Comparing Changes and Transitions of Home Care Clients in Retirement Homes and Private Homes*

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RÉSUMÉ

Les clients qui reçoivent des soins de longue durée à domicile résident principalement en foyers privés ou en résidences pour personnes âgées, et le type d'établissement peut influencer les facteurs de risque associés au placement en centres de soins de longue durée. La présente étude analytique multi-états se base sur les données de *RAI-Home Care* et les données administratives du *Hamilton Niagara Haldimand Brant Local Health Integration Network* pour modéliser les états de risque conceptualisés dans les conditions initiales et au cours d'une période de suivi de 13 mois. Les facteurs de risque modifiables dans ces états étaient la solitude et les symptômes dépressifs du client, ainsi que la détresse du soignant. Dans les cas où le risque était considéré plus faible, la probabilité rajustée d'une sortie due au décès était plus élevée dans les résidences pour personnes âgées. Suivant les ajustements associés aux caractéristiques des clients, des services et des soignants, il est apparu que le fait de résider dans une résidence pour personnes âgées était associé à une probabilité plus élevée de : 1) placement dans un centre de soins de longue durée, 2) réduction de la détresse des aidants et 3) augmentation de la solitude ou de la dépression des clients. Les résidences pour personnes âgées représentent une solution de rechange aux foyers privés pour les clients nécessitant des soins à domicile de longue durée. Toutefois, les résidences pour personnes âgées impliquent des concessions pour le client et l'aidant naturel.

ABSTRACT

Long-stay home care clients mostly reside in private homes or retirement homes, and the type of residence may influence risk factors for long-term care placement. This multi-state analytic study uses RAI-Home Care and administrative data from the Hamilton Niagara Haldimand Brant Local Health Integration Network to model conceptualized states of risk at baseline through a 13-month follow-up period. Modifiable risk factors in these states were client loneliness or depressive symptoms, and caregiver distress. A higher adjusted likelihood of being discharged deceased was found for the lowest-risk clients in retirement homes. Adjusting for client, service, and caregiver characteristics, retirement home residency was associated with higher likelihood of placement in a long-term care home; reduced caregiver distress; and increased client loneliness/depression. As an alternative to private home settings as the location for aging in place among these long-stay home care clients, retirement home residency represents some trade-offs between client and informal caregiver.

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Introduction

A retirement home is a common type of residence for many older adults who cannot, or choose to not, live in a private home. Often called assisted living facilities in the United States and elsewhere, retirement homes have been regulated in the province of Ontario, Canada, since 2010. The provincial legislation defines retirement home as a "residential complex or the part of a residential complex", "occupied primarily by persons who are 65 years of age or older", whose residents are "not related to the operator of the home", and have "at least two care services available, directly or indirectly"(Government of Ontario, 2010). An estimated 55,000 seniors live in more than 700 retirement home facilities across Ontario (Retirement Home Regulatory Authority, 2017). Residents may elect to purchase care services offered by their facility, such as meals or laundry. Additionally, many retirement home residents receive ongoing support for personal care and other home care needs through Ontario's publicly funded home care system.

An earlier publication by many of the current study's authors described the characteristics and services of home care recipients living in retirement home facilities in the Hamilton Niagara Haldimand Brant (HNHB) Local Health Integration Network (LHIN) (Poss et al., 2017). Ontario has 14 LHINs that plan, integrate, and fund health care services in their local regions. In general, in this study we found increasing care needs when comparing home care clients in private homes, home care clients in retirement homes, and residents of long-term care (LTC) homes. LTC homes in Ontario are licensed care facilities with the availability of 24-hour nursing and may be known as nursing homes or residential care facilities elsewhere. Among long-stay home care clients, those living in retirement homes showed distinctive patterns from those in private homes: older, more likely to be widowed or female, have a dementia diagnosis, experience bladder incontinence, and receive psychotropic medications. Perhaps most importantly in a home care context are the differences in informal support, with the primary informal caregiver of a retirement home-residing client being less likely to live with the client, providing fewer hours of care, and experiencing lower levels of caregiver distress. In the HNHB region, an estimated 40 per cent of retirement home residents received publicly funded long-stay home care services.

Building on the findings of this descriptive work, the current study focuses on changes and transitions, and how these may differ by type of residence (i.e., retirement home or private home). The focus is not on transitions between private home and retirement home, but rather on changes in risk factors of LTC placement or transitions out of home care within these two populations over time. Supporting persons with ongoing care needs in a community setting is a central goal of home care services, consistent with avoiding LTC entry for as long as possible. Along the continuum of seniors' accommodations, retirement homes are marketed as an independent living option for those who are having difficulties staying in their own homes, preferring or needing to receive some help with everyday living, and/or preferring to live close to or participate in social activities with peers. To that end, our work sought to understand the role that retirement homes may play in important and potentially modifiable factors related to the risk of, and actual, LTC placement. Specifically, this study conceptualized the degree of risk and discharge from the formal home care system as mutually exclusive states within a multi-state model and compared the likelihood of state transitions between long-stay home care clients living in retirement homes and those in private homes.

