



OFFICE OF THE  
**SENIORS** ADVOCATE  
BRITISH COLUMBIA

# From Residential Care to Hospital:

## An Emerging Pattern





This report resulted from the feedback I received from emergency room clinicians. Working alongside front line staff in six different hospitals throughout the province, I heard a common complaint. Many felt that some care homes in their area were sending residents to the emergency department unnecessarily. This sparked the question “*what do the data tell us about who is going to the emergency department and is there a pattern that predicts a particular care home is more likely to call the ambulance?*”

In looking for an answer to the question, we found a rich repository of data and information that demonstrate a strong pattern of emergency department visits, hospitalization rates and death in hospital for a particular group of care homes based on the type of operator. If you are a resident living in a licensed care facility operated by a *contracted* provider versus one operated by a health authority, you are:

- **32% more likely** to be sent to the emergency department
- **34% more likely** to be hospitalized
- Your length of stay in hospital will be **32% longer**
- There is a **47% greater likelihood** that you will not return to the facility you came from and you will become an alternative level of care (ALC) patient
- **54% more likely** to die in the hospital

If contracted care facilities performed as well as health authority operated facilities, the health care system would:

- Save \$17 million annually
- Increase capacity by freeing up 16,246 hospital beds each year
- Improve health outcomes for frail seniors via decreases in adverse events and hospital deaths

This is an important issue. Hospital congestion and costs are increasing and improving the care and quality of life for seniors in residential care is a goal we all want to achieve. Looking at the evidence to guide our efforts and focus our priorities will be the best path forward to needed systemic change.

I want to thank the many nurses and physicians in emergency rooms across the province who took the time to share their thoughts and observations with me, and I want to thank the OSA research team including Dr. Jeff Poss from the University of Waterloo and Dr. Kim McGrail from the University of British Columbia, the B.C. Ministry of Health and the Canadian Institute of Health Information for your data and analysis. I continue to be inspired by the many people who want to improve the lives of B.C. seniors.

*The attached report has updated cost savings and ALC numbers compared to the August 1, 2018, report. Details on these, and all other calculations and modeling, can be found in Appendix A.*

Sincerely,

Isobel Mackenzie  
Seniors Advocate, Province of British Columbia

# From Residential Care to the Hospital: A Pattern Emerges

## Introduction

Since its inception, the Office of the Seniors Advocate (OSA) has conducted research on various aspects of the residential care sector. In British Columbia, almost 28,000 seniors live in one of 293 publicly subsidized residential care facilities, sometimes referred to as nursing homes. Residents of these facilities are generally the most frail and vulnerable members of the senior population.

All British Columbians are entitled to access a subsidized residential care bed. You are assessed for eligibility based on a functional assessment, while a financial assessment determines how much you will pay. The real cost of subsidized residential care ranges from \$6,000-\$7,500 per month. Residents, however, pay only 80% of their after tax income, up to a maximum capped rate of \$3,278 per month. Currently, the average fee charged to residents is \$1,685 per month; 30% of residents pay the minimum of \$1,130 per month and only 7% pay the maximum capped rate of \$3,278.

Currently in B.C., about 90% of all long term care beds are subsidized. Private-pay beds can be co-located in a facility that also has subsidized beds (approximately 100 contracted facilities have a combination of private-pay and subsidized beds) or the facility can be entirely devoted to private-pay residents. This report excludes those facilities with no subsidized beds.

Of the 293 publicly subsidized care facilities in British Columbia, 32% of beds are in facilities operated directly by the health authority, while the majority (68%) of beds are in facilities operated by contracted care providers under a contractual arrangement with the health authority. The contracted care providers are an equal mix of not-for-profit organizations and private companies.

