ORIGINAL RESEARCH

Measuring Potentially Avoidable Acute Care Transfers From Long-Term Care Homes in Quebec: a Cross Sectional Study

Deniz Cetin-Sahin, MD, PhD[1,2], Mark Karanofsky, MDCM, CCFP, FCFP[1,3], Greta G. Cummings RN, PhD[4], Isabelle Vedel, MD, PhD[1,5], Machelle Wilchesky, PhD[1,2,5,6]

[1]Department of Family Medicine, McGill University, Montreal, QC; [2]Donald Berman Maimonides Geriatric Centre for Research in Aging, Montreal, QC; [3]Herzl Family Practice Centre, Jewish General Hospital CIUSSS Centre-Ouest-de-l'Île-de-Montréal, Montreal, QC; [4]College of Health Sciences, University of Alberta, Edmonton, AB; [5]Lady Davis Institute for Medical Research, Jewish General Hospital, Montreal, QC; [6]Division of Geriatric Medicine, McGill University, Montreal, QC, Canada

https://doi.org/10.5770/cgj.26.620

ABSTRACT

Background

Potentially avoidable emergency department transfers (PAEDTs) and hospitalizations (PAHs) from long-term care (LTC) homes are two key quality improvement metrics. We aimed to: 1) Measure proportions of PAEDTs and PAHs in a Quebec sample; and 2) Compare them with those reported for the rest of Canada.

Methods

We conducted a repeated cross-sectional study of residents who were received at one tertiary hospital between April 2017 and March 2019 from seven LTC homes in Quebec, Canada. The MedUrge emergency department database was used to extract transfers and resident characteristics. Using published definitions, PAEDTs and PAHs were identified from principal emergency department and hospitalization diagnoses, respectively. PAEDT and PAH proportions were compared to those reported by the Canadian Institute for Health Information.

Results

A total of 1,233 transfers by 692 residents were recorded, among which 36.3% were classified as being potentially avoidable: 22.8% 'PAEDT only', 11.6% 'both PAEDT & PAH', and 1.9% 'PAH only'. Shortness of breath was the most common reason for transfer. Pneumonia was the most common diagnosis from the 'both PAEDT & PAH' category. PAEDTs and PAHs accounted for 95% and 37% of potentially avoidable transfers, respectively. Among 533 hospitalizations, 31.3% were PAHs. These proportions were comparable to the rest of Canada, with some differences in proportions of transfers due to congestive heart failure, urinary tract infection, and implanted device management.

Conclusions

PAEDTs far outweigh PAHs in terms of frequency, and their monitoring is important for quality assurance as they may inform LTC-level interventions aimed at their reduction.

Key words: potentially avoidable emergency transfers, hospitalizations, acute care transfers, long-term care, nursing homes, geriatric medicine, health services research

INTRODUCTION

Despite receiving 24-hour nursing care, long-term care (LTC) home residents are frequently transferred to acute care settings in response to a health status change.[1,2] Some of these transfers are potentially avoidable[3]—i.e., could theoretically be circumvented by timely and effective in-facility care.[4] The lack of consensus regarding how to conceptualize and measure 'potentially avoidable transfers' from LTC presents a methodological challenge.[3] The factors involved are complex, including the management of early-acute or low-acuity symptoms,[5] post-hoc assessment of factors contributing to avoidability (e.g., facility capabilities,[5] burdensome transitions at the end of life,[6] transfers contrary to advance directives,[7,8] or, more commonly, the measurement of ambulatory care sensitive conditions (e.g., pneumonia, hypertension)).[5]

Investigations of potentially avoidable transfers from LTC homes have typically reported on potentially avoidable emergency department transfers (PAEDTs) or potentially avoidable hospitalizations (PAHs), with the majority reporting on the latter. North American PAEDT estimates range from 25%[9] to 44%,[10] and PAH estimates vary considerably, ranging from 23% to 67%.[4,11-13] While using the ambulatory care sensitive condition approach to identify potentially avoidable transfers

is relatively straightforward from a research perspective, there are challenges with its implementation in practice. In addition, further confusion exists as "preventable" conditions (e.g., falls and trauma) and conditions that are "manageable" in LTC homes (e.g., pneumonia) are often combined.[8,14]

Transfer decision-making processes are complex and typically involve primary care physicians, nurses, residents, and families or substitute decision-makers.[15,16] Mechanisms that monitor potentially avoidable transfers in this setting can be useful to clinicians and administrators. Given that the province of Quebec does not take part in Canada's Continuing Care Reporting System,[17] however, no formal monitoring mechanism exists for these homes. To address these issues, the two objectives of this study were to 1) measure the proportions of PAEDTs and PAHs among transfers to a tertiary acute care setting from a Quebec LTC home sample, and 2) compare our Quebec findings with those reported for the rest of Canada.

METHODS

Study Design

A repeated cross-sectional study was conducted in partnership with the Integrated Health and Social Services University Network for West-Central Montreal ("the Network"). This design was deemed appropriate for estimating the prevalence of PAEDTs and PAHs in LTC residents presenting to the ED. The results of this study are reported in accordance with the REporting of studies Conducted using Observational Routinely-collected health Data (RECORD) Statement,[18] which is an extension of the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement.

Setting

This network includes one tertiary-care hospital and seven publicly-funded LTC homes: three small (<100), two medium (100-200), and two large (>200) (1,189 beds in total). This hospital was selected as it receives, on average, 75% of all transfers from the seven participating LTC homes. A LTC home was defined, using the Canadian Institutes for Health Information (CIHI)[19] definition, as an institution that provides care for older adults (and to a lesser degree, for younger adults), requiring 24-hour nursing and rehabilitation for chronic medical conditions or impaired mental capacity, and having significant deficiencies in activities of daily living.

