# A Profile of Residents in Prairie Nursing Homes

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## RÉSUMÉ

Les maisons de soins infirmiers sont devenues des environnements offrant des soins complexes, dont les habitants ont des besoins importants et la plupart souffrent de la démence liée a l'âge. S'appuyant sur les recherches de Hirdes et al. (2011), nous décrivons un profil des résidents dans un échantillon représentatif de 30 maisons de soins infirmiers en milieu urbain dans les provinces des Prairies, en utilisant des données de L'Instrument d'évaluation des résidents/le recueil de données minimum (Resident Assistant Instrument – Minimum Data Set 2.0) de 5 196 évaluations résidents accomplies entre le 1ier octobre et le 31ieme décembre 3011. Les résidents avaient principalement plus de 85 ans, étaient des femmes, et souffraient d'une démence liée à l'âge. Nous avons comparé le soutien et les services connexes des établissements et les caractéristiques des résidents par province, par les modèles du propriétaire-gérant, et par le nombre d'unités dans une installation. Nous avons également constaté que les établissements publics ont tendance à s'occuper des résidents ayant des caractéristiques plus exigeants : notamment, la déficience cognitive, un comportement aggressif, et l'incontinence. Aucune tendance claire n'a été observée reliant le nombre d'unités dans un établissement aux caractéristiques des résidents.

## ABSTRACT

Nursing homes have become complex care environments where residents have significant needs and most have age-related dementia. Building on research by Hirdes et al. (2011), we describe a resident profile in a representative sample of 30 urban nursing homes in the prairie provinces using Resident Assessment Instrument – Minimum Data Set 2.0 data from 5,196 resident assessments completed between 1 October 2007 and 31 December 2011. Residents were chiefly over age 85, female, and with an age-related dementia. We compared facility support and related services and resident characteristics by province, owner-operator model, and number of facility units. We observed differences in support and related services by both unit count and province. We also found that public facilities tend to care for residents with more demanding characteristics: notably cognitive impairment, aggressive behaviours, and incontinence. No clear trends associating the number of units in a facility with resident characteristics were observed.

Correspondence and requests for offprints should be sent to / La correspondance et les demandes de tirés-à-part doivent être adressées à:

Carole A. Estabrooks, Ph.D.
University of Alberta
Faculty of Nursing
11405 87 Avenue
Edmonton, AB T6G 1C9
(carole.estabrooks@ualberta.ca)

## Background

Older adults (age 65 and older) are the fastest-growing age group in the Canadian population. This population trend is expected to continue and accelerate due to below-replacement fertility rates, an increase in life expectancy, and the aging of the post-World War II baby boom generation. In 2011, an estimated five million Canadians were age 65 or older; this number is expected to reach 10.4 million by 2036. By 2051, about 25 per cent of Canadians are expected to be age 65 or older (Human Resources and Skills Development Canada, 2012; Statistics Canada, 2012b). With this increasing longevity comes a sharp rise in the number of Canadians with age-related dementias. Presently, one in 40 Canadians age 65–74 and one in three Canadians age 85 and older have an age-related dementia (Canadian Institutes of Health Research, 2010; Canadian Study of Health and Aging Working Group, 1994). The *Rising Tide* report projects this to rise from 480,600 in 2008 to 1.125 million by 2038 (Alzheimer Society of Canada, 2010). The current per capita cost associated with age-related dementia is $32,865, for a total estimated annual cost in Canada of $16 billion, at least half of which is related directly to nursing home care (Alzheimer Society of Canada, 2010).

Despite decreasing per capita nursing home use rates, 20 per cent of men and one in three women over age 85 reside in nursing homes (Doupe, Fransoo, et al., 2011). Recent projections estimate that older adults will require between 29 per cent and 49 per cent more nursing home beds by 2031 (Doupe, Fransoo, et al., 2011).

Nursing homes in Canada have become complex care environments (Berta, Laporte, Zarnett, Valdmanis, & Anderson, 2006; Doupe, Brownell, et al., 2011; Hirdes, Mitchell, Maxwell, & White, 2011; Menec, MacWilliam, Soodeen, & Mitchell, 2002) with approximately 60 per cent of residents having significant and often co-morbid needs, and with 70 per cent having an age-related dementia (Canadian Study of Health and Aging Working Group, 1994; Doupe et al., 2006; Doupe, Brownell, et al., 2011; Gruber-Baldini et al., 2009).

