Health System Reconfiguration

Long-Stay Alternate Level of Care in Ontario Complex Continuing Care Beds

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The Challenge

One of the greatest challenges facing government is to effectively manage healthcare resources for a growing and aging population affected by multiple chronic and complex medical conditions. Timely access to care is a fundamental aim of the health system and an important marker of system efficiency. One barrier to such efficiency is Alternate Level of Care (ALC) patient days. Patients are given an ALC designation when they occupy a hospital bed, but they no longer require that level intensity of resources and services. ALC patient days are an inefficient use of system resources and may prevent access to care for other system users. From the perspective of patients and their families, prolonged wait times may negatively affect health outcomes, quality of life, and satisfaction with the healthcare system.

Recent data provided to the Ontario Hospital Association (OHA) by Cancer Care Ontario (CCO) – *Access to Care (CCO-ATC) Wait Time Information System* shows that in September 2015, patients designated ALC were occupying approximately 14 per cent of all inpatient bed days in Ontario (Cancer Care Ontario, Access to Care - Alternate Level of Care Informatics, 2015). These patients are waiting in hospital beds for more appropriate care within the hospital or in the community.

A closer look at the October 2015 CCO-ATC data indicates that:

- Out of the 4,053 patients designated ALC, 34 per cent of the ALC patients are residing in complex continuing care (CCC) and mental health beds and are contributing to 66 per cent of ALC days in hospitals.

- Of those patients waiting for long periods of time (≥ 30 days)

- 31 per cent are waiting in a CCC bed;

- 16 per cent are waiting in a mental health bed.

To effectively address the ALC challenges and ensure that patients have access to the right care, at the right time, and in the right place, will require an integrated system of care which spans the entire healthcare continuum. Ontario's move to strengthen its home and community care sector presents an opportunity to improve our understanding of the needs and barriers of long-stay ALC patients awaiting discharge from hospital.

The Two Research Initiatives

To help improve our understanding of the needs of ALC long-stay mental health and Complex Continuing Care (CCC) patients, the OHA engaged the University of Waterloo to undertake two research studies. The goal of these research studies was to:

• Characterize long-stay ALC patients in both Mental Health and CCC settings

• Identify the services required to enable long-stay ALC patients to transition to less resource intensive care settings

• Assist the OHA in pinpointing service gaps to inform solutions which lead to a reduction in ALC patient days

Clarity around the needs of these patients will aid in the implementation of solutions and planning for future investments. More importantly, it will enhance patients' quality of care and help alleviate the tremendous burden shouldered by patients and their caregivers.

ALC Patients in CCC Beds

CCC facilities provide hospital-based nursing and rehabilitation services to individuals recovering from acute illness, or who have complex clinical needs requiring specialized medical care over an extended period of time. For most patients, CCC facilities are a transition point between acute care hospitals and home care or residential long-term care settings. Studying patient flow across the entire health system is important as delayed discharge may result in increased wait times in adjacent care settings. While great attention is paid to patient flow in acute care hospitals, barriers to admission and discharge from post-acute care facilities, such as CCC, may lead to increased wait times for the entire health system. In March 2015, 19.6 per cent of CCC beds in Ontario were occupied by ALC patients that no longer needed the intensity or type of care that is offered in these beds (Cancer Care Ontario, Access to Care - Alternate Level of Care Informatics, 2015).

STUDY APPROACH

The Andersen-Newman (1973) theoretical framework is often used when studying health service utilization. Andersen-Newman theorizes that health service use is dependent on both societal and individual determinants. Examples of societal determinants may include factors such as the volume of resources that are available relative to the population served and the accessibility of services. Individual determinants are divided into three types: predisposing factors, enabling factors and illness level. Predisposing factors increase one's likelihood of utilizing health services, and may include demographics (e.g., age, sex, past illness), social structure (e.g., ethnicity, level of education) and beliefs (e.g., values concerning health and wellness, attitudes toward health service use). Enabling factors facilitate an individual's access to health services. These may include factors such as income, health insurance and geographic location (i.e. urban versus rural). Lastly, illness level, both perceived by the patient and evaluated by a health professional, determine use of health resources. Theoretical frameworks such as the Andersen-Newman model serve as valuable guides when analyzing complex problems such as ALC patients in CCC facilities.