Client loneliness, client depressive symptoms, and signs of distress among informal caregivers were the factors we chose for the study because they are known risk factors for LTC placement, are likely affected by residence type, and may be modifiable by interventions.

These items as well as other clinical variables were drawn from the Resident Assessment Instrument-Home Care (RAI-HC), a comprehensive assessment tool mandated for Ontario practice that has good reliability and validity (Carpenter et al., 2004; Landi et al., 2000; Morris et al., 1997). Among adult home care recipients expected to remain active (i.e., on service) 60 days or longer, the RAI-HC is completed by trained care coordinator assessors. It is completed on program entry and repeated every 6 to 12 months, or earlier if there is significant clinical change.

Loneliness can be described as sadness related to insufficient social contact with family or friends, and is known to increase with older age (Singh & Misra, 2009). Its presence puts the individual at higher risk of LTC placement, possibly by affecting physical and/or mental health status directly or by prompting the client or family to consider the social benefits of placement (Hanratty, Stow, Collingridge Moore, Valtorta, & Matthews, 2018). Loneliness is increasingly recognized as an important public issue overall, with recent actions such as the establishment of the Minister of Loneliness in the United Kingdom (Pimlott, 2018). In the RAI-HC, a single item records loneliness (yes/no) that the client has expressed or indicated within the past 3 days.

Depressive and anxious symptoms are commonly observed in older home care clients (Lohman, Mezuk, & Dumenci, 2017) and also place the person at higher risk of LTC entry (Miu & Chan, 2011). However, depression among older adults is often underdiagnosed

(Haigh, Bogucki, Sigmon, & Blazer, 2018). We used the standard Depression Rating Scale (DRS) that suggests the presence of depressive and anxious symptoms regardless of a depression diagnosis that may be treated or untreated (Burrows, Morris, Simon, Hirdes, & Phillips, 2000). The DRS uses 7 items from the RAI-HC to construct a scale from 0 to 14, with higher scores representing stronger indication of depressive illness. A cut-point of 3 or greater for the DRS was adopted as evidence of possible depressive illness that is consistent with other studies of this population (Hirdes, Mitchell, Maxwell, & White, 2011; Hogeveen, Chen, & Hirdes, 2017).

In addition to loneliness being associated with levels of depressive symptoms in seniors congregate care (Adams, Sanders, & Auth, 2004), loneliness has been shown to be recognized by seniors themselves as a precursor state of depression (Barg et al., 2006). Although conceptually distinct, loneliness and depressive symptoms can interact synergistically (Cacioppo, Hughes, Waite, Hawkley, & Thisted, 2006) and were treated in our analysis as a collective state. That is, we considered the state of client loneliness and/or depressive symptoms to be present when one or both were present on the RAI-HC assessment.

An informal caregiver of a home care client experiencing distress is a clear and strong predictor of LTC entry (Betini et al., 2017; Gaugler, Yu, Krichbaum, & Wyman, 2009; Luppa et al., 2010). In the RAI-HC, this concept has been classified in previous studies using two items: (a) "A caregiver is unable to continue in caring activities – e.g., decline in the health of the caregiver makes it difficult to continue"; or (b) "Primary caregiver expresses feelings of distress, anger, or depression" (Mitchell et al., 2015; Pauley, Chang, Wojtak, Seddon, & Hirdes, 2018). We considered caregiver distress to be present for any assessment in which one or both of these items were indicated.

We classified client assessments into one of four mutually exclusive states, itemized in Table 1, with a hypothesized hierarchy of risk of LTC placement:

Table 1: Baseline states

Baseline State Label	Description
1	Client depressive symptoms absent, client not lonely; caregiver distress absent
2	Client depressive symptoms present or client lonely; caregiver distress absent
3	Client depressive symptoms absent, client not lonely; caregiver distress present
4	Client depressive symptoms present or client lonely; caregiver distress present

Methods

Data Sources

The HNHB LHIN provided anonymized data to researchers at the University of Waterloo as part of a contracted arrangement. Ethics clearance was provided from the University of Waterloo, ORE #20862. The types of data we used for the analysis were the same as in the prior work (Poss et al., 2017) and are briefly summarized here.

Data informing episodes of care including discharge date and discharge reason are from the HNHB LHIN's administrative system that is the standard in use across the province of Ontario. This system records type of residence over time, such that it can be understood on any day of the service episode. Since all retirement homes are licensed and known to the HNHB LHIN, the quality of the type of residence information can be expected to be high.

Records were linkable at the client level. This included RAI-HC assessment data from April 1, 2014, to April 30, 2018, along with associated data about the LHIN's administration of home care services and LTC placement, which they coordinate. In addition, we used records from the Discharge Abstract Database for hospital admissions and the National Ambulatory Care Reporting System for emergency department visits of HNHB LHIN clients in HNHB LHIN hospitals. These data sets do not capture hospital admissions or emergency department visits occurring outside of the HNHB LHIN geographic boundary; these instances are not common, but they do occur more frequently for clients who live close to some boundaries with neighbouring LHINs.