Several provincial (e.g., British Columbia Office of the Ombudsperson, 2010; Dunn, 2005; Long-Term Care Task Force Ontario, 2012), national (e.g., National Advisory Council on Aging, 2005), and international (e.g., OECD, 2013) reports describe indicators of sub-optimal quality of nursing home care with less than clear evidence as to why such poor quality conditions exist. While much work remains to be done in improving quality of care for nursing home residents, a significant development in nursing home care across Canada towards achieving this goal has been the implementation of the Resident Assessment Instrument – Minimum Data Set Instrument (RAI-MDS 2.0) in many jurisdictions. The RAI-MDS 2.0 is a comprehensive, multidimensional resident assessment approach (http://www.interrai.org/) designed to assess resident strengths, needs, and potential risks in order to inform individualized care planning and monitoring. The RAI-MDS 2.0 has been reported to be a valid and reliable instrument (Hawes et al., 1995; Hutchinson et al., 2010; Poss et al., 2008; Snowden et al., 1999). The data have been shown to have equivalent reliability and validity to research databases of persons in residential care (Phillips & Morris, 1997) and have been used in significant research initiatives (Bernabei et al., 1999; Jonsson et al., 2012). The data emerging from the RAI-MDS 2.0 instrument have considerable potential to inform decision making and quality of care in nursing homes.

Recently, Hirdes et al. (2011) published a paper using data collected with several InterRAI assessment instruments (including RAI-MDS 2.0). Their analysis was at the provincial level (i.e., they aggregated all individual resident RAI data within each province and territory to obtain provincial values). Hirdes et al. (2011) found that the majority of nursing home residents in these Canadian samples were female, comprising approximately two thirds of the long-term care population. Dementia was a common diagnosis, affecting the majority of persons in nursing home settings (40.9%–70.8% of residents). Additionally, many residents had significant co-morbidities including diabetes, heart failure, and/or emphysema/COPD (chronic obstructive pulmonary disease). Selected Clinical Assessment Protocols (CAPs) that may be used to trigger care plan development and to identify needs at the person and population levels were also assessed. Similar to co-morbidities, CAPs were also shown to vary by province or territory with many CAPs being their highest in

western Canadian facilities. For example, delirium, restraint use for people needing help with *any* activities of daily living, and falls were all highest in one or more of the western provinces. Selected resident outcomes (e.g., aggressive behaviour and depression) were also higher in the west compared to the rest of Canada.

Hirdes et al. (2011) confirmed that the needs of older people in nursing homes in Canada are complex and that quality of care varies substantially between and within provinces. One limitation of their research was the absence of a representative sample of nursing homes across the regions they included in their report. In addition, these data are provided at the province level. We have demonstrated previously that resident quality care varies within facilities at the clinical microsystem (i.e., resident care unit) level (Estabrooks, Morgan et al., 2011). From a quality improvement perspective, we know that targeting quality improvement efforts at the microsystem level is essential for the betterment of care (Mohr, Batalden, & Barach, 2004; Nelson et al., 2002). These microsystems are also shown to be the location of essential quality, safety, reliability, efficiency, and innovation efforts. Studies from various organizations including nursing homes in the United States (Nelson, Batalden, & Godfrey, 2007), the United Kingdom (Williams, Dickinson, Robinson, & Allen, 2009), and Scandinavia (Kjøs, Botten, Gjevjon, & Romøren, 2010) have demonstrated that when these microsystems are identified and supported they can improve the quality, efficiency, and safety of care processes.

Collectively, therefore, this article addresses two specific research objectives, both exploratory in nature. First, in building on the research conducted by Hirdes et al. (2011), we have compared nursing home facility and resident characteristics, and also the risk-adjusted quality indicator rates, across a representative sample of urban nursing homes in the prairie provinces (Alberta, Saskatchewan, Manitoba) using data collected from RAI-MDS 2.0 as part of the Translating Research in Elder Care (TREC) Program (Estabrooks, Hutchinson et al., 2009; Estabrooks, Squires, Cummings, Teare, & Norton, 2009). Second, across all provinces combined, we have compared these same outcomes across nursing homes by count of resident care units, assessing how the organizational structure at the sub-facility level impacts factors such as quality care.