There is often debate about the quality of care and cost differences between a publicly operated facility and a contracted facility. The Office of the Seniors Advocate collects large amounts of data and information on both public and contracted care homes in the province. For most quality indicators, there is no statistically significant difference between contracted long term care facilities and those operated by a health authority. On average, contracted facilities do provide less physiotherapy, occupational therapy and recreation therapy than public facilities; however, they are funded on average for fewer hours of direct care and an accurate comparison of these therapy services cannot be made until the funding is standardized. We know that contracted facilities have more substantiated complaints and reportable incidents than public facilities, but in the recent province-wide satisfaction survey of all subsidized contracted and public care facilities in the province, there was no overall difference in the level of satisfaction and quality of life indicators between those facilities operated by a health authority (public) and those facilities operated by the contractors.

There is one area, however, with a statistically significant difference between facilities that are publicly operated and those that are operated by the contracted providers—emergency department use and hospitalization rates.

The OSA examined multi-year data for all subsidized care facilities in B.C. Of the 293 subsidized residential care facilities in B.C. at the time of the review, 212 facilities were included in the review of emergency department transfers. These facilities represent 82% of all residential care beds in the province. The decision to include most, but not all residential care facilities was based on accessing the best available data for hospitals and emergency rooms – the Canadian Institute for Health Information’s (CIHI) National Ambulatory Care Reporting System (NACRS). As not all hospitals in B.C. are reporting information to the NACRS database, we chose to focus on those geographic areas with hospitals reporting NACRS data. Those hospitals that were excluded were generally smaller hospitals in more remote parts of the province. Additionally, we reviewed interRAI MDS 2.0 datasets for those residents who experienced a transfer to the emergency department. The interRAI MDS 2.0 assessment is the functional assessment given to all residents on a quarterly and annual basis (as well as upon admission), and is used in all of B.C.’s subsidized residential care facilities. The Discharge Abstract Database (DAD) is used by all hospitals and was used for the review of hospitalization rates, length of stay, ALC, and death in hospital for all 293 facilities. This information, taken together, provides an interesting picture of the care facility transfer to emergency department patterns in B.C., including information about the reason for transfers.

The 24 acute hospitals with NACRS data are urban hospitals and, as a result, the outcome of our emergency department analysis may not be applicable to rural areas. We reviewed data for resident transfers from the 212 care facilities whose pattern of transfers were to the 24 NACRS sites. Of the 212 care facilities included in the study, 25% (52 facilities) are health authority operated and 75% (160 facilities) are contracted facilities operating subsidized beds under contract with a health authority. We explored all available emergency department data and inpatient data for acute, unplanned hospitalizations (excluding admissions for elective and otherwise planned procedures). Additionally, we reviewed the primary admitting diagnosis assigned in hospital to understand whether some reasons for transfer and admission were more common than others. In each of these data reviews we focused on the care facility population aged 65 or older because older persons make up most (about 94%) of the people living in care facilities. The remaining 6% are under age 65 and were excluded from our analysis.

Further information on data sources and methodology can be found in Appendix A.

The results of this research indicates that, all things being equal, if you live in a **contracted** facility, you are:

- **32% more likely** to be sent to the emergency department.
- **34% more likely** to be hospitalized.
- Once admitted, your length of stay is **32% longer**.
- Your chance of not returning to your nursing home but instead reverting to an alternative level of care (ALC) patient is **47% higher** and your average length of stay as ALC is **9% longer**.
- The likelihood of dying in the hospital is **54% higher** if you live in a contracted care facility versus a public care facility.

While contracted care facilities, on average, care for less complex residents than public facilities and they have fewer funded hours of care, the results reported in this paper have corrected for these variations in funded levels of care and resident complexity (acuity).

The data show a consistent pattern of underperformance across standard measures of hospital utilization for residents by contracted residential care facilities.

The importance of this pattern is twofold. From the perspective of the public, there is a need to reduce pressure on the hospital system given its high cost and congestion. From the perspective of the senior living in a residential care facility, any trip to the hospital presents a risk and should only be undertaken when necessary.



## Background

To gain a greater understanding of the emergency department experience for seniors, the Seniors Advocate worked shifts alongside front line clinicians in a number of emergency departments across the province.