Sample

Our analysis employed multi-state analysis starting with a representative sample of assessed home care recipients. The baseline cohort consisted of clients aged 18 years and older who received an RAI-HC assessment in the period of April 1, 2014, to March 31, 2017, and resided in private residences or retirement homes. Only those types of clients who might be expected to receive a future RAI-HC assessment (conditional on the home care service episode continuing) were included, being classified as maintenance or long-stay supportive types (i.e., not acute, rehabilitation, or end-of-life types). Baseline assessments in which the client was discharged within 30 days were excluded. If more than one qualifying baseline assessment was received in the baseline period, we used the one closest to the mid-point (October 1, 2015). Analytic co-variates were primarily drawn from the RAI-HC assessment items. We identified hospital and emergency department admissions from linked Discharge Abstract Database

and National Ambulatory Care Reporting System data to create a variable for recent acute hospital use. All home care services provided by the LHIN were averaged as cost per day, from the date of the baseline RAI-HC assessment up to 90 days, or discharge, whichever occurred first.

A period of up to 395 days (13 months) was allowed to observe a follow-up RAI-HC assessment. Many follow up RAI-HC assessments are performed around the one-year mark, so one extra month allowed many cases to be included as reassessments that is typical of normal practice. The primary future event of interest was a follow-up RAI-HC assessment, along with additional discharge states (e.g., to LTC). Those still on service at the end of 13 months but not yet reassessed were treated as an additional outcome group. All cases were assigned to one of 10 follow-up states summarized in Table 2.

Note that follow-up states 1 through 9 required the client to be continuously in the same residence type (retirement home or private home) until the time the follow-up state was assigned, otherwise they were assigned to state 10. These are cases where the residence type was not stable and therefore any outcome could not be reliably associated with the residence type. For example, if the records indicated the client had moved from private home to retirement home and then subsequently admitted to LTC within the 13-month period, the case was assigned to state 10.

Analysis

We used multi-state logistic regression to estimate the adjusted odds ratio for retirement home residence, compared to private home, among each of the four baseline states, of one of the 10 follow-up states (i.e., four separate regression models). All of the four baseline states could change to any of the 10 follow-up states, as depicted in Figure 1. We selected co-variates on the basis of available measures in the data that the

literature suggests are associated with these follow-up states: (a) demographics, (b) diagnoses, (c) physical function, (d) cognition, (e) informal care, (f) psychosocial well-being, (g) wandering and responsive behaviours, (h) falls, (i) incontinence, and (j) health care utilization. Retained co-variates were those found to have statistical significance in at least one of the four models; each model used identical co-variates. Time to event or discharge was constrained to a 13-month follow-up window; however, time itself was not used as an adjustor.

A conventional goodness of fit statistic was not available for multi-state models. We ran equivalent binary logistic regressions for each of the 10 follow-up states among the four baseline states.

For all analyses, we used SAS 9.4 software.

Results

A cohort of 34,359 home care clients constituted the analytic data set. Descriptive characteristics used as modeling co-variates are presented in Table 3. Clients in retirement homes made up 17 per cent of the sample. Retirement home clients were older, more likely to speak English or French as their primary language, and much less likely to live with their primary informal caregiver or receive high amounts of informal care time from them. Retirement home clients were more likely to spend long periods of their day alone, have a diagnosis of dementia, and have wandering or aggressive/responsive behaviours. Physical and cognitive impairment were generally greater among retirement home clients. Overall, prevalence of the classifying characteristics at baseline were as follows (the first percentage corresponding to private homes; the second, to retirement homes): (a) was lonely (private home 11.0% / retirement home 12.4%), (b) had depressive symptoms (DRS3 or greater, 18.2% / 15.8%), (c) had either lonely or depressive symptoms (24.7% / 23.9%), (d) exhibited caregiver distress (32.6% /20.0%).

Table 2: Possible follow-up states

Follow-up State Label	Description
1,2,3,4	If the next RAI-HC assessment was completed between 1 and 13 months later in the same residence type (PH or RH) as the baseline RAI-HC, states 1 through 4 were assigned using the criteria assigning the baseline states
5	Discharged to a long-term care (LTC) home
6	Client deceased
7	Discharged with the service plan complete
8	Discharged for other reasons (including family/client preference, transfer to another geographic area, or admit to acute hospital)
9	Home care service ongoing, but no follow-up RAI-HC assessment yet received
10	Residence type changed from either PH to RH or from RH to PH prior to reassessment, discharge, or 13 months (whichever occurs first)