## Translating Research in Elder Care (TREC) Program

TREC is a multi-level (provinces, regions, facilities, units within facilities, individuals) and longitudinal research program. The purpose of TREC is to identify modifiable characteristics of organizational context (i.e., the work environment) in nursing homes that are associated with the use of best practices by care providers and the subsequent impact of organizational context and use of best practices on resident and staff outcomes (Estabrooks, Hutchinson et al., 2009; Estabrooks, Morgan et al., 2011; Estabrooks, Squires, Hayduk, Cummings, & Norton, 2011). TREC is situated in 36 nursing homes in the three Canadian prairie provinces of Alberta, Saskatchewan, and Manitoba. The 36 nursing homes comprised 30 urban and six rural nursing homes. Stratified (by health care region, owner-operational model, and size) random sampling was used to select the 30 urban nursing homes; the six rural nursing homes represented a convenience sample from Saskatchewan. As part of TREC, we obtained data from the RAI-MDS 2.0 routinely collected by the 36 participating nursing homes. In this article, we report on the RAI-MDS 2.0 data from the 30 urban nursing homes for the period April 1, 2009, to March 31, 2010.

## Methods

The sample of 30 urban residential long-term care facilities was drawn from the TREC study, as described. Within the urban sample of 30 nursing homes, two were veteran's facilities. All facilities used the RAI-MDS 2.0 assessment as part of regular clinical practice, with residents assessed on admission and reassessed at 3-month intervals, or sooner in cases of significant clinical change. Resident assessment data were recorded by the facilities and processed according to each facility's vendor arrangements. They were then transmitted to provincial repositories and, in some cases [Saskatchewan, Manitoba], also submitted to the Canadian Institute for Health Information. These data were subsequently de-identified and provided to the research team who performed further assessments for data quality and completeness. The care unit in which residents resided at the time of assessment, as well as other descriptive information, was also provided to the research team – captured within these data. Specific variables, file structure/format, and methods for securely transferring and storing these health data were approved by Research Ethics Boards for the respective jurisdictions; they were also negotiated with the appropriate data stewards and complied with provincial privacy commissioner standards. Timelines for the research team to receive these data were negotiated with their respective data stewards.

Facilities provided data from October 2007 to September 2010. Assessments completed between April 1, 2009, and March 31, 2010, were selected for analysis. A cross-sectional sample of 5,196 assessments was prepared by taking the last assessment completed among residents during that period. If that assessment was the quarterly form (and had some omitted items), then the prior full

assessment was used to inform those items. Descriptive items (for example, continence status) were taken directly from recorded items. Outcome scales for activities of daily living, cognition, pain, depressive symptoms, and health instability were computed. Quality indicators (QIs) were selected to represent practice-sensitive care domains, a subset of those supported by the Canadian Institute for Health Information's Continuing Care Reporting System. These QIs require assessments for a 12-month period; the one-year period ending March 31, 2010 was used. We used risk-adjusted rates. Risk adjustment employs both resident-level co-variate adjustment as well as a direct adjustment method to control for overall important differences among facilities (Jones et al., 2010). In cases where the resident may have resided in more than one unit during that period, for QI reporting they were assigned to the last unit identified during the 12-month period. Reported rates are the average of facility rates, within unit-count membership. Overall QI rates are the averaged rates of all 30 facilities.

## Results

Table 1 provides a summary of facility and unit characteristics. Homes are characterized according to the number of units (1, 2, 3, 4 or more). The average facility size among the 30 homes was 133 beds. The majority (77%) were not-for-profit homes; 30 per cent were small homes (35–79 beds), 30 per cent were medium size (80–120 beds), and 40 per cent were large homes (> 120 beds); half of the homes were in Alberta (see Table 2). All ownership types had at least one facility in each of the unit counts. Alberta had at least two homes in each unit count, with Manitoba having no 1-unit facilities, and Saskatchewan having no facilities with 4 or more units. The 94 units averaged 43 beds each, with more than half of all units found in facilities with 4 or more units. About 65 per cent of the units were classified as general, about 30 per cent were secure dementia, and 5 per cent combined long-term care and dementia. A single unit in the sample was classified as mental health.

