

Improving the Use of Healthcare Resources in Canadian Hospitals: The Impact of a Reintegration Unit in Expanding Acute Care Capacity and Resource Use in Sunnybrook Health Sciences Centre

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Abstract

Background: Alternate level of care (ALC) patients are those who reside in acute hospital beds but can be managed in non-hospital settings. They contribute to high occupancy levels in Canadian hospitals. Between 2017-18, Ontario spent 1.1 billion dollars on hospitalized patients waiting for alternate level of care (ALC) beds. To improve value for care, Ontario Ministry of Health (MOHLTC) invested into reintegration units which are designed to transfer ALC patients out of hospital and transition them back into the community or long-term care (LTC). Given today's healthcare budget pressures, it is unclear if reactivation units are feasible. In 2018, the MOHLTC funded a reintegration unit, Pine Villa with an operational partner, Sunnybrook Hospital and community service providers (SPRINT Senior Care, LOFT) in Toronto, Ontario. The objective was to determine averted costs for ALC-patients and impact on Sunnybrook patient flow-through if ALC-patient Pine Villa transfers occurred on the day of ALC readiness.

Methods: Retrospective, observational analysis of Sunnybrook ALC-patients discharged to Pine Villa between January 9, 2018 to February 4, 2019. From the healthcare payer's perspective (MOHLTC), cost analysis was modelled for ALC patients designated for 1) LTC and 2) home with supports. Averted costs at time of ALC readiness were determined by case-costing. Averted hospital ALC days were established.

Results: If ALC patients were transferred to Pine Villa at time of ALC readiness for LTC, the healthcare system could have averted 5.4 million dollars from Sunnybrook. If the patients were transferred for home, 2.3 million dollars could have been averted. Both models increased acute Sunnybrook Hospital capacity by 34 beds.

Conclusion: There is a business case supporting reintegration units if ALC-patients are discharged from the hospital on the day of ALC-readiness.

Background

Canadian hospitals face increasing demands on their resources. These demands include the pressures of growing and aging populations and the failure of payers in publicly funded systems to increase capacity. However, a substantial portion of current demand comes from patients whose needs could be better addressed in other settings, usually at lower costs. These patients, labelled in Canada as Alternate Level of Care (ALC), are "people who occupy an acute care hospital bed and who can be cared for elsewhere [1, 2]." In 2007-8, 5% of Canadian beds and 14% of hospital days were occupied by ALC patients with a provincial range of 2–7% [2]. More recent studies have found higher ALC rates. One Canadian hospital had 33% of its beds occupied by ALC patients with a mean length of stay of 379.6 days. Eighty-six percent of these patients were waiting for long-term care community beds and the majority of patients declined functionally while in hospital [1]. For high-cost users, one hospital found a significant fraction of inpatient spending on ALC days [3]. ALC patients occupying hospital beds are a contributor to hospital crowding and inappropriate use of limited acute beds. Eliminating "hallway medicine" is a healthcare priority in Ontario, Canada [4] and a concern in many other jurisdictions, including Spain [5], Finland [6], the United Kingdom [7], and elsewhere. Identifying cost-effective solutions that reduce current ALC levels would address a critical strategic issue facing healthcare decision makers in many healthcare systems. In this paper, we outline the complexity of the ALC issue and use a case study of care redesign in one setting, Sunnybrook Health Science Centre, in Toronto, Canada, to illustrate how this issue can be addressed.

Strategies For Appropriate Placement Of Alc Patients

Risk factors for ALC include neuro-cognitive impairment, such as stroke, dementia, psychiatric illness or delirium [1, 2, 8, 9], social support needs, informal caregiver needs [10], lack of spouse and/or children [9] and homelessness [11]. The majority of ALC patients begin their hospitalization through the emergency department [2]. Once admitted, the inability of hospitals to expeditiously transition ALC at-risk patients back to the community worsens their functional status to the point that for many patients the only possible discharge destination is ALC [12] and often requires transfer to another institutional setting. The lack of appropriate social and physical hospital services is felt to contribute to the hospitalized ALC patients' physical and mental decline [13]. Thus, dealing with the ALC challenge has important implications for patients and families as well as the healthcare system.