PH = private home; RH = retirement home
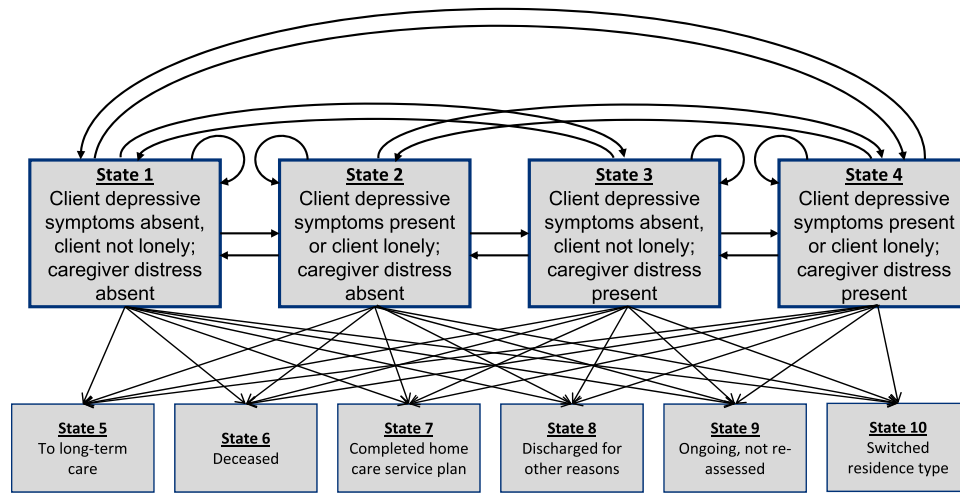
Figure 1: Transition possibilities from baseline (states 1 to 4) to follow-up (states 1 to 10)

All transition proportions, by starting state and residence type, are shown in Table 4. Overall, 30.7 per cent of the cases had a qualifying RAI-HC follow-up assessment and were classified as states 1 to 4. Other common follow-up states were discharged with service plan complete (22.3%) and ongoing but not yet reassessed (15.8%). There were 11.3 per cent of baseline cases classified as deceased and 8.7 per cent discharged to LTC. Hierarchical ordering for transition to LTC (state 5) is observed across baseline states 1 to 4, for both types of residence, where it increases with each state.

Adjusted odds ratios comparing retirement home to private home for each of the four baseline states from multi-state logistic regression models are presented in Table 5. The reference state for each model was that of being reassessed with the same state as that of the baseline assessment – for example, the reference for the state 1 model is follow-up state 1. The interpretation of these odds ratios is the influence that retirement homes have, relative to private homes, on the adjusted likelihood of transitioning from the baseline state to the follow-up state, represented by the intersection in the table.

For state 1 baseline cases, retirement homes were significantly protective of a transition to states 3 and 4 (new caregiver distress regardless of client loneliness or depressive symptoms) and slightly increased likelihood of being discharged deceased. State 2 baseline cases showed retirement homes to be protective of transitioning to state 4 where both client loneliness/depression and caregiver distress are present. Among state 3 cases, retirement homes were positively associated with moving to state 2, meaning that retirement homes had the influence of removing the distress among caregivers while adding loneliness or depression among clients. For state 4 cases, the type of residence was not significant in moving to one of the other re-assessed states (i.e., states 1 to 3).

For all models except baseline state 4, retirement homes had a significant positive adjusted likelihood for discharge to LTC. Among state 1 cases only, retirement homes were protective of discharge with service plan complete and other discharges, and were predictive of being discharged deceased. In all baseline state models, retirement homes were consistently highly protective of changing residence type, meaning persons in a retirement home were much less likely to move to a private home than vice versa.

C-statistics for equivalent binary logistic regression models averaged from 0.694 to 0.711 among models of the four baseline states, and from 0.608 to 0.880 among the 10 follow-up states. The average C-statistic among these 40 models was 0.702.

Discussion

The goal of this work was to compare private home and retirement home residency regarding modifiable factors that represent LTC placement risk, as well as to compare private home and retirement home residency for actual LTC transition, while adjusting for important measured characteristics.

The hypothesized hierarchy of the four baseline states 1 to 4, formulated for this analysis, is confirmed in the observed unadjusted transition proportions to LTC. Caregiver distress on its own is a stronger indicator of LTC placement than is client loneliness/depression on its own, but the presence of both risk factors is stronger than either of them separately. We observed these associations, unadjusted, in both the private home and retirement home cases.

These analyses show how retirement home residency is associated with change from states that have differing risk of LTC placement, driven by caregiver distress: Compared to private home care clients, retirement homes