When we considered support and related services (having a clinical educator, nurse practitioner, and medical director; average number of allied, and of specialized, services), we found that unit count was related to some differences (average number of allied and other specialized services), but more differences were apparent when province was considered. In this regard, Saskatchewan facilities differ from Alberta and Manitoba:

**Table 1: Facility/unit description**

| Structural characteristics | 1 unit | 2 units | 3 units | 4+ units | All | | | |
|---|---|---|---|---|---|---|---|---|
| Number of facilities | 5 | 7 | 9 | 9 | 30 | | | |
| Average beds/facility | 60 | 101 | 135 | 197 | 133 | | | |
| Ownership | | | | | | | | |
| for profit | 2 | 1 | 2 | 2 | 7 | | | |
| public | 1 | 2 | 1 | 3 | 7 | | | |
| voluntary | 2 | 4 | 6 | 4 | 16 | | | |
| Province | | | | | | | | |
| Manitoba | 0 | 1 | 4 | 3 | 8 | | | |
| Saskatchewan | 2 | 4 | 1 | 0 | 7 | | | |
| Alberta | 3 | 2 | 4 | 6 | 15 | | | |
| Total units | 5 | 14 | 27 | 48 | 94 | | | |
| Unit types | | | | | | | | |
| general | 2 | 10 | 20 | 29 | 61 | | | |
| secure dementia | 1 | 4 | 5 | 17 | 27 | | | |
| combined LTC/dementia | 2 | 0 | 2 | 1 | 5 | | | |
| mental health | 0 | 0 | 0 | 1 | 1 | | | |
| Support and related characteristics | | | | | | AB | SK | MB |
| have clinical educator | 80% | 43% | 78% | 89% | 73% | 87% | 29% | 88% |
| average number of allied services | 6.4 | 7.1 | 9.4 | 9.7 | 8.5 | 9.1 | 6.0 | 9.4 |
| have nurse practitioner | 0% | 0% | 33% | 11% | 13% | 7% | 0% | 38% |
| average of specialized services* | 2.6 | 3.3 | 3.6 | 3.4 | 3.3 | 3.5 | 2.6 | 3.5 |
| have medical director | 80% | 57% | 89% | 100% | 83% | 100% | 29% | 100% |

**\* Specialized services include geriatric mental health counselling, geriatrician, psychiatrist, and palliative care specialist.**
**AB = Alberta**
**LTC = long-term care**
**MB = Manitoba**
**SK = Saskatchewan**

**Table 2:  Size and owner-operator model of sample in the three provinces**

| Province | | Size | | | Owner-operator model | | All n |
|---|---|---|---|---|---|---|---|
| | | Small* n (%) | Medium* n (%) | Large* n (%) | Non-profit** n (%) | For-profit n (%) | |
| **AB** | **TREC sample** | 6 (40%) | 2 (13%) | 7 (47%) | 12 (80%) | 3 (20%) | 15 |
| | **Total AB** | (46%) | (24%) | (31%) | (83%) | (17%) | |
| **SK** | **TREC sample** | 3 (43%) | 2 (29%) | 2 (29%) | 5 (71%) | 2 (29%) | 7 |
| | **Total SK** | (63%) | (21%) | (16%) | (96%) | (4%) | |
| **MB** | **TREC sample** | 0 (0%) | 5 (63%) | 3 (38%) | 6 (75%) | 2 (25%) | 8 |
| | **Total MB** | (42%) | (29%) | (29%) | (81%) | (19%) | |
| **All** | **TREC All** | 9 (30%) | 9 (30%) | 12 (40%) | 23 (77%) | 7 (23%) | 30 |
| | **Total All** | (50%) | (24%) | (26%) | (83%) | (17%) | |

\* small = 35–79 beds; medium = 80–120 beds; large > 120 beds
\*\* includes public not for profit and voluntary (not for profit)
AB = Alberta
MB = Manitoba
SK = Saskatchewan
TREC = Translating Research in Elder Care

fewer Saskatchewan facilities have a clinical educator, medical director, or nurse practitioner, and allied and specialized services are notably less common.

Table 3 summarizes selected characteristics by unit count, province, and operator model. Overall, residents averaged 85 years of age and two thirds were female, the latter varying by facility unit count, with 61 per cent in 2-unit facilities and nearly 75 per cent in those with 3 units. More than 60 per cent had a diagnosis of either Alzheimer's disease or another dementia, and one fifth had experienced a stroke that affected their functional status. The mental health diagnoses of schizophrenia or bipolar disorder were rare, and unsurprisingly highest in 4-unit facilities that included the single mental health unit in our study. Residents had high rates of physical dependency and cognitive impairment; more than one quarter experienced pain every day; and nearly half exhibited some responsive behaviours that are considered aggressive: verbally abusive, physically abusive, socially inappropriate, or resisting care. Over 30 per cent showed notably unstable health, suggesting symptoms or a recent decline that is predictive of mortality. More than one third showed depressive symptoms consistent with at least minor depressive illness. Frequent bladder and bowel incontinence were present in 65 per cent and 44 per cent of residents respectively. Over half reported taking nine or more medications in a 7-day period, and one in six had fallen in the past 30 days.