While working shifts in six different emergency departments throughout B.C., the Seniors Advocate heard a similar theme from front line clinicians. Many nurses and some physicians commented on the predictability of an emergency department transfer resulting in an admission to hospital based on the residential care facility in which the senior resided, rather than on the acuity of their condition. This led the OSA to examine whether, in fact, there was a pattern among facilities that could predict a greater likelihood of transfer to the emergency department or admission to hospital. The answer is “yes,” there is a predictable pattern, with a resident living in a contracted facility having a significantly greater likelihood, compared to that same resident residing in a publicly operated facility, of: being sent to the emergency department; being admitted to hospital; staying longer in hospital; and dying in hospital.

### Why does it matter how often a senior living in a long term care facility goes to the emergency department?

People who live in British Columbia’s residential care facilities require care for a number of long-term chronic health conditions, including diabetes, chronic obstructive pulmonary disease (COPD), high blood pressure, heart disease (including heart failure), and a variety of neurological and other illnesses. Given the complexity of many residents’ care needs, it is reasonable to assume that a trip to the emergency department or a stay in hospital is to be expected. Indeed, we want to ensure that, if required and if it is a resident’s wish, they are transferred to the emergency department. However, it is important to understand that a potentially avoidable trip to hospital for a frail senior carries a risk often equal to the risk of not going to the hospital when necessary.

Any transfer to an emergency department or stay in hospital is likely to be stressful, most particularly for those with dementia, hearing or visual challenges, and those who may not understand why they are being transferred. The stresses are many, including transport in an ambulance, potentially long waits in an emergency department in order to see a physician, in-hospital transfers to diagnostic areas and more waiting to learn the plan of care, including if a decision is made for admission to hospital. Even when a decision is made to admit to hospital, the waiting continues, including long waits on stretchers in hallways with unfamiliar noises, unfamiliar people and staff rushing by. This can be frightening for almost anyone and even more so for frail and vulnerable seniors.

Hospitals are not designed to meet the needs of frail elderly people. With the loss of familiar routines, increased confusion and loss of movement and mobility related to extended periods of time in bed, frail seniors recover more slowly from illness and are more susceptible to the unintended effects of hospitalization (skin breakdown, delirium and hospital-acquired infections).

We know that up to 50% of frail seniors will experience a hospital acquired delirium or infection. This makes it all the more important to ensure that we are not unnecessarily transferring frail seniors from their care facility to the hospital and that, if the trip to the emergency department is necessary, the senior returns to the familiar surroundings of their home in the care facility as soon as possible.

This isn't to suggest that care facility residents should never be sent to the emergency department or admitted to hospital. Sometimes, urgent health issues arise that cannot be managed within the residential setting, necessitating a transfer to an emergency department and an admission to acute care. However, the data provide evidence of a systemic pattern that demonstrates one group of care facilities—those operated under contract—are sending more residents to the hospital than those facilities operated by the public sector, even after adjusting for staffing levels and resident acuity.

## A Trip to the Emergency Department

There are several reasons a resident may be transferred to the emergency department. Transfers may be for diagnostic services (lab and x-ray), for assessment by a physician for potentially treatable conditions (fracture, infection, stroke or heart attack), or for symptom management at end of life. The reasons for transfer range from less complex situations that may have potential to be more effectively managed within a care facility, to those requiring services and equipment only available in a hospital.

### *Across the Province:*

- Seniors in care homes go to the emergency department about 13,500 times per year. On average, 40% of seniors will go to the emergency department during their first year in the care home; 24% will have only one trip while 16% will go twice or more during their first year in the nursing home.
- 46% of residents who got to the emergency department are assessed as appropriate to admit as an in-patient.
- Funded direct care hours—either above or below the median of 3.11 direct care hours—did not impact the rate of transfer to the emergency department, regardless of facility ownership.
- Residents with certain diagnoses are much more likely to be admitted to hospital after arriving at the emergency department. The most likely to be admitted diagnoses are: sepsis (95% admitted), hip fracture (94%), pneumonia (84%) and heart failure (80%). These four diagnoses alone make up 30% of all hospital admissions that come through the emergency department and are likely to be triaged as moderately urgent or higher.
- Nearly half (43%) of all care facility transfers are related to infections (22%) and injuries (21%), with most injuries consistent with a fall. Common infections include pneumonia and urinary tract infections, as well as sepsis. Injuries related to falls are most frequently femur/hip fractures and injuries to the head (ranging from lacerations to more significant head injury).

