

Healthy Homes Adequacy Standard

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Table of Contents

Executive Summary	3
Résumé	3
Introduction	4
Methodology	4
Qualitative Methodology	4
<i>Literature Review and Analytical Method</i>	<i>4</i>
<i>Results</i>	<i>5</i>
Quantitative Methodology	6
<i>Data and Analytical Method</i>	<i>6</i>
<i>Results</i>	<i>7</i>
Discussion	12
Implications	13
Conclusion	15
Works Cited	16

Tables

Figure 1: Proportion of households reporting mold or pest, weighted	8
Figure 2: Proportion of households who rent compared to homeowners reporting mold and/or pest by province, weighted	8
Figure 3: Proportion of households who rent reporting mold and/or pest by province, weighted.....	9
Figure 4: Implications to Core Housing Need Indicator	14
Figure 5: Implications to the Core Housing Need indicator - proportions of total population	15
Table 1: Marginal effects after logistic regressions, full and CHN only samples	11
Table 2: Socio-economic variable interactions within the full sample.....	11
Table 3: Intersection of socio-economic variables in CHN and mold and pest.	12

Executive Summary

Executive Summary

The current housing adequacy standard does not include infestation conditions in households that cause negative health outcomes. Until recently, little data was available at the national level to quantify and track the occurrence of infestation conditions in houses, with many researchers relying on custom and localized surveys to gather this information. To resolve this data gap, the Canada Housing Survey (CHS) has added two questions addressing the presence of mold or pests in a household. This research project examines how infestation conditions have been studied in the housing domain through a historical review of policy interventions that address housing adequacy. Researchers then considered how infestation conditions have been examined by life scientists and other policy players in the context of housing. To complement this literature review, a quantitative analysis aimed to quantify the links between the presence of mold and pest in dwellings led by minority household members (including households that self-identified as Indigenous), geographic location, housing tenure, income, and self-reported physical and mental health, providing new demographic information about the populations facing this public health challenge. The resulting analysis demonstrates the compounding vulnerability experienced by populations already disadvantaged by affordability, adequacy, and suitability of their dwellings and at the intersection of their housing tenure and other identities. Indigenous and visible minority renters are most likely to report living in dwellings with infestation conditions.

Résumé

La norme actuelle relative à la qualité d'un logement ne tient pas compte des conditions d'infestation dans lesquelles vivent les ménages et qui entraînent des effets négatifs pour la santé. Jusqu'à récemment, peu de données étaient disponibles à l'échelle nationale pour quantifier et suivre l'occurrence des conditions d'infestations dans les habitations, et de nombreux chercheurs comptaient sur des enquêtes personnalisées et localisées pour recueillir cette information. Pour combler cette lacune dans les données, l'Enquête canadienne sur le logement (ECL) comprend maintenant deux questions sur la présence de moisissures ou d'animaux et d'insectes nuisibles dans une habitation. Ce projet de recherche examine la façon dont les conditions d'infestation ont été étudiées dans le domaine du logement au moyen d'un examen historique des interventions stratégiques visant à améliorer la qualité du logement. Les chercheurs se sont ensuite penchés sur la façon dont les conditions d'infestation ont été examinées par les chercheurs en sciences de la vie et d'autres acteurs du secteur politique dans le contexte du logement. En complément de cette analyse documentaire, une analyse quantitative visait à quantifier les liens entre la présence de moisissures et d'animaux ou d'insectes nuisibles dans les logements dirigés par des membres de ménages appartenant à une minorité (y compris les ménages qui ont déclaré volontairement être autochtones), l'emplacement géographique, le mode d'occupation des logements, le revenu et la santé physique et mentale autodéclarée, fournissant ainsi de nouvelles informations démographiques sur les populations qui font face à ce défi de santé publique. L'analyse qui en résulte démontre la vulnérabilité combinée des populations déjà désavantagées pour ce qui est de l'abordabilité, de la qualité et de la taille de leur logement et par l'intersectionnalité de leur mode d'occupation et d'autres facteurs identitaires. Les locataires autochtones et membres des minorités visibles sont plus susceptibles de déclarer vivre dans des logements infestés.

Introduction

The current housing adequacy¹ standard is a component of the Core Housing Need (CHN) indicator, indicating if a dwelling requires major repairs. While the necessity of major repairs implies the structure integrity of a dwelling, many policy interventions have also signalled the benefits to health outcomes. However, the current Canadian adequacy standard does not include infestation conditions in households that equally have health implications. A review of Canadian and international literature on housing and health reveals the shifts in social policy, technical advancement, and economic expectations that have influenced the development of the adequacy standard (Burke, et al., 1981; Hwang, et al., 1999; Shelter and Adequacy Work Group; Housing Requirement Unit Program & Market Requirements Division, 1977). Historically, however, public health research has dominated the literature in this area. Two major shifts have contributed to renewed interest in this domain within CMHC: 1) the human rights approach to housing, which has increased focus on the wellbeing of priority populations that extend beyond bricks and mortar dwellings, and (2) recent international policies articulating housing as prerequisite for physical and mental health.

The Canadian standard has remained unchanged since the 1980s, concerned exclusively with the integrity of the physical structure of a dwelling. As a result, houses are deemed inadequate if they have major issues related to leaks, inadequate plumbing or heating, holes in the walls, ceiling, roof, or floor, and unsafe or unstable foundations, stairwells, or exits. Also captured in the current standard is the presence of toxins identified in building material, like asbestos or radon, which have documented links to negative health outcomes (Krewski, et al., 2005; Hodgson & Darnton, 2000). As a result, buildings identified with these issues are targeted for improvement. Yet there remains an opportunity in the current knowledge to include biological hazards – pests like rats, mice, cockroaches, bedbugs, and other disease vectors, as well as infestations of mold and other fungal growths.