Data sources and Sample Selection

We used MedUrge, an electronic triage and flow tracking system that allows ED clinicians to locate patients, access patient clinical information, and manage consultations, all with the aim of improving the quality of care.[20,21] Data pertaining to all acute care transfers by residents from the seven LTC homes and rehabilitation centres who received care at one tertiary hospital ED between 1 April 2017 and 31 March 2019 were extracted to an Excel worksheet by the Network's Chief Information Officer and Performance Evaluation at the Quality, Evaluation, Performance, Ethics and Archives Department. Data were deidentified before being saved at the Hospital's Research Institute. Data cleaning was then conducted by checking for duplicates or inconsistencies in terminology (e.g., facility names, reasons for transfer such as 'dyspnea' vs. 'shortness of breath'). To compare our data to all other provinces, we used the proportions of PAEDTs[22] and PAHs[8] reported by CIHI.

Measures

The following variables were extracted from the MedUrge database: the name of the facility of origin, residents' sex and age at the time of transfer, and transfer episode characteristics (day and time of ED arrival, the acuity according to the Canadian Triage and Acuity Scale),[23] principal ED diagnoses, ED length of stay, disposition after the ED episode, and, if admitted, diagnoses at the hospital admission and hospital length of stay. Due to the exploratory nature of the study, a two-year study period was deemed to be sufficient. The 'facility type' and 'facility name' variables were used to exclude transfers that originated from LTC homes in other Networks, or from any intermediate care settings (e.g., assisted living facilities) or rehabilitation centres.

Assessment of transfer avoidability was conducted using definitions proposed by CIHI,[23] Walsh *et al*.,[24] and Walker *et al*.[12] In Figure 1A, we present a Venn diagram describing conditions included when considering PAEDT and PAH definitions, and the degree to which they overlap. We chose CIHI's PAEDT definition[22] for our primary analysis that includes visits "for selected potentially preventable conditions—similar to ambulatory care sensitive conditions and validated for LTC home residents—for which timely primary care management could have been effective" (CIHI Category 1),[22] and visits classified as being "Less Urgent" or "Non Urgent" (low acuity) according to the Canadian Emergency Department Triage and Acuity Scale,[25] and "without inpatient admission, resulting in the patient returning directly to LTC home" (CIHI Category 2).[22] Category 1 PAEDTs were identified using principal ED diagnoses, while Category 2 PAEDTs were identified using the triage code and ED disposition for each transfer episode.[22] To measure PAHs, we used the Walsh *et al*. definition, which includes a list of conditions validated for the LTC population and distinguishes between conditions that are 'manageable' and 'preventable' in the LTC setting.[24]

In order to compare our Quebec data with that from other provinces, proportions of CIHI Category 1 ambulatory care sensitive conditions (pneumonia, congestive heart failure, urinary tract infection, COPD, cellulitis, and other conditions) were extracted from the most recently available 2013–2014 CIHI report.[22] As the proportions of specific conditions for Category 2 are not published, we compared total proportions. We used the total proportion of PAH reported in another CIHI document presenting 2011–2012 data.[8]

Statistical Analyses

Acute care transfer episodes were categorized by avoidability status and described by resident and transfer characteristics,

the most common reasons for transfer, ED diagnoses, and hospital admission diagnoses. Descriptive analyses evaluating the degree to which each outcome measure contributed to overall potentially avoidable acute care transfers were calculated. More specifically, we compared proportions of PAEDTs and PAHs where the sum of all potentially avoidable transfers was the denominator (transfers deemed to be PAEDTs and/or ultimately resulted in being PAHs). To investigate the degree to which our outcomes would align with a Canadian PAH definition, we also conducted a sensitivity analysis in which we used the list of conditions identified by Walker *et al*. that does not distinguish between manageable and preventable conditions.[12] Conditions that most frequently resulted in PAEDTs and PAHs were described and compared to the CIHI reports, where possible. R statistical software version 4.0.0 (R Foundation for Statistical Computing; https://www.r-project.org/foundation/) and SAS© software, version 9.4 (SAS Institute Inc., Cary, NC) were used for analyses.