Strategies to reduce ALC days include initiatives to prevent hospitalization, including community falls prevention programs, emergency department geriatric screening for ALC risk

[8, 12, 14], discharge capability with community supports, provision of hospital care in long term care facilities [15], community dementia screening and early management [1] and “assertive outreach through community mental health programs” for the homeless [11]. If hospitalized, these individuals require multidisciplinary interventions for functional decline prevention [12] and promotion of early discharge to home with supports [12], restorative or transitional care units [16, 17] or respite care for the homeless [11].

State of Alternate Level of Care (ALC) at Sunnybrook Health Sciences Center

Examples of preferable discharge destinations for alternate level of care (ALC) patients include home care, palliation, convalescent care, complex continuing care, supervised assisted living, mental health, long-term Care (LTC) or rehabilitation. Sunnybrook Health Sciences Center (Sunnybrook) in Toronto, Ontario is a large academic health centre with three sites: Bayview (which provides acute care, including acute Mental Health and an Emergency Department), along with two smaller sites, Holland Center and St John’s Rehabilitation. The Bayview site is for acute hospital care with 320 beds available for emergency department admissions. The Holland Center is dedicated for acute musculoskeletal care but was able to re-purpose 28 beds for patients with prolonged waits for LTC. St John’s Rehabilitation is a 154-bed facility that focuses on burn, trauma, organ transplant and general rehabilitation patients.

During the time of this study (January 9, 2018 to February 14, 2019), there were 2847 Bayview-Holland patients who were classified as ALC. Forty-seven percent of these ALC patients were waiting greater than 3 days. In St John’s Rehabilitation, there were 96 ALC patients waiting for LTC or home care. At Bayview, the average percentage of acute hospital beds occupied by patients waiting for ALC was 17%. At Holland, the average ALC occupancy was 118%. The top three reasons why Bayview-Holland patients were classified as ALC included waits for rehabilitation (63%), palliative care (13%) and home care (9%).

Implementation Of Pine Villa:

Delayed hospital discharges and inappropriate placement of patients in acute care have been studied in a number of countries [18]. At a system level there are a number of possible solutions, including regional coordination, monitoring and care pathways that have been used to address this issue [6] (Hiltunen, et al., 2020). However, local solutions are also possible.

In September 2017, in an effort to alleviate hospital occupancy pressures, a joint proposal between Sunnybrook Health Sciences Centre, SPRINT Senior Care, and LOFT Community Services was submitted to the Toronto Central Local Health Integration Network (TC LHIN), to open a transitional care home on the site of a former retirement home. Sunnybrook would serve as the operational lead for the facility, and SPRINT Senior Care and LOFT would be the service providers to support up to 68 clients (designated ALC and meeting eligibility requirements) until they could transition to their home or other discharge destination. Pine Villa is an integrated partnership model where the three partners oversee governance and quality together. With financial support from the TC LHIN (under Ontario Ministry of Health and Long-Term Care (MOHLTC)), Sunnybrook leased the Pine Villa facility, and undertook significant renovations to ensure accessibility. The facility opened its doors to ALC patients from all Toronto hospitals in March 2018.

Program Description:

Pine Villa is a supportive transitional care site (reintegration unit) providing short-term services for older adults and seniors who no longer require care in a hospital, and who are waiting to move home with community supports or are awaiting placement in a long-term care facility or another care setting. In Pine Villa, specialized supports are provided for patients with dementia, mental health, addictions, social determinants of health needs and responsive behaviours. Therapeutic recreation is the primary model of care that supports clients through rehabilitation allowing them to regain or maintain their current level of functioning until they are able to

safely transition to their discharge destination. Admission criteria for Pine Villa requires that patients be medically stable and are able to be discharged within 3 months.