Three main concerns have aligned to thrust housing adequacy and health in the spotlight. First, the attention paid to housing as a social determinant of health by public health agencies, housing advocates, and non-profit organizations has led to intense public health research in this domain. Second, the ongoing COVID-19 pandemic has also shone a renewed spotlight on the connections between housing and health in the public domain. Finally, the Canadian Housing Survey now captures data that tracks the presence of mold or vermin infestations in housing. Mold and pests can be present in all homes, even those of the wealthiest. However, the data analysis reveals that renters, as well as populations experiencing and at the intersections of multiple vulnerabilities experience this challenge the most.

Methodology

Qualitative Methodology

Literature Review and Analytical Method

Two scoping literature searches were conducted. The literature searches were not meant to be exhaustive, but rather to capture the pertinent advances in public health knowledge and the influences that led to the development of the adequacy standard.

The first was conducted through the CMHC Housing Knowledge Center² using the search terms, “Housing,” “Home,” “Housing health pests mold,” and “Health”. Due to the limited number of responses, the search was expanded to

¹ In this research report, the terms housing “quality” and “adequacy” are used interchangeably to point to interior and exterior integrity of a dwelling.

² https://cmhc.ent.sirsiidynix.net/client/en_US/CMHCLibrary/

include the terms, “housing condition”, “housing quality,” and “adequa*” to capture all iterations of the word “adequate”. The terms “discrimination,” “minority,” “racialized,” and “Indigenous” or “aboriginal” were also later added since these terms emerged from the research in the United States and Canada as contiguous with housing and health.

The second search consisted of scientific and medical literature emerging post-1999. The date was chosen to examine the advancement of research in housing and health, as well as housing adequacy, since the publication of the literature review on housing and health completed by CMHC. The search was conducted on the Google Scholar platform, and particular attention was paid to grey literature from the World Health Organization (WHO), as well as literature emerging from the United States. The search terms used included “HUD health,” “Housing Urban Development health,” “Housing health discrimination,” and “HUD: Housing health pest mold,” as well as “WHO Housing Health,” and “WHO pests mold”. The results were then filtered by date.

A theoretical literature review was chosen to examine the pool of theories that have been developed related to housing adequacy and the relationships between housing and health. A final thematic analysis yielded two clear domains of knowledge: policy changes the development of a framework for housing adequacy, and public health knowledge and evidence. In the years preceding 1999, the two domains were distinct, but later were joined under the umbrella of the social determinants of health in the early 2000s.

Results

Standards for housing adequacy, or quality, have changed since the post-war period in Canada. Three factors contributed to the changing policy: 1) changing income levels and social expectations; 2) the availability of data, and 3) scientific advancement and knowledge about housing material, design, and health influences (Burke, et al., 1981; McCartney, Herskovits, & Hintelmann, 2021). Burke et. al. (1981) note that, “the judgement of what constitutes minimum standard housing has risen over time as per capita incomes and consumer expectations have increased,” (p. 5). Adequacy had once been measured according to the presence of indoor plumbing and electricity (McCartney, Herskovits, & Hintelmann, 2021), but as this feature became standard in new home construction, the standard was changed to measure the presence of visible defects requiring major repair in the 1970s. Both research teams signal that housing standards operate in direct relation to broader values and goals linked consumer and social standards and household wealth.

Equally important was the availability of data to measure and monitor housing improvements. In the 1970s, the availability of data related to housing was, as previously mentioned, constrained to the presence of indoor plumbing and electricity (Burke, et al., 1981; Shelter and Adequacy Work Group; Housing Requirement Unit Program & Market Requirements Division, 1977; Department of Social Services, 1974). However, these studies all noted that the presence of pests and mold in a dwelling also signalled inadequate living conditions. Data gaps were equally noted in the American literature, capturing major issues like leaks, cracks, holes, and plumbing, but missing any interior issues and defects like mold and pest infestation (Friedman & Rosenbaum, 2004). Similarly, by the time Hwang et. al. (1999) published their summary of the housing and health literature in 1999, they too discussed interior housing quality but there was little quantitative data to examine the scope of the issue in the Canadian housing market with only localized information available from small studies.

Local attention to the links between housing and health preceded the heuristic of the social determinants of health (Ellaway & MacIntyre, 1998; Hopton & Hunt, 1996; Smith, 1990; Vingilis & Sarkella, 1997). In the late 1990s, CMHC commissioned a literature review examining the links between housing and health (Hwang, et al., 1999). Hwang and his colleagues concluded that chemical exposures and the physical environment, like structural damage requiring major repairs, yielded definitive causal links. However, they also noted that there was not enough causal evidence between biological contaminants like pests or mold and human health, although correlative evidence was found in the body’s allergic response to some exposures. Since the publication of that study, public health and medical scholars have concluded that it is impossible to quantify the unique biological response of each body to allergen exposures, and instead have turned to examining risk of immunological reactivity exposure (Caillaud, Leynaert, Keirsbulck, & Nadif, 2018; Krieger & Higgins, 2002; Gorny, et al., 2002). Researchers concluded that indoor biological contaminants linked to air quality, like mold, coupled with tighter building envelopes and insufficient air flow, posed

a significant risk for human health. The shift in research attention led to an equally important shift in policy recommendations. The World Health Organization published a series of reports examining the effect of biological allergens, and concluded that the effect of mold and pest in households should be mitigated at all cost (World Health Organization, 2018; Bonnefoy, Kampen, & Sweeney, 2008; Braubach, Jacobs, & Ormandy, 2011).