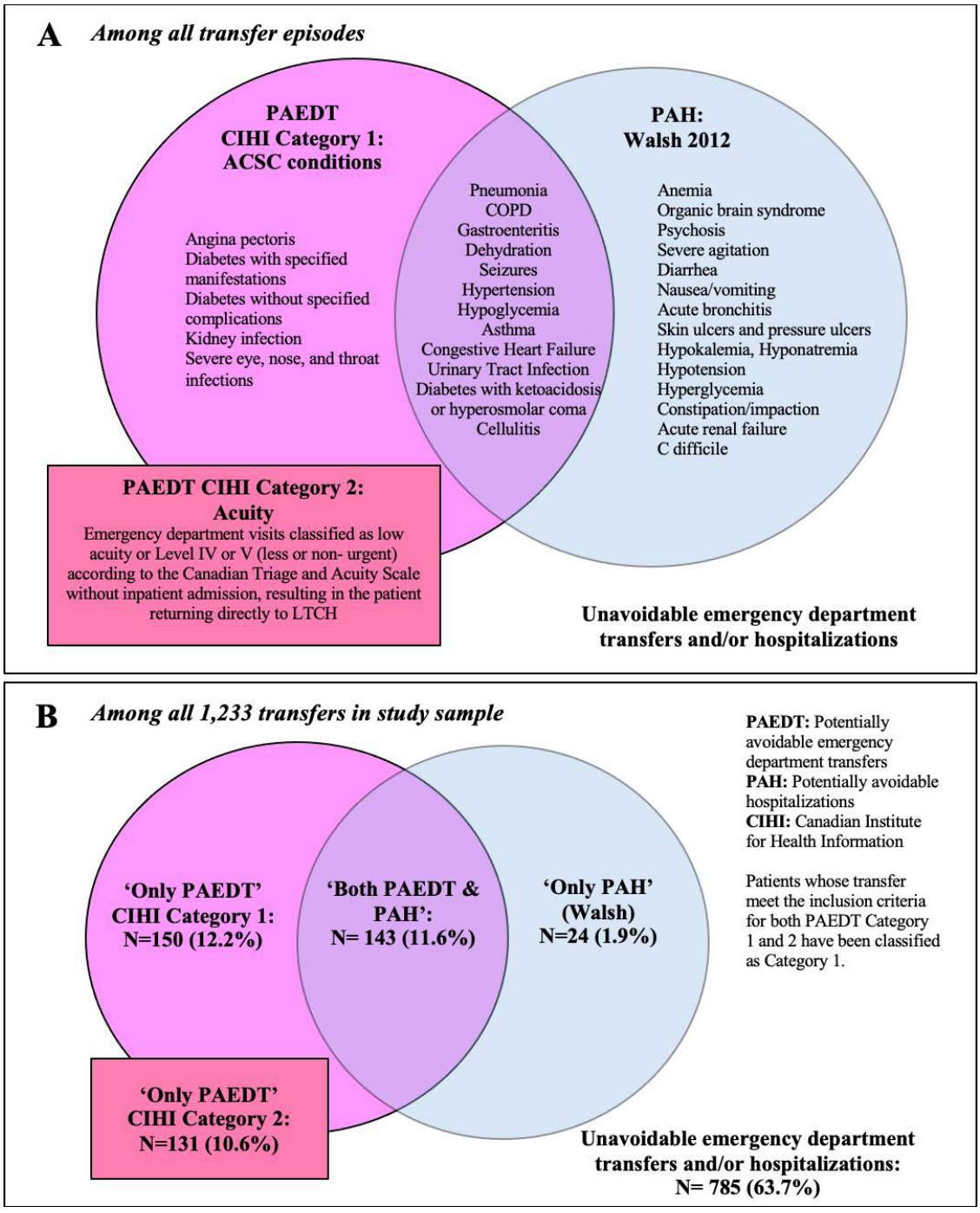

FIGURE 1. Potentially avoidable emergency department transfers and hospitalizations from long-term care homes: conditions (A) and proportions in study sample (B)

Ethics Approval

The Network's Research Review Office (Medical-Biomedical Research Ethics Committee) approved the study (Project 2019-1580). To protect confidentiality, names of residents and LTC homes were deidentified.

RESULTS

Summary of Transfer Episodes

A total of 1,907 transfer episodes were initially identified. Among these, 671 episodes originated from ineligible facilities not providing 24-hour nursing care (e.g., rehabilitation centres) and three database duplicates (i.e., when a resident's triage code was updated in the ED resulting in separate database entries) were excluded. After exclusion, 1,233 transfer episodes by 692 residents were retained for study; 417 (60%) of residents were transferred once, 246 (36%) experienced two to five transfers, and 29(4%) experienced six to 12 transfers during the two-year study period. In two transfer episodes, the reason why the resident left without being seen was unknown, but in both cases, these were categorized as being unavoidable given that their triage codes were II and III. In five transfer episodes where the hospital admission diagnosis was missing, avoidability status was assigned using the principal ED diagnosis.

In total, 448 transfer episodes (36.3%) were classified as being potentially avoidable. In Figure 1B, we reported the proportions of transfers classified by their avoidability status. Proportions of 'PAEDT only' CIHI Category 1, 'PAEDT only' CIHI Category 2, 'both PAEDT & PAH', and 'PAH only' from among all transfers corresponded to 12.2%, 10.6%, 11.6%, and 1.9% of our sample, respectively.

Comparison of the Quebec Sample With the Rest of Canada

The proportions of ED diagnoses among PAEDTs and hospital diagnoses among PAHs are shown in Figure 2. In total, 293 episodes belonged to PAEDT Category 1, among which pneumonia was the most frequent condition followed by congestive heart failure, urinary tract infection, chronic obstructive pulmonary disease, and cellulitis (Figure 2A). "Other" conditions included seizure, dehydration, severe eye, nose, and throat infections, angina, gastroenteritis, hypoglycemia, kidney infections, diabetes, hypertension, and asthma. In Quebec, PAEDT Category 1 accounted for 24% of all transfers, which was identical to the rate reported in the rest of Canada.[22] Within this category, the Quebec sample had a higher frequency for heart failure (23% vs.14%) and lower frequency of transfer for urinary tract infection (15% vs. 30%).[22]

A total of 131 episodes belonged to PAEDT Category 2 (Figure 2B). We categorized final ED diagnoses into the following 11 groups: adjustment and management of implanted devices, injury and fracture, skin problems, pain, respiratory system problems, cardiovascular problems, cognitive problems, gastrointestinal problems, bleeding, weakness/fatigue, and other problems. Other medical problems included retention of urine, localized edema, anemia, ascites, hemorrhoids, hypernatremia, gynecological neoplasms, paresthesia/numbness, and counselling/medical advice. Overall PAEDT Category 2 from the Quebec sample accounted for 10.6% of all transfers, which was again identical to that in the rest of Canada (10%).[22] 'Adjustment and management of implanted devices' was the most frequent principal ED diagnosis within this category in Quebec (28.2%), followed by injury and fracture (18.2%), whereas the most frequent diagnosis in the rest of Canada in this category was falls (25%).[22]