Provincially, Manitoba facilities tend to be distinctive, with residents being somewhat older, more likely to be female, more likely to have dementia, and less likely to be highly physically dependent, with more-stable health status and taking fewer medications. Operator model differences are apparent in that public facilities tend to care for residents with more-demanding characteristics, notably cognitive impairment, aggressive behaviours, and incontinence. No clear trends connecting the number of units in a facility to resident characteristics were found; however, some differences were apparent. For example, higher rates of pain were evident in 2-unit facilities, and lower rates were evident in those with 3 units. Single-unit facilities had lower proportions of residents with a recorded fall; they also had higher rates of bladder incontinence and of an individual's taking nine or more medications.

The seventh column in Table 3 presents the average range, among facilities with 2 or more units, of the highest value unit and the lowest, for a given measure. For example, 27.1 per cent of all residents reported daily pain, but this averaged 16.8 per cent in the lowest-pain unit and 37.2 per cent in the highest-pain unit, for an average range of 20.4 per cent. For most of the measures in this table, the range is at least half the absolute value of the measure itself, suggesting significant differences by unit, within facilities.

Tables 4 and 5 present rates of selected quality indicators, with risk adjustment applied. Some differences can be seen across the unit-count groups, but they are minor with no trend from single to multi-unit facilities (see Table 4). The 2-unit facility group has the lowest rate for declining behaviour and physical restraints, and the highest rate for indwelling catheter, urinary tract infections (UTIs), falls, and feeding tubes. Similar to the descriptive characteristics, the range of QI rates among units within a facility is notable.

Provincially, Alberta facilities tend to show less-desirable QI rates, higher for worsening pain, delirium, and decline in behaviour, mood, and activities of daily living (ADL; see Table 5). Rates of indwelling catheter

**Table 3: Resident characteristics**

| Resident characteristics | Size | | | | | | Province | | | Owner-operator model | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 unit | 2 units | 3 units | 4+ units | All | Where 2+ units, avg range high to low unit | AB | SK | MB | Private for profit | Public | Voluntary |
| *Number of residents* | 360 | 950 | 1,567 | 2,319 | **5,196** | | 2,890 | 884 | 1,422 | 1,346 | 1,222 | 2,628 |
| Mean age (SD) | 85.7 (8.3) | 85.6 (9.1) | 86.0 (9.0) | 84.3 (9.9) | **85.1 (9.4)** | 3.5 | 84.2 (9.7) | 85.3 (9.7) | 86.9 (8.3) | 85.6 (9.1) | 84.3 (9.6) | 85.2 (9.4) |
| % female | 69.2% | 60.6% | 74.5% | 63.6% | **66.8%** | 17.9% | 60.5% | 69.5% | 77.8% | 73.6% | 52.6% | 69.9% |
| Median LOS at assessment | 648 | 516 | 593 | 603 | **580** | 351 | 563 | 511 | 645 | 553 | 647 | 583 |
| % Alzheimer's or other dementia | 56.9% | 57.6% | 64.4% | 64.1% | **62.5%** | 35.3% | 62.9% | 55.6% | 66.0% | 57.7% | 60.1% | 66.1% |
| % stroke | 21.7% | 25.8% | 19.5% | 18.2% | **20.2%** | 17.4% | 19.5% | 25.6% | 18.3% | 19.2% | 18.0% | 21.8% |
| % schizophrenia or bipolar | 2.3% | 3.5% | 3.7% | 5.1% | **4.3%** | 7.8% | 4.3% | 5.2% | 4.1% | 3.4% | 5.3% | 4.2% |
| % requires extensive physical assistance (ADLh 4+) | 55.3% | 51.6% | 48.6% | 48.8% | **49.7%** | 23.5% | 52.5% | 51.7% | 42.9% | 48.7% | 52.3% | 49.0% |
| % moderate/severe or higher cognitive impairment (CPS 4+) | 38.3% | 40.2% | 41.9% | 36.1% | **38.8%** | 33.8% | 41.7% | 33.1% | 36.4% | 35.0% | 45.4% | 37.6% |
| % daily pain | 29.4% | 35.7% | 19.8% | 28.1% | **27.1%** | 20.4% | 27.6% | 32.7% | 22.4% | 30.4% | 28.1% | 24.9% |
| % any aggressive behaviour | 40.8% | 44.3% | 45.0% | 49.3% | **46.5%** | 32.6% | 54.7% | 31.9% | 38.8% | 43.1% | 60.1% | 41.9% |
| % unstable health (CHESS 2+) | 30.5% | 45.5% | 27.2% | 29.9% | **31.1%** | 20.4% | 34.6% | 36.6% | 22.7% | 28.9% | 37.3% | 28.85 |
| % depressive symptoms (DRS 3+) | 30.1% | 39.8% | 27.4% | 36.2% | **33.8%** | 24.9% | 42.8% | 23.9% | 21.5% | 36.3% | 43.7% | 27.8% |
| % frequently incontinent – bladder | 70.0% | 64.9% | 62.9% | 65.4% | **64.9%** | 22.9% | 68.4% | 64.1% | 58.1% | 62.4% | 69.6% | 63.9% |
| % frequently incontinent – bowel | 43.3% | 35.6% | 43.2% | 47.0% | **43.5%** | 27.2% | 51.4% | 27.6% | 37.3% | 37.0% | 57.0% | 40.6% |
| % on 9+ medications last 7 days | 61.7% | 58.5% | 46.0% | 57.3% | **54.4%** | 23.1% | 62.1% | 58.4% | 36.2% | 55.6% | 61.4% | 50.6% |
| % fell in last 30 days | 12.2% | 20.2% | 16.4% | 16.1% | **16.7%** | 12.4% | 16.6% | 16.4% | 17.0% | 14.4% | 19.0% | 16.8% |

