments were used to characterize the complexity of community clients. Variables of interest included individual characteristics (e.g., medical complexity, social connection, behavioural factors), environmental characteristics (e.g., poor housing conditions, vulnerable cohabitants, safety), and housing and
financial stability. A subset of these variables was used to identify potentially useful clusters of hoarding clients. Investigating client clusters will lead to the development of specific intervention targets and evidence-based recommendations for resource and staff allocation. Further, the identification of clusters will illuminate some of the particular challenges community teams experience when helping clients.

**Method**

**Study Context**

Vancouver’s Hoarding Action Response Team (HART) was launched in May 2011 as an 18-month pilot program to coordinate interventions for those impacted by hoarding. The pilot goals were to help discover and support people with severe hoarding behaviour in Vancouver by conducting fire inspections and referring clients to community resources. The team has now been in operation for seven years and currently comprises four team members: a full-time fire prevention inspector and a full-time psychiatric nurse, as well as two supervisors (a fire captain and a clinical supervisor) who can provide backup coverage when necessary. The team’s primary aim is to promote public safety by reducing clutter to a safer level. Additionally, they aim to improve the resident’s quality of life by providing health referrals if needed and to preserve tenancy. The team acknowledges that their intervention is limited to harm reduction and is not to be considered treatment for hoarding.

The team has seen many changes and improvements since its creation in 2011. For example, they have improved their case tracking system, gaining a better handle on incoming and outgoing cases. Additionally, they have experienced several staff changes, including replacing the initial role of health worker with a psychiatric nurse to provide a much-needed mental-health perspective to the team. However, despite the team’s improvements, they continue
to face many challenges. Several of these challenges, including difficulties getting clients to engage, the presence of comorbid health conditions, and a shortage of team resources, motivated the current study with its focus on capturing case complexity.

To contextualize the variables collected for this study, a description of how cases are generated and case managed will follow. To begin, potential cases are reported by community members (e.g., family, property managers, first responders) to the City of Vancouver’s 3-1-1 Contact Centre and are assessed to see if they meet the team’s mandate. Cases with vulnerable occupants (e.g., elderly, children, or pets at risk) or extreme clutter volumes are prioritized as immediate risks, whereas other new cases are placed in a waitlist sequence. The fire prevention inspector and psychiatric nurse attend the initial inspection together and make a judgment as to the degree of risk in the home, including a safety assessment of the dwelling and a clinical assessment of the individual. If a client’s home does not meet fire regulations, the fire prevention inspector engages the client in an educational conversation about fire safety and issues a Notice of Violation. Team members also collaboratively assess the level of clutter in the home using the Clutter Image Rating (CIR; Frost et al., 2008) pictorial scale. During the initial inspection, the team decides if the case meets the team’s mandate. Inclusion criteria are severely hoarded conditions (CIR ≥ 6) or more moderate hoarded conditions in the context of physical or mental health concerns about vulnerable occupants of the home. If the case meets those criteria, HART members set up a re-inspection appointment during the initial inspection. Intervention plans and decisions are made on a case-by-case basis.

Throughout case interventions, the fire prevention inspector follows up on progress with coming into compliance with the fire code. Clients need to maintain clear pathways throughout their home, remove clutter obstructing the safe use of kitchen appliances, and reduce the height
of items stacked up throughout the home to prevent avalanches or tripping hazards. The nurse’s intervention incorporates some features of case management (Bratiotis, Woody, & Lauster, 2018), including prioritizing the establishment and maintenance of a supportive relationship with the client, linking the client to an array of appropriate community services (e.g., to initiate cognitive testing or to request home health support), and advocating for tenancy preservation or safe home conditions upon discharge if the client is hospitalized. The nurse may visit the client alone to provide additional support and occasionally to help sort through the clutter or to support the client during clutter removal that the client has arranged. If older adult self-neglect or abuse is suspected, the nurse and his supervisor may take protective action within their legal mandate (i.e., invoke the Adult Guardianship Act).

At weekly meetings, the team reviews progress on cases they are currently managing. If a client is persistently not making progress to remedy the fire code/by-law violations, the fire prevention inspector and fire captain discuss escalating legal action to increase pressure to comply with fire codes (e.g., issuing a Fire Chief’s order, engaging the homeowners’ association, or levying fines). A case is closed ideally when the client meets harm reduction goals (CIR ≤ 4 and fire code compliance). However, cases can also close if the resident withdraws consent for the team’s intervention. According to the fire code, homeowners of single-family dwellings have the right at any time to refuse entry and thereby decline the intervention. However, if a homeowner in a condominium declines intervention, the team will send an order to the homeowners’ association to comply with fire codes. Legal action may then be taken by the homeowners’ association to protect the interests of all homeowners and to ensure the building’s compliance with property use laws. Finally, a case can close if other actions occur that obviate additional intervention (e.g., a clean-out, death, or eviction).
Procedure

Prior to the current study, the researcher spent about a year learning more about the HART approach, familiarizing herself with the structure of the team and the workflow around hoarding cases. During data collection, the researcher attended weekly HART meetings and occasional in-home inspections. Although the researcher had limited control over the incoming data collected by HART, she made use of all available data to construct a representation of community hoarding case complexity. She had access to all information systems used by HART to track their cases, and she facilitated consistent data collection. A research assistant helped document and resolve any discrepancies between data sources. The researcher was transparent with the team about her methods and variables of interest. The team agreed to make the data available and to try to remain consistent in their work procedures during the study. To ease this process, the researcher met bi-weekly with the psychiatric nurse to fill in missing information. Refer to Table 2 for the complete list of variables collected per case. Study data were collected and managed using REDCap electronic data capture tools hosted at the University of British Columbia (Harris et al., 2009).

Table 2

Variables Used to Assess Hoarding Case Complexity

<table>
<thead>
<tr>
<th>Individual Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Age at intake (in years)</td>
</tr>
<tr>
<td>2. Did medical comorbidity play a role in case intervention? (No, Yes)</td>
</tr>
<tr>
<td>3. Health referrals active during case intervention (tally the number of referrals)</td>
</tr>
<tr>
<td>4. Hospitalized at intake or during the intervention? (No, Yes)</td>
</tr>
<tr>
<td>5. Uses a mobility aid? (No, Yes)</td>
</tr>
</tbody>
</table>
6. Risk of falling? (No, Yes)

7. Personal hygiene concern? (*severe* = 2, *moderate/mild* = 1, *absent* = 0)

8. Impairing drug/alcohol use? (No, Yes)

9. Risk of violence? (No, Yes)

10. Verbally aggressive? (No, Yes)

11. Known interpersonal conflict? (No, Yes)

12. Any visitors to the home? (No, Yes)

13. Social network outside of the home? (No, Yes)

14. Lives alone? (No, Yes)

15. Guardianship (2 = met Adult Guardianship Act criteria, 1 = met criteria for assessment and was assessed but did not meet AGA criteria, 0 = absent)

16. Cognitive concerns? (No, Yes)

17. DSM-5 hoarding insight (0 = absent/delusional, 1 = poor, 2 = fair/good)

---

*Environmental Characteristics*

18. Older adults living in the home? (No, Yes)

19. Pets living in the home? (No, Yes)

20. Person under 19 years of age living in the home? (No, Yes)

21. Clutter Image Rating (*range* = 1-9)

22. Fire violations on 1st inspection (*tally of the number of violations*)

23. Domestic squalor? (No, Yes)

24. Pests? (No, Yes)

25. Delayed hospital discharge due to hoarding? (No, Yes)

26. Electrical/plumbing problems related to hoarding? (No, Yes)
Financial/Housing Stability

27. Limited financial means? (No, Yes)
28. Rented home? (No, Yes)
29. Social housing? (No, Yes)
30. Risk for eviction? (No, Yes)

Data Sources

3-1-1. The City of Vancouver’s 3-1-1 Contact Centre is a single-entry system designed to receive the calls of Vancouver’s citizens and businesses when they are reporting concerns. 3-1-1 was also the number to report potential hoarding cases and inquiries. The 3-1-1 Contact Centre generated Hoarding reports, which were then transferred to the Fire Prevention Office to be examined. The 3-1-1 report provided the following information about each potential case: name, address, approximate age, complainant’s identity and contact information, and the reason for the report (e.g., hoarding is suspected as a tenant failed to allow access for the annual smoke detector check). Information documented on the 3-1-1 report was transferred to other data sources by HART, and the researcher had access to the original reports at the VFRS office to check for accuracy and completeness.