Canada's legislative environment, recent housing research, and changes in data availability also indicate that the time is ripe to further explore the housing adequacy standard. Canada's National Housing Strategy Act³ now includes language reflecting a human rights-based approach to housing, stating that, "The National Housing Strategy is to, among other things (a) set out a long-term vision for housing in Canada that recognizes the importance of housing in achieving social, economic, *health* and environmental goals..." (Article 5, section 2a, emphasis added). Recent research the United States signals the intricate links between public health costs associated with poor housing, racial identity, and legal status (Watson, Steffen, Martin, & Vandenbroucke, 2017; Hall & Greenman, 2013; Friedman & Rosenbaum, 2004). Canadian research on the housing needs of priority populations indicate that these groups are most likely to live in inadequate dwellings, with Indigenous populations faring the worst (Canadian Mortgage and Housing Corporation, 2014; Dunlavy, 2016; Young, Bruce, Elias, O'Neil, & Yassie, 1991; Reading & Wein, 2009; Rose, Germain, & Ferreira, 2006; Ngoundjou, Shan, & Ojha, 2021; Toronto Public Health, 2016). These groups often live in rental dwellings, and by necessity, rely on building management to resolve infestation issues (Phipps, et al., 2018; Public Health for Montréal, 2015; Toronto Public Health, 2016). Research on housing mobility and precariousness in the United States and in Canada connects the presence of mold and pests to chronic moving (Sylvestre, et al., 2001; Bailey, et al., 2016; Siskar & Evans, 2021; Fustic, Guay, Khalid, & Hossain, 2019; Office of the Assistant Secretary for Planning and Evaluation, 1998). While some data has been collected on a local level with ad hoc survey mechanisms (Phipps, et al., 2018; Public Health for Montréal, 2015; Toronto Public Health, 2016), until recently, there was very little national-level Canadian data to quantify the presence of mold and pests in households.

Canada's Adequacy Standard

Adequate Housing does not require any major repairs, according to residents. Major repairs include those to defective plumbing or electrical wiring, or structural repairs to walls, floors, or ceilings.

The standard has remained unchanged since the 1980s.

The addition to two questions in the Canadian Housing Survey addressing the presence of mold or pests in a household has filled this crucial data gap. The analysis in this report aims to quantify the links between the presence of mold and pest with racialized identity, geographic location, housing tenure, income, and self-reported health, providing new demographic information about the populations facing this public health challenge.

Quantitative Methodology

Data and Analytical Method

Throughout this analysis, data from the 2018 Canadian Housing Survey (CHS) is used. Information is provided either at a person or household level. In this research, the combined unit of analysis is household *head* or primary household maintainer. Our variable of interest is whether a household reported that, "in the past 12 months, it experienced mold/mildew larger than one square metre and/or infestations of unwanted pests"⁴. The variable is binary, taking the value of 1 if the answer is "YES" and the value of 0 otherwise. All reported results are weighted.

³ <https://laws-lois.justice.gc.ca/eng/acts/n-11.2/FullText.html>

⁴ For more details, please visit the following link:

https://www23.statcan.gc.ca/imdb/p3Instr.pl?Function=assembleInstr&a=1&&lang=en&Item_Id=1197668#qb1199592

We use a weighted logistic regression with clustered robust standard errors by province⁵ to identify what socio-economic factors matter the most in predicting if a household would report mold and pest issues. This allows us to establish a profile of an average household reporting these issues.

We use the following variables: socio-economic characteristics (age, household size, gender, race, education, employment, owner/renter, shelter costs to income ratio), location (provinces), health variables, as well as whether a household is in CHN or not.

Our subsample of interest is households in CHN. We present the results for the unrestricted sample for most of our estimations and restrict the sample to households in CHN where noted. This strategy allows us to get an overview of the estimates both between and within households, by CHN classification.

The estimated equations take this form:

$$y_i = \frac{\exp(\beta_0 + \beta X_i + \varepsilon_i)}{1 + \exp(\beta_0 + \beta X_i + \varepsilon_i)} \quad (1), \text{ where}$$

y_i is the binary outcome variable; X_i is the vector of all control variables listed above and ε_i is the error term.

In addition to the estimated equation in (1) we add interaction variables under different specifications to assess whether the intersectionality of different socio-economic characteristics such as gender and race or race and CHN is significant in predicting the outcome variable. These specifications take this general form:

$$y_i = \frac{\exp(\beta_0 + \beta_1 \text{Socio1} + \beta_2 \text{Socio2} + \beta_3 \text{Socio1} \cdot \text{Socio2} + \beta_i X_i + \gamma_i)}{1 + \exp(\beta_0 + \beta_1 \text{Socio1} + \beta_2 \text{Socio2} + \beta_3 \text{Socio1} \cdot \text{Socio2} + \beta_i X_i + \gamma_i)} \quad (2)$$

y_i is the binary outcome variable; X_i is the vector of control variables listed above and γ_i is the error term and we are interested in the β_3 coefficient.

We report the marginal effects after the logistic regression. For interactions, we solely present the variable of interest while keeping the other covariate fixed (Williams, 2012)⁶. This allows us to illustrate the effects of a specific characteristic on a subgroup of people, mimicking the effects of an interaction effect.