### *Transfer to Emergency: Contracted versus Public:*

Contracted facilities have a 32% higher rate of transfer of residents to the emergency department than public, health authority operated facilities.

On the basis of a review of transfer to emergency department data alone, it's difficult to explain why contracted facilities have a significantly higher rate of transfer to the emergency department overall. A review of interRAI MDS 2.0 assessment data suggests resident acuity does not appear to explain the difference in transfer rates between public versus contracted facilities in B.C. In fact, contracted facilities have, on average, residents with less complexity and frailty than public facilities. The health authority operated sites have an 11% higher prevalence of residents with congestive heart failure (CHF) and a 7% higher prevalence of residents with a diagnosis of COPD than do contracted facilities—two of the most frequent reasons that residents are admitted to the emergency department.

The obvious reasons why contracted facilities might send more residents to the emergency department—such as, residents are more sick, there is less funded care, different licensing and regulatory standards—do not apply. This leaves a number of possible factors, such as staff skill mix. We do know that the actual number of funded care hours does not impact the pattern of transfer to the emergency department, but what we do not know with any certainty is the skill mix within those funded care hours. The relative use of RNs, LPNs and care aides, the wage rates paid, the practices around providing relief and backfill for vacation and sick leave, and the use of sub-contracted care staff all may play a role and warrant further study. So, too, must we look at annual staff training and the overall clinical leadership and expert clinical supports provided in contracted versus public facilities.

Whatever the underlying cause, the result is that, all things being equal, some residents who live in a contracted facility and would have had their symptoms addressed by the care staff in a public facility are instead sent to the emergency department.

### *Decision to Admit as In-patient*

Once a senior arrives at the emergency department, a decision is made whether or not to treat the senior for the presenting symptom(s) and send them back to the care facility or to admit them to hospital as an in-patient. The reasons a resident may be admitted to acute care are wide ranging; however, we know from our review of the emergency department transfer data that four primary conditions drive admission to hospital: infections (including sepsis), fractures, and chronic disease management (e.g., CHF, COPD). More importantly, research indicates that seniors in hospital are at risk of unintended consequences such as skin breakdown, loss of mobility and strength, increased confusion and delirium. Every hospital admission and every day in hospital increases the risk of unintended consequences for the frail elderly.



### *Hospital Admissions: The Provincial Perspective*

- Seniors in care facilities are hospitalized around 8,000 times per year, or approximately 22 admissions per day across the province.
  - ◆ About 1 in 8 residents admitted to hospital from the emergency department dies in hospital.
  - ◆ 75% of care facility residents admitted to hospital are first seen in the emergency department, while 25% are not seen in the emergency department but admitted directly to a hospital bed. Most of these direct admissions (almost 90%) are “elective” (planned) and are for scheduled procedures or other medical treatments or tests requiring hospital admission. These elective admissions were excluded from our analysis.
  - ◆ The most common reasons for a care facility resident to be admitted to hospital include pneumonia (13%), fracture of femur/hip (11%), urinary system disorders including urinary tract infections (UTIs) (8%), and lung conditions including COPD (5%).
  - ◆ The most common diagnoses for those care facility residents who die in hospital are pneumonitis and pneumonia (together 1 in 5 deaths), sepsis, CHF, COPD, and hip fractures.
  - ◆ Very rarely the resident is unable to return to their facility upon discharge from hospital, and as a result is classified as Alternate Level of Care (ALC) in hospital. This is equivalent to approximately 178 residents per year in B.C. hospitals.
  - ◆ The average length of stay for a care facility resident admitted to hospital is 7.9 days; and for those who experience an extended hospital stay and/or are not able to return to their residential care facility, ALC status adds almost three weeks to a hospital stay.
  - ◆ Facilities with funded direct care hours of greater than 3.11 hours (the median) per resident per day were less likely (4%) to be admitted to hospital following transfer to emergency department when compared to facilities where funded direct care hours were at or below 3.11 hours



### *Decision to Admit: Contracted versus Public*

The major impetus for this research project was the fairly consistent frustration expressed by many front line clinicians in the emergency department that some care homes were sending their residents to the emergency department too frequently and refusing to accept them back in a timely manner.