Triage Spreadsheet. On a weekly basis, the fire prevention inspector updated the triage spreadsheet. It listed the address and name of each hoarding case currently open with the team, as well as a record of inspection dates, attempted contacts, and Clutter Image Rating at each inspection. Team members, including the researcher, received hard copies of this document at weekly team meetings. The triage spreadsheet was used as a tool for case discussion; both VFRS and VCH kept their own confidential electronic records as per their disciplines’ documentation rules. The triage sheet was a critical tool to track the flow of cases and to facilitate
communication, as it included information that was relevant and accessible to all team members. Once a case was closed, it was removed from the spreadsheet. The researcher attended these triage meetings to record any additional information the team discussed during the meeting, as well as to minimize missing data or data inconsistencies.

**Primary Access Regional Information System (PARIS).** PARIS is Vancouver Coastal Health’s electronic health records database. Clinicians can obtain information about their client’s past medical history, see a list of VCH teams who are already providing care to the client, and open a new referral. The Vancouver Coastal Health Research Institute approved the current study and granted the researcher access to parts of the PARIS system that were relevant to the HART team's work. Access to identifying information was necessary to facilitate data collection; it was not practical to strip the database of identifying information as the researcher needed to obtain data on repeated contacts between HART team members and clients. The researcher completed training given by VCH on how to use PARIS following strict access controls, and accessed the database only at the VCH office. Importantly, HART clients did not consent to have their individual data included in this study, but the waiver of requirement to obtain consent was approved by both the VCH Research Institute and UBC’s Behavioural Research Ethics Board. This research would not be possible without such a waiver. The team was reasonably concerned that seeking consent for this research would give the false impression that their interventions were driven by a research agenda rather than by safety concerns. Furthermore, researchers were studying interventions that were being offered by the agencies and had no influence on the interventions offered to any client; the client’s experience was not altered in any way by the conduct of the research.
The psychiatric nurse wrote detailed case notes after each contact with a HART client. Using these case notes, as well as demographic case overview information, the researcher coded for individual and environmental characteristics, as well as housing and financial stability. To ensure data quality, the researcher had biweekly meetings with the psychiatric nurse to confirm ratings and clarify questions pertaining to the variables of interest.

**Fire Data Management (FDM) Database.** Vancouver Fire Rescue Services used FDM to track their day-to-day activities, including documenting fire safety violations they observed during a given inspection at a particular address. At subsequent inspections of the same address, the fire prevention inspector noted the status (e.g., satisfactory, unsatisfactory) of each previously noted violation. As part of the collaboration with HART, a business analyst from the City of Vancouver provided Fire Prevention FDM data on a monthly basis. A research assistant identified HART cases and coded the frequency and type of violations noted by the fire prevention inspector on the first inspection.

**Clutter Image Rating** (CIR: Frost et al., 2008). The CIR assesses clutter volume through three sets of photographs of a kitchen, living room, and bedroom, each set with pictorial levels of progressively increasing clutter scaled from 1 to 9 (1 = like an empty hotel room, 9 = clutter nearly to the ceiling). The psychiatric nurse and fire prevention inspector collaboratively selected the photograph that most closely depicted the average level of clutter throughout the home. A score of 4 or above indicates clutter significant enough to warrant clinical attention, but the HART threshold for action was a score of 6 unless there were special considerations such as a frail elderly resident. The CIR has demonstrated good internal consistency, test–retest reliability, and convergent validity, as well as excellent inter-rater reliability (Frost et al., 2008). Initial and
closing CIR were analyzed for this study. These scores were reported by the psychiatric nurse in PARIS.

**Health of the Nation Outcome Scales** (HoNOS: Wing et al., 1998). The HoNOS is a 12-item observation scale of overall mental health and social functioning. As shown in Table 3, the assessor rates various aspects of mental and social health, each on five-point scales ranging from zero (“no problem”) to four (“severe to very severe”). The HoNOS is frequently used as a broad measure of functioning in psychiatric settings. The HoNOS has shown good convergent validity with other measures related to illness severity (McClelland, Trimble, Fox, Stevenson, & Bell, 2000) and has good predictive validity for overall clinical pre-post change and symptom improvement (Lovaglio & Monzani, 2011). All available initial HoNOS ratings were analyzed for this study. The sample size for this measure was smaller because the HoNOS was a recommended but not required part of the VCH team’s assessment. Further, once a case was closed, the system would no longer permit the measure to be completed. The HoNOS was used as a convergent measure of hoarding case complexity, as some of the items provide similar information to Table 2.

**Table 3**

*Health of the Nation Outcome Scales*

---

1. Overactive, aggressive, disruptive or agitated behaviour
2. Non-accidental self-injury
3. Problem-drinking or drug-taking
4. Cognitive problems
5. Physical illness or disability problems
6. Problems associated with hallucinations and delusions
7. Problems with depressed mood
8. Other mental and behavioural problems
9. Problems with relationships
10. Problems with activities of daily living
11. Problems with living conditions
12. Problems with occupation and activities

Note. All items follow the format: 0 = no problem, 1 = minor problem requiring no action, 2 = mild problem but definitely present, 3 = moderately severe problem, 4 = severe to very severe problem. Rate 9 if not known.

Participants

The present study used data collected on 124 cases referred to or managed by the team from May 2017 to May 2018. Refer to Figure 2 for a summary chart detailing the flow of all 124 referred cases. Based upon an initial inspection, 67 cases met HART’s inclusion criteria of severely hoarded conditions (CIR ≥ 6) or moderately hoarded conditions in the context of physical or mental health concerns (e.g., a frail elderly client with CIR = 4). Cases not meeting inclusion criteria (n = 21) may have met criteria for hoarding disorder in DSM-5 terms, but these cases were in compliance of the fire code and did not require health referrals so were not accepted for HART intervention.
Figure 2. Case Flow

3-1-1 Intake  
\( n = 124 \)

- Initial inspection  
  \( n = 99 \)
  - Initial fire inspection, on waitlist for nurse  
    \( n = 11 \)
  - Did not meet criteria  
    \( n = 21 \)
  - Met criteria for intervention  
    \( n = 67 \)
    - Moved to care home  
      \( n = 1 \)
    - Referred to geriatric psychiatry  
      \( n = 1 \)
    - Deemed minor risk  
      \( n = 19 \)

- Unknown  
  \( n = 6 \)
  - Inspection pending  
    \( n = 8 \)

- No initial inspection  
  \( n = 11 \)
  - Events obviated intervention  
    \( n = 3 \)
  - Invalid address  
    \( n = 1 \)
  - Client denied entry  
    \( n = 1 \)
  - Referred to Problem Buildings Fire Prevention Team  
    \( n = 6 \)
  - Client died  
    \( n = 1 \)
  - Moved to hospice  
    \( n = 1 \)
  - Client evicted  
    \( n = 1 \)

Initial intakes include:  
- Intake \( n = 124 \)
- Final intake \( n = 11 \)
Analyses were conducted on all available data for each of the 67 cases that met HART criteria for intervention. Refer to Table 4 for demographics of those cases.

**Table 4**

*Demographics of Cases Meeting Criteria for Intervention*

<table>
<thead>
<tr>
<th>Available n</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Initial Clutter Image Rating</strong></td>
</tr>
<tr>
<td><strong>Age</strong></td>
</tr>
<tr>
<td><strong>Female</strong></td>
</tr>
<tr>
<td><strong>Renter</strong></td>
</tr>
<tr>
<td><strong>Multi-Family Housing Type</strong></td>
</tr>
<tr>
<td><strong>Cohabitants</strong></td>
</tr>
<tr>
<td><strong>Older adult(s) in home</strong></td>
</tr>
<tr>
<td><strong>Pet(s) in home</strong></td>
</tr>
<tr>
<td><strong>Child(ren) in home</strong></td>
</tr>
<tr>
<td><strong>Complainant identity</strong></td>
</tr>
<tr>
<td><strong>Housing provider/homeowners’ association</strong></td>
</tr>
<tr>
<td><strong>Health/social services</strong></td>
</tr>
<tr>
<td><strong>First responder</strong></td>
</tr>
<tr>
<td><strong>Neighbour/tenant</strong></td>
</tr>
<tr>
<td><strong>Family/friend</strong></td>
</tr>
<tr>
<td><strong>Self-referred</strong></td>
</tr>
<tr>
<td><strong>Anonymous</strong></td>
</tr>
</tbody>
</table>
The coding of many variables depended on the psychiatric nurse’s in-depth knowledge of each client, which was not always complete for various reasons. Accordingly, the cluster analysis was performed on 51 cases with data available for the variables used in this analysis. Of the 16 not included in the cluster analysis, nine never met the psychiatric nurse, four were already receiving sufficient care from an affordable housing society (precluding the need for the nurse to get involved), and three clients were unwilling to engage as they did not want mental health services. Clients included in the cluster analysis did not differ from those who were excluded on gender distribution, $X^2 (1, N = 63) = 2.58, p = .11$, age, $t(57) = 0.10, p = .93, d = 0.04$, initial Clutter Image Rating, $t(61) = 0.53, p = .60, d = 0.16$, or number of fire violations, $t(60) = 1.83, p = .07, d = 0.54$. However, clients who were not included in the cluster analysis undoubtedly differed in their willingness to engage with HART.

