

Predicting Adverse Outcomes After Discharge From Complex Continuing Care Hospital Settings to the Community

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ABSTRACT

Purpose of Study: The purpose was to identify risk and protective factors assessed at complex continuing care (CCC) admission that were associated with three adverse outcomes (death, readmission, and incidence of or failure to improve possible depression) for persons discharged from CCC to the community with home care services.

Primary Practice Settings: CCC, home care, community.

Methodology and Sample: The sample included all CCC patients in Ontario assessed with the Resident Assessment Instrument–Minimum Data Set 2.0 between January 2003 and December 2010 and who were subsequently assessed with the Resident Assessment Instrument–Home Care within 6 months of discharge to the community ($n = 9,940$). Separate multivariable logistic regression models were developed for each outcome.

Results: Within 6 months, 4.9% of the sample had died, 6.5% were readmitted to any Ontario CCC facility, and 13.7% showed symptoms of new possible depression or failure to improve possible depression. Heart failure, chronic obstructive pulmonary disease (COPD), health instability, intravenous/tube feed, and pressure ulcer were associated with increased risk of death. Difficulty with comprehension, possible depression, COPD, unstable conditions, acute episode or flare-up, short-term prognosis, worsening self-sufficiency, and having either patient or caregiver optimistic about discharge were associated with increased risk of readmission. Existing depressive symptoms or depression, unsettled relationships, multimorbidity, and polypharmacy were associated with risk for incidence of or failure to improve possible depression. Optimism about rehabilitation potential and high social engagement were protective against readmission and depressive outcomes, respectively.

Implications for Case Management Practice: Person-level clinical data collected on admission to CCC can be used to identify high-risk patients and trigger early discharge planning processes and other in-home interventions. These results support the sharing of information between settings, and highlight key areas in which care teams in CCC and case managers in home care organizations can work together to support the transition to home and potentially reduce adverse postdischarge outcomes.

Key words: *discharge planning, home care, interRAI, postacute care, readmission*

There is substantial literature on predictors of adverse outcomes after discharge from acute hospitals or emergency departments to home. Well-established risk factors include multimorbidity, poor functional status, delirium, depression, prior health service use, and longer hospital stay (García-Pérez et al., 2011; Hasan et al., 2010; Kansagara et al., 2011; Walter et al., 2001). Increasingly, older adults (≥ 65) who are discharged from hospital are more frail or at risk of functional decline (Kleinpell, Fletcher, & Jennings, 2008). As a result, older adults are being discharged to postacute settings like complex continuing care (CCC) more often than directly back to the community (Complex Continuing Care

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and Rehabilitation Provincial Leadership Council, 2006).

In Ontario, Canada, CCC programs provide hospital-based nursing and rehabilitation services to persons recovering from acute illness, or who have complex medical needs requiring skilled care that is not available at home or in long-term care. Registered nurses and registered practical nurses make up the majority of staff, and care teams typically include a physiotherapist, occupational therapist, recreational therapist, speech language pathologist, registered dietician, and social worker. CCC plays a transitional role for many patients as is reflected by the median length of stay of 29 days for older adults (Canadian Institute for Health Information, 2011). CCC programs may be known as postacute, subacute, intermediate, or transitional care programs and may be offered in a variety of settings such as skilled nursing facilities, nursing homes, and long-term acute care hospitals (Melis, Parker, & van Eijken, 2004). The role of CCC in the context of the health care system can be described by comparing the average resource intensity relative to long-term care facilities (or nursing homes) using the Resource Utilization Group classification (Hirdes, Sinclair, King, Tuttle, & McKinley, 2003). In general, patients in the Clinically Complex, Extensive Services, and Special Care levels are considered to require CCC services, whereas the needs of patients in the Behavior Problems, Impaired Cognition, and Reduced Physical Functions levels can likely be met in long-term care facilities. Over time, this distinction has become more polarized as CCC has admitted patients with increasingly complex medical and rehabilitative needs. Compared with other continuing care populations, CCC patients are more likely to have multiple comorbidities (including neurological conditions), higher functional impairment, and require extensive therapies such as ventilation and feeding tubes (Complex Continuing Care and Rehabilitation Provincial Leadership Council, 2006; Danila et al., 2014). Thus, most of the existing literature on postdischarge outcomes may not be readily applicable to CCC populations.