We acknowledge that reporting the presence of mold and/or pest in a dwelling may be driven by many factors, including geography or climate. As a result, mold and pests affect all households regardless of their income. However, for households already facing housing challenges – those identified as being in CHN - this represents an additional barrier that they cannot solve on their own with direct negative health impacts. As a result, we present our analysis for all households as well as only those in CHN to understand of what is needed to address this issue. To begin, we present households reporting mold and pest at a national, aggregate level.

Results

Figure 1 below illustrates the proportion of households in Canada reporting mold and pest issues. At a national aggregate level, the share of households reporting mold and pest issues is about 17%, a relatively low proportion.

⁵ Our results are robust to the different Standard Error (SE) specifications. We report the clustered robust SE in this research as they yield the most conservative estimates and, given the survey design, these would be a first choice. For future research, especially focusing on Social and Affordable Housing, a different specification of the SE may be more suitable.

⁶ Marginal Effects (ME) for interaction terms in non-linear models do have their own ME; interactions are used to compute the ME of its components, but the interactions cannot change independently from the value of its components.

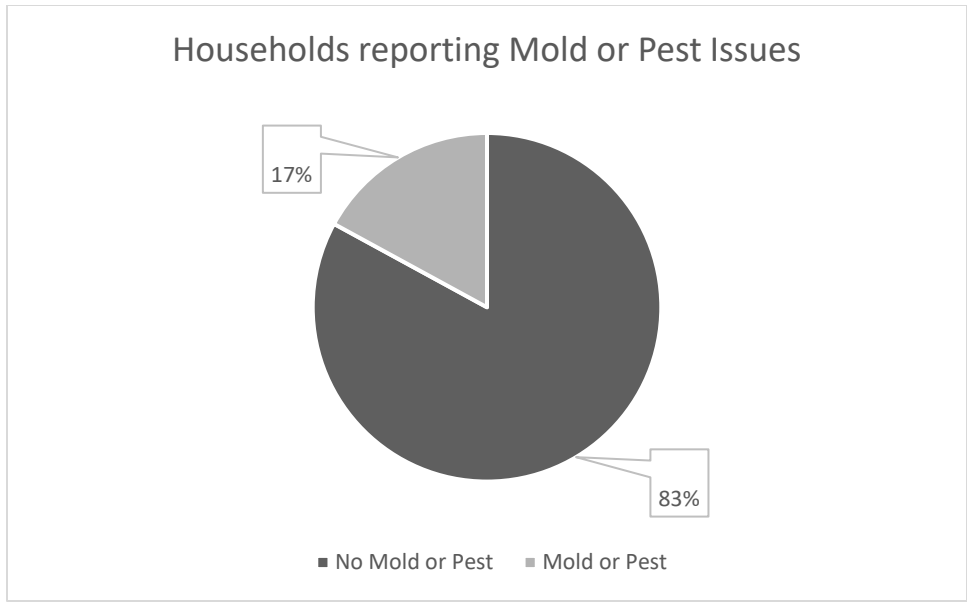


Figure 1: Proportion of households reporting mold or pest, weighted

Source: Canadian Housing Survey (2018) and CMHC calculations

When disaggregated by province and tenure type, we note that renters report living in dwellings with mold and pests more often than homeowners (see Figure 2). Regardless of tenure type, households living in Nunavut report living in dwellings with mold and pest the most often, followed by Prince Edward Island, and New Brunswick. Alberta households report living in dwellings with mold and pest the least often.

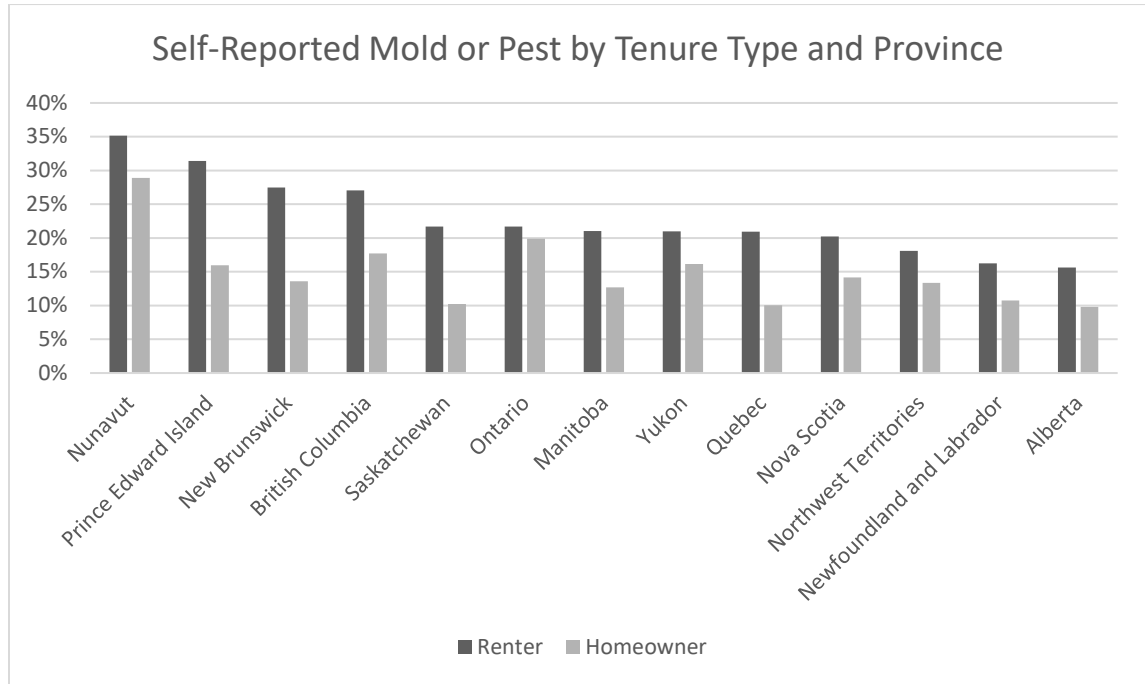


Figure 2: Proportion of households who rent compared to homeowners reporting mold and/or pest by province, weighted