Table 3: Sample description

Baseline State	Retirement Home					Private Home				
	State 1	State 2	State 3	State 4	All	State 1	State 2	State 3	State 4	All
n	3,707	951	720	441	**5,819**	15,292	3,952	6,197	3,099	**28,540**
Female	68.4%	73.1%	60.0%	69.2%	**68.2%**	60.0%	69.4%	50.6%	61.7%	**59.5%**
Average age	86.2	85.6	86.7	85.8	**86.1**	76.3	73.9	79.3	77.2	**76.7**
Under 65 years	3.4%	4.2%	1.9%	2.3%	**3.3%**	19.6%	27.0%	11.8%	16.8%	**18.6%**
Over 85 years	65.9%	64.8%	67.2%	62.4%	**65.6%**	32.2%	27.4%	40.0%	33.1%	**33.3%**
English or French primary language	94.3%	91.3%	93.8%	91.8%	**93.5%**	88.7%	87.9%	82.8%	81.0%	**86.4%**
Primary informal caregiver co-resides	9.8%	6.7%	28.6%	18.1%	**12.3%**	56.4%	39.9%	75.7%	67.0%	**59.4%**
Primary informal caregiver: spouse	6.6%	4.3%	27.9%	17.2%	**9.6%**	34.4%	21.1%	49.4%	42.6%	**36.7%**
child/child-in-law	69.3%	72.1%	58.5%	65.3%	**68.1%**	42.7%	49.5%	38.2%	42.3%	**42.6%**
other relation	20.9%	19.7%	12.4%	17.2%	**19.4%**	20.1%	23.4%	11.8%	13.9%	**18.1%**
no caregiver	2.9%	3.6%	0.6%	0.2%	**2.5%**	2.4%	5.6%	0.2%	0.8%	**2.2%**
Informal hours in 7 days: less than 7	56.0%	52.5%	24.7%	30.4%	**49.6%**	25.9%	36.0%	6.7%	8.5%	**21.2%**
7 to <21	37.9%	40.0%	49.7%	41.0%	**39.9%**	41.5%	37.4%	25.7%	25.3%	**35.8%**
21 or greater	6.1%	7.6%	25.6%	28.6%	**10.5%**	32.6%	26.7%	67.6%	66.2%	**43.0%**
Long periods alone	56.5%	66.8%	38.1%	56.0%	**55.9%**	50.7%	69.3%	25.4%	37.9%	**46.4%**
Cognition (CPS): 0	21.7%	17.1%	7.8%	5.9%	**18.1%**	51.1%	40.8%	20.8%	15.8%	**39.3%**
1 or 2	60.4%	61.4%	53.2%	49.4%	**58.8%**	41.2%	52.1%	49.8%	53.3%	**45.9%**
3 or 4	12.8%	17.1%	27.1%	32.4%	**16.8%**	4.8%	5.1%	19.5%	21.7%	**9.9%**
5 or 6	5.1%	4.3%	11.9%	12.2%	**6.4%**	2.9%	2.0%	9.9%	9.2%	**5.0%**
Functional hierarchy: 0 to 3	13.6%	9.4%	3.8%	4.1%	**11.0%**	45.6%	44.3%	13.6%	12.3%	**34.8%**
4 to 6	36.3%	36.4%	22.2%	25.6%	**33.8%**	31.0%	33.5%	30.5%	33.7%	**31.5%**
7 to 9	44.5%	48.3%	64.4%	62.1%	**48.9%**	20.1%	19.5%	49.1%	48.5%	**29.4%**
10 or 11	5.7%	6.0%	9.6%	8.2%	**6.4%**	3.3%	2.7%	6.9%	5.5%	**4.3%**
Health instability (CHESS): 0	23.2%	12.3%	12.2%	7.0%	**18.8%**	26.4%	17.5%	14.4%	8.9%	**20.7%**
1 or 2	60.6%	59.8%	54.4%	56.0%	**59.4%**	59.6%	59.5%	60.1%	53.6%	**59.0%**
3 to 5	16.2%	27.9%	33.3%	37.0%	**21.8%**	14.0%	23.0%	25.6%	37.5%	**20.3%**
Dementia diagnosis	31.7%	33.2%	48.9%	58.3%	**36.1%**	12.2%	11.9%	36.5%	37.3%	**20.2%**
Falls last 90 days: none	54.0%	43.9%	38.3%	44.2%	**49.7%**	60.7%	55.0%	52.2%	48.6%	**56.8%**
1 fall	22.8%	21.1%	29.0%	19.7%	**23.1%**	21.3%	20.8%	21.5%	19.9%	**21.1%**
2+ falls	23.2%	35.0%	32.6%	36.1%	**27.3%**	18.0%	24.3%	26.2%	31.6%	**22.1%**
Wandering	3.5%	6.3%	9.2%	14.5%	**5.5%**	0.8%	1.3%	5.1%	9.2%	**2.7%**
Any of 4 aggressive behaviours	8.7%	18.1%	19.7%	39.0%	**13.9%**	3.1%	7.7%	16.0%	28.7%	**9.3%**
Bladder incontinence frequent or always	39.4%	38.8%	47.1%	45.1%	**40.7%**	19.9%	23.9%	33.5%	32.9%	**24.8%**
ED or hospital last 6 months	62.0%	68.1%	69.6%	72.6%	**64.7%**	62.8%	63.2%	58.5%	61.0%	**61.7%**
Waiting for LTC at time of baseline RAI-HC assessment	17.5%	21.0%	32.2%	32.7%	**21.1%**	3.7%	4.9%	14.0%	17.0%	**7.5%**
Daily home care cost[a]: none	6.0%	6.3%	8.8%	10.7%	**6.7%**	9.7%	9.6%	8.8%	9.4%	**9.5%**
$0.32 to $9.74	21.0%	16.2%	10.4%	12.2%	**18.2%**	27.6%	26.8%	15.8%	15.9%	**23.7%**
$9.75 to 19.47	22.1%	20.0%	16.4%	17.0%	**20.7%**	24.4%	24.3%	20.3%	21.3%	**23.2%**
$19.48 to $38.87	28.3%	29.1%	23.8%	24.5%	**27.6%**	20.9%	20.7%	24.0%	23.1%	**21.8%**
$38.88 to $793.84 (max)	22.7%	28.4%	40.7%	35.6%	**26.8%**	17.4%	18.6%	31.2%	30.3%	**21.9%**