Furthermore, a recent systematic review found that few risk prediction models for hospital readmission incorporated clinically actionable data that could be used to triage patients to different types of interventions (Kansagara et al., 2011). Useful risk prediction models should have good predictive ability, be appropriate for the selected population, and give information early enough to trigger a transitional care intervention such as discharge planning initiated at admission (Kansagara et al., 2011). This study is part of a larger initiative to establish intersectoral care transition planning across three settings:

acute care, CCC, and home and community care. By leveraging and optimizing use of existing resources in the health care system, patients can receive the right intensity of care at the right time that may simultaneously promote better individual outcomes and increase system efficiency.

To address these gaps in research and practice, this study aimed to identify risk and protective factors assessed at CCC admission that were associated with three adverse outcomes (death, readmission, and incidence of or failure to improve possible depression) for persons discharged from CCC to the community with home care services. This information could lead to practical recommendations for how CCC and home care organizations can work together to proactively address persons at risk for adverse postdischarge outcomes. To our knowledge, this is the first study to link standardized assessments spanning the transition from CCC hospitals/units to the community.

METHODS

Sample and Procedure

Data for this study were obtained from the Innovations in Data, Evidence, and Applications for Persons with Neurological Conditions (ideas PNC) research program. This linked dataset represents persons who received care in long-term care homes, CCC hospitals/units, and/or long-stay home care across seven Canadian provinces and territories (Hirdes, Poss, Mitchell, Korngut, & Heckman, 2014). Ethics approval was obtained through the University of Waterloo's Office of Research Ethics (ORE #17045).

The present sample included all CCC patients in Ontario assessed with the Resident Assessment Instrument–Minimum Data Set (RAI-MDS 2.0) between January 2003 and December 2010 and who were subsequently assessed with the Resident Assessment Instrument–Home Care (RAI-HC) within 6 months of discharge to the community. The RAI-MDS 2.0 and RAI-HC are comprehensive, standardized clinical assessments used widely in Canada and internationally (Carpenter & Hirdes, 2013). These multidimensional instruments cover key clinical domains: sociodemographic information, cognition, communication/hearing, vision, mood and behavior, psychological well-being, social functioning, physical functioning, continence, diagnoses and health conditions, nutrition and oral status, skin condition, medications, and treatments and procedures. In addition, the RAI-MDS 2.0 has a section on discharge potential and the RAI-HC covers environmental assessment and service utilization. The interRAI suite of instruments is fully integrated, meaning that 70% to 80% of items are shared between the RAI-MDS

2.0 and RAI-HC (Carpenter & Hirdes, 2013). The assessments produce the same clinical protocols, outcome scales, and quality indicators that support care planning and can be used to inform resource allocation, evaluate best practices, and establish case mix funding systems across the continuum of care (Hirdes et al., 1999). In Ontario, the RAI-MDS 2.0 is used in long-term care facilities (or nursing homes) and CCC hospitals/units. Patients are assessed, often by interdisciplinary care teams, on admission and quarterly thereafter. Home care case managers who are usually registered nurses or social workers administer the RAI-HC for all adult, nonpalliative long-stay home care patients (i.e., expected to receive services for >60 days) on intake and every 6 months thereafter. Linking the RAI-MDS 2.0 and RAI-HC allows for comparison of short- and long-term changes across settings on many indicators of health status.

Of all unique RAI-MDS 2.0 admission assessments completed between January 2003 and December 2010 ($n = 132,558$), only episodes in which the person was eventually discharged to home care service, assisted living/board and care, or private home without home care ($n = 44,925$) were retained. The unit of analysis was the CCC episode; thus, a person could be represented more than once if discharged and readmitted under a new episode. Short, temporary stays in acute care do not trigger a new episode. At the person level, these RAI-MDS 2.0 assessments were linked to RAI-HC assessments, where the RAI-HC assessment date occurred after the discharge date from CCC ($n = 18,002$). If there were more than one matching RAI-HC, the RAI-HC closest to the discharge date was chosen. Data linking was done by matching deidentified personal and facility numbers. All data holdings and the linking procedures used in this study meet best practice guidelines for protecting privacy and confidentiality as outlined in a data-sharing agreement between interRAI Canada and the Canadian Institute for Health Information. After excluding instances in which the RAI-MDS 2.0 and RAI-HC assessments were done more than 6 months apart, the final sample consisted of 9,940 episodes.