**Data Analysis**

As a person-centered approach, cluster analysis was used in an effort to identify relatively homogenous groups of community hoarding clients. The choice of variables in cluster analysis is one of the most critical steps. Although there are no guidelines for the number of variables to choose, variables should be chosen within the context of an explicitly stated theory (Aldenderfer & Blashfield, 1984; Dolnicar, 2002). As no previously published theory exists characterizing community hoarding clients, I used the model I developed to guide the selection of variables (see Figure 1). The model draws upon existing research describing hoarding case complexity, but also includes variables relevant to communities. In addition to their representation of the aspects of the theoretical model, variables were chosen based on their adequate variability in the sample (e.g., risk of violence was not included because only 2 out of 51 presented even a mild risk) and availability of cases. To avoid the need to standardize variables with different units of
measurement, only dichotomous variables were used. Standardization in cluster analysis has been found to reduce the differences between groups on those variables that might be the best discriminators of group differences (Everett, 1980). Furthermore, mixed variable types are not recommended for the chosen hierarchical cluster method.

Variables included in the analysis, and a description of how they were generated, are presented in Table 5. Following the recommendations of Aldenderfer and Blashfield (1984), variables not included in the cluster analysis were used to further characterize the identified clusters and to provide external validation for the cluster solution.

Table 5

Variables Included in the Cluster Analysis

<table>
<thead>
<tr>
<th></th>
<th>Description of variable coding</th>
<th>Theoretical aspect</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Mobility aid Did the client require a mobility aid (i.e., cane, walker, wheelchair) in the home?</td>
<td>Medical Complexity</td>
</tr>
<tr>
<td>2.</td>
<td>Hospitalized Was the client hospitalized at any point during the intervention?</td>
<td>Medical Complexity</td>
</tr>
<tr>
<td>3.</td>
<td>Lives alone Did the client live alone?</td>
<td>Social Connection</td>
</tr>
<tr>
<td>4.</td>
<td>Visitors to home Did the client have visitors to the home (e.g., family, friends, health providers)?</td>
<td>Social Connection</td>
</tr>
<tr>
<td>5.</td>
<td>Verbal aggression Was the client verbally aggressive (e.g., explosive, lacking impulse control, hostile) toward team members?</td>
<td>Behavioural Factors</td>
</tr>
<tr>
<td>6.</td>
<td>Eviction risk Was the client explicitly at risk for eviction?</td>
<td>Explicit Risk of Eviction</td>
</tr>
<tr>
<td>7.</td>
<td>Social housing Did the client live in social housing?</td>
<td>Housing</td>
</tr>
</tbody>
</table>
The cluster analysis involved four steps: first, I chose a cluster method, second, I selected a criterion for determining the similarity or distance between cases, third, I selected a criterion for determining which clusters were merged at successive steps, and fourth, I determined the number of clusters that best represented my data. For each of these steps, multiple options were available, therefore my decisions were guided by the most highly cited cluster analysis literature and the methods most suitable for dichotomous data.

Hierarchical cluster analysis is the most suitable method for small sample sizes and does not require the researcher to pre-select the number of clusters (Aldenderfer & Blashfield, 1984). The hierarchical cluster analysis generated a series of cluster solutions from one (all cases in one cluster) to 51 (all cases in individual clusters). Squared Euclidean distance is the most widely used distance measure for dichotomous data (Omran, Engelbrecht, & Salman, 2007). Deriving the squared Euclidean distance between two cases involved computing the sum of the squared differences between all eight variables. Ward’s method (1963) was chosen to link the clusters, because several Monte Carlo studies have shown it to be superior to other clustering methods at population recovery of clusters (Finch, 2005; Kuiper & Fisher, 1975). Further, this method also obtained the highest accuracy in a study comparing the exactness of four agglomerative hierarchical methods (single linkage, complete linkage, average linking, and Ward’s method) in solving 50 data sets (Blashfield, 1976). Ward’s method optimizes the minimum variance within clusters, such that the error sum of squares among members of each cluster is minimal (Ward, 1963). Finally, to determine the number of clusters that best represented my data, I examined the dendrogram (see Figure 3) and the characteristics of the clusters, and then incrementally
adjusted the number of clusters to obtain a solution that appeared to have both theoretical and practical value. The decision process I followed is described later alongside the cluster solution.

Results

Case Intervention

This section will describe features of the team’s case intervention. At the time data collection stopped on May 15, 2018, 41 of 67 cases meeting criteria for intervention were completed and therefore closed. The following analyses include only those closed cases. The waitlist duration from 3-1-1 report to initial inspection was between 1 and 280 days ($Mdn = 69, n = 39$). Interventions lasted between 1 and 807 days ($Mdn = 175, n = 40$), during which an average of 5.71 ($SD = 4.33, n = 41$) home visits occurred. On average, home visits took 41 minutes ($SD = 28, n = 27$), however this duration varied widely from 25 - 172 minutes. At least one cancellation occurred for 63% of cases (range 0 - 8, $n = 41$). The average initial CIR score was 5.93 ($SD = 1.15, n = 36$), and the average CIR at the last inspection was 3.92 ($SD = 1.49, n = 36$), a large and statistically significant reduction, $t(35) = 7.70, p < .001, d = 1.28$. On average, cases received 2.05 fire violations ($SD = 0.50, n = 61$). Table 6 summarizes the categories and frequencies of these violations.

Table 6

Frequencies of Fire Violations ($N = 61$)

<table>
<thead>
<tr>
<th>Category</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excessive height of stored material</td>
<td>41 (67%)</td>
</tr>
<tr>
<td>Insufficient aisle width</td>
<td>41 (67%)</td>
</tr>
<tr>
<td>Obstructed means of egress</td>
<td>15 (25%)</td>
</tr>
<tr>
<td>Excessive amount of stored combustibles in and around building</td>
<td>14 (23%)</td>
</tr>
</tbody>
</table>
Combustible materials blocking means of egress 6 (10%)
Poorly maintained smoke/fire alarms 6 (10%)

In addition to the HART team being involved, at least one network partner (e.g., property manager, family member, other health team) was involved in 87% of cases (range of network partners 0 - 5, n = 39). Further, for most cases with available data, decluttering help was offered by family, friends or professionals (24 of 31, 77%). For a minority of cases, legal action was necessary (12 of 40, 30%). Legal action involved issuing a notice to allow the fire department to inspect the residence, issuing a Fire Chief’s order for compliance, or action taken by the homeowners’ association. At the end of case intervention, the majority of clients had retained their housing (36 of 39, 87.8%), but two were evicted and one client moved to a care home.

These results provide further rationale as to why identifying subgroups is important. The large range and standard deviation for each variable suggests case interventions were unfolding differently across cases. For instance, why did some cases take up to two years to resolve? Were there additional intervention targets beyond decluttering for these cases (e.g., medical comorbidities, eviction risk, interpersonal conflict)? The following results focus on the primary analysis of this paper, the cluster analysis.

Selection of Variables

Although of interest, the following variables were not included in analyses because of poor variability in the sample.

- Impairing drug/alcohol use: only 3 of 51 cases were coded as at least moderate users.
- Risk of violence: only 2 of 51 cases were coded as at least mild risk.
• Guardianship: 3 of 51 cases were assessed, but none were granted status (i.e., every adult was presumed capable of making decisions about their personal care, health care and financial affairs).

• Social network: 43 of 51 cases were coded as having a social network.