Note. **CHESS: Changes in Health, End-Stage Disease, Signs and Symptoms (0 to 5, higher values more unstable health) (Hirdes et al. 2003); CPS = Cognitive Performance Scale (0 to 6, higher values more cognitively impaired) (Morris et al. 1994); ED = Emergency Department.**
Functional Hierarchy: Activities of Daily Living (ADL) and Instrumental ADLs used for this scale (0 to 11, higher values more impaired) (Morris et al. 2013)
[a] **Average daily home care service cost, up to 90 days after baseline RAI-HC date, or until discharge, whichever is earlier. Those in the first row received no home visits (likely received care coordination or LTC placement service), and remainder of cases were assigned to quartiles of those with service costs.**

tend to be protective of new caregiver distress, and predictive of resolving previously reported distress. Results were mixed with regards to new client loneliness/depression, with retirement homes being protective among those in state 1 but predictive among those in state 3. On balance, retirement homes can be seen as being neutral to beneficial to a case moving to a lower risk state in the future, conditional on continuing to receive home care services. We did find evidence that this can mean a shift, in some cases, of a risk factor (distress) experienced by informal caregivers being shifted to one (depression/loneliness) experienced by clients among those in retirement home residency.

Table 4: Transition rates by the four baseline states, by type of residence

Proportion of the Baseline State in the 10 Follow-up States		Baseline Type of Residence and State							
		Retirement Home[a]				Private Home[a]			
		State 1	State 2	State 3	State 4	State 1	State 2	State 3	State 4
Follow-up states	State 1	**26.3%**	7.4%	4.7%	3.2%	**18.6%**	5.9%	3.7%	2.0%
	State 2	2.9%	**20.0%**	1.4%	3.6%	2.2%	**17.3%**	0.4%	2.3%
	State 3	3.8%	1.5%	**19.7%**	5.4%	5.4%	1.4%	**25.2%**	6.1%
	State 4	1.3%	4.3%	4.4%	**18.8%**	1.5%	6.4%	5.2%	**23.0%**
	State 5: to LTC	15.4%	21.8%	33.5%	37.4%	2.4%	3.9%	12.4%	17.5%
	State 6: deceased	11.9%	12.5%	12.9%	9.3%	10.6%	10.1%	12.8%	11.7%
	State 7: completed service plan	13.5%	11.5%	9.3%	9.8%	29.9%	26.1%	14.5%	14.1%
	State 8: discharged other reasons	6.0%	7.8%	5.0%	5.7%	9.3%	9.8%	8.5%	8.4%
	State 9: ongoing, not reassessed	17.4%	10.9%	6.9%	4.8%	17.9%	15.9%	14.4%	11.8%
	State 10: switched residence type	1.6%	2.3%	2.1%	2.0%	2.4%	3.4%	3.0%	3.2%

Note. State 1: Client depressive symptoms absent, client not lonely; caregiver distress absent; State 2: Client depressive symptoms present or client lonely; caregiver distress absent; State 3: Client depressive symptoms absent, client not lonely; caregiver distress present; State 4: Client depressive symptoms present or client lonely; caregiver distress present.
[a] Columns may not sum to 100% due to rounding of decimals.

In addition, we sought to understand how retirement homes affect the likelihood of transition to LTC, observed here among cases in the sample that were discharged to LTC prior to reassessment (state 5). Among baseline states 1, 2, and 3, the adjusted likelihood of LTC placement was found to be significantly higher for those in retirement homes, adjusting for all co-variates including having an LTC application at baseline. Only for the baseline state 4 group, where caregiver distress and client loneliness/depression placed them at the highest risk of LTC placement, was no significant effect of residency type observed on LTC placement, after adjustment.

Retirement homes, compared to private home residency, present two faces simultaneously for long-stay home care clients: those continuing to live in retirement homes are more likely to shift to states of relatively lower risk of LTC placement, whereas retirement home clients as a whole are at higher risk of placement. Thus, there are some positive mediating aspects to retirement home residency that soften otherwise poorer outcomes with respect to LTC placement.