The data do support the first observation from emergency department clinicians that contracted care facilities are sending residents to the emergency department more frequently than public facilities, even though the data indicate they care for less complex and frail residents. The data also support the observation of some clinicians that, all things being equal, the contracted care facilities are not accepting the residents back to the facility as quickly as the public facilities, resulting in longer lengths of stay, higher conversion to alternative level of care (ALC) and higher rates of death in hospital. The data specifically demonstrate:

- Contracted facility residents have a **34% higher** hospitalization rate than residents in publicly operated facilities.
- Contracted facility residents have hospital lengths of stay that are **32% longer** than residents from public facilities experience.
- Residents from a contracted facility are almost **twice as likely (47%)** to experience an extended length of stay resulting in ALC status.
- Residents from contracted facilities have ALC lengths of stay that are **9% longer** (almost 7 days longer) than residents from a publicly operated facility.
- Residents from contracted facilities have more admissions to hospital for certain conditions, even though they have a lower prevalence of the condition:
  - ◆ COPD – 64% higher rate of admission but 7% lower prevalence
  - ◆ CHF – 48% higher rate of admission but an 11% lower prevalence
  - ◆ Pneumonias – 38% higher
- Residents from contracted facilities are **54% more likely** to die in hospital.

These data indicate there is a significant potential for reducing costs in our health care system if contracted facilities performed as well as public facilities in relation to emergency department transfer, hospital admission and hospital discharge.

### *Why Are Contracted Facilities Underperforming?*

Trying to pinpoint the exact reason for the underperformance of the contracted care facilities is difficult and indeed it is likely multifactorial. With a pattern that is consistent for standard hospitalization measures—transfer, admission, length of stay, conversion to ALC and death in hospital each demonstrate statistically significant poorer outcomes for contracted facilities versus public facilities—the question of “why” inevitably comes to mind. In order to find the answer, we must first have the courage to ask difficult questions.

We know the pattern is not related to differences in the condition of the residents or the funded hours of care between public and contracted operators. We know that public and contracted facilities have the same rate (23.5%) of “do not hospitalize” (DNH) orders. We know that the pattern is sufficiently pervasive that it is not about an individual care provider. However, the decision to call the ambulance and the discussion with the physician or nurses at the hospital about the resident returning home is done by/with staff in the care home. What is it about the culture in contracted care homes that, on balance, makes the staff more likely to send someone to the hospital and more hesitant to support their return to the facility?

Continuity of care has been well researched as linking to better health outcomes, and this holds particularly true in reducing hospitalization. Knowing the resident and their conditions would certainly be helpful in determining when changes might require a trip to the hospital, but if staff is changing frequently, continuity of care is compromised. Do we see less continuity of staff in contracted facilities?

We know that in public facilities there is actually good continuity. The Health Employers Association of British Columbia (HEABC) reports that 84% of staff who worked in public care homes in 2017 also worked in that same care home in 2016; this data includes casuals. If casuals are excluded, the data show that 94% of regular staff are consistent year over year. Unfortunately, we do not have any comparable data on staff turn-over for contracted facilities. We do know that there is turn-over in some of the contracted facilities who contract their clinical staff from another company. Often referred to as “contract flipping,” some facilities change companies they have contracted with to provide care and a mass lay off of workers may often be the result. Does this have an impact on continuity of care? Indeed, what about the practice of contracting out care in general— does this have an impact?