AB = Alberta
ADL = activities of daily living
CHESS = Changes in Health, End-stage disease and Symptoms and Signs
CPS = Cognitive Performance Scale
DRS = Depression Rating Scale
LOS = Length of Stay
ADLh = Activities of Daily Living Hierarchy Scale
MB = Manitoba
SK = Saskatchewan

**Table 4: Risk-adjusted (facility level) rates for quality indicators by the number of units in a facility**

| Facility rates, risk adjusted (higher numbers are worse) | 1 unit | 2 units | 3 units | 4+ units | All | Where 2+ units, average range high to low unit |
|---|---|---|---|---|---|---|
| Pressure ulcer prevalence (stage 2+) | 5.4% | 5.5% | 6.1% | 6.8% | 6.1% | 7.1% |
| Worsening pain | 11.5% | 9.1% | 12.7% | 12.4% | 11.6% | 6.8% |
| Indwelling catheter | 5.5% | 6.8% | 5.7% | 4.9% | 5.7% | 8.5% |
| Urinary tract infection (UTI) | 6.7% | 7.0% | 5.2% | 5.0% | 5.8% | 4.8% |
| Delirium | 18.7% | 18.7% | 19.8% | 20.9% | 19.7% | 15.1% |
| Declining behavioural symptoms | 13.6% | 9.5% | 10.8% | 12.5% | 11.5% | 8.0% |
| Decline in mood | 26.8% | 22.2% | 21.7% | 22.8% | 23.0% | 11.2% |
| Late-loss ADL | 21.7% | 16.1% | 19.6% | 19.6% | 19.1% | 10.6% |
| Unexplained weight loss | 5.7% | 8.4% | 5.1% | 4.7% | 5.9% | 5.6% |
| Fallen in last 30 days | 12.9% | 17.0% | 16.5% | 15.4% | 15.7% | 12.9% |
| Antipsychotic use without psychosis | 31.8% | 31.0% | 26.9% | 26.4% | 28.5% | 23.6% |
| Physical restraint use | 11.3% | 8.3% | 14.2% | 14.1% | 12.3% | 13.2% |
| Feeding tube | 4.0% | 5.9% | 1.8% | 3.5% | 3.6% | 6.2% |

ADL = activities of daily living

and weight loss are the highest among Saskatchewan homes, while Manitoba homes are notable for lower rates of UTI and feeding tubes. QI rates by operator model show generally less-desirable rates in public facilities, notably for delirium, as well as declines in behaviour and ADL. Private for-profit facilities were found to have much higher rates of physical restraints.