Objective:

The goals in funding and staffing Pine Villa were to improve patient flow through the healthcare system, provide more appropriate settings for ALC-patients and reduce costs of care. This paper's primary objective was to determine the potential direct ALC waiting-costs averted and the impact on patient flow-through for Sunnybrook by Pine Villa if transfers occurred on the day of ALC-readiness. This information is useful in assessing the feasibility of reactivation unit. The secondary objective was to compare Pine Villa patients' actual discharge destination to what was originally planned at time of admission. This information is useful in further program refinements to the processes of assessing patients for transfer provide baseline information for future quality improvement initiatives.

Methods

Using the healthcare payer's (MOHTLC) perspective, this was a retrospective observational study and business case [19, 20] of all Pine Villa admissions between January 9, 2018 to February 14, 2019. Costs were derived through case costing, an accepted method for determining actual hospital costs in Ontario [10, 11] [21]. Direct costs are those directly associated with patient care such as nursing, allied health, diagnostic therapeutic services, pharmaceutical and medical surgical supplies. Indirect costs are those related to administrative and support services which are performed on behalf of all patients but not associated with a patient (i.e., information systems) [21]. Case costing excludes physician remuneration.

For Sunnybrook patients transferred to Pine Villa, data sources included patient data from the transfer sites (Bayview, Holland and St. John's Rehabilitation sites), demographics, length-of-stay (acute, ALC, Pine Villa), diagnosis, proposed and actual disposition. Data for these patients was extracted from the National Ambulatory Care Reporting System (NACRS), Ontario Mental Health Reporting System (OMHRS) and Discharge Abstract Database (DAD) followed definitions as per Ontario's abstracting guidelines. Additional data were also derived from eALC, Sunnybrook's ALC referral tracking, and Pine Villa's data registry.

To calculate the hypothetical averted direct costs from Sunnybrook, a timeline for each Sunnybrook patient waiting for ALC was constructed. Using data from NACRS, DAD, OMHRS and eALC, the 2017-18 ALC median wait-time for ALC (with interquartile range) was determined for Sunnybrook patients transitioning through Bayview, Holland or St. John's Rehabilitation to ALC (Home Care, Rehabilitation, Long-Term Care) (Fig. 1). This time period was chosen to specifically reflect wait-times before Pine Villa opened. The portions of patients' lengths of stay for acute care were excluded from this timeline. It was assumed that Sunnybrook ALC patients would be admitted from the emergency department (including mental health) to Bayview ward and then transferred to community ALC, Holland (for LTC placement) or St John's Rehabilitation. From Holland or rehabilitation, patients would ultimately be transferred to community ALC (which included LTC placement or Home Care with Supports). Two disposition scenarios for direct daily costs were used: 1) Waiting for Long Term Care or 2) Home with Supports.

For Sunnybrook costing, data sources were from multiple clinical utilization systems and the hospital general ledger following Ontario Case Costing Standards. ALC length-of-stay was derived from DAD. Direct, indirect and total daily cost (median and IQR) were collected for the 2017-18 fiscal year ALC patients. Costs were organized by Sunnybrook site (Bayview, Holland and St John's Rehabilitation) and disposition (Home Care, Rehabilitation and Long-Term Care). 2017-18 ALC length-of-stay in days (median and IQR) were calculated for each Sunnybrook site and disposition. For Pine Villa costing, the Ontario Ministry of Health provided the direct daily cost for Pine Villa admissions [22]. Median LOS was provided by Pine Villa data.

The direct daily costs, organized by Sunnybrook site, were multiplied by the site-specific ALC days to determine total direct costs per patient. Summing up all the Sunnybrook-Pine Villa transfers determined a grand total. Pine Villa direct costs per patient were the product of daily direct Pine Villa costs and median Pine Villa length-of-stay (days). A grand total for Pine Villa expenses were determined. All costs were provided in Canadian dollars.

Averted costs were the difference between the costs of a Sunnybrook ALC patient without Pine Villa minus the patient costs at Sunnybrook after ALC designation plus the costs at Pine Villa.