We know that, on average, contracted care facilities pay lower wages than public facilities. Only 54 out of 187 contracted facilities pay the funded wage rate and benefits of the master collective agreement (\$23.95 per hour); the other facilities pay less, some of them much less (some are below \$19 per hour). Is this attracting less experienced staff and/or is it adding to turn-over as care aides may seek opportunities for higher paying and/or more stable jobs in another facility? If care staff in all publicly funded facilities were required to receive comparable wages and benefits, would there be a more stable workforce?

What ongoing education and clinical support is available to care staff in contracted facilities? Is it different than what is provided in public facilities? Is there access to clinical nurse specialists and

clinical educators? Are clinical staff supervised by an RN or an LPN? Does this make a difference?

Have we properly aligned the financial incentives for the contracted care homes to ensure optimal care and outcome for the residents? We know that contracted facilities are permitted to pay less in wages for care staff despite being funded to pay at a higher rate. Is this the best way to ensure continuity of care with experienced staff to attend to residents clinical needs? We know that contracted care facilities continue to be funded for a bed that has been vacated by a resident that has been admitted to hospital. Have we created an incentive for a contracted facility to send a resident to the emergency department and resist the resident's quick return to the facility?

These are some of the difficult questions we need to ask if we want to understand why residents from contracted facilities transfer to the emergency department and are hospitalized more frequently than those in public facilities. There is a problem—that is clear from the data—but we cannot find solutions if we do not understand what is causing the problem. Undoubtedly, some contracted care providers will be uncomfortable with some of these questions and fixing the problem may have a financial impact on the care home operators' profitability. However, fixing the problem may also bring the care home operators more resources that will allow them to improve the outcome of care for their residents, and that is a goal that we should all embrace.



### *Why does this matter?*

The rate of transfer to emergency, admission to hospital, length of stay, conversion to ALC and dying in a hospital bed has both a human and healthcare system cost. The cost to a resident cannot be understated in terms of distress at transfer to hospital and neither can the well-documented impacts of an acute care hospital stay for the frail elderly. Additionally, family members experience stress as they endeavor to communicate their family member's story and wishes to a myriad of clinicians in the acute care system, and almost no one wants to die in hospital. The system impacts of grid-locked hospitals is significant, and it too results in both human and healthcare system costs as staff struggle to provide quality care in an overburdened hospital.

Consider the potential system savings if contracted residential care facilities achieved the same level of success as the public care facilities in relation to hospitalization of residents.

*Estimated costs (Health System Matrix database):*

- An emergency department visit in B.C. is approximately \$470
  - ◆ Potentially avoidable emergency department visits (contracted facilities) 1,930 annually
    - Total cost savings: **\$907,100 annually**
- In-hospital cost per day ranges from \$800 - \$1,200
  - ◆ Potentially avoidable admissions and length of stay accounts for 14,906 acute care days
  - ◆ An average cost of \$1,000/day hospital cost
    - Total cost savings: **\$14,906,000 annually**
  - ◆ Potentially avoidable ALC status days is 1,340
  - ◆ An average cost of \$1,000/day hospital cost
    - Total cost savings: **\$1,340,000 annually**
- Total inpatient hospital days potentially saved
  - ◆ Excess acute care days and lengths of stay = 14,906 days
  - ◆ Designated as ALC = 1,340 days
    - Total savings of **16,246 days or 45 hospital beds/day**

**Total potential savings of \$17,153,100 per year and 45 hospital beds per day in B.C.**

The ALC (care facility) population is unique among ALC populations in that these individuals are already known to the system, have been assessed as meeting the criteria for admission to residential care, have an assigned residential care bed, and have care needs that are well-documented. The question to consider, then, is why a care facility individual would attract ALC status, rather than be returned to their residential care facility with augmented service, either until recovery or until an alternate service is available?