SOURCES OF INFORMATION

Access to care wait times in the province are measured using Cancer Care Ontario's Wait Time Information System (WTIS). This large database of patient records includes information on the number of days spent waiting for care (ALC days), basic patient demographics, facility, bed and service type, most appropriate discharge setting, and finally, specialized needs and supports that are required at the discharge setting and may be a potential barrier to discharge. WTIS is a valuable tool for measuring wait time efficiency at various points in the health system, though it is limited by the clinical information that it collects on patients waiting for discharge to alternate levels of care.

Comprehensive clinical assessments such as the Resident Assessment Information – Minimum Data Set 2.0 (MDS 2.0) are used in CCC to evaluate patients across a broad range of health domains, including physical, cognitive and social functioning, diseases and conditions, and health service and medication utilization. In Ontario, the RAI MDS 2.0 assessment system has multiple applications for multiple audiences, such as patient care planning, funding, quality measurement, system planning and research. On a quarterly basis, RAI MDS 2.0 assessments from all CCC facilities in the province are collected for the Continuing Care Reporting System (CCRS). For the purpose of this study, the information harnessed through the RAI MDS 2.0 provides valuable insight into the individual-level determinants of long-stay ALC patient status, particularly with respect to predisposing factors and illness level.

In order to examine the clinical characteristics and discharge barriers associated with ALC status in Ontario, both information about patient clinical characteristics and measures of wait times are required. With the assistance of Cancer Care Ontario, a linked dataset of WTIS and CCRS patient records was created for analysis. A final sample of 32,810 episodes of care from January 1, 2011 to March 31, 2013 was used for this study.

ANALYSES

Descriptive statistics comparing patients with 30 or more ALC days in an episode of care (long-stay ALC patients) to those with less than 30 ALC days were computed. Subsequently, a multi-variable logistic regression analysis was performed to identify predictors of long-stay ALC status.

Distribution of ALC Days

Overall, 13.8 per cent of CCC patients had one or more ALC days within the episode of care. While efforts to discharge patients in a timely manner should be made, it is important to recognize unavoidable ALC days may be incurred at the end of an episode of care as patients transition to a less intensive care setting. It is for this reason that long-stay ALC patients were targeted in this study. Adopting CCO's definition, long-stay ALC patients were identified as those patients with 30 or more ALC days within the episode of care. In total, 9.8 per cent of CCC patients were identified as long-stay ALC patients.
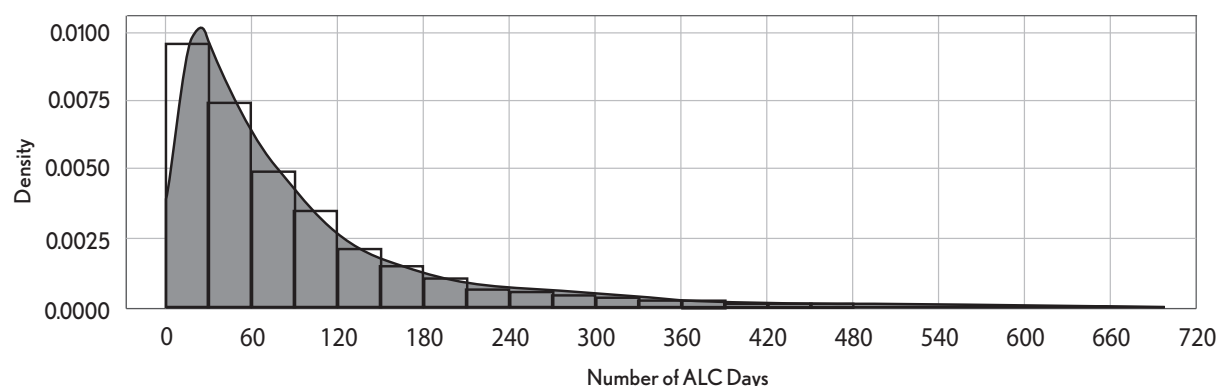
Figure 1: Distribution of ALC Days in Ontario CCC Facilities

Figure 1 presents the distribution of ALC days amongst those CCC patients with one or more ALC days. Of those with at least one ALC day, 71 per cent spent more than 30 days waiting in CCC for placement.