Among 533 hospitalizations, 31.3% were found to be potentially avoidable (Figure 2C) using the Walsh definition. Using the Walker PAH definition (as reported by CIHI), we found that the Quebec PAH prevalence as a proportion of hospitalizations was comparable to the rest of Canada (47% vs. 45%, respectively).[8] The five most frequent conditions for PAHs were same as those for PAEDTs mentioned above, followed by anemia, acute renal failure, decubitus ulcers, dehydration, and other conditions (e.g., diabetes with hypoglycemia, gastroenteritis/diarrhea, hypertension, hyponatremia, hypotension, nausea with vomiting, open wound/infection, and seizures/convulsions).

Potentially Avoidable Transfers—a Comparison of PAEDTs vs. PAHs

Figure 3 presents the contribution of PAEDTs and PAHs within the subset of potentially avoidable acute care transfer episodes. When using our primary analysis Walsh PAH definition (Figure 3A), the PAEDT outcome measure was dominant, as it captured, in total, about 95% of all potentially avoidable transfers, whereas in our sensitivity analysis using Walker's definition (Figure 3B), PAEDTs captured 81%. The PAH measure captured 37% and 47% of all potentially avoidable transfers when using the Walsh vs. Walker definitions, respectively. These differences occurred mostly due to the inclusion of septicemia and closed hip fracture (which are 'preventable' as opposed to 'manageable' conditions in the Walker definition).

Episode Characteristics by Avoidability Outcomes

Table 1 presents patient and acute care transfer-level characteristics classified by transfer avoidability outcome measure. Among all transfers, only 17% were low acuity, but this proportion increased to 58% within the PAEDT category. In Table 2, the reasons for transfer as provided by the LTC home, ED and hospital admission diagnoses are presented by avoidability outcome among all transfers and those that resulted in hospitalization. Shortness of breath was the most common LTC reason for transfer, while pneumonia was the most common diagnosis captured by the 'both PAEDT & PAH' category. The 10 most common acute care diagnoses were similar when comparing all transfers to those that resulted in hospitalization, with the exception of adjustment of implanted device and weakness/fatigue (overall transfers) and gastrointestinal bleeding and cerebrovascular accident diagnoses (transfers resulting in hospitalization).

DISCUSSION

We investigated potentially avoidable ED transfers and hospitalizations for conditions that are potentially 'clinically manageable' in the context of the Quebec LTC setting. Our results indicate that the PAEDT measure is an essential metric in terms of its ability to capture potentially avoidable transfers from LTC homes. PAEDT and PAH proportions in our Quebec sample were comparable to the rest of Canada. While current mechanisms to investigate potentially avoidable transfers to acute care from LTC homes require improvement (especially in Quebec), we have established that ED databases can be used to achieve this end with some limitations.