Cluster Solution

As described earlier, data from 51 cases were subjected to a hierarchical cluster analysis, using squared Euclidean distance as the distance measure and Ward’s method as the clustering method. The dendrogram, shown in Figure 3, provides a visual representation of the distance at which clusters were combined.
Figure 3. *Client Cluster Dendrogram*

Cluster 1: Cohabiting in Squalor  
\(n = 8\)

Cluster 2: Socially Engaged  
\(n = 6\)

Cluster 3: Isolated at Home  
\(n = 11\)

Cluster 4: Medically Complex  
\(n = 13\)

Cluster 5: Difficult to House  
\(n = 13\)
Following procedures recommended by Aldenderfer and Blashfield (1984), a subjective inspection of the different branches of the dendrogram was made to find a parsimonious cluster solution that yielded theoretical and practical sense. In addition, I examined the change in distance measures between cluster stages, as recommended by Norusis & Inc. SPPS (2011). I examined solutions with two to eight clusters. As can be seen in Table 6, the distance coefficients show a markedly bigger increase initially between the four to three-cluster solution, suggesting a four-cluster solution. Following examination of the dendrogram and the distance coefficients, both four- and five-cluster solutions were considered. The two clusters that merged to generate the four-cluster solution differed widely on the variables of age (a mean of 60 versus 75), the presence of domestic squalor (75% versus 0%), and whether clients lived alone (50% versus 77%). As the most important objective of cluster analysis is to arrive at an interpretable solution, I selected the five-cluster solution. Solutions with fewer numbers of clusters (two or three) failed to make theoretical sense, whereas solutions with a greater number of clusters (six to eight) represented only slight variations of previous clusters.

Table 7

*Distance Coefficient by Cluster Solution*

<table>
<thead>
<tr>
<th>Cluster Solution</th>
<th>Distance Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 clusters</td>
<td>33.32</td>
</tr>
<tr>
<td>7 clusters</td>
<td>37.07</td>
</tr>
<tr>
<td>6 clusters</td>
<td>41.37</td>
</tr>
<tr>
<td>5 clusters</td>
<td>45.94</td>
</tr>
<tr>
<td>4 clusters</td>
<td>51.64</td>
</tr>
<tr>
<td>3 clusters</td>
<td>60.15</td>
</tr>
</tbody>
</table>
Table 7 represents the chosen cluster solution, depicting profiles of five clusters of clients, in addition to basic demographic information. The series of bar graphs in Figure 4 further compares each cluster on the eight variables analysed.
### Table 8

**Profiles of Client Clusters**

<table>
<thead>
<tr>
<th>Cluster</th>
<th>N</th>
<th>Mean Age</th>
<th>Female</th>
<th>Hospitalized</th>
<th>Uses mobility aid</th>
<th>Lives alone</th>
<th>Has visitors to home</th>
<th>Verbally aggressive</th>
<th>Explicit eviction risk</th>
<th>Lives in social housing</th>
<th>Domestic squalor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Cohabiting in Squalor</td>
<td>8</td>
<td>60</td>
<td>75%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>50%</td>
<td>38%</td>
<td>0%</td>
<td>13%</td>
<td>75%</td>
</tr>
<tr>
<td>2. Socially Engaged</td>
<td>6</td>
<td>75</td>
<td>67%</td>
<td>0%</td>
<td>67%</td>
<td>50%</td>
<td>100%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>3. Isolated at Home</td>
<td>11</td>
<td>73</td>
<td>36%</td>
<td>18%</td>
<td>0%</td>
<td>100%</td>
<td>0%</td>
<td>0%</td>
<td>27%</td>
<td>0%</td>
<td>55%</td>
</tr>
<tr>
<td>4. Medically Complex</td>
<td>13</td>
<td>74</td>
<td>77%</td>
<td>92%</td>
<td>62%</td>
<td>100%</td>
<td>92%</td>
<td>15%</td>
<td>31%</td>
<td>46%</td>
<td>46%</td>
</tr>
<tr>
<td>5. Difficult to House</td>
<td>13</td>
<td>63</td>
<td>62%</td>
<td>8%</td>
<td>0%</td>
<td>92%</td>
<td>85%</td>
<td>62%</td>
<td>77%</td>
<td>54%</td>
<td>77%</td>
</tr>
<tr>
<td><strong>Total sample</strong></td>
<td>51</td>
<td>69</td>
<td>67%</td>
<td>29%</td>
<td>24%</td>
<td>77%</td>
<td>65%</td>
<td>26%</td>
<td>33%</td>
<td>28%</td>
<td>55%</td>
</tr>
</tbody>
</table>
Figure 4. *Hoardig Case Complexity by Client Cluster*

**Medical Needs**

<table>
<thead>
<tr>
<th>Client Cluster</th>
<th>Uses mobility aid</th>
<th>Hospitalized</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cohabiting in Squalor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Socially Engaged</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Isolated at Home</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medically Complex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Difficult to House</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Social Connection**

<table>
<thead>
<tr>
<th>Client Cluster</th>
<th>Cohabitants</th>
<th>Has visitors to home (includes home-based care)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cohabiting in Squalor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Socially Engaged</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Isolated at Home</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medically Complex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Difficult to House</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Cohabiting in Squalor
Socially Engaged
Isolated at Home
Medically Complex
Difficult to House

Verbal Aggression

Housing Instability

Explicit eviction risk  Lives in social housing
Cluster 1 \((n = 8; 16\%)\) was designated “Cohabiting in Squalor.” Unlike most clients, Cluster 1 clients lived with someone (100%) and were quite likely (75%) to live in squalor. They were also relatively young \((M = 60\text{ years}, SD = 14)\) and were somewhat likely to engage in verbally aggressive behaviour towards HART (38%).

Cluster 2 \((n = 6, 12\%)\) was designated “Socially Engaged.” Cluster 2 clients were not at risk for housing instability or verbally aggressive behaviour. They had visitors to the home and showed no evidence of squalor. They were, however, older \((M = 75\text{ years}, SD = 12)\) and many (67%) required a mobility aid.

Cluster 3 \((n = 11, 22\%)\) was designated “Isolated at Home.” Cluster 3 clients were more likely to be older men (64% male, \(M = 73\text{ years}, SD = 8)\) who lived alone (100%) and had no visitors to their home.

Cluster 4 \((n = 13, 25\%)\) was designated “Medically Complex.” Most Cluster 4 clients were hospitalized at some point during the intervention (92%) and were likely to be using a
mobility aid (62%). These clients were older adults ($M = 74$ years, $SD = 14$) who were likely to be living in social housing (46%).

Cluster 5 ($n = 13$, 25%) was designated “Difficult to House.” Cluster 5 clients represented a high risk for verbally aggressive behaviour (62%) and eviction threat (77%). In addition, they were likely to be living in squalor (77%) and in social housing (56%). Similar to Cluster 1, clients were relatively young ($M = 63$ years, $SD = 10$).

**Further Characterization of Clusters**

To further examine the identified clusters, follow-up descriptive analyses were conducted to discover distinctions between clusters on variables beyond those that were used to determine the original clusters. As would be predicted by the variables coding for hospitalization and use of mobility aid, clients in the Medically Complex cluster had the most health referrals ($M = 3.38$, $SD = 2.32$), followed by clients in the Socially Engaged cluster ($M = 2.00$, $SD = 2.00$). Clients in the other clusters had fewer than one health referral ($0.27 \leq M \leq 0.69$, $SD \leq 0.75$). Additional variables (shown in Table 8) further characterize the clusters and add theoretical and practical value.