Table 5: Adjusted odds ratios of retirement home status on follow-up state

Adjusted Odds Ratio (95% confidence) of RH residence at baseline, on follow-up state, compared to PH residence at baseline		Baseline State			
		State 1 Model (Client depressive symptoms absent, client not lonely; caregiver distress absent)	State 2 Model (Client depressive symptoms present or client lonely; caregiver distress absent)	State 3 Model (Client depressive symptoms absent, client not lonely; caregiver distress present)	State 4 Model (Client depressive symptoms present or client lonely; caregiver distress present)
	n	*n* = 18,999	*n* = 4,903	*n* = 6,917	*n* = 3,540
Follow-up states	State 1	*reference*	1.20 (0.82, 1.76)	1.41 (0.89, 2.24)	1.67 (0.80, 3.49)
	State 2	1.02 (0.77, 1.36)	*reference*	4.00 (1.58, 10.16)*	1.13 (0.56, 2.28)
	State 3	0.62 (0.49, 0.78)*	1.23 (0.57, 2.65)	*reference*	1.24 (0.71, 2.15)
	State 4	0.66 (0.45, 0.98)*	0.62 (0.41, 0.96)*	1.01 (0.64, 1.59)	*reference*
	State 5: to LTC	1.65 (1.33, 2.05)*	1.74 (1.21, 2.50)*	1.50 (1.12, 2.01)*	1.19 (0.83, 1.72)
	State 6: deceased	1.19 (1.01, 1.40)*	1.36 (0.98, 1.89)	1.22 (0.89, 1.69)	0.93 (0.59, 1.46)
	State 7: completed service plan	0.70 (0.61, 0.81)*	0.88 (0.65, 1.20)	0.90 (0.64, 1.26)	1.09 (0.70, 1.71)
	State 8: discharged, other reasons	0.64 (0.53, 0.78)*	1.01 (0.71, 1.44)	0.73 (0.48, 1.11)	0.77 (0.45, 1.29)
	State 9: ongoing, not reassessed	1.00 (0.87, 1.16)	0.93 (0.68, 1.26)	0.81 (0.56, 1.17)	0.72 (0.42, 1.25)
	State 10: switched residence type	0.26 (0.19, 0.36)*	0.35 (0.20, 0.61)*	0.42 (0.23, 0.78)*	0.41 (0.19, 0.90)*

RH = retirement home. * Significant at *p* < .05.

The small increased odds of death among retirement home clients in the state 1 model may be a chance result, although the odds ratio for death in the state 2 model is also close to significance with a confidence interval of 0.98 to 1.89. The meaning of this finding is unclear, but it may be possible that there is some unmeasured mortality risk that is more common in retirement homes; while we adjusted using the CHESS score (a validated scale of health instability that predicts hospitalization and death among frail elderly; Hirdes, Frijters, & Teare, 2003), we did not adjust for specific conditions such as cancer or renal failure, or for the presence of advance directives.

Although this study set aside cases where clients changed residence type (as state 10), observed state changes are likely to occur as a result of adapting to new relationships and environments over the short- and long-term. The baseline cohort represents a variety of experiences: Some clients may be new to home care while others are long-standing clients, or some recently moved to a retirement home while others have lived in retirement homes for long enough to adjust to the move. The reasons behind loneliness or depressive symptoms that do not improve are likely multi-factorial, including (a) the client does not want to move to the retirement home (Dellasega, Mastrian, & Weinert, 1995; Kane & Kane, 2001; McAuley & Travis, 1997), (b) they do not feel at ease or found it challenging to create new friendships (Park, 2009), or (c) the social opportunities offered by the retirement home are not satisfying for them (Cummings, 2002).

A fundamental difference between retirement homes and private homes is in the nature of informal caregiving. Despite needs being higher in retirement homes, informal care hours are lower, due to the retirement home setting's providing key IADL services that would otherwise require informal support. Especially for IADL assistance that is required daily (e.g., meal preparation, medication management), retirement homes may result in the removal of these everyday types of contact by informal caregivers. This in turn could lead to a reduction in caregiver distress but also, as a result of less-frequent contact with caregivers, an increase in client loneliness and associated depressive symptoms. Moving to a retirement home has been reported to be associated with loss of social contact with family and friends (Tompkins, Ihara, Cusick, & Park, 2012).

The models adjust for all items in Table 3, including baseline functional impairment (ADL & IADL), wandering and behaviours, co-residing with the primary caregiver, the relationship between the client and primary caregiver, and the care time provided by the primary caregiver and the public home care system, yet there is something distinct about the retirement home experience. Our finding that living in a retirement home residence with their in-place supports reduces caregiver distress is analogous to findings of LTC admission studies. In these studies, caregivers were more likely to report reduced burden and depressive symptoms or improved health after care recipients entered LTC (Gaugler, Mittelman, Hepburn, & Newcomer, 2010; Gold, Reis, Markiewicz, & Andres, 1995; Mausbach et al., 2007).

We do not know, from the data, what motivated the person to move from their former, private home to a retirement home, nor do we understand the values and perspectives among client-primary informal caregiver dyads. Disability and family relationships are highly influential in these decisions (Betini et al. 2017), along with the availability and attractiveness of alternatives (Litwak & Longino, 1987; Stone & Reinhard, 2007). Retirement homes may represent a range of considerations by a person's moving there: They are tired of shopping, cooking, and cleaning; or they are challenged by these activities and have no spouse or close family nearby who can help; or they do have help available but are uncomfortable receiving that degree of help from their family and friends. For informal caregivers, especially adult children, there may be additional motivations such as balancing caregiving with their own work and family life, or worrying about a parent when they cannot be there. Whatever the considerations, moving to a retirement home will change the day-to-day nature of the care recipient and informal caregiver interaction that would otherwise occur if the person was not in a retirement home.