Source: Canadian Housing Survey (2018) and CMHC calculations

When we further restrict the sample to renters alone, the proportions of households that report living in dwellings with mold and pest differ greatly from the national share of all renters (see Figure 3, below). Like the analysis by province and territory, the largest proportion of renter households reporting mold and/or pest problems are in Nunavut, at about 35.18%. The smallest proportion is in Alberta – about 15.61%. On average, 1 in 5 renter households report mold and/or pest issues in Canada, in comparison to about 1 in 7 homeowners.

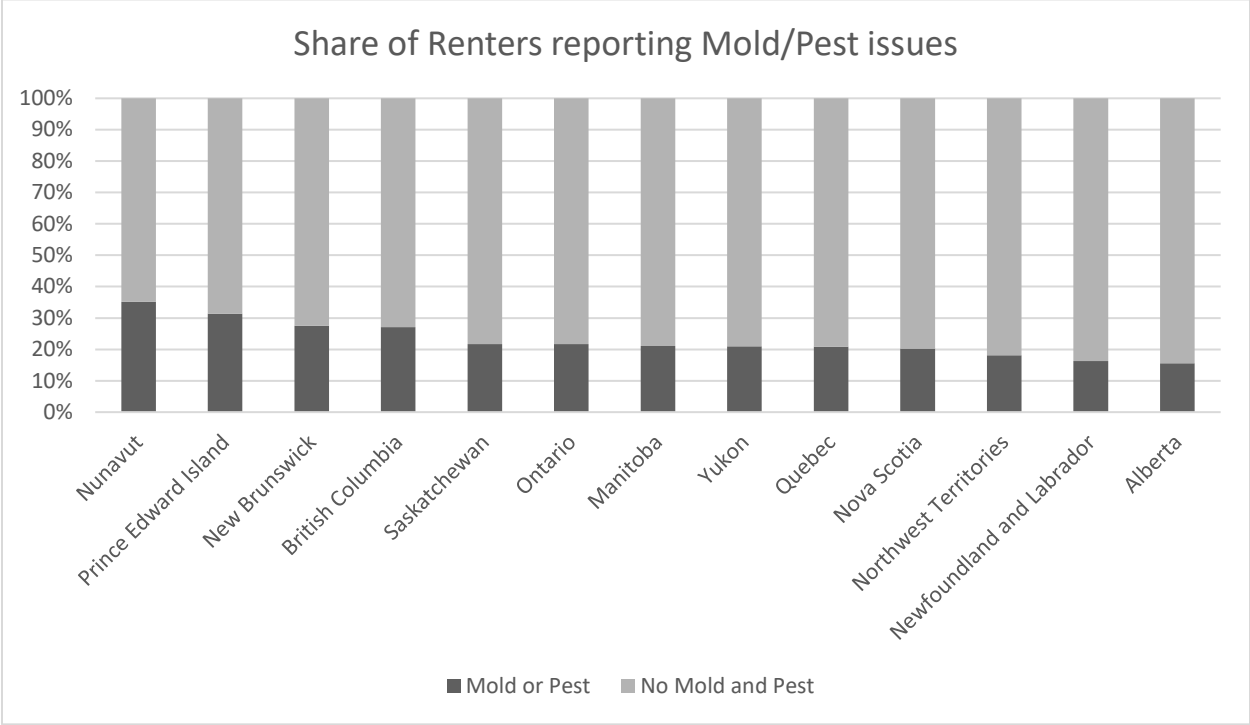


Figure 3: Proportion of households who rent reporting mold and/or pest by province, weighted

An Indigenous household is about 5% more likely to report living in a dwelling with mold and pest issues. Once we restrict the sample to households in core housing need only, that estimate increases to 12% for an Indigenous household.

Table 1 presents the marginal effects after the weighted logistic regression for the full sample and restricted sample of households in CHN. Several interesting patterns emerge.

As expected, being in CHN increases the probability of living in dwellings with mold and pest by about 7%. However, one would expect that households with a high shelter cost to income ratio, a proxy for housing poverty, would report living in a dwelling with mold and pest more often. Yet this analysis finds that a 1% increase in shelter to income ratio, indicating a higher level of housing-related poverty, reduces the likelihood of reporting living in a dwelling with mold and/or pest by 0.9% in the full sample. In households experiencing CHN, the likelihood is reduced by 10.3%. Though surprising at first, we do observe that on average households in CHN that report living in dwellings with mold and/or pest have a lower shelter cost to income ratio than households in CHN that do not. The cost difference indicates that the shelter costs for these units likely account for the challenges with mold and pest.