Remaining in hospital for 21 days (the B.C. average)—or, in the case of contracted facilities, an average of 28 days—is essentially occupying both a care facility bed and an acute bed. Challenges with congestion in our acute system strongly suggest that innovation in short term higher acuity resource allocation should be considered. An example of this could be directing home health RN resources to coach and support residential care nursing staff with technical skill tasks that occur infrequently in the care facility setting. Other opportunities could explore consultation from Respiratory Tech services to assess changes in condition for individuals with COPD and assist in symptom management strategies (as an example).

Overall, improving the rate of hospital transfer, admission and reducing the ALC length of stay indicates that approximately \$17 million dollars could be re-targeted annually to other key health priorities (this is an estimated cost savings, and does not include impacts such as hospital congestion and overtime costs).

## Conclusion and Recommendation

Everyone who works in the care community, whether in a contracted or public institution, goes to work each day thinking they are delivering the best possible care and making the best possible decisions for the residents. However, we must be guided by the evidence and it shows that, for a particular group of care facilities, there is a consistent and persistent pattern of poorer outcomes in the context of emergency department transfers and hospitalizations. The most obvious reasons for this discrepancy have been adjusted for in our review; it is not about resident acuity, funded care hours or different licensing standards.

To get the much-needed answers, we must do additional research and analysis, and this requires more and better information than we currently have on staffing differences between the contracted care facilities and the public facilities.

Reducing hospitalizations for seniors is a goal that is gaining increasing attention and for good reason; it benefits both the senior and the taxpayer. The Ministry of Health must take a leadership role in directing the health authorities to work with their contracted care providers to collect the standardized data necessary to determine the root cause of this discrepancy which will then allow us to make the necessary changes.

## APPENDIX A

About the data:

- Four fiscal years: from April 1, 2012 to March 31, 2016.
- Resident characteristics, facility size, urban/rural status, facility admission and discharge dates, and the reason for discharge are from the Continuing Care Reporting System (CCRS). All care facilities in B.C. are required to submit information to CCRS.
- Funded direct care hours and ownership were compiled from data submitted to the Office of the Seniors Advocate by B.C.'s five health authorities.
- Emergency department visits: We looked at hospital admissions among all care facilities to the acute hospitals that report to the National Ambulatory Care Reporting System (NACRS). Since hospitals tend to admit from their own emergency departments, this provided a way to select those care facilities (212) that transfer to NACRS hospitals only and are therefore properly represented in the emergency department data. NACRS is complete for all hospitals from April 1, 2014 to March 31, 2016 only, so the emergency department analysis is restricted to this time period of two fiscal years.
- Hospitalizations: All hospitals are required to submit to the Discharge Abstract Database (DAD).
- The Canadian Institute for Health Information (CIHI) administers the CCRS, NACRS, and DAD and provides B.C.'s data to the B.C. Ministry of Health, who in turn made the necessary data available. Personally identifying information, like date of birth and personal health number, was removed, and resident and facility identifiers were replaced with anonymized codes that supported linkage of records across datasets.

### *Details on Methodology*

The overall framework for the data was the Continuing Care Reporting System (CCRS). The CCRS is the provincially mandated information reporting system for all care facilities—both public and contracted—and it gathers information on admission data, episodes of care and links with the interRAI MDS 2.0 resident assessments. The timeframe of CCRS data that was used was the four year period April 1, 2012 to March 31, 2016. The resident RAI assessments used in this study are obtained from the CCRS.

For the admission to emergency/hospital to be considered, the person being admitted needed to link to the CCRS as a resident of the care facility. Excluded from this data set were residents who experienced an admission to emergency/hospital within the first seven days of their residency in the facility.

The emergency room utilization data was obtained from examining the National Ambulatory Care Reporting System (NACRS). The NACRS is not used in some of the small remote hospitals and, to ensure we had robust comparable data, we limited our study of ED transfers to those facilities that fell within the catchment area of one of the 24 NACRS-reporting hospitals. This captured 82% of our residential care population. The data from NACRS was also limited to a two year period to

ensure the widest reach of data. The time frame for the NACRS data is April 2014 to March 2016.