Clinical Characteristics of Long-stay ALC Patients

In the Andersen-Newman Framework, socio-demographic factors serve as predisposing factors for increased resource use. Long-stay ALC patients were generally older, with a greater percentage aged 75 years and older, and a mean group difference of 2.1 years. However, those in the regular-stay group were also typically 65 years of age and older. Differences between groups for all other predisposing factors were small. Notably, fewer long-stay ALC patients were married and more lived alone prior to admission to CCC.

Patient Characteristic	≤ 30 ALC Days	30+ ALC Days
Female	57.8%	55.9%
Mean Age	77.4 (SD=13.0)	79.5 (SD=12.1)
Age Group		
0-64	15.7%	12.2%
65-74	17.1%	13.8%
75-84	33.3%	33.7%
85-94	30.7%	36.1%
95+	3.3%	4.3%
Married	39.7%	34.4%
Previously lived alone	25.6%	30.7%
Speaks foreign language	10.5%	11.8%

Perceived and evaluated illness level are also important predictors of resource use. A greater percentage of long-stay ALC patients had diagnoses of Alzheimer's disease and related dementias, Hemiplegia/Hemiparesis, Parkinson's diseases, stroke, and traumatic brain injury. Conversely, long-stay ALC patients were less likely to have cancer, congestive heart failure, and renal failure diagnoses on admission.

More long-stay ALC patients had occasional or worse bladder or bowel incontinence and hallucinations or delusions. These patients were less likely to present with edema, shortness of breath, and insufficient fluid on admission. A greater number of long-stay ALC patients had a history of pressure ulcers on admission, although fewer presented with a stage 3 or greater pressure ulcer on admission. Approximately half as many long-stay ALC patients were admitted with surgical wounds.

Patient Characteristic	≤ 30 ALC Days	30+ ALC Days
Disease		
Alzheimer's disease and related dementias	21.4%	39.3%
Cancer	26.6%	15.4%
Congestive heart failure	13.2%	11.5%
Parkinson's disease	4.1%	6.4%
Renal failure	13.3%	11.8%
Stroke	17.1%	25.5%
Traumatic brain injury	1.7%	2.5%
Condition		
Edema	25.6%	17.5%
Hallucinations or delusions	6.0%	9.3%
Insufficient fluid intake	7.7%	3.9%
Occasional or worse bladder/ bowel incontinence	54.6%	64.5%
Shortness of breath	25.4%	16.0%

The RAI MDS 2.0 clinical applications includes numerous embedded clinical scales for providing summary ratings of patient health status in different areas of clinical interest. The Activities of Daily Living Hierarchy (ADL-H) scale considers early, middle and late loss activities of daily living to create a hierarchical measure of functional performance. Greater ADL-H scores indicate greater impairment. Long-stay ALC patients experienced greater functional impairment and thus were more dependent on others for managing activities of daily living.

The Cognitive Performance Scale (CPS) uses five measures of cognition to group patients into seven distinct levels of cognitive function (Morris et al., 1994). Greater CPS scores indicate greater impairment. On admission, long-stay ALC patients were more cognitively impaired than the comparison group.