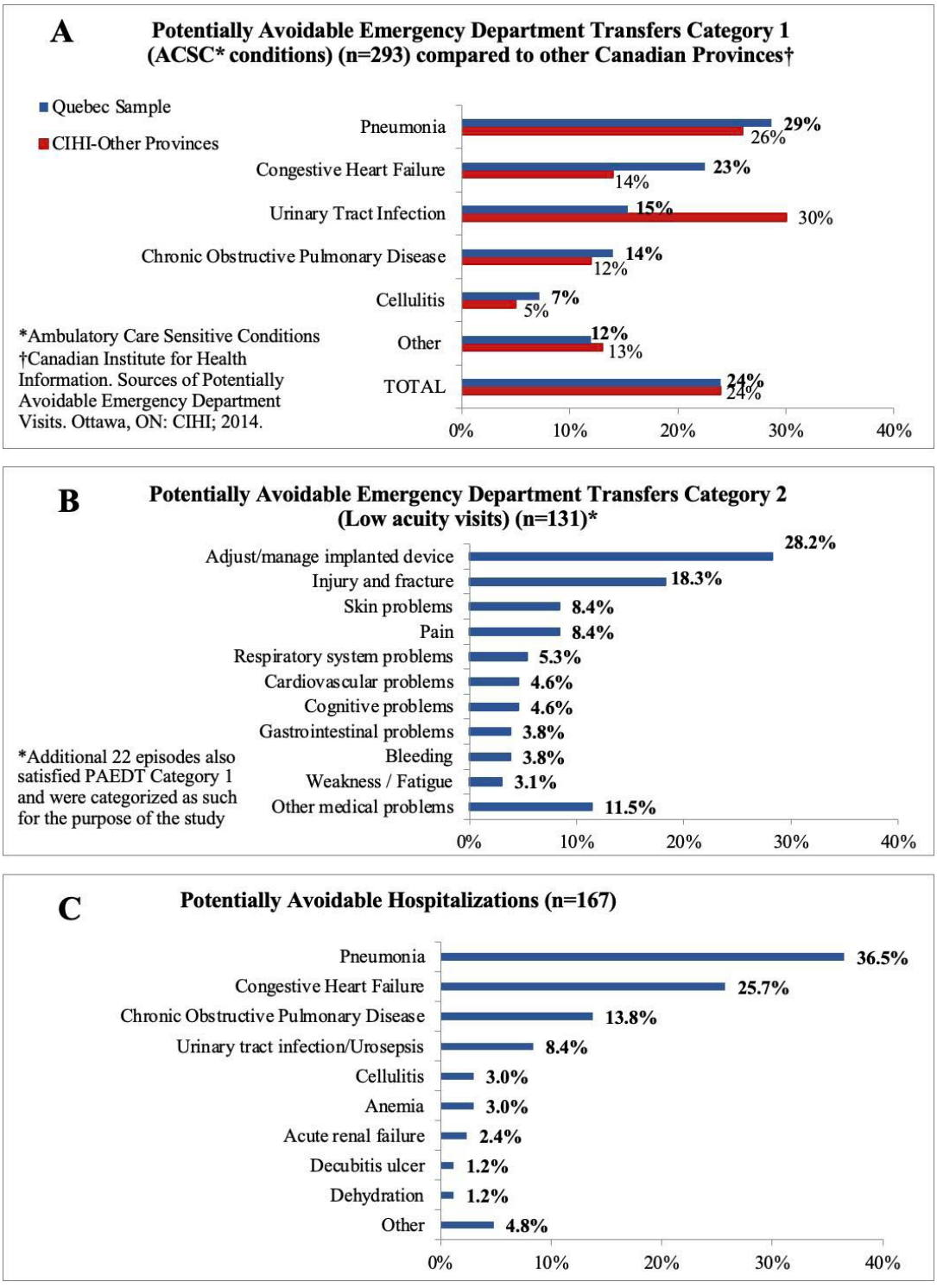

FIGURE 2. Principal emergency department and hospital admission diagnoses

In the LTC avoidable transfers literature, PAHs have historically been the more commonly used outcome measure.[26-28] Hospitalizations have a significant impact on both clinical and cost trajectories for this resident population upon return to the LTC, such that preventive strategies at the LTC level are required.[29] The decision to hospitalize following admission to the ED, however, involves factors outside of LTC staff control (e.g., availability of acute care beds, ED care practices and norms, health status changes in the ED, or ED staff perceptions of LTC capability).[30] Our study underscores the importance of PAEDT quantification regardless of subsequent hospitalizations, as PAEDTs reflect complex LTC transfer decision-making processes undertaken by LTC stakeholders. Indeed, ED visits by LTC home residents that do not result in subsequent hospitalization are sometimes defined as being 'potentially avoidable', while those resulting in admission are considered 'less likely avoidable'.[22,31]

In our recent systematic scoping review of interventions aimed at reducing transfers from LTC, we found that reported outcomes were almost always limited to all transfers (i.e., regardless of avoidability specification),[32-40] while only three studies[41-43] (representing 3.3% of the review study sample) measured PAEDTs as their primary outcome.[44] These three studies adapted the ambulatory care sensitive condition approach in different ways, which speaks to the need for harmonizing definitions. More to the point, however, is the fact that PAEDTs are seldom measured in the literature, perhaps due to challenges with their measurement.