**Table 9**

*Frequencies of Variables Not Included in the Cluster Analysis*

<table>
<thead>
<tr>
<th></th>
<th>Cohabiting in Squalor</th>
<th>Socially Engaged</th>
<th>Isolated at Home</th>
<th>Medically Complex</th>
<th>Difficult to House</th>
<th>Full sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rental unit</td>
<td>2 (25%)</td>
<td>2 (33%)</td>
<td>8 (73%)</td>
<td>11 (85%)</td>
<td>12 (92%)</td>
<td>35 (69%)</td>
</tr>
<tr>
<td>Multi-family dwelling</td>
<td>4 (50%)</td>
<td>4 (67%)</td>
<td>9 (82%)</td>
<td>10 (77%)</td>
<td>13 (100%)</td>
<td>40 (78%)</td>
</tr>
<tr>
<td>Previous HART intervention</td>
<td>1 (12.5%)</td>
<td>1 (17%)</td>
<td>2 (18%)</td>
<td>6 (46%)</td>
<td>4 (31%)</td>
<td>14 (27%)</td>
</tr>
<tr>
<td>Category</td>
<td>Count</td>
<td>Percentage</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------------------------------</td>
<td>-------</td>
<td>------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medical comorbidity</td>
<td>2 (25%)</td>
<td>5 (83%)</td>
<td>5 (46%)</td>
<td>12 (92%)</td>
<td>4 (31%)</td>
<td>28 (55%)</td>
</tr>
<tr>
<td>Risk of falling</td>
<td>4 (50%)</td>
<td>6 (100%)</td>
<td>10 (91%)</td>
<td>13 (100%)</td>
<td>9 (69%)</td>
<td>42 (82%)</td>
</tr>
<tr>
<td>Personal hygiene concern</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mild to moderate</td>
<td>1 (12.5%)</td>
<td>0 (0%)</td>
<td>3 (27%)</td>
<td>2 (15%)</td>
<td>2 (15%)</td>
<td>8 (16%)</td>
</tr>
<tr>
<td>Severe</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>2 (18%)</td>
<td>3 (23%)</td>
<td>6 (46%)</td>
<td>11 (22%)</td>
</tr>
<tr>
<td>Cognitive concerns</td>
<td>0 (0%)</td>
<td>2 (33%)</td>
<td>2 (18%)</td>
<td>7 (58%)</td>
<td>3 (25%)</td>
<td>14 (28%)</td>
</tr>
<tr>
<td>Interpersonal conflict</td>
<td>6 (75%)</td>
<td>2 (33%)</td>
<td>7 (64%)</td>
<td>5 (39%)</td>
<td>11 (85%)</td>
<td>31 (61%)</td>
</tr>
<tr>
<td>Limited finances</td>
<td>1 (12.5%)</td>
<td>2 (33%)</td>
<td>5 (46%)</td>
<td>9 (69%)</td>
<td>9 (69%)</td>
<td>26 (51%)</td>
</tr>
<tr>
<td>Insight into hoarding</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor</td>
<td>5 (63%)</td>
<td>6 (50%)</td>
<td>4 (36%)</td>
<td>7 (54%)</td>
<td>9 (69%)</td>
<td>28 (55%)</td>
</tr>
<tr>
<td>Fair/Good</td>
<td>3 (38%)</td>
<td>6 (50%)</td>
<td>7 (64%)</td>
<td>6 (47%)</td>
<td>4 (31%)</td>
<td>23 (45%)</td>
</tr>
<tr>
<td>Pests</td>
<td>2 (25%)</td>
<td>0 (0%)</td>
<td>1 (9%)</td>
<td>2 (15%)</td>
<td>4 (31%)</td>
<td>9 (18%)</td>
</tr>
<tr>
<td>Plumbing problems</td>
<td>4 (50%)</td>
<td>1 (17%)</td>
<td>3 (27%)</td>
<td>2 (15%)</td>
<td>2 (18%)</td>
<td>12 (24%)</td>
</tr>
</tbody>
</table>

Clients in Cluster 1 (Cohabiting in Squalor) were likely to be single family homeowners with adequate means. They represented a high risk for interpersonal conflict, perhaps because they were likely to live in poor conditions with someone else. Interestingly, there were no reported cognitive concerns (e.g., older age cognitive decline, suspected brain injury), in this cluster, which would have been a plausible explanation for squalid conditions. However, plumbing problems were likely, perhaps contributing to the problems with squalor in this cluster.

Clients in Cluster 2 (Socially Engaged) were primarily condominium owners with adequate means. Clients were likely to be engaged in positive interpersonal interactions. Despite having medical comorbidities, clients had no personal hygiene concerns and few cognitive concerns.
Clients in Cluster 3 (Isolated at Home) were likely to be low income earners living in rental apartments. Clients were mildly neglecting their personal hygiene and were at increased risk of falling. Clients were likely to be engaged in interpersonal conflict, perhaps a contributor to their isolation.

Clients in Cluster 4 (Medically Complex) were very likely to have medical comorbidities. Perhaps relating to their older age, some were at risk for cognitive concerns. Clients in this cluster were limited financially and likely to be living in rented apartments. Interestingly, clients were likely to have received a prior intervention with HART.

Clients in Cluster 5 (Difficult to House) were likely to be engaging in interpersonal conflict. Despite having low medical comorbidity and cognitive concerns, these clients were likely neglecting personal hygiene. Similar to Cluster 4, clients were limited financially and likely to be living in rented apartments.

**Housing Conditions**

As expected based upon HART’s criteria for case intervention, on average, clients’ homes were severely hoarded ($M = 6.17, SD = 1.21, n = 51$). Interestingly, a one-way ANOVA showed no statistically significant differences between clusters on clutter level, $F(4, 46) = .42, p = .79, \eta^2 = 0.04$. See Figure 5. The larger variability for the Socially Engaged cluster is likely due to HART’s inclusion criteria of more moderate hoarded conditions in the context of physical or mental health concerns about vulnerable occupants of the home. Some clients in the Socially Engaged cluster may have had less overall clutter, but they would have met HART’s service mandate due to risks posed by their older age and use of mobility aids.
Health of the Nation Outcome Scales

HoNOS data were available for some of the cases (24 of 51) in the cluster analysis. Comparisons of clients with versus without HoNOS ratings indicated no significant differences for gender distribution, $X^2 (1, N = 51) = 1.42, p = .23$, age, $t(39.94) = 0.98, p = .33$, $d = 0.28$, home ownership, $X^2 (1, N = 51) = 0.10, p = .75$, housing type, $X^2 (1, N = 51) = 0.01, p = .90$, or cohabitation, $X^2 (1, N = 51) = 0.18, p = .67$. Further, no significant differences were found for initial Clutter Image Rating, $t(49) = -1.16, p = .25$, $d = 0.33$, or number of fire violations, $t(47) = -0.64, p = .52$, $d = 0.19$.

Across all clients in the cluster analysis, the mean total HoNOS score was 14.71 ($SD = 5.42$, range = 6-27). Table 10 presents the frequency of clients with clinical problems in each item and item means and standard deviations. Clinical problems were defined as a score of two
or more (Orrell, Yard, Handysides, & Schapira, 1999), indicating at least a “mild problem but definitely present”.

**Table 10**

*Frequencies of HoNOS Problems (N = 24)*

<table>
<thead>
<tr>
<th>HoNOS scale</th>
<th>Frequency (%)</th>
<th>Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disruptive behavior</td>
<td>3 (13%)</td>
<td>0.67 (0.92)</td>
</tr>
<tr>
<td>Self-injury</td>
<td>0 (0%)</td>
<td>0.00 (0.00)</td>
</tr>
<tr>
<td>Alcohol/drug problems</td>
<td>1 (4%)</td>
<td>0.17 (0.82)</td>
</tr>
<tr>
<td>Cognitive problems</td>
<td>7 (29%)</td>
<td>1.08 (1.25)</td>
</tr>
<tr>
<td>Physical problems</td>
<td>15 (63%)</td>
<td>1.75 (1.36)</td>
</tr>
<tr>
<td>Hallucinations/delusions</td>
<td>0 (0%)</td>
<td>0.08 (0.28)</td>
</tr>
<tr>
<td>Depressed mood</td>
<td>8 (33%)</td>
<td>1.00 (0.93)</td>
</tr>
<tr>
<td>Other mental health problems (e.g., hoarding)</td>
<td>23 (96%)</td>
<td>2.92 (1.06)</td>
</tr>
<tr>
<td>Relationships</td>
<td>12 (50%)</td>
<td>1.38 (1.17)</td>
</tr>
<tr>
<td>Activities of daily living</td>
<td>12 (50%)</td>
<td>1.54 (0.83)</td>
</tr>
<tr>
<td>Living conditions</td>
<td>24 (100%)</td>
<td>2.67 (0.82)</td>
</tr>
<tr>
<td>Occupation/leisure</td>
<td>13 (54%)</td>
<td>1.46 (1.14)</td>
</tr>
<tr>
<td>HoNOS Total</td>
<td></td>
<td>14.71 (5.42)</td>
</tr>
</tbody>
</table>

*Note:* Problems were defined as a score ≥ 2.

Statistical testing of the HoNOS total score (or individual item scores) by cluster was not performed due to the small number of observations. However, the means and standard deviations are displayed in Figure 6 for descriptive purposes. The larger variability for the Isolated at Home cluster is due to one outlier who had a total score of 26.
As a validity check, variables used in the cluster analysis were compared to scores on related HoNOS items. Clients classified as using a mobility aid received higher scores on the physical illness/disability item ($M = 2.75$, $SD = 0.71$, $n = 8$) than those not using a mobility aid ($M = 1.25$, $SD = 1.34$, $n = 16$), $t(21.85) = -3.59$, $p < .001$, $d = 1.40$. Clients noted as hospitalized during the intervention received higher scores on physical illness/disability ($M = 2.67$, $SD = 1.00$, $n = 9$) compared to those who were not hospitalized ($M = 1.20$, $SD = 1.27$, $n = 15$), $t(22) = -2.96$, $p = .01$, $d = 1.29$. Clients coded as verbally aggressive towards HART received higher scores on disruptive behaviour ($M = 2.00$, $SD = 1.00$, $n = 5$) compared to those who were not aggressive ($M = 0.32$, $SD = 0.48$, $n = 19$), $t(4.49) = -3.66$, $p = .02$, $d = 2.14$. Verbally aggressive clients also received marginally higher scores on problems with relationships ($M = 2.20$, $SD = 1.00$, $n = 5$).
1.30, \( n = 5 \), compared to those who were not aggressive (\( M = 1.16, SD = 1.07, n = 19 \)), \( t(22) = -1.86, p = .08, d = 0.87 \).