## Discussion

The comprehensive nature of the RAI-MDS 2.0 assessment supports a highly detailed picture of these sampled facilities. Important clinical characteristics can be reliably reported and compared, and indicators of outcomes of care, adjusted for risk and facility factors, can be tabulated in the form of quality indicators. Along with other information (ownership, size, number of units, support services, and province), this detailed picture becomes even more complex.

The differences in facilities according to unit count were often minor, with each of the four groups counting both best and worst rates for the selected quality indicators. There is little to suggest a link between the number of units (and, by extension, size of facility) with the types of residents served or the outcomes of care. However, differences by province are more clearly expressed in this sample, with Manitoba showing a more skewed resident

**Table 5: Risk-adjusted (unit level) rates for quality indicators by province and operator model**

| Unit rates, risk adjusted (higher numbers are worse) | Province | | | Operator Model | | |
|---|---|---|---|---|---|---|
| | AB | SK | MB | Private for-profit | Public | Voluntary |
| Pressure ulcer prevalence (stage 2+) | 5.1% | 6.0% | 5.2% | 6.3% | 4.0% | 5.5% |
| Worsening pain | 15.4% | 8.7% | 6.9% | 11.0% | 15.1% | 10.6% |
| Indwelling catheter | 4.5% | 8.2% | 3.7% | 5.8% | 3.9% | 4.8% |
| Urinary tract infection (UTI) | 5.9% | 7.7% | 3.9% | 5.2% | 6.5% | 5.2% |
| Delirium | 26.1% | 12.6% | 15.6% | 17.4% | 31.2% | 17.5% |
| Declining behavioral symptoms | 15.0% | 8.3% | 7.5% | 11.4% | 15.4% | 10.2% |
| Decline in mood | 28.3% | 21.2% | 12.9% | 24.3% | 27.1% | 20.0% |
| Late-loss ADL | 25.0% | 18.5% | 10.8% | 16.4% | 27.0% | 17.6% |
| Unexplained weight loss | 5.2% | 9.8% | 3.1% | 5.1% | 5.7% | 5.0% |
| Fallen in last 30 days | 15.7% | 14.8% | 17.8% | 13.3% | 18.4% | 16.2% |
| Antipsychotic use without psychosis | 27.5% | 35.3% | 27.8% | 26.1% | 25.9% | 31.0% |
| Physical restraint use | 11.4% | 9.6% | 15.0% | 18.5% | 6.8% | 12.6% |
| Feeding tube | 3.4% | 6.6% | 0.4% | 2.4% | 4.7% | 2.3% |

AB = Alberta
ADL = activities of daily living
MB = Manitoba
SK = Saskatchewan

profile (older, women, dementia) and with Alberta, QI results that suggest more rapid decline. The latter may be a reflection of provincial policy shifts in the early to mid-2000s to enhance community supports for the elderly population with more living options that are more supportive and thus later admission to nursing homes.

The sampling in the TREC study (30 urban prairie province facilities, stratified by size and randomly selected) was not explicitly designed to be representative of homes with different numbers of units, nor of each of the three provinces, but rather to provide a sample representative of the prairie region. That said, the provincial differences suggest that each province has developed a residential care system distinctive of the needs, and perhaps the values, of each. Some may be grounded in provincial demographics and differences in health status among older adults, while others reflect capacity in community supports (both formal, such as housing and home care, and informal that can vary by marital status or number and proximity of adult children). The number of nursing home beds is known to vary by province, with reports from Statistics Canada supporting numbers per 1,000 residents over age seventy-five as 79, 95, and 107 for Alberta, Manitoba, and Saskatchewan respectively (Statistics Canada, 2012a). This can explain, in part, the differences found here. Other alternatives such as assisted or supportive living or hospital-based continuing care capacity will influence who occupies nursing home beds.

It is important to recognize that our analyses in this paper compares, at the facility level, variation in study outcomes by nursing home organizational structures (for facilities with one versus four or greater resident care units). While resident care units are an essential level by which to monitor and improve quality care, our analyses to date using TREC data do not compare the intra-facility variation in quality care by these functional units. These types of analyses, however, are highly feasible using TREC data. Measuring objectively, on a Western Canadian sample of nursing homes, the degree to which risk adjusted quality indicators vary within facility by unit, is important for identifying features at the microsystem level associated with positive care. Understanding both this degree of variation and microsystem attributes associated with quality care, may be instructive to develop more optimal RAI QI reporting strategies and for developing more targeted quality care improvement initiatives.

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