Outcomes

Three postdischarge outcomes were of interest: death within 6 months, readmission within 6 months, and incidence of or failure to improve possible depression on the first RAI-HC after discharge. Death was defined where the home care agency coded "death" as the reason for discharge from home care services within 6 months of index discharge. Readmission was defined where the person had a second CCC episode within 6 months of index discharge; thus, this

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outcome represented all-cause readmission to any Ontario CCC hospital/unit. A threshold score of three or greater on the Depression Rating Scale (DRS) was used as an indicator of possible depression, which has been shown to be highly correlated with the Hamilton Rating Scale for Depression and the Cornell Scale for Depression (Burrows, Morris, Simon, Hirdes, & Phillips, 2000). The DRS is also highly predictive of a new depression diagnosis at follow-up in CCC populations (Martin et al., 2008). The third outcome was defined as either scoring below the threshold on the RAI-MDS 2.0 but scoring above the threshold on the RAI-HC (i.e., incidence of possible depression) or scoring above the threshold on both the RAI-MDS 2.0 and RAI-HC (i.e., failure to improve possible depression). DRS scores could not be calculated for two persons, so they were dropped from examination for this particular outcome.

Independent Variables

Independent variables from the admission RAI-MDS 2.0 assessment were chosen based on existing literature and expert clinical input. Selected variables represented a range of clinical domains: functional status, cognitive status, communication, mood and behavior, psychosocial well-being, health conditions, diagnoses, prior health service use, and subjective appraisals. Unsettled relationships included conflict or anger with CCC staff, other patients, family, or friends. Rehabilitation potential referred to whether the person and/or CCC care team thought he or she was capable of increased independence in at least some functional areas. Discharge potential referred to whether the person and/or a support person was positive toward discharge. Worsening self-sufficiency was defined as an increase in the care needs and/or support received in the last 90 days. The ADL Hierarchy Scale, Cognitive Performance Scale, DRS, Index of Social Engagement, and Changes in Health, End-Stage disease, and Signs and Symptoms (CHESS) scale can be derived from both the RAI-MDS 2.0 and RAI-HC, and these summary scales have been validated in long-term care and home care populations

(Gray et al., 2009; Hirdes, Frijters, & Teare, 2003; Hirdes et al., 2014; Landi et al., 2000; Morris et al., 1994; Morris, Fries, & Morris, 1999; Schroll, Jónsson, Mor, Berg, & Sherwood, 1997).

Statistical Analysis

All statistical analyses were performed using SAS, Version 9.4 (SAS Institute, Cary, NC). Sample characteristics were summarized using frequencies and percentages for categorical variables and means and standard deviations for continuous variables. Separate logistic regression models were created for each outcome. Bivariate logistic regression analyses were conducted for each independent variable against each outcome. Variables that achieved a significance level of $p < .05$ were selected for inclusion in the multivariable logistic regression model using both automated stepwise and manual backward selection. Reintroduction of eliminated variables, interaction testing, and proxy variable substitution were used to increase robustness of the models. Final models were selected on the basis of indicators of statistical significance such as Akaike information criterion and c statistic.

RESULTS

Table 1 summarizes the sociodemographic and clinical characteristics of CCC patients discharged to the community and assessed with the RAI-HC within 6 months ($n = 9,940$). The mean age \pm standard deviation was 77.9 ± 11.8 years, and 95% of the sample were older than 55 years. The mean length of stay in CCC was 56.0 ± 78.1 days, and the mean time between CCC discharge and home care assessment was 36.9 ± 42.9 days. Up to 64.4% were referred directly to home care, whereas 11.7% and 24.0% were discharged to residential care and private home, respectively, and accessed home care at a later date. On admission, patients presented generally with moderate functional impairment and mild cognitive impairment. The five most common diagnoses were hypertension (59.1%), type 2 diabetes (31.7%), arthritis (31.4%), stroke (20.0%), and Alzheimer disease or related dementia (16.9%).

The majority of patients (77.1%) did not experience any of the adverse outcomes of interest. Within 6 months, 4.9% of the sample had died and 6.5% were readmitted to any Ontario CCC hospital/unit. Up to 13.7% of the sample showed symptoms of new possible depression or failure to improve possible depression detected in CCC. Because the outcomes were very weakly correlated (all $r < 0.05$), development of three separate models was appropriate.