Excel (Microsoft Windows, Washington) and Stata (StataCorp LLC, Texas) provided descriptive statistics and calculations. Given the non-parametric nature and small sample size of the Pine Villa cohort, data was kept consistent by using median and interquartile range measures. To simplify the averted direct cost calculations, only median values were used. Because this was a local quality improvement study, the Sunnybrook Research Ethics Board waived ethics application.

Results

Study Population:

Between January 9, 2018 to February 4, 2019, 140 Sunnybrook patients were screened for Pine Villa admissions. Of these 140 patients, 11% declined to be transferred, 10% were denied admission and 6% were declined for an unknown reason, resulting in 102 admissions. Reasons for denied admission included high needs, inappropriate behavior, unsafe discharge or LTC choices with waiting periods exceeding Pine Villa’s criteria of three months. During this time period, the total number of patients waiting for ALC in the Sunnybrook organization was 2943. Pine Villa was able to admit 3.5% of this patient population. The Pine Villa admissions were elderly and slightly more female than the full Sunnybrook ALC population. Two-thirds and one-third of the Pine Villa admissions required SPRINT and LOFT services, respectively. The patients with the longest Sunnybrook ALC stays were transfers from the Holland Center to Pine Villa. The longest Sunnybrook ALC length-of-stay before Pine Villa admission was 870 days (2.4 years). The greatest number of ALC patient transfers to Pine Villa were from St. John’s Rehabilitation (Table 1). The top three diagnoses for transferred patients were musculoskeletal rehabilitation, chronic medical issues and frailty. The majority of Pine Villa patients were discharged to home with supports or LTC with a median LOS at Pine Villa of 59 days [IQR: 31–102]. Of the remaining patients, eight were designated for LTC, but four of these were sent back to hospital, three died and one went home. One Pine Villa patient designated for home went to hospital and two patients waiting for palliative care, died.

Table 1

Demographics, Acute and Alternate Level (ALC) of Care Length-of-Stay (LOS) for Patients Transferred from Sunnybrook Hospital to Pine Villa for Reintegration (January 9, 2018 – February 4, 2019)

ALC Patient Type	Daily Direct Cost of Sunnybrook Bed waiting for LTC ALC [p50,IQR]	Daily Direct Cost of Sunnybrook Bed waiting for Home ALC [p50,IQR]
Emergency Department: waiting for LTC	\$387.32 [\$291.66-\$475.18]	\$387.32 [\$291.66-\$475.18]
Bayview Ward: waiting for LTC	\$536.83 [\$447.85-\$606.65]	\$578.65 [\$532.70-\$649.80]
Bayview Ward: waiting for Rehabilitation	\$628.58 [\$592.37-\$690.33]	\$628.58 [\$592.37-\$690.33]
Holland: waiting for LTC	\$555.29 [\$477.80-\$613.34]	\$656.24 [\$577.68-\$703.90]
St. John’s Rehabilitation: waiting for LTC	\$376.58 [\$337.22-\$420.79]	\$396.78 [\$338.64-\$429.85]

Cost Analysis

The direct cost of a patient admitted to Pine Villa is \$190/day [22]. For the 2017-18 fiscal year, 30,312 Sunnybrook ALC days were analyzed. LTC ALC accounted for 8735 days. The median daily direct Sunnybrook costs waiting for LTC ranged from \$370 – \$630 per day (Table 2). Waiting for LTC is longest at the Holland Center (> 150 days). If a patient was designated for LTC at the Bayview site (ED, Mental Health, Ward), their waits to community LTC could be less than 25 days, but some were transferred to Holland Center to wait. Transfer between Bayview and St John’s Rehabilitation was within five days, and once there, median transfer to LTC was 24 days (Table 3, Fig. 1).