Surprisingly, family composition is linked to the presence of mold and pest in several different ways. Households with three or more members are more likely to report mold and pest issues in the full sample only. This indicates that housing suitability is an important factor in the experience of mold and pest for all families regardless of CHN as an aggregate indicator. In the restricted sample to CHN, family size is not a significant factor, suggesting that households in CHN have a similar household structure. The higher the age of the household maintainer, the lower the probability of reporting living in a dwelling with mold and pest issues. Women-headed households in the CHN

sample are less likely to report living in a dwelling with the issues. Education level does not seem to be an important factor for households in CHN, suggesting a similar household composition in terms of education attainment within the sample. In the full sample, however, a household maintainer with a high school diploma or equivalent is less likely to report living in a dwelling with the problems.

Some estimates emerging from the analysis are as expected. In line with the literature review, homeowners who report being in a good or above mental and health condition are equally less likely to report living in a dwelling with mold and pest as an issue.

Visible minorities or Indigenous households have a greater likelihood of living in dwellings with issues of mold and pest. However, the difference in magnitudes between samples for Indigenous households is striking. In the aggregate sample, an Indigenous household is about 5% more likely to report living in a dwelling with mold and pest issues. Once we restrict the sample to households in CHN only, that estimate increases to 12% for an Indigenous household. In terms of other variables, the magnitudes of the estimates are very similar.

VARIABLES	(1)	(2)
	Full Sample	Only HH in CHN
Shelter cost to income, ln	-0.00878*** (0.00263)	-0.103*** (0.0207)
HH is size 3+	0.0261*** (0.00679)	0.0107 (0.0255)
Age of household head	-0.00172*** (0.000128)	-0.00267*** (0.000332)
Homeowner	-0.0917*** (0.00760)	-0.0809*** (0.0127)
Female	-0.000635 (0.00443)	-0.0493*** (0.0131)
Visible Minority	0.0370*** (0.00890)	0.0418* (0.0245)
Indigenous	0.0510*** (0.00715)	0.120*** (0.0337)
Employed	0.00278 (0.00821)	0.0157* (0.00823)
Education level: HS diploma or its equivalent	-0.0145*** (0.00517)	-0.00142 (0.0256)
Education level: College, diploma below bachelor's level	-0.00609 (0.00548)	-0.0116 (0.0295)
Health Condition: good, very good or excellent	-0.0634*** (0.00719)	-0.0897*** (0.0190)
Mental Condition: good, very good or excellent	-0.0789***	-0.0627***

	(0.0117)	(0.0221)
HH is in CHN	0.0697***	-
	(0.00946)	
Newfoundland and Labrador	-0.0165	0.105***
	(0.0151)	(0.0381)
PEI	0.0802***	0.224***
	(0.0212)	(0.0409)
Nova Scotia	0.0665***	0.121***
	(0.0201)	(0.0387)
New Brunswick	0.0268	0.131***
	(0.0180)	(0.0366)
Quebec	0.000102	0.0812**
	(0.0161)	(0.0363)
Ontario	0.0484***	0.166***
	(0.0172)	(0.0344)
Manitoba	-0.00247	0.0802**
	(0.0159)	(0.0344)
Saskatchewan	-0.0204	0.0289
	(0.0147)	(0.0325)
Alberta	-0.0433***	0.0540
	(0.0136)	(0.0369)
British Columbia	0.0216	0.141***
	(0.0174)	(0.0403)
N- unweighted	62'317	8'917

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 1: Marginal effects after logistic regressions, full and CHN only samples

When assessing interactions, we first use the full sample to assess the interaction between a socio-economic variable and CHN (see Table 2 below).

VARIABLES	CHN YES	CHN NO		CHN YES	CHN NO		CHN YES	CHN NO
Female	-0.0416***	0.00530	Indigenous	0.115***	0.0407***	Homeowner	-0.0818***	-0.0941***
	(0.0153)	(0.0035 2)		(0.0266)	(0.00710)		(0.0157)	(0.00741)

Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Table 2: Socio-economic variable interactions within the full sample

In Table 3, we restrict the sample to the households in CHN to assess the intersectionality of socio-economic variables. A difference between the estimates would approximate the marginal effects of the interaction terms.

VARIABLES	Homeowner	Renter	Indigenous	Homeowner	Renter	Health Condition: good, very good or excellent	Homeowner	Renter
Female	-0.107***	-0.0151	Indigenous	0.139	0.115***	Health Condition: good, very good or excellent	-0.126***	-0.0688***
	(0.0359)	(0.0112)		(0.0959)	(0.0236)		(0.0302)	(0.0131)
VARIABLES	Indigenous	Non Indigenous	Indigenous	Non Indigenous	Visible Minority YES	Visible Minority NO		
Female	0.0800	-0.0571***	Health Condition: good, very good or excellent	-0.196***	-0.0813***	Health Condition: good, very good or excellent	-0.0784***	-0.0932***
	(0.0865)	(0.0148)		(0.0713)	(0.0248)		(0.0294)	(0.0203)

Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Table 3: Intersection of socio-economic variables in CHN and mold and pest.

Table 3 shows that when disaggregated by tenure, interesting differences emerge between categories. Women-headed households that are homeowners are less likely to report living in dwellings with mold or pest problems. If they are renters, however, they are as likely as men to report living in a dwelling with this issue. Homeowners that report being in good or above excellent health conditions are equally less likely to report living in dwellings with mold and pest infestations than renters with a similar health status (about 6% less likely).

Indigenous renters are about 11.5% more likely to report living in dwellings with mold and pest issues than non-Indigenous renters. Indigenous women are as likely to report living in dwellings with mold and pest problems as Indigenous men. Table 3 also demonstrates that Indigenous men and women who report good or excellent health conditions are equally less likely to report living in dwellings with mold and pest issues. The same phenomenon can be observed among visible minority households at the same rate of likelihood. In other words, both visible minority households and self-identified Indigenous households who experience good mental and physical health have less likelihood of stating they live in a dwelling with mold and pest issues.