Table 2 presents the results of the bivariate and multivariable models. All multivariable models were

TABLE 1
Selected Characteristics for CCC Patients Discharged to Community and Assessed With RAI-HC Within 6 Months ($n = 9,940$)

Selected Characteristics	n (%)
Female	6,316 (63.5)
Married	4,202 (42.3)
Referred from	
Inpatient acute care	8,610 (86.6)
Inpatient rehabilitation	508 (5.1)
Home care	294 (3.0)
Other home and community	377 (3.8)
Other facilities	151 (1.5)
Discharged to	
Home care	6,396 (64.4)
Residential care	1,159 (11.7)
Private home	2,385 (24.0)
ADL Hierarchy Scale	
Independent 0	646 (6.5)
Mostly independent 1–2	3,463 (34.8)
Extensive assistance 3–4	3,165 (31.8)
Mostly dependent 5–6	2,666 (26.8)
Cognitive Performance Score	
No impairment 0	3,543 (35.6)
Mild impairment 1–2	3,948 (39.7)
Moderate impairment 3–4	1,950 (19.6)
Severe impairment 5–6	499 (5.0)
Depression Rating Scale	
No symptoms 0	5,824 (58.6)
Depressive symptoms 1–2	2,512 (25.3)
Possible depression ≥ 3	1,602 (16.1)
Index of Social Engagement	
Low engagement 0–2	3,116 (31.4)
Moderate engagement 3–4	3,362 (33.8)
High engagement 5–6	3,462 (34.8)

adjusted for age, sex, length of stay in CCC, and time to home care follow-up. For death, after adjusting for these covariates, risk factors were heart failure (odds ratio [OR] = 2.15), chronic obstructive pulmonary disease (COPD; OR = 1.51), low to moderate/high health instability (OR = 1.16 for CHES score 1–2 and OR = 1.98 for CHES score 3–5, respectively), intravenous/tube feed (OR = 1.56), and pressure ulcer (OR = 1.75).

Risk factors for readmission included difficulty with comprehension (OR = 2.28), possible depression (OR = 1.28), COPD (OR = 1.43), unstable conditions (OR = 1.26), acute episode or flare-up (OR = 1.44), prognosis of 6 months or less (OR = 2.18),

TABLE 2**Unadjusted and Adjusted Logistic Regression Models Controlling for Age, Sex, CCC Length of Stay, and Time to Home Care Follow-Up**

	Death Within 6 Months		Readmission Within 6 Months		Incidence of or Failure to Improve Possible Depression	
	Unadjusted OR	Adjusted OR	Unadjusted OR	Adjusted OR	Unadjusted OR	Adjusted OR
ADL Hierarchy Scale (reference = 0)						
Mostly independent 1–2	1.18 (0.77–1.81)		1.00 (0.71–1.42)			0.82 (0.65–1.04)
Extensive assistance 3–4	1.19 (0.77–1.84)		1.05 (0.74–1.49)			0.68 (0.53–0.87)
Mostly dependent 5–6	1.58 (1.02–2.42)		1.12 (0.78–1.59)			0.71 (0.56–0.91)
Worsening ADL	1.22 (1.01–1.48)		1.36 (1.15–1.62)			
Cognitive Performance Score (reference = 0)						
Mild impairment 1–2	1.18 (0.96–1.47)		1.09 (0.91–1.31)		1.24 (1.09–1.42)	
Moderate impairment 3–4	1.21 (0.94–1.56)		0.90 (0.71–1.14)		1.26 (1.07–1.48)	
Severe impairment 5–6	1.05 (0.67–1.64)		1.38 (0.98–1.94)		1.37 (1.06–1.78)	
Worsening cognition	1.33 (1.10–1.64)		1.37 (1.14–1.65)		1.16 (1.01–1.34)	
Delirium	1.55 (1.15–2.08)		1.40 (1.07–1.84)		1.34 (1.10–1.64)	
Difficulty with comprehension			2.92 (1.48–5.79)	2.28 (1.13–4.62)		
Depression Rating Scale (reference = 0)						
Depressive symptoms 1–2			0.96 (0.79–1.15)	0.89 (0.73–1.09)	1.61 (1.41–1.85)	1.50 (1.30–1.73)
Possible depression ≥ 3			1.43 (1.16–1.75)	1.28 (1.03–1.59)	2.61 (1.53–3.01)	2.23 (1.90–2.62)
Worsening mood					1.50 (1.32–1.70)	
Index of Social Engagement (reference = 0–2)						
Moderate engagement 3–4	0.81 (0.65–1.00)				0.82 (0.71–0.94)	0.88 (0.76–1.01)
High engagement 5–6	0.66 (0.53–0.83)				0.64 (0.56–0.74)	0.72 (0.65–0.84)
Unsettled relationships					1.73 (1.50–2.01)	1.21 (1.03–1.42)
Heart failure	2.49 (2.03–3.06)	2.15 (1.74–2.66)	1.26 (1.02–1.55)			
COPD	1.89 (1.56–2.31)	1.51 (1.23–1.87)	1.59 (1.32–1.91)	1.43 (1.18–1.73)		
≥ 5 different comorbidities					1.25 (1.11–1.41)	1.17 (1.03–1.32)
≥ 9 different medications					1.31 (1.13–1.52)	1.18 (1.01–1.38)
Changes in Health, End-Stage Disease, and Signs and Symptoms (reference = 0)						
Low instability 1–2	1.37 (1.03–1.83)	1.16 (0.87–1.56)	1.22 (0.97–1.54)			
Moderate/high instability 3–5	2.65 (1.96–3.58)	1.98 (1.45–2.71)	1.65 (1.28–2.14)			
Worsening self-sufficiency			1.50 (1.27–1.79)	1.42 (1.19–1.70)		
Severe pain					1.29 (1.04–1.61)	
IV/tube feed	1.57 (1.14–2.16)	1.56 (1.11–2.17)			1.34 (1.08–1.67)	
Pressure ulcer	1.80 (1.47–2.21)	1.75 (1.42–2.16)				
Unstable conditions	1.40 (1.17–1.68)		1.47 (1.25–1.73)	1.26 (1.06–1.49)	1.19 (1.06–1.33)	
Acute episode or flare-up	1.50 (1.25–1.80)		1.68 (1.43–1.97)	1.44 (1.19–1.70)		
Prognosis ≤ 6 months			2.52 (1.54–4.13)	2.18 (1.31–3.63)		
Rehabilitation potential						
Either patient or care staff optimistic	0.97 (0.75–1.24)		0.59 (0.46–0.75)	0.62 (0.48–0.79)		
Both patient and care staff optimistic	0.72 (0.59–0.88)		0.68 (0.57–0.81)	0.71 (0.59–0.84)		
Discharge potential						
Either patient or caregiver optimistic			1.83 (1.18–2.84)	1.80 (1.15–2.83)	1.35 (1.01–1.81)	
Both patient and caregiver optimistic			1.31 (0.90–1.93)	1.37 (0.92–2.05)	1.01 (0.79–1.29)	
C statistic		0.69		0.64		0.64