Table 2
Daily Direct Costs for Sunnybrook Patients waiting Long Term Care (LTC) or Home ALC (Fiscal year 2017-18)

Potential ALC Days* and Direct Costs Averted if Pine Villa Implemented at Time of Bayview ALC-Readiness for Long Term Care							
	Bayview				Holland	St JR	Total
	ED (no Admit)	ED (Admit)	Mental Health	Ward			
N	11	11	3	31	16	41	102
Bayview ALC days*	n/a	24 [14-48]	24 [14-48]	24 [14-48]	24 [14-48]	5 [4-9]	40 [17-121]
Holland ALC days	n/a	154 [114-215]	154 [114-215]	154 [114-215]	154 [114-215]		
StJR ALC days**						24 [14-55]	
Sunnybrook Direct Costs	\$14,485.77	\$1,082,384.38	\$295,194.74	\$3,050,355.98	\$1,574,377.28	\$507,145.154	\$6,509,548.53
Averted Direct Costs	n/a	\$959,074.38	\$261,565.74	\$2,702,845.98	\$1,395,017.28	\$47,535.15	\$5,366,028.53
Patient Opportunity^	111 CTAS13 223 CTAS45	38	10	106	55	31	240
Potential ALC Days* and Direct Costs Averted if Pine Villa Implemented at Time of Bayview ALC -Readiness for Home Care							
	Bayview				Holland	St JR	Total
	ED (no Admit)	ED (Admit)	Mental Health	Ward			
N	11	11	3	31	16	41	102
Bayview ALC days*	n/a	8 [5-9]	8 [5-9]	8 [5-9]	24 [14-48]	5 [4-9]	14 [17-31]
Holland ALC days	n/a	52 [16-69]	52 [16-69]	52 [16-69]	52 [16-69]		
StJR ALC days**						26 [17-33]	
Sunnybrook Direct Costs	\$14,485.77	\$524,523.56	\$143,051.88	\$1,478,202.76	\$762,943.36	\$560,623.91	\$3,469,345.47
Averted Direct Costs	n/a	\$401,213.56	\$109,421.88	\$1,130,692.76	\$583,583.36	\$101,013.91	\$2,325,925.47
Patient Opportunity^	111 CTAS13 223 CTAS45	38	10	106	55	31	240
*ALC: Alternate Level of Care							
** StJR: Saint John's Rehabilitation Hospital							
^ Assuming that ideal EDLOS is 8 hours for CTAS1-3, 4 hours for CTAS 4-5 and 7 days for acute (Bayview) patient admissions							

Analyzing 4430 Sunnybrook home ALC days, daily direct Sunnybrook costs ranged from \$380 - \$660 per day (Table 2). The longest median home ALC wait was at the Holland Center (> 50 days) and just over a week at the Bayview site (Table 3, Fig. 1).

If Sunnybrook patients had not been transferred to Pine Villa, the hypothetical total direct costs for the Pine Villa cohort after ALC designation and while waiting for LTC placement to stay at Sunnybrook would be 6.5 million dollars instead of the \$1.1 million at Pine Villa. If Pine Villa were able to admit these patients on the day of LTC-readiness with the 59-day Pine Villa LOS, it would have been able to avert 5.4 million dollars from Sunnybrook. Using a 7-day admission LOS per acute-hospitalized (Bayview) patient, the release of the beds occupied by this Pine Villa LTC cohort would give Sunnybrook the ability to flow through 240 more patients for acute hospital care. Since 2017, there are 320 Sunnybrook Bayview beds available for acute admissions. This Pine Villa cohort occupied 11% of acute care capacity waiting for ALC. If patients were transferred to Pine Villa at time of ALC-readiness, the equivalent of 34 acute beds would become available for acute care at the Bayview site (Table 3).

Instead, if the Pine Villa cohort was waiting to go home with supports, the hypothetical total direct Sunnybrook costs would be greater than 3.4 million dollars. If Pine Villa were able to admit these patients on the day of home support-readiness with the 59-day LOS, it would be able to avert 2.3 million dollars from Sunnybrook. The release of acute beds would be the same as the LTC model (Table 3).