Discussion

The current housing adequacy standard does not include infestation conditions in households that cause negative health outcomes. The recent addition of two questions in the Canadian Housing Survey addressing the presence of mold or pests in a household has filled this crucial gap. The literature review demonstrated links between the presence of household mold and pest and negative public health outcomes. Yet many researchers equally expressed difficulty in quantifying thresholds for acceptable levels of infestation. More importantly, however, the

literature review indicated that populations experiencing vulnerability may face compounded difficulty. These equity-seeking households are defined in the NHS⁷ to include women-led single parent households, racialized individuals and groups, members of the 2SLGBTQIA+ communities, new Canadians, veterans, and Indigenous identity groups.

Our quantitative analysis aggregated these groups by tenure, income level, and then distinguished them by gender, minority, and Indigenous status. As expected, renters reported more of these issues than homeowners. Of the two groups, renters have less ability to directly resolve infestations due to mold and pests, especially if the level of infestation impacts multiple units in the same building (Phipps, et al., 2018). Homeowners, in contrast, are directly responsible for the upkeep and resolution of housing infestation issues. However, given the affordability issues currently seen among homeowners in the current housing market, it is possible that not all owners have enough financial liquidity to resolve infestation issues, or major or minor housing repairs.

Of the population subgroups that were examined, self-identified Indigenous households reported most often living in dwellings with mold and pest infestations. Corresponding to this outcome, households living in Nunavut reported living in dwellings with mold and pest more often than any other province or territory. The result is unsurprising, given the wealth of media and public reports on the dwelling adequacy of households living in the remote region, the short window for delivering building materials, and the challenges associated with overcrowded housing in the region. Of greater interest, however, is the fact that self-identified Indigenous households that report being in good or excellent health are less likely to report living in dwellings with infestations than non-Indigenous households. The difference compared to non-Indigenous households is striking and suggests that addressing mold and pest issues will have a larger positive impact for Indigenous households.

The same pattern is found among minority groups at the intersection of their identity and self-reported health status. The difference between the minority and non-minority groups is smaller, however. In comparison with the non-visible minority population, households that report being in good or excellent health are less likely to report living in dwellings with mold and pest infestation issues. The result raises questions about whether the thresholds for infestation levels established in the Canadian Housing survey resonate with this population. Similarly, the result raises questions about the definitions used when determining subjective interpretations of good or excellent health.

Implications

Adequate housing⁸ does not require any major repairs, according to residents. Major repairs include those to defective plumbing or electrical wiring, or structural repairs to walls, floors, or ceilings. Figure 3 illustrates the impact to the core housing need indicator. Four groups are identified: those who report mold and pest infestation and those that do not; and those who are in core housing need and those who are not.

⁷ See <https://www.cmhc-schl.gc.ca/en/nhs/guidepage-strategy/glossary>

⁸ See <https://www.cmhc-schl.gc.ca/en/nhs/guidepage-strategy/glossary>

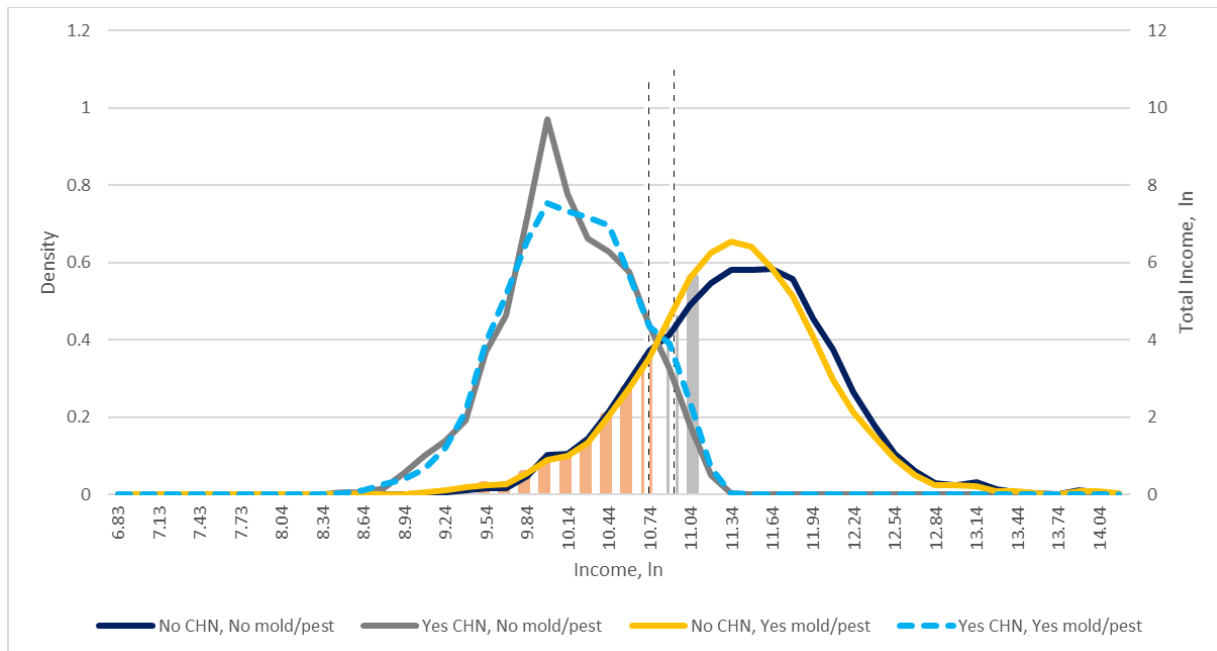


Figure 4: Implications to Core Housing Need Indicator

Of these groups, the households that hover around the threshold of core housing need are of interest, because they are most likely to be unable to resolve infestation conditions on their own, and yet are currently excluded from the group of households identified by the core housing need indicator. These households (represented in Figure 3 by the vertical orange and grey bars in the centre) have similar low-income levels as those in CHN⁹ but in addition, report having mold and pest infestations.