The NACRS data tell us who was admitted to the emergency department along with their presenting symptoms. Other general information such as age and sex are gathered at intake and captured in NACRS. In total, 22,062 admissions to ED were reviewed for this study.

The hospital admission data was obtained using the Discharge Abstract Database (DAD). The DAD is a national reporting standard that all hospitals in B.C. are required to report to. The DAD captures patient data on when they arrived, where they arrived from, where they are being discharged to, their overall length of stay, and their ALC days. It also charts a patient's primary and other diagnoses.

Four years of DAD data were examined for the period of April 2012 to March 2016. Excluded from the analysis were planned admissions for scheduled diagnostics or procedures; these represented 24% of total admissions. This left a total of 24,248 admissions that were reviewed as part of this study.

Location of death examined 24,165 persons who were discharged deceased from residential care or who died in hospital, up to 14 days after discharge, between April 2012 and March 2016.

All these data are independent data, contributed by hospitals and residential care facilities to the Canadian Institute for Health Information (CIHI) who ensures overall data quality and integrity as part of national health reporting standards. CIHI provides it to the government of B.C.

These data sources were used to construct three different models. The models are calibrated to level out differences that may confound the ability to fairly compare outcomes between facilities based on populations and funded hours of care. This allows us to say, for two residents who are the same in all the ways the measures can describe, but differ only in ownership, that this is the independent difference that ownership makes.

The first model looked at the risk of an ED visit, and adjusted for sex, age, care hours, facility size, and a validated measure of health instability associated with health decline, hospital use, and death (CHESS), in addition to ownership. It can be considered representative of the 212 facilities in the two years from April 2014 to March 2016.

The second model looked at the risk of hospital admission, and adjusted for age, sex, care hours, facility size, facility urban or rural, and the measure of health instability (CHESS) used in the ED model, in addition to ownership. It can be considered representative of all B.C. facilities in the four years from April 2012 to March 2016.

These models used multivariable proportional hazard regression, also known as Cox regression. The model employed a time varying covariate (CHESS score, drawn from the MDS 2.0 assessment) as well as age, sex, facility size, urban/rural, and ownership as simultaneous independent adjustment factors. This regression produces estimates of hazard ratios of the independent adjustments, which represent the additional likelihood of the event when that factor (contracted ownership) is present, adjusting for all others in the model.



The third model looked at location of death: either in hospital or in the residential care facility. It adjusted for the same things as the second model and can be considered representative of all B.C. facilities in the four years from April 2012 to March 2016.

This model used the multivariable logistic regression among deaths in the sample, adjusting for the last measured CHES score in addition to age, sex, facility size, urban/rural and ownership as simultaneous independent adjustment factors. Logistic regression produces odds ratios which are re-stated as risk ratios using the prevalence rate of the sample. In this way, the resulting risk ratio informs the additional likelihood of the event when that factor (contracted ownership) is present, adjusting for all others in the model.

### **Financial Estimates**

The cost savings estimates are based on the amount that potentially could be saved if contracted facilities' emergency department transfer, hospitalization, ALC conversion, and length of stay characteristics matched those of health authority owned and operated facilities. We calculated the number of days residents spent in hospital as a proportion of the total days residents were living in residential care. This statistic was calculated for both groups of facilities: contracted and health authority. We then applied the health authority proportion to the contracted resident days, to arrive at the estimated number of hospital days contracted facility residents would be expected to utilize if their facilities had the hospitalization characteristics of health authority facilities.

For the hospital admission savings, the calculations took into account differences in the rate of hospitalization, the rate of conversion to ALC status, and the resultant lengths of stay of those hospitalizations. We used separate calculations for the acute care phase and (if applicable) ALC phase of a resident's stay in hospital to illustrate where potential cost savings can be found. Both elective and urgent/emergent admissions were included in the calculation.

The emergency department transfer calculation used the same methodology of comparing the relative number of transfers in an equalized number of resident days. The emergency department calculations only apply to residents coming from the 212 facilities that transfer primarily to NACRS-reporting emergency departments. The figure was not extrapolated to all facilities.

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