Clinical Scale	≤ 30 ALC Days	30+ ALC Days
ADL-Hierarchy Scale		
0	4.2%	2.8%
1-2	25.1%	19.9%
3-4	28.0%	30.8%
5-6	42.7%	46.5%
Cognitive Performance Scale		
0	28.0%	15.2%
1-2	35.4%	29.3%

Clinical Scale	≤ 30 ALC Days	30+ ALC Days
3-4	24.5%	34.8%
5-6	12.1%	20.8%
Aggressive Behaviour Scale		
0	78.0%	69.4%
1-4	18.5%	23.1%
5+	3.4%	7.5%
Pain Scale		
0	26.6%	36.7%
1-2	66.1%	59.4%
3	7.3%	3.9%
CHESS Scale		
0	15.1%	21.0%
1-2	47.7%	52.1%
3+	37.3%	26.9%
Index of Social Engagement		
0-1	31.4%	39.2%
2-4	42.5%	41.7%
5-6	26.1%	19.0%

CHESS Scale = Changes in Health, End-Stage Disease, Signs, and Symptoms Scale

The Aggressive Behaviour Scale (ABS) considers episodes of verbal abuse, physical abuse, socially-disruptive behaviour and resistance to care to create a summary measure of aggressive behaviour. This scale is analogous to the Cohen Mansfield Agitation Inventory (CMAI) aggressive subscale, and greater scores are an indication of both greater frequency and intensity of aggressive behaviors (Perlman and Hirdes, 2008). Long-stay ALC patients were more likely to display signs of aggressive behaviour on admission.

The Pain Scale takes into account the frequency and severity of pain a patient experiences to provide clinicians with summary measure of pain. A Pain Scale score of one indicates that the patient has pain that occurs less than daily. Patients with daily pain that is mild or moderate are scored as a two, while those with severe daily pain are receive the maximum Pain Scale score of three (Fries et al., 2001). Long-stay ALC patients were in less pain than regular stay patients on admission.

The Changes in Health, End-Stage Disease, Signs, and Symptoms Scale (CHESS) is a measure of health instability that is strongly predictive of mortality in institutionalized older adults (Hirdes et al., 2003). Long-stay ALC patients had greater health stability on admission to CCC.

The Index of Social Engagement (ISE) is an observational scale intended to assess a patient's social behaviour through participation in social opportunities provided by the facility (Mor et al., 1995; Gerritsen et al., 2008). Long-stay ALC patients were less socially engaged on admission to CCC.

Clinical Predictors of Long-stay ALC Status

A single multivariable logistic regression model predicting long-stay ALC status was created. Using patient characteristics available at baseline, this model simultaneously accounts for all variables inserted into the model to provide odds ratio estimates for each effect. Odds ratio estimates that are greater than 1.0 indicate greater odds of becoming a long-stay ALC patient. Odds ratio estimates that are lower than 1.0 are protective and indicate lower odds of becoming a long-stay ALC patient. Finally, odds ratio estimate confidence intervals that overlap with 1.0 are not statistically significant. In this instance, patients with these clinical characteristics have equal odds of becoming long-stay ALC patients as the baseline or reference category.

In this model, married patients had lower odds of becoming a long-stay ALC patient while those who had previously received care in a CCC facility within five years of hospital admission had greater odds. ADRD and Stroke was associated with greater odds of becoming a long-stay ALC patient. Conversely, patients presenting with shortness of breath or surgical wounds on admission had lower odds of delayed discharge. Patients requiring supervision or limited assistance for the completion of Activities of Daily Living were no more likely to be long-stay ALC patients compared to those were independent in all four ADLs in the ADL-Hierarchy scale. However, patients requiring extensive or greater assistance in the completion of ADLs had greater odds of becoming long-stay ALC patients. As degree of cognitive impairment increased, the odds of being a long-stay ALC patient also increased. For example, patients with severe cognitive impairment (CPS 5+) were 2.2 times more likely to experience delayed discharge compared to those with no cognitive impairment. Further, those requiring reorientation had greater odds of delayed discharge. After accounting for cognition, only patients exhibiting very severe aggressive behaviour (ABS 6+) had greater odds of becoming long-stay ALC patients. Daily, intensive pain and clinical instability, as measured by the Pain scale and CHESS scale respectively, were protective against becoming long-stay ALC patients. Patients receiving community skills training, parenteral (IV) nutrition, suctioning or those belonging to a hospice program had lower odds of becoming long-stay ALC patients.