There were 11 emergency department (ED) patients who were transferred directly to Pine Villa for ALC. The median EDLOS was 3.4 days before transfer. If these 11 patients were transferred on the day of ED visit, it would have released an ED care space. Using EDLOS of four hours for low acuity patients and eight hours for high acuity, 223 and 111 low or high acuity patients could have rotated through these ED care spaces, respectively (Table 3).

Potential ALC Days* and Direct Costs Averted if Pine Villa Implemented at Time of Bayview ALC-Readiness for Long Term Care							
	Bayview				Holland	St JR	Total
	ED (no Admit)	ED (Admit)	Mental Health	Ward			
N	11	11	3	31	16	41	102
Bayview ALC days*	n/a	24 [14-48]	24 [14-48]	24 [14-48]	24 [14-48]	5 [4-9]	40 [17-121]
Holland ALC days	n/a	154 [114-215]	154 [114-215]	154 [114-215]	154 [114-215]		
StJR ALC days**						24 [14-55]	
Sunnybrook Direct Costs	\$14,485.77	\$1,082,384.38	\$295,194.74	\$3,050,355.98	\$1,574,377.28	\$ 507,145.154	\$6,509,548.53
Averted Direct Costs	n/a	\$ 959,074.38	\$261,565.74	\$2,702,845.98	\$1,395,017.28	\$ 47,535.15	\$5,366,028.53
Patient Opportunity^	111 CTAS13 223 CTAS45	38	10	106	55	31	240
Potential ALC Days* and Direct Costs Averted if Pine Villa Implemented at Time of Bayview ALC -Readiness for Home Care							
	Bayview				Holland	St JR	Total
	ED (no Admit)	ED (Admit)	Mental Health	Ward			
N	11	11	3	31	16	41	102
Bayview ALC days*	n/a	8 [5-9]	8 [5-9]	8 [5-9]	24 [14-48]	5 [4-9]	14 [17-31]
Holland ALC days	n/a	52 [16-69]	52 [16-69]	52 [16-69]	52 [16-69]		
StJR ALC days**						26 [17-33]	
Sunnybrook Direct Costs	\$14,485.77	\$524,523.56	\$143,051.88	\$1,478,202.76	\$762,943.36	\$560,623.91	\$3,469,345.47
Averted Direct Costs	n/a	\$401,213.56	\$109,421.88	\$1,130,692.76	\$583,583.36	\$101,013.91	\$2,325,925.47
Patient Opportunity^	111 CTAS13 223 CTAS45	38	10	106	55	31	240

*ALC: Alternate Level of Care

** StJR: Saint John's Rehabilitation Hospital

^ Assuming that ideal EDLOS is 8 hours for CTAS1-3, 4 hours for CTAS 4-5 and 7 days for acute (Bayview) patient admissions

Table 3

Potential Hospital Direct Cost and ALC Days Averted if Pine Villa Cohort were transferred at time of ALC-Readiness (Fiscal Year 2017-18)

Discussion

102 ALC patients in acute care beds were transferred to Pine Villa between January 9, 2018 to February 14, 2019. Based on estimates of averted costs using hospital and other data, if these patients were transferred at the time of ALC-readiness, there is a business case supporting the implementation and continuation of reactivation units. Pine Villa could potentially avert greater than 2 million dollars from Sunnybrook hospital if patients were transferred at the time of ALC-readiness. Opening Sunnybrook hospital beds by transferring ALC patients to Pine Villa would increase patient flow-through for acute care. Given that "hallway medicine" is

exacerbated by hospitalized patients waiting for ALC [4], reintegration units, such as Pine Villa, could be a core key strategy for this urgent health system problem. In July 2019, the MOHLTC announced the scaling up of reintegration units by increasing beds at Pine Villa and creating more units with other hospital partners in the Greater Toronto Area [23]. Strategies to transfer patients at time of ALC-readiness should also be explored.