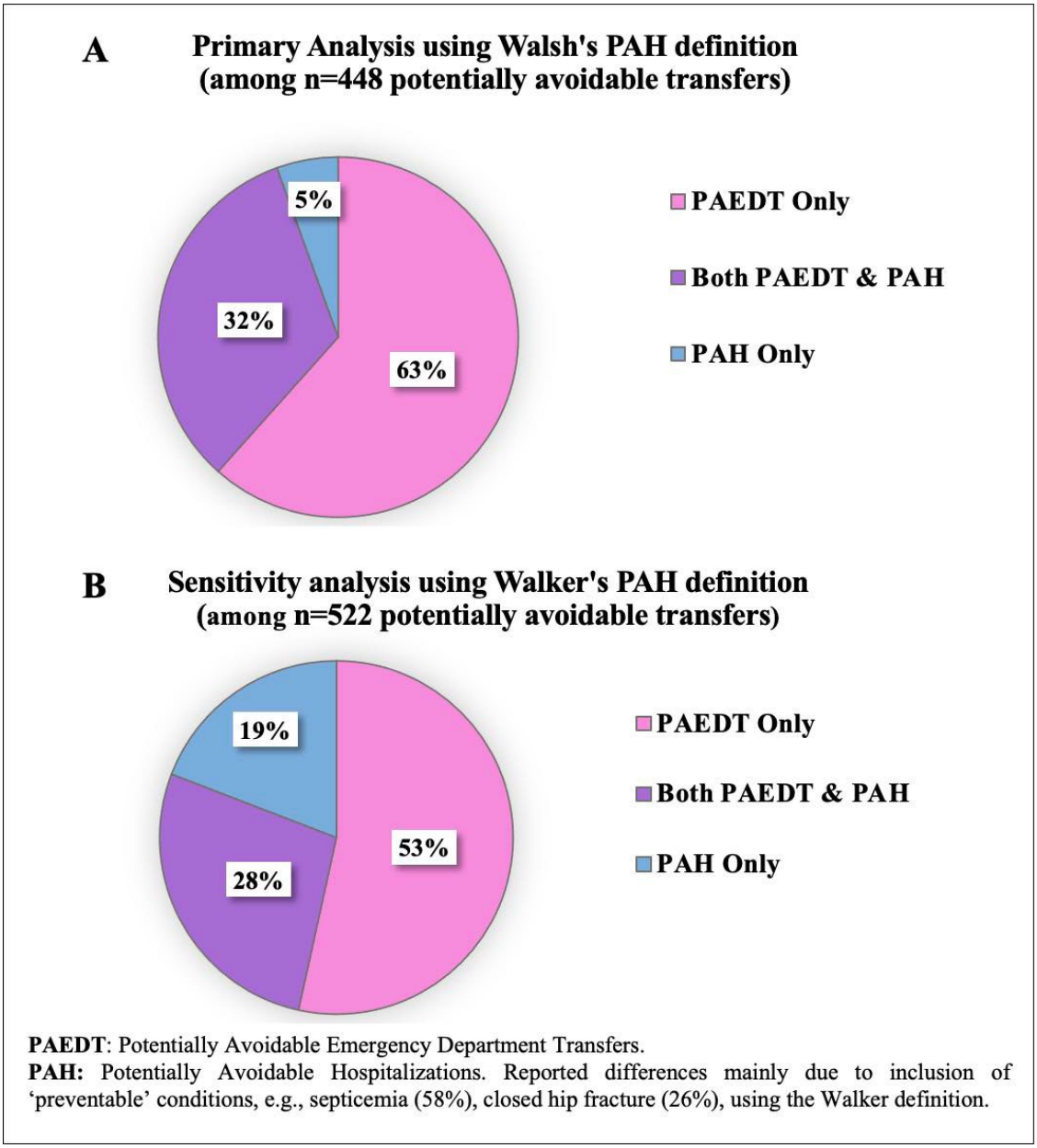

FIGURE 3. Proportions of PAEDTs and PAHs

If the goal is to effect change, it is necessary to target the source and examine relevant outcomes. For instance, we found fewer urinary tract infection-related PAEDT Category 1 transfers in Quebec compared with those in the rest of Canada, which may indicate some locally established best practices. In contrast, the frequency of transfers attributable to implanted device malfunction was particularly notable in our sample. Though this finding may indicate an area for local LTC improvement, without further details, it is hard to know whether this was due to higher prevalence of using such devices or the achievability of 'fixes' outside the hospital setting. In the rest of Canada, falls was the most frequent condition, accounting for 25% of all PAEDT Category 2 transfers.[22] In our dataset, the "injury and fracture" category captured conditions such as head injury, joint dislocations, and bone fractures, for which the underlying reasons might have been falls.

Finally, the Walker PAH definition considers transfers for 'manageable' as well as 'preventable' conditions (e.g., septicemia and closed hip fracture) as being potentially avoidable. It is our contention that the concepts of 'preventing' vs. 'managing' acute conditions in LTC should be investigated separately, given that they represent distinct sets of clinical activities within an exposure–outcome timeline. This approach would yield more focused and effective strategies to improve LTC quality of care.

Strengths and limitations

The main strength of our study is that we conducted a thorough investigation of PAEDTs both with and without subsequent hospitalization from the LTC setting. Our use of the ED database (as opposed to LTC census data) facilitated the exclusion of planned hospital visits (e.g., appointments with specialists, elective surgeries) from our sample. This was

TABLE 1.
Patient and acute care transfer-level characteristics by avoidability outcome measure

	All Transfers	*PAEDT Only*	*Both PAEDT & PAHs*	*PAH Only*	*Unavoidable Transfers*
Episodes N (%)	1,233 (100)	281 (22.8)	143 (11.6)	24 (1.9)	785 (63.7)
Female N (%)	620 (50.3)	151 (53.7)	76 (53.1)	11 (45.8)	382 (48.7)
Age at the time of the episode N (%)					
<65	139 (11.3)	27 (9.6)	10 (0.7)	6 (25.0)	96 (12.2)
65-74	154 (12.5)	36 (12.8)	15 (10.5)	1 (4.2)	102 (13.0)
75-84	345 (28.0)	87 (31.0)	38 (26.6)	8 (33.3)	212 (27.0)
85-94	495 (40.1)	113 (40.2)	61 (42.7)	8 (33.3)	313 (39.9)
>95	100 (8.1)	18 (6.4)	19 (13.3)	1 (4.2)	62 (7.9)
Time of ED arrival (work shift) N (%)					
07:59 AM – 04:00 PM (day)	598 (48.5)	144 (51.2)	67 (46.9)	10 (41.7)	377 (48.0)
04:01 PM – 12:00 AM (evening)	480 (38.9)	102 (36.3)	55 (38.5)	13 (54.2)	310 (39.5)
00:01 AM – 08:00 AM (night)	155 (12.6)	35 (12.5)	21 (14.7)	1 (4.2)	98 (12.5)
Day of the episode N (%)					
Weekday (Mon-Fri)	932 (75.6)	216 (76.9)	110 (76.9)	15 (62.5)	591 (75.3)
Weekend/Holiday	301 (24.4)	65 (23.1)	33 (23.1)	9 (37.5)	194 (24.7)
CTAS triage acuity at arrival N (%)					
Level I: Resuscitation	130 (10.5)	13 (4.6)	21 (14.7)	3 (12.5)	93 (12.5)
Level II: Emergent	391 (31.7)	47 (16.7)	70 (49.0)	7 (29.2)	267 (34.0)
Level III: Urgent	505 (41.0)	67 (23.8)	43 (30.1)	12 (50.0)	383 (48.8)
Level IV: Less urgent	201 (16.3)	151 (53.7)	9 (6.3)	2 (8.3)	39 (5.0)
Level V: Non urgent	6 (0.5)	3 (1.1)	0 (0.0)	1 (0.0)	3 (0.4)
Length of Stay (Mean ± SD)					
ED (hours)	26±19	20±17	37±18	34±19	26±19
Hospital (days)	9±15	NA	8±8	10±7	11±18
Discharge disposition N (%)					
Returned to LTC home	632 (51.3)	252 (89.7)	0 (0.0)	0 (0.0)	380 (48.4)
Hospitalized	533 (43.2)	13 (4.6)	143 (100.0)	24 (100)	353 (45.0)
Died	37 (3.0)	4 (1.4)	0 (0.0)	0 (0.0)	33 (4.2)
Institution transfer	29 (2.4)	12 (4.3)	0 (0.0)	0 (0.0)	17 (2.2)
Left without being seen	2 (0.2)	0 (0.0)	0 (0.0)	0 (0.0)	2 (0.3)

PAEDT = potentially avoidable emergency department transfers; PAH = potentially avoidable hospitalizations; ED = emergency department; LTC = long-term care

also the first study, to our knowledge, to investigate this issue in one metropolitan city hospital in the province of Quebec. Generalizability of our results to all LTC homes, however, may be limited. Choosing another Canadian province or city as a comparator was not possible due to the lack of available data, and our sample does not represent private LTC homes.