**Discussion**

The overall aim of this project was to identify subgroups of hoarding cases based on a range of community-relevant assessed risks. To this end, the current study identified five distinct clusters of clients. Data were collected from HART, a community-based hoarding team in Vancouver. As such, this study begins to bridge the gap between research and practice.

**Intervention Summary**

Clients meeting inclusion criteria for intervention (\( N = 67 \)) were primarily older female adults. The majority were tenants in apartments and lived alone. Most cases were referred by human services (health/social services or first responders) or by someone in the building (property managers, homeowners’ association, landlords, or neighbours). Few clients were self-referred, as might be expected from an intervention in which the referral was initiated by contacting a city service hotline, rather than a mental health professional or receptionist. Finally, likely related to age of the clients, almost no children were living in the assessed homes.

These were not quick cases to resolve, as seen by the average case intervention of almost eight months. Neither were they uniform: the quickest cases were resolved at the initial inspection, but the longest case lasted over two years. HART involved at least one network partner in 87% of cases. Likely the complexity of cases necessitated this additional network support. This intervention summary provides important context by characterizing the full sample from which clusters were identified. The aim of the current study was to identify subsets of clients who deviated from the full sample in meaningful ways.
Complexities of Intervention

Hoarding is a very complicated problem. As described previously in the introduction, a number of issues that are difficult to manage tend to co-occur with hoarding. These complexities have primarily been discussed in relation to research samples. Therefore, the current study provided an opportunity to understand what similarities and differences exist regarding case complexity between research and community samples. For example, chronic health conditions and declining strength and mobility have been identified as complicating factors among older adult hoarding clients (Diefenbach et al., 2013; Eckfield & Wallhagen, 2013; Tolin et al., 2008). These studies involved either research volunteers or family member report. The current study generalized these findings to a sample of not help-seeking older adult community clients. Indeed, medical comorbidity played a role in case intervention for about half (55%) of HART clients; on average clients were actively involved with at least one other healthcare team (e.g., geriatrics) within the system.

Interpersonal conflict and strained family relationships have also been discussed as complicating factors in research samples (Drury et al., 2015; Grisham et al., 2008; Park et al., 2014). Family members find it difficult to understand why their relatives choose to live in hoarded conditions and avoid clean-outs. Although it would have been interesting to interview families in this study, only client data were available. More than 60% of the clients in this sample were experiencing interpersonal conflict with family or others which reinforces the commonalities between research and community samples.

Squalor is rarely assessed in research studies, likely due to the lack of in-home assessments. However, the assessment of squalor by community professionals is routine. In the current study, 55% of clients lived in squalid conditions. This estimate is comparable to Luu et
al. (2018) who found 35-72% of hoarded homes also had squalor. Future studies should investigate if the level of squalor seen in community samples is comparable or higher than that of research volunteers. Similarly, risk of eviction is rarely described in research reports. However, Rodriguez et al. (2012) identified hoarding as an important element in the cases of lower-income community clients who were seeking advocacy for housing issues, usually involving eviction. In the current sample, a third of the clients faced an explicit eviction risk. Of those 17 clients at risk, 12 were classified as having limited financial means and seven were living in social housing, meaning that the threat of homelessness was a reasonable concern.

Finally, poor insight has been identified as a common barrier in both community and clinical interventions (Mathes et al., 2018; Tolin et al., 2010; Tolin, 2011). Importantly, Drury et al. (2015) indicated that community teams are more likely than researchers to encounter low-insight cases, as this subset is unlikely to volunteer for research. In the current sample, 55% of clients were determined by the psychiatric nurse to have poor insight into their hoarding behaviours. This high proportion of clients with poor insight is in stark contrast to the typical research sample, for example, only 17% of McCabe-Bennett’s (2018) hoarding participants had poor insight. Future research on the implications of poor insight in hoarding for community interventions is needed.

Given all this complexity, it would be useful to identify clusters of clients with some commonalities. If programmatic research can establish such clusters, progress will be made in understanding hoarding and planning for intervention. This study made an initial step in this direction by conducting a cluster analysis.

**Intervention Targets and Barriers**
Clients in the Cohabiting in Squalor cluster lived with someone else, often in squalid conditions. The fact that clients in this cluster were cohabiting is in direct contrast to the other clusters and raises questions regarding the power dynamic and conflict in the relationship. Do both parties find it acceptable to be living in these conditions? Is one party more in control or in a position of power?

Exploring the details of cases in this cluster showed that the cohabitant was most likely to be a family member (e.g., adult children, elderly mother, nephew). As would be expected, these families were typically engaged in conflict related to the clutter and squalid conditions in the home. For instance, one client had cut off contact with his sister because she had tried to clean out the home, and another engaged in frequent arguments with her spouse over who was responsible for the hoarding. Interestingly, these clients were also more likely to be homeowners with adequate financial assets, suggesting that the issue is more than the financial cost of a clean-up.

In addition, a high proportion of clients in this cluster were judged by the HART nurse to have poor insight. We can speculate that poor insight set the stage for conflict, as clients were unwilling or unable to consider their living conditions as problematic. If indeed poor insight catalyzed the conflict, we would expect that family conflict would subside if the client’s insight improved and living conditions were cleaned up. Alternatively, perhaps these relationships were fraught with conflict that predated the squalid and hoarded conditions. Clients may have asserted their power in the relationship by neglecting living conditions in a passive attempt to further antagonize family members. This explanation suggests that squalid conditions would be maintained until the family conflict was resolved. Obviously, the relationship between squalor,
family conflict, and poor insight is an important one for future research, and it would be helpful to take a thorough history to assess the timing of the development of all three factors.

Intervention targets for this cluster would involve reducing family conflict. This would likely be achieved by encouraging the responsible party(ies) to improve living conditions; in addition, a referral for family or individual counselling might also be recommended. However, poor insight might be an obstacle to getting clients to engage in an intervention. In addition, as scholarly understanding of squalor is nascent, no evidence-based intervention options are available to help clients improve squalid conditions. Further, stigma against those living in squalor is pronounced. Squalid conditions often preclude individuals from receiving home-based care as community professionals do not want to go in the home because of occupational health and safety concerns (McDermott & Gleeson, 2009). Interestingly, HART did not consider cases of squalor (absent severe hoarding) as part of their mandate, unless the client was at risk of self-neglect (e.g., if the client met criteria for mental health legislation and guardianship).

The Socially Engaged clients were notable for their negative assessment findings. There were no reports of aggression, eviction risk, or squalor. Being older adults, most clients had some medical comorbidities, but none were hospitalized or judged to have personal hygiene concerns. This suggests that clients were receiving adequate medical care or were at least maintaining their physical health. These clients had social contact (visitors or a cohabitant) and were unlikely to have active interpersonal conflict. Based on the variables assessed, perhaps these clients would be most amenable to intervention. At a minimum, these clients seem more comparable to the ones we would expect to see in research samples as they would not be excluded based on severe personality features (e.g., aggression), current physiological substance
dependence, cognitive decline, or conflict. On the other hand, half of these clients had poor insight, which would likely distinguish them from the typical research volunteer.

Intervention targets for this cluster involve leveraging clients’ existing social networks and helping them to tap their financial resources to get assistance. Barriers are less obvious for this cluster, but perhaps instrumental help in decluttering would be necessary as these older clients have physical limitations. Further, although clients in this cluster showed lower risks in many areas, monitoring their medical status is important because their risk profile could change quickly given their advanced age.

All of the Isolated at Home clients lived alone and had no visitors to the home. They were also more likely to be men. We can speculate that isolation may have played a role in maintaining their hoarding behavior, as they seem to have kept to themselves and not invited others into the home. The psychological reasons behind the isolation, such as shame, suspiciousness of others, or poor social skills, may present intervention barriers and make it difficult for the client to let anyone into their home. Therefore, the first intervention target would need to be relationship building: developing a level of trust that the team’s main aim is harm reduction, not to judge the client’s living conditions or to enforce a clean-out as the initial intervention. Finally, it would be important to assess whether these clients would like more social contact, and if so, an intervention target would be to help them build a network.