Baseline Pine Villa data illustrates that there is potential for increasing Pine Villa or other site's capacity for reintegration. Only 10% of patients screened declined to go to Pine Villa. Moreover, less than 4% of Sunnybrook ALC patients were transferred to Pine Villa, indicating further opportunity for expanded capacity. The majority of transfers were St John's Rehabilitation patients. Whether or not more patients can be transferred from the Bayview or Holland site should be explored. Current literature suggests that hospital staff underestimate the capacity for patient independence and have an insufficient understanding of home care services. Additionally, hospitalizations lead to deconditioning. These are factors associated with prolonged hospital stays waiting for ALC [24]. Closer scrutiny to determine the gap between assessments of Sunnybrook-ALC readiness and Pine Villa's inclusion criteria could be performed. Closing this gap to increase the number of transfers would be the next step in a quality improvement project. Examining other health systems' approach to expedient ALC transfers should be explored. For example, In Orebro, Sweden, the community has three days to transfer community-supported ALC patients from hospital once deemed ALC-ready, or they pay hospital costs (P Sundin, A Meehan, personal communication, May 2018).

Four of Pine Villa's patients were eventually transferred back to hospital. While this is a low recidivism rate, further exploration is needed to see if these numbers be improved. Similarly, about 10% of patients were declined. Pine Villa may also be exposing the existence of the hospital-dependent patient [25]. This suggests that reintegration facilities may need to expand their capacity to manage high needs patients or more alternative community facilities and/or LTC facilities that provide higher-intensity care for complex, high-need patients could be created. Melbourne, Australia has piloted the option of hospital treatment (including dementia and palliation) in residential homes with successful avoidance of hospital transfers and no difference in mortality, rehospitalization rates but with a decrease in length-of-care [15]. A Canadian study recommends that nursing homes increase capacity to manage underrepresented conditions, such as neurological, psychological, behavioral and weight-related conditions [26].

One limitation to this study is the patient journey model for the hypothetical averted cost (Fig. 1). It was assumed that each patient would take the longest patient journey before ALC – being admitted to acute care (Bayview) through the emergency department before being transferred to the Holland or St John's Rehabilitation. This assumption could underestimate the savings. However, the lengthiest patient journey was used because Pine Villa would provide greatest impact with maximum averted costs. Having two scenarios for ALC: going home or to LTC, was intended to provide different perspectives on averted costs. Whether or not a patient could actually be transferred on the day designated for ALC is unlikely, however, this ideal was used for the model.

Other limitations included the short duration of the study; however, the data are based on available experience. Moreover, these estimates establish a baseline for quality improvement initiatives by identifying the current state and potential averted costs. The short duration provides timely data that can be actionable for future Plan-Do-Study-Act improvement cycles.

The 2017-18 DAD, NACRS, OMHRS data was used for 2018-19 Pine Villa data. To reflect the state of Sunnybrook patients waiting for ALC before Pine Villa, 2017-18 data is preferable because it was not open during that time period. The case costing data does not include physician remuneration; however, acute care, including physician billings, would likely be minimal during hospital ALC days.

Conclusions

ALC patients contribute to growing pressures on hospital occupancy in Canadian hospitals, resulting in poor patient experiences, provider burnout and unnecessary costs. Data from the experience of one academic health science centre illustrates the business case for creation of reintegration units, such as Pine Villa. If this facility could transition Sunnybrook patients at time of ALC-readiness, it would avert millions of MOHLTC dollars in direct hospital costs, increase Sunnybrook's capacity to improve patient flow, increase the capacity of acute hospital care, help decrease hallway medicine and align appropriate care to patient needs. Pine Villa has been open for one year. Baseline data shows that is potential for quality improvement with respect to capacity and efficiency. Because the MOHLTC is expanding this program in scope and scale, this study's findings can help inform them and other policymakers on reactivation unit evaluation and next steps.

List Of Abbreviations

ALC – alternate level of care

LTC – long term care

MOHTLC – Ontario Ministry of Health and Long Term Care

TCLHIN – Toronto Central Local Health Integrated Network

NACRS – National Ambulatory Care Reporting System

OMHRS – Ontario Mental Health Reporting System

DAD – Discharge Abstract Database

Declarations

Ethics Approval:

Because this was a local quality improvement study, the Sunnybrook Research Ethics Board waived ethics application.