Variable	Odds Ratio Estimate	Odds Ratio Interval
Married	0.74	0.68 - 0.80
Previous stay in CCC	1.48	1.37 - 1.60
Diseases and Conditions		
ADRD	1.41	1.31 - 1.57
Stroke	1.43	1.31 - 1.57
Shortness of breath	0.82	0.74 - 0.92
Surgical wounds	0.62	0.55 - 0.70
ADL-Hierarchy Scale		
1-2 vs. 0	1.26*	0.94 - 1.59
3-4 vs. 0	1.59	1.26 - 2.00
5-6 vs. 0	1.77	1.41 - 2.23
Cognitive Performance Scale		
1-2 vs. 0	1.39	1.23 - 1.56
3-4 vs. 0	1.86	1.63 - 2.11
5-6 vs. 0	2.18	1.87 - 2.54

Variable	Odds Ratio Estimate	Odds Ratio Interval
Aggressive Behaviour Scale		
1-2 vs. 0	1.09*	0.98 – 1.22
3-5 vs. 0	1.15*	1.00 -1.32
6+ vs. 0	1.29	1.29 - 1.54
Pain Scale		
1-2 vs. 0	0.85	0.78 - 0.92
3 vs. 0	0.67	0.55 - 0.81
CHESS Scale		
1-2 vs. 0	0.82	0.74 - 0.91
3+ vs. 0	0.59	0.55 - 0.63
Treatments and Therapies		
Reorientation	1.26	1.16 - 1.37
Community skills training	0.50	0.46 - 0.55
Parenteral nutrition	0.43	0.35 - 0.52
Suctioning	0.27	0.19 - 0.37
Hospice	0.27	0.22 - 0.32
All statistics significant to $p \leq 0.05$ unless denoted by an * Model C-statistic = 0.74		

CONCLUSION

As indicated by the multivariable logistic regression model predicting long-stay ALC status, delayed discharge from CCC facilities is multifactorial and rooted in a large number of health domains. Risk factors include a history of hospitalization, functional and cognitive impairment, aggressive behaviours, pain, and neurological disease conditions (e.g., Alzheimer's disease and related dementias, stroke). There are also numerous protective factors that reduce the likelihood of an individual becoming a long-stay ALC patient, including the presence of a spousal caregiver and provision of community skills training. Finally, end-stage health status and the need for advanced medical treatments, such as parenteral feeding and suctioning are protective against becoming long-stay ALC patients as these factors may determine need for care in a CCC facility.

This work provides the foundation for the implementation of system solutions to reduce the number of ALC patient incurred by CCC patients in Ontario. By characterizing long-stay ALC patients, opportunities to provide specialized care and improve the flow of patients through CCC facilities have been identified. For example, the results of the multivariable logistic regression model indicate a need for care settings that are able to attend to the needs of patients with cognitive and behavioural needs. This may include specialized behavioural units in long-term care settings or community based supports that enable a greater number of patients with cognitive impairment to safely reside in the community. It also highlights the importance of interventions - such as community skills training - and the crucial role of community based informal caregivers in enabling a timely discharge from hospital.

This research utilized patient admission assessments to identify predictors of long-stay ALC status. This highlights the opportunity for early identification and targeted intervention for those patients at risk of becoming a long-stay ALC patient. At-risk patients can be identified early in the episode of care. With appropriate and timely intervention, including collaboration with community service providers, hospitals may reduce the odds of delayed discharge and unnecessary acute care bed utilization. Future research will focus on the development of predictive algorithms enabling the early identification of patients with an increased likelihood of delayed discharge, and prompting the initiation of discharge planning.

Finally, this research demonstrates the utility of the RAI MDS 2.0 clinical assessment as a source of patient information that maybe leveraged for managing patient flow in post-acute care settings.

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