If self-reported mold and pest infestation variables were included into the current adequacy standard, the number of households in core housing need would increase by 2 – 5% of total Canadians (see Figure 4 below). The range depends on the income thresholds from Figure 3.

⁹ The vertical line in Figure 3 highlights the 10.82 and 11.16 thresholds or about \$50,000 and \$70,000 per year, respectively. These are 95th and the 100th percentile of the income distribution of households in CHN: 95% of households in CHN have incomes equal or below \$50,000; all households in CHN have incomes equal or below \$70,000

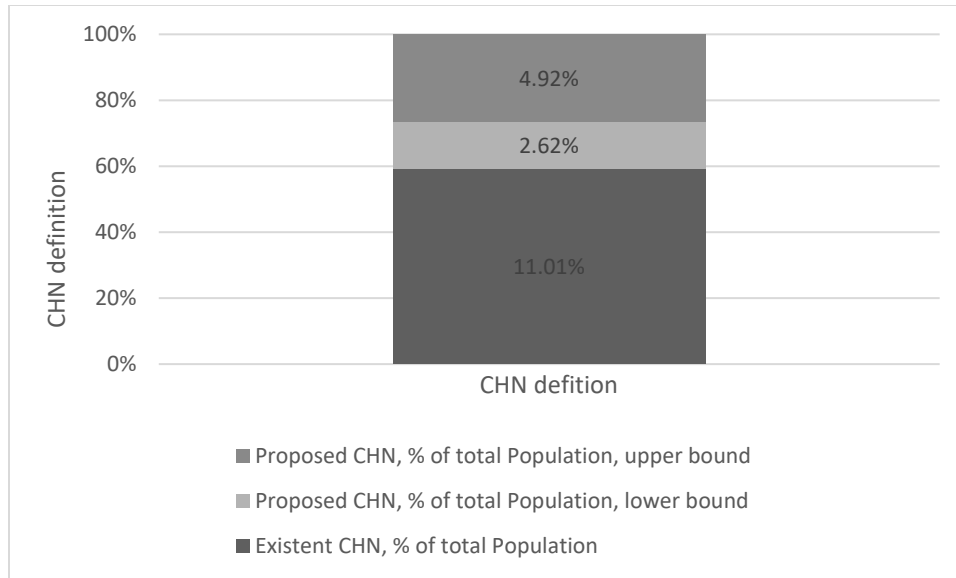


Figure 5: Implications to the Core Housing Need indicator - proportions of total population

Conclusion

Our analysis demonstrates that populations experiencing vulnerability are more likely to report living in dwellings with mold and pest issues. More importantly, the analysis corresponds with the published literature indicating that these households equally experience mental and physical health issues. At the intersections of renters, having an Indigenous or visible minority identity, and being in CHN results in a household more likely to report living in a dwelling with mold and pest problems. Canadians in CHN, therefore, are doubly or triply disadvantaged as they are equally unable to move into a dwelling that does not have mold and pest issues. In a similar analysis conducted by CMHC (see Nkwinkeum & Feltaous, forthcoming), households in CHN move more often than those who are not in CHN, but not necessarily to better suitable or adequate dwellings, since they remain in CHN. Households reporting the presence of mold and pest in their dwellings also move more frequently than any other group. The presence of mold and pests have implications on the mental and physical health of family members, and as the literature review demonstrates, frequent moves may disrupt employment attachment and child education attainment.

Of even greater importance, however, is the finding that self-identified Indigenous households that report being in good or excellent health are less likely to report living in dwellings with infestations than non-Indigenous households. This suggests that addressing mold and pest issues will have a larger positive impact for Indigenous households. Given that much has been seen in media and research reports regarding the conditions of housing available to Indigenous households, remediation in this area would have a positive impact.

Further, if the prevalence of mold and pest infestation were included into the adequacy standard, core housing need would increase by 2 – 4%. However, recognizing the important health implications would be the first step in integrating a human rights approach to adequate housing.

Although the Canadian Housing Survey aims at capturing all populations and be representative at the national level, the survey can still miss subgroups or geographies that could be disproportionately affected by mold and pest such as Indigenous groups living on reserve or in remote locations. As such, our findings could be underestimating the extent of housing adequacy issues for people who might need the most help in resolving the mold and pest issues. However, the questions on mold and pest are present in subsequent cycles of the CHS (cycle 2 and onwards), making an ongoing examination of the presence of infestation in household feasible and valuable.

The discussion points mentioned in this section represent examples of possible explanations and theories that emerge after our analysis. Future quantitative research could examine the changes in reporting mold and pest using subsequent cycles of the CHS, given the presence of the questions in cycle two of the survey and beyond. Such research could provide insight into the regional changes of infestation conditions within rentals. Further qualitative research, disaggregated by tenure and sub-population, would help in further understanding how the experience of mold and pest infestations differ between homeowners and renters, as well as among the various subpopulations within each category.

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