Consent for Publication: Not applicable

Availability of Data and Materials:

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing Interests:

SL is the Chief Executive Officer of SPRINT Senior Care, which is an accredited, not-for-profit community health support service agency in Toronto by offering a wide range of practice and low-cost services to seniors and their caregivers.

DW is the Senior Director of Complex Care and Seniors Services and a member of the senior team of LOFT Community services. DW is responsible for the services LOFT provides at Pine Villa. Her role also involves liaising with the Toronto Central LHIN/MOHLTC related to the funding received to provide services at Pine Villa and any future funding.

DC is employed by Sunnybrook Hospital at Pine Villa and could theoretically benefit by Pine Villa being viewed positively and continuing to operate.

The rest of the authors declare that they have no competing interests.

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Authors Contribution:

IC, GRB, DC, DW, DL, WL and YM contributed substantially to conception, design, acquisition of data or analysis of the data and drafted the article, revised it critically for important intellectual content. All authors read and approved the final manuscript.

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Figures

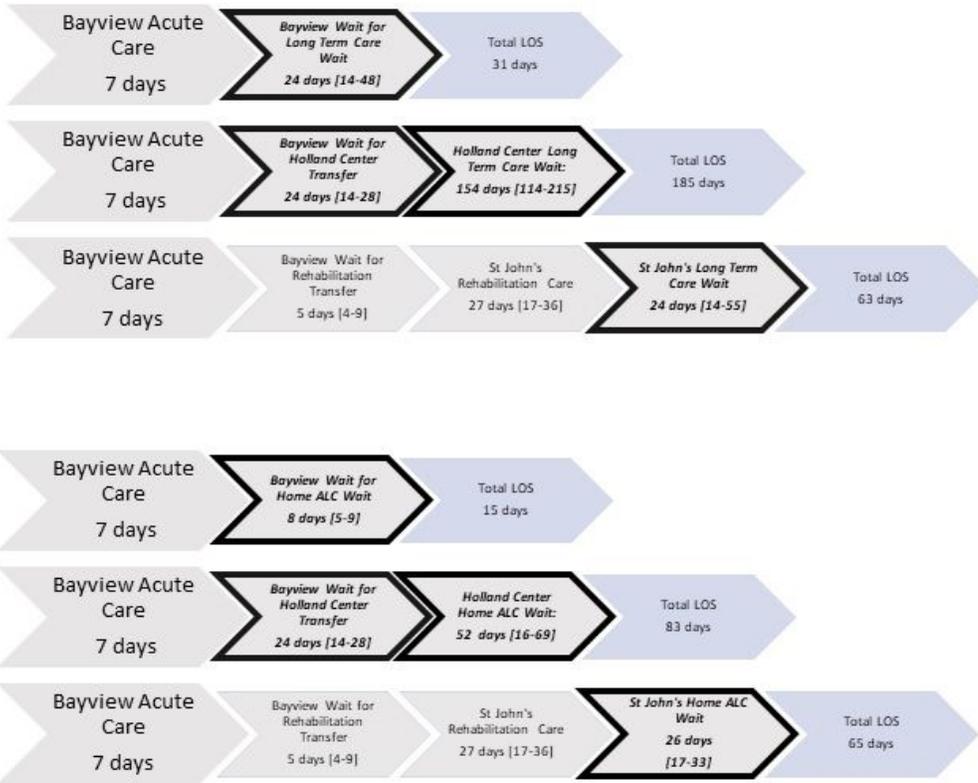


Figure 1

2017-18 Sunnybrook Hospital (Bayview, Holland and St John's Rehabilitation) wait-times for Long-Term Care or Home alternate level of care (ALC). Intervention opportunity of a Reintegration Unit to transfer patients out of hospital when ready for (ALC) are highlighted and italicized and bolded font