Medically Complex clients were dealing with multiple medical problems, sometimes including problems with cognitive functioning. Although clients in this cluster did have visitors to the home, in most cases, these visitors were home-based medical staff. Importantly, for six of the 12 clients who had been hospitalized, discharge was delayed due to living conditions. Delayed discharge is a serious complication in the health care system as each day someone
remains in hospital costs the system a significant amount of money and potentially prevents someone else from receiving medical care. In these cases, the team had to advocate on the clients’ behalf as housing conditions were indeed poor and necessitated attention prior to discharge. For some clients, the hospital paid for a clean-out to be able to discharge the patient to safe conditions. Although experts in hoarding usually do not recommend clean-outs due to the high likelihood of recidivism and trauma, this intervention may have been easier to justify for these clients considering the options available.

Interestingly, clients in this cluster were likely to have received a prior intervention from HART. This rate of re-referrals may be due to regular in-home assessments by home health care staff, who would notice any deterioration of conditions and take steps to initiate appropriate intervention. Indeed, most clients in this cluster were referred to the team by health or social service providers. On the other hand, perhaps the previous intervention was not successful due to cognitive concerns or because the client was not ready for making behavioural change. Medical problems, including poor mobility or cognitive decline, would likely limit a client’s ability to maintain a decluttered home. Particularly for clients in this cluster, it would be important to understand whether hoarding or cognitive decline is the primary issue. Furthermore, clients in this cluster should be prioritized for any maintenance program (e.g., a check-in visit once every six months) that community-based teams are able to offer.

Intervention targets for this cluster involve liaising with medical teams and family, ensuring hygienic living conditions to reduce risk of infection and preventing falls by removing trip hazards. Also, it would be important to ensure medical equipment can be used in the home and that home health care workers are safe when visiting the home. Barriers include delays in clutter reduction due to frequency of medical complications, as well as needing to provide
physical assistance and ongoing home support to help the client remove items from the home. Progress in these cases can be expected to stall frequently as the client’s health needs are prioritized above decluttering. Further, finding a friend or family member who is able to physically help declutter often proves quite challenging. Ideally, community teams should have resources to provide physical decluttering help if no friends or family are available, but such decluttering assistance can be very time-consuming, diverting staff time and resources from other cases.

Finally, the *Difficult to House* clients represented a range of behavioural, social, and financial risks. However, the most salient concern affecting this cluster was eviction. As most clients were living in social housing and on a low income, they were vulnerable to homelessness if evicted. Therefore, the main intervention target for this cluster would be to preserve clients’ tenancy. This might be achieved by establishing rapport with housing providers. For instance, teams may need to communicate with the housing provider (e.g., property manager, homeowners’ association) to explain the team’s mandate and responsibility to try to engage the resident in a harm reduction intervention. Ideally, teams would be able to learn what specifically is needed to be done to remove the immediate threat of eviction (e.g., decrease level of clutter, clear combustibles near heat sources). Often, it is possible to negotiate to extend the time required to achieve compliance. Unfortunately, community teams might become aware of a precarious living situation too late in the eviction proceedings to be able to alter the outcome. Further, eviction might still occur despite a constructive engagement with the housing provider if the client were unwilling to engage. Importantly, clients in this cluster were not only high risks for eviction, but also for verbally aggressive behavior. Understandably, advocacy is challenging for a client who creates interpersonal barriers to getting help.
Additional Measures

One of the most important findings in this study was that the volume of clutter, as assessed by the CIR, was similar across clusters, regardless of individual complexities. If communities focused primarily on clutter volume, the complexity of cases would be invisible and decisions could be made based on an incomplete picture. Clients with similar clutter volumes may require different services based on factors such as mobility, medical needs or level of squalor. This finding highlights the importance of assessing a range of factors when characterizing hoarding cases and this is best done by multidisciplinary teams. The role of fire prevention is to assess fire safety only and referrals to other appropriate community services would likely not be initiated without a team approach.

Several aspects of the HoNOS results are noteworthy: first, the average total score was quite high; clients experienced significant problems primarily as a result of their hoarding behaviours (i.e., problems with activities of daily living and problems with living conditions). Research studies used to develop and validate the HoNOS measure reported typically lower total scores (on samples of psychiatric patients with varying disorders) than those reported in this sample ($M = 8.5 – 10.5$; Orrell et al., 1999; Wing et al., 1998). Secondly, scores on individual HoNOS items (e.g., physical problems, problems with relationships) reinforced the validity of coding for the variables used to assess hoarding case complexity in Table 2. Thirdly, the psychiatric nurse observed no clients who had problems with non-accidental self-injury and few clients with hallucinations or delusions, suggesting these are not problem areas for hoarding clients.

Unexpected Findings
There were several unexpected findings in this study meriting further discussion. Despite literature suggesting alcohol dependence is prevalent in individuals with hoarding (Raines, Chavarria, Allan, Short, & Schmidt, 2017; Samuels et al., 2008), only one client was judged to be at least moderately impaired by alcohol use in the current sample (the individual was in the Difficult to House cluster). Perhaps this inconsistency in findings can be attributed to differing assessment methods. The psychiatric nurse in the present study was highly experienced in assessing drug and alcohol impairment, and he knew most of the clients fairly well, suggesting false positives were unlikely. False negatives may have occurred, for example if clients were adept at hiding their use or motivated to lie to preserve their housing. In contrast, Raines et al. (2017) used self-report methods, whereas Samuels et al. (2008) used a diagnostic interview. Perhaps these methods and the research context (lacking direct consequences for the participant) produced a higher estimate of prevalence. Two clients in the present sample were coded as severely impaired by drug use (one client each in the Difficult to House and Cohabiting in Squalor clusters). Clinically, it would be important to take a thorough history noting if the drug use predated the hoarding, as this would help determine the primary intervention target. No extant research has reported on prevalence of drug use in a hoarding sample.

Similarly, the risk of violence rarely occurred in this sample, despite literature suggesting individuals may threaten violence when attempts are made by community professionals to declutter their home (McGuire et al., 2013). This low risk of violence is especially notable, as 26% of clients were verbally aggressive towards the team. It would be interesting to explore if verbal aggression, in the context of interventions for hoarding, escalates the risk of violence and if so, how teams can diffuse said risk. As a researcher, I suspect the low incidence of violence was related to the harm reduction approach taken by the team. Using this approach, team
members were empathic and sought to minimize the risks of hoarding, rather than forcing clients to discard most of their possessions. Further, even though clients were usually not seeking help, the team asked clients for consent to work with them. These elements of the team’s approach, in addition to their knowledge and experience working with individuals who hoard, should be a model for other community teams.

Interestingly, although three clients were assessed for whether they required a guardian to make decisions about their personal care, health care and financial affairs, no client met the criteria for this status. This is an important finding as laypeople might think hoarding clients are not in their “right mind” regarding their housing conditions. However, the nurse noted concerns about cognitive functioning (most often due to cognitive decline associated with aging) for 14 cases, which did require monitoring in case of abrupt changes in cognitive functioning.

Finally, social isolation or limited social interaction is considered a common problem among people who hoard (Bratiotis et al., 2011; Medard & Kellett, 2014). The current study partly supports this relationship as three out of every four clients lived alone. Most, however, did have visitors to the home and a social network. It is important to note that both the social network and visitors to home variables were coded quite generously. For example, if a client attended weekly art class or had lunch with his friends, he would have received a “yes” for social network, or if a client had regular sessions of home-based care or had a friend over during an inspection, she would have received a “yes” for visitors to home. Nevertheless, the finding that most clients had some sort of social contact was somewhat unexpected. In addition, it would have been useful to know if this network could be enlisted to help the client with their hoarding problem. Therefore, a follow-up question assessing the strength of the relationship may have been more clinically useful. For instance, how likely were individuals in these social networks to
volunteer to help the client declutter or to keep the client company during decluttering? Were these individuals (e.g., from art class) ever invited over to the client’s home?