Among other things, a move to the congregate living setting of a retirement home could represent a breaking of the ties to the family home, ties that may be protective of a move to LTC. For two home care clients with equivalent needs, the client who has already moved once may be more willing to move again. In addition, the same motivations and considerations that led to the first move to a retirement home may also influence a decision to make a second move to LTC. Functional decline, in particular cognitive impairment, may be a limiting factor for remaining in a retirement home, possibly because of rigid rules in retirement homes that the resident be able to direct their care and not be a safety concern for themselves or others due to associated responsive behaviours of dementia (Hawes, Phillips, Rose, Holan, & Sherman, 2003). These issues may be more readily managed in private home settings but only with strong informal caregiver supports, albeit also with the potential for increased caregiver distress.

All things being equal, moving any given case regardless of residence type to a lesser state would be expected to lower the likelihood of LTC placement. Therefore, interventions that reduce client loneliness and depression

or alleviate caregiver distress should prolong opportunities to live in the community among these home care clients. Placing these issues more centrally in the public policy eye, as is the case with loneliness in the United Kingdom, opens the door to more effective intervention. Caregiver distress and ways to support in-home caregivers is receiving attention among national and provincial agencies (Canadian Institute for Health Information, 2018; Health Quality Ontario, 2016; Office of the Seniors Advocate British Columbia, 2017).

More broadly, this study's findings revolve around quality of life, a goal that is at once shared but may be conflicting between family members. For clients, quality of life is negatively influenced by loneliness (Musich, Wang, Hawkins, & Yeh, 2015) and depression (Sivertsen, Bjørkløf, Engedal, Selbæk, & Helvik, 2015); for caregivers, quality of life is negatively influenced by distress (Lim & Zebrack, 2004). Clients living in retirement homes may show declining quality of life related to loneliness and depression, whereas their informal caregivers are more likely to experience less distress and thus improved quality of life. The picture is reversed for clients and caregivers in private homes.

Compared to long-term care, aging in place with home care is the preferred option for most Canadians (Petersen & Quinn, 2017), however it represents much of the burden of care being borne by unpaid caregivers. Retirement home residency with home care represents a kind of middle ground in this shift, in that less of this shifted burden falls on informal providers. With retirement home utilization increasing in Ontario (Canadian Mortgage and Housing Corporation [CMHC], 2018) this may be moderating to some extent the trend of increasing informal caregiver distress among long-stay home care recipients reported in recent years (Health Quality Ontario, 2018).

Although retirement homes denote – for at least some of the groups – an increased likelihood of being discharged deceased, or of being admitted to LTC, and experiencing new loneliness or depressive symptoms, it is important to place this in a broader context. These retirement home clients had only a slightly higher prevalence of loneliness, a lower prevalence of depressive symptoms, and no significant difference when combining loneliness and depressive symptoms. And in addition to these retirement home clients being more likely to have existing caregiver distress be alleviated, they have a much lower prevalence of it overall (one in five, compared to nearly one in three among private home clients).

Significant odds ratios of increased likelihood provide overall evidence and may be helpful in informing policies and services in the broadest sense. Person-centred plans of care created by both the retirement home operator and the home care system need to retain a focus on the congregate care nature of retirement homes, with its associated reduction of informal care.

This study used all available data of qualifying home care clients receiving services who were assessed with the comprehensive RAI-HC assessment as part of normal case management practice. The large sample size of almost 35,000 mostly frail, older individuals represented a single geographic area of Ontario, but it is unknown how generalizable it may be to other jurisdictions. The study does not consider all individuals in retirement homes (the majority are not long-stay home care clients), nor does it consider all persons with ongoing care needs who live in private homes (some will be supported by informal care and/or private care outside of the publicly funded home care system). It does, however, represent the target population of adult long-stay home care in Ontario: individuals with care needs who in the absence of receiving help would be at high risk of LTC placement. This study draws on a rich, standardized, and high-quality set of health system measurements including repeated comprehensive assessments with measures of client and informal caregiver need, administrative records of home care and LTC activity, and acute care service use.

In order to manage the considerable complexity that 4 baseline and 10 follow-up states present, the analysis did not adjust for time to event, for example, LTC placement in 1 month was treated the same as in 12 months. Examination of distributions of time to follow-up assessment or discharge among the four states and two residence types did not reveal meaningful differences. The additional challenge is that model co-variates come from the baseline conditions alone, but they may have changed after the assessment was done and that could differ among baseline states and residence type.

Conclusions

Residents of retirement homes who receive ongoing home care services are confirmed to have distinct characteristics from those who reside in private homes, with generally higher levels of impairment and lower levels of informal care. Retirement homes are generally beneficial to informal caregivers by removing reported distress, and in some cases this can happen simultaneously with evidence of new loneliness or depressive symptoms among clients. For three of four groups (those at lower overall risk), residency in a retirement home was associated with higher rates of transition to LTC, something that overpowered any protective effect of resolved caregiver distress or client loneliness/depression.

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