There were no reliable registries of emergency transfers recorded by LTC homes during the study period, which led

TABLE 2.
Long-term care home reasons for transfers and acute care diagnoses by avoidability outcome

		PAEDT Only	*Both PAEDT & PAH*	*PAH Only (Walsh)*	*Unavoidable Transfers*
All Transfers (N=1,233)	*N (%)*	*281 (22.8)*	*143 (11.6)*	*24 (1.9)*	*785 (63.7)*
Ten Most Common LTC Home Transfer Reasons					
Shortness of breath	234 (19.0)	42 (14.9)	70 (49.0)	4 (16.7)	118 (15.0)
Altered level of consciousness	125 (10.1)	13 (4.6)	18 (12.6)	4 (16.7)	90 (11.5)
General weakness	75 (6.1)	13 (4.6)	8 (5.6)	-	54 (6.9)
Medical device problem	72 (5.8)	43 (15.3)	1 (0.7)	-	28 (3.6)
Lower extremity injury	51 (4.1)	13 (4.6)	-	-	38 (4.8)
Abnormal lab values	45 (3.6)	5 (1.8)	3 (2.1)	3 (12.5)	34 (4.3)
Head injury	38 (3.1)	8 (2.8)	-	1 (4.2)	29 (3.6)
Abdominal pain	37 (3.0)	8 (2.8)	4 (2.8)	-	25 (3.2)
Chest pain (cardiac features)	37 (3.0)	3 (1.1)	2 (1.4)	1 (4.2)	31 (3.9)
Cough / Congestion	31 (2.5)	10 (3.6)	7 (4.9)	-	14 (1.8)
Ten Most Common Principal ED Diagnoses					
Pneumonia	80 (6.5)	26 (9.3)	54 (37.8)	-	-
Aspiration pneumonia	76 (6.2)	2 (0.7)	-	3 (12.5)	71 (9.0)
Congestive heart failure	66 (5.4)	25 (8.9)	41 (28.7)	-	-
Septicemia	55 (4.5)	-	-	1 (4.2)	54 (6.9)
Adjustment of implanted device	51 (4.1)	33 (11.7)	-	-	18 (2.3)
Urinary tract infection	45 (3.6)	33 (11.7)	12 (8.4)	-	-
Shortness of breath	40 (3.2)	4 (1.4)	-	2(8.3)	34 (4.3)
Weakness/fatigue	35 (2.8)	4 (1.4)	-	-	31 (3.9)
COPD exacerbation	34 (2.8)	15 (5.3)	19 (13.3)	-	-
Closed hip fracture	30 (2.4)	2(0.7)	-	-	28 (3.6)
Hospitalizations (N=533)	*N (%)*	*13 (2.4)*	*143 (26.8)*	*24 (4.5)*	*353 (66.2)*
Ten Most Common LTC Home Transfer Reasons					
Shortness of breath	160 (30.0)	3 (23.1)	70 (49.0)	4 (16.7)	83 (23.5)
Altered level of consciousness	72 (13.5)	2 (15.4)	18 (12.6)	4 (16.7)	48 (13.6)
General weakness	39 (7.3)	8 (5.6)	8 (5.6)	-	29 (8.2)
Lower extremity injury	24 (4.5)	-	-	-	24 (6.8)
Abdominal pain	18 (3.4)	1 (7.7)	4 (2.8)	-	13 (3.7)
Abnormal lab values	16 (3.0)	-	3 (2.1)	3 (12.5)	10 (2.8)
Vomiting and/or nausea	15 (2.8)	-	3 (2.1)	2 (8.3)	10 (2.8)
Chest pain (cardiac features)	12 (2.3)	-	2 (1.4)	1 (4.2)	9 (2.5)
Cough / Congestion	12 (2.3)	-	7 (4.9)	-	5 (1.4)
Cough and fever	12 (2.3)	1 (7.7)	6 (4.2)	-	5 (1.4)
Ten Most Common Hospital Diagnoses[a]					
Pneumonia	61 (11.4)	-	56 (39.2)	5 (20.8)	-
Septicemia	58 (10.9)	-	-	-	58 (16.4)
Aspiration pneumonia	51 (10.9)	-	-	-	51 (14.4)
Congestive heart failure	40 (7.5)	-	38 (26.6)	2 (8.3)	-
Closed hip fracture	26 (4.9)	-	-	-	26 (7.4)
COPD exacerbation	19 (3.6)	-	19 (13.3)	-	-
Shortness of breath	14 (2.6)	2 (15.4)	-	-	12 (3.4)
Urinary tract infection- urosepsis	14 (2.6)	-	13 (9.1)	1 (4.2)	-
Gastrointestinal bleeding	13 (2.4)	-	-	-	13 (3.7)
Cerebrovascular accident	12 (2.3)	1 (7.7)	-	-	11 (3.1)

[a]Five admitted transfers with missing hospitalization diagnoses were replaced with ED diagnoses.
LTC = Long-term care; PAEDT = potentially avoidable emergency department transfers; PAH = potentially avoidable hospitalizations.

us to use the MedUrge electronic tracking and flow system to identify acute care transfers. This approach generated some limitations. First, the tertiary care hospital for which this database was available captured 75% of all acute care transfers from our participating LTC homes. While we do not believe that there would be any systematic differences in terms of the characteristics of transfers sent to other hospitals during this period, it is possible that this could be the case. In addition, use of MedUrge had its own specific limitations. Firstly, principal ED diagnoses are recorded without the use of a standardized coding system. As such, we were unable to report a list of codes used to classify outcome measures. Furthermore, given that there is no post hoc linkage with the hospitalization database, we did not have access to the more precise list of diagnosis codes for residents who were subsequently admitted to hospital.