**Limitations**

The biggest limitation to the current study was the data collection method. The available data were restricted to what the team collected and recorded over the course of their intervention. For instance, the team’s mandate guided who received an intervention and who did not. The decision to proceed to an intervention or to carry out an assessment rested solely with the team. I was unable to gain assessments on individuals whom the team deemed to be minor risks (and therefore outside their mandate). Further, the sample size was limited to the number of cases assessed during the data collection period. In addition, the majority of my variables rested upon the ability of the psychiatric nurse to get to know the client. If the nurse was unable to build rapport or if the client did not want to engage, very few data were available.

Further, the data collection method was limited by only having one trained observer to report on the clinical variables. Ideally, there would have been two nurses who assessed the clients and wrote case notes. As this was not possible within the context of HART, I was unable to calculate inter-rater reliability. This limitation was particularly relevant for the variables assessing behavioural factors and insight. For instance, a judgment of the client being verbally aggressive towards the team and having poor insight may have been related to poor rapport established between the nurse and client, rather than an individual difference related to the client. However, this limitation was not as pertinent for the variables relating to medical complexity (as I had access to the clinical health reports) or the more objective ratings of environmental complexity and housing/financial stability.
In addition, limitations to the method of cluster analysis are important to discuss. To begin, cluster analysis is an exploratory method. It will always identify clusters, even if they do not represent a valid taxonomy. Further, different cluster analysis methods (of which there are many) yield different solutions (Blashfield, 1976). Given a larger sample size, I would have been able to follow the hierarchical analysis with a non-iterative $k$-means clustering procedure as a second step. This procedure would have allowed reassignments to better fitting clusters, whereas in hierarchical analysis, once a cluster formed it cannot be split. With a larger sample size, I could have randomly divided the sample into two subsamples and done a cluster analysis for each, thereby being able to calculate the degree of correspondence. Finally, cluster analysis lacks well-established stopping rules for determining the number of clusters in a data set (Kabacoff, 2015; Omran et al., 2007). Therefore, the decision rests with the researcher to choose the most interpretable solution. Despite these method limitations, I took steps to find the best partitioning of the data set. I examined several different clustering methods, and I also used follow-up analysis on variables not included in the cluster analysis to understand distinctions between the possible cluster solutions.

Finally, the current study used data from one community-based team. Replication of these results using data from other community-based interventions is needed. If findings are consistent across multiple communities, more confidence can be given to these exploratory results. The site of the current research, Vancouver, is a metropolitan city. Perhaps differences in the complexities of clients would exist in a more rural sample. For example, I would anticipate more animal hoarding and differences in housing type and ownership in such a sample (e.g., more single-family homeowners). Similarly, clients’ needs might differ depending on the mandate of the community organization conducting the intervention. For example, HART
prioritizes fire safety, as the team comprises a fire prevention inspector, whereas the Hamilton Gatekeepers Program in Ontario, for example prioritizes older adults at risk for self-neglect, and the Metro Housing Boston in Massachusetts is a housing advocacy organization. These priorities inform inclusion criteria and have implications for sample characteristics. Finally, the cases assessed by a community team are dependent on the referrals and the process required to be assessed. HART relied on a city service hotline and had a low proportion of clients who self-referred to the team. Perhaps a more client-focused referral process would encourage individuals to self-identify, thereby impacting the sample characteristics (e.g., a younger sample similar to the clients we see in treatment studies.)

**Implications**

The current study identified five clusters. All clusters had a similar degree of clutter, but they presented distinct challenges that would necessitate different interventions. A one size fits all approach is not recommended based on the current findings, as subgroups with distinct needs were identified. A multidisciplinary approach will likely be required to handle vastly different client needs. For example, the identified clusters illustrate that a team may need to advocate for a client’s housing, help develop a social network, liaise with medical professionals, monitor cognitive decline, and improve squalid living conditions. A varied network of professionals is advisable, as these needs are all in addition to the primary target of improving safety within a hoarded home. Although not the focus of this paper, the intervention did meet harm reduction goals of clutter reduction and tenancy preservation for the majority of cases, suggesting HART’s intervention could be a model for other communities.

The cases described in this study are relevant to other communities. As such, the current research will have implications for the 100+ hoarding task forces across North America in
helping guide their policies and procedures. In addition to providing guidance for established teams, the current study will help those communities who have yet to develop a hoarding team. By identifying clusters, study results prepare community-based teams for what types of cases to expect, what resources (instrumental or network support) might be needed, and how to better allocate staff time (e.g., the Medically Complex cluster will require far more of a health professional’s time compared to that of fire prevention or law enforcement). Results may also improve communication amongst team members, by encouraging team members to consider intervention targets outside their disciplines. Further, the varying intervention barriers help explain why certain cases might stall or necessitate a longer compliance time.

This research also has implications for policymakers, as the clusters identify gaps in the current interventions available. For instance, despite 55% of cases having squalor, there are no evidence-based interventions currently available for this problem. Staff working with clients who hoard will undoubtedly end up also dealing with squalid conditions, but they typically have no guidelines on how to target this problem. As we have yet to understand the course of development of squalor in some (but not all) hoarding cases, future research is needed. Further, the staffing needs required to manage hoarding cases are great. Policymakers need to be aware that complications, such as discharge planning, providing support for tenancy preservation, and initiating referrals to appropriate services, necessitate a great deal of time. Finally, the number of clients at risk of eviction highlights the need for policymakers to understand the problem of hoarding from a mental health context. Social service providers, especially those in housing, might benefit from workshops explaining what hoarding is and how they can learn to better support residents by using harm reduction strategies and establishing intervention targets. Perhaps policymakers are conceptualizing hoarding as similar to other housing problems, like
bedbug infestations, that might be handled from a purely regulatory stance. In contrast, the problem of hoarding requires a social service provider to work in partnership with the resident to systematically and slowly reduce clutter in their home.

Broadly, this study has implications for understanding the psychopathology of hoarding. Although certain specifiers for hoarding disorder, such as excessive acquisition and insight, have been included in DSM-5 to improve the utility of diagnosis, the current study identified other associated features worthy of clinical attention (e.g., squalor, verbal aggression, social connection, medical comorbidities). As the focus of the current study is to better understand the complexity of hoarding disorder, results may help broaden psychology’s model of hoarding beyond internal processes such as information processing, emotional attachment, and beliefs about possessions (Frost & Hartl, 1996).

The current study findings provide guidance for future research. As stated in the introduction, researchers have yet to assess variables relevant to communities. The current sample suggests problems, such as squalor, eviction risk, and aggression, are prevalent. Further, communities are desperate for guidance on how to deal with these problems. Researchers should begin to include community-relevant variables in their studies, in addition to considering how to fill the void of evidence-based community interventions. For instance, treatments could be developed with adjunct interventions for the varying targets proposed in this study (e.g., cognitive behavioural therapy plus medical case management, family counselling, squalor-focused interventions, or tenancy preservation.) These adjunct interventions could be developed in collaboration with social service professionals (e.g., psychiatric nurses, fire prevention inspectors, social workers). Further, researchers could begin to statistically control for certain
complicating factors in regard to treatment outcomes, to better understand which variables represent barriers to decreasing hoarding symptomatology.

The next steps in this line of research will involve increasing the sample size to validate the identified subgroups and to examine a broader array of variables from the theoretical model, including those with a low base rate. Additionally, more HoNOS data would allow for statistical testing of item scores by cluster. Further, identifying differential intervention outcomes by cluster would be an important research question. For instance, does membership in a certain cluster predict staff time required or client engagement? Do outcomes regarding housing status and clutter volume vary by cluster type?

Descriptive studies, similar to the current one, have taken steps to develop effective models for community care by dividing the responsibilities of different disciplines (Beebe, Smith, & Phillips, 2016; Glader, Plews-Ogan, & Agrawal, 2016; Li, Liu, & Huang, 2016). Future work, using the current study results, could develop an intervention map outlining the roles and responsibilities of each discipline (e.g., fire prevention, nursing, or social work) in relation to the identified clusters. In addition, specific recommendations could be made as to which intervention targets require a multidisciplinary focus. Translating research into policy recommendations is an important strategy for improving community health and for maintaining collaborative partnerships between researchers and community disciplines (Roussos & Fawcett, 2000). The research collaboration described in the current study will be strengthened by communicating these findings and providing targeted recommendations to the team and community officials. The results of the current study will lead to more efficient triaging, network coordination, and evidence-based decision-making on the part of policymakers.
References


doi:10.1017/S1041610214001677


Marketing Academy Conference 2002 (ANZMAC 2002), Deakin University, Melbourne, 2-4 December 2002.

doi:10.1016/j.jocrd.2015.01.005

doi:10.1177/1054773813496422


doi:10.1016/j.brat.2011.06.010


doi:10.1016/j.psychres.2014.07.061