Our study included all seven LTC homes in the Network. We opted not to exclude data emanating from the smallest site that has both dedicated LTC home and rehabilitation beds, as the majority of transfers from this site are known to emanate from the LTC resident population. We had originally planned on conducting detailed resident chart reviews to document specific transfer details, fill in missing information, and validate residents from this smallest site as belonging to the LTC bed population. The advent of the COVID-19 pandemic,[45] however, prohibited researcher access to LTC homes in the province of Quebec during 2020, and this phase of our study was unfortunately cancelled. It is, therefore, possible that as much as 3% of our transfer episode study sample has been misclassified as emanating from LTC residents. Although we could not conduct our planned chart reviews due to COVID-19 pandemic-related research restrictions, we were provided access to 16 charts corresponding to 23 transfers from two participating homes. This limited access allowed us to verify that low-acuity transfers due to 'adjustment and management of implanted devices' pertained to issues with percutaneous endoscopic gastrostomy, urinary catheter, peripherally inserted central catheter lines, or nephrostomy tubes.

Future Directions

An important issue not considered in this study pertains to transfers that contravene resident advance directives. A 2019 Canadian study reported that about half of LTC residents who were transferred to hospital had explicitly declared advance directives to the contrary,[7] and in 2016 CIHI reported that, among LTC residents with a "do not hospitalize" directive, 7% were hospitalized.[8] Factors relating to the role of non-clinical stakeholders in the decision-making process should be considered, and future studies that measure avoidable transfers from this setting should consider including transfers that contravene advance directives in their results.

Although the ambulatory care sensitive condition approach can provide a literature-based portrait of the prevalence of potentially avoidable acute care transfers, it does not take into account LTC facility-level factors such as staffing characteristics, diagnostic testing and treatment capabilities, affiliation with acute care hospitals, or regional primary care availability.[1,46] Indeed, the term 'potentially' acknowledges comorbidity, disease severity, or other risk factors that may necessitate transfers.[24] We are currently designing a large observational study (covering 1,200 LTC resident beds over a three-year period) to conduct an in-depth analysis regarding the match between theory and clinical realities on the ground. This will be achieved via detailed resident chart reviews and a post hoc analysis of the underlying reasons for transferring as opposed to treating residents on site. Using these results, we will then engage front-line staff in deliberative dialogues to explore key transfer scenarios with the aim of identifying transfer-reducing strategies.

Another area of future study should include an analysis of LTC reasons for transfer and eventual ED and hospital diagnoses to better understand the trajectory of acute events resulting in the decision to transfer.

Finally, residents younger than 65 years old contributed to 11% of all transfers in our study. This group of residents is usually characterized by individuals who are developmentally disabled or who have other conditions that render them dependent for their activities of daily living. Although these younger residents may have different acute problems and recovery trajectories, functional impairment requiring around-the-clock assistance for activities of daily living is a common characteristic of those residing in LTC homes. In fact, acute care transfer rates were reported to be the highest among residents younger than 60 years-old.[47] We recommend that future studies include all LTC residents and report detailed individual-level data prior to transfers (e.g., specific signs and symptoms, dementia severity, or standardized measure of frailty). These approaches would promote developing person-centred strategies for this population.

CONCLUSIONS

Understanding the circumstances and reasons for acute care transfers from LTC homes is important for improving care in this milieu. We demonstrated that the quantification of potentially avoidable ED transfers with or without hospitalizations is an essential quality assurance measure for the frail LTC home population. Our findings have implications for this complex care setting that involve not only LTC practice and policy, but also practicing geriatricians and other stakeholders involved in the management of transitions between care settings in Canada. This study was also the first time potentially avoidable ED transfers and hospitalizations were investigated in-depth in the province of Quebec. Improved mechanisms for monitoring potentially avoidable acute care transfers should be developed to inform interventions so as to reduce them in Quebec and beyond.

ACKNOWLEDGEMENTS

The authors would like to thank: Dr. Tibor Schuster for his input regarding the study design, our collaborators in the

Integrated Health and Social Services University Network for West-Central Montreal for their data acquisition support; Megan G. Bunga for conducting verification chart reviews; and Stephanie Ballard, Principal Research Assistant and Operations Manager at the Donald Berman Maimonides Centre for Research in Aging, for proofreading.

CONFLICT OF INTEREST DISCLOSURES

We have read and understood the *Canadian Geriatrics Journal*'s policy on disclosing conflicts of interest and declare that we have none.

FUNDING

This study received doctoral training support from The Fonds de recherche du Québec—Santé (FRQ-S) and The Donald Berman Maimonides Medical Research Foundation.

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Correspondence to: Machelle Wilchesky, PhD, Donald Berman Maimonides Centre for Research in Aging, 5795 Avenue Caldwell, Montreal, QC H4W 1W3
E-mail: machelle.wilchesky@mcgill.ca