Note. COPD = chronic obstructive pulmonary disease; OR, odds ratio; IV = intravenous.

Risk factors for readmission included difficulty with comprehension, possible depression, COPD, unstable conditions, acute episode or flare-up, prognosis of 6 months or less, worsening self-sufficiency, and having either patient or caregiver optimistic about discharge but not both. Cases in which the patient and/or care staff were optimistic about rehabilitation were protective against readmission.

worsening self-sufficiency (OR = 1.42), and having either patient or caregiver optimistic about discharge but not both (OR = 1.80). Cases in which the patient and/or care staff were optimistic about rehabilitation were protective against readmission (OR = 0.71 and OR = 0.62, respectively).

Risk factors for incidence of or failure to improve possible depression were presence of depressive symptoms (OR = 1.50) or possible depression (OR = 2.23) at baseline, unsettled relationships (OR = 1.21), multimorbidity (OR = 1.17), and polypharmacy (OR = 1.18). High social engagement was a protective factor (OR = 0.72).

DISCUSSION

This study examined previously identified risk factors in general discharge risk models as well as novel risk and protective factors specific to CCC populations. Consistent with other studies, multimorbidity, cardiorespiratory symptoms, depression, and short-term prognosis were associated with death and readmission (García-Pérez et al., 2011; Hasan et al., 2010; Kansagara et al., 2011; Walter et al., 2001). Prior health service use and polypharmacy that have been identified by other studies were not significant, but these rates may be more similar in an older and more medically complex population. Importantly, this study showed that these factors measured on CCC admission—rather than at CCC discharge or home care admission—were significantly associated with postdischarge outcomes, which could trigger discharge planning processes early in the hospital stay. As well, although there were some common risk and protective factors, many factors were unique to each outcome that would help to triage patients to targeted interventions.

Greater health instability as measured by the CHES scale as well as having a diagnosis of heart failure or COPD was highly associated with risk of death after discharge. Subsequent analyses (not shown) of the individual components of the CHES scale such as dyspnea, weight loss, and leaving food uneaten were also significantly associated with death. The CHES scale has already been validated as a predictor of adverse outcomes in long-term care, home care, and

palliative care settings (Armstrong, Stolee, Hirdes, & Poss, 2010; Hirdes, Freeman, Smith, & Stolee, 2012; Hjaltadóttir, Hallberg, Ekwall, & Nyberg, 2011), and this study provides further evidence of its predictive ability in the postacute setting. The CHES scale is useful because it can be calculated from both the RAI-MDS 2.0 and RAI-HC. Thus, the CHES scale offers a common method of triaging high-risk patients for close medical monitoring after discharge or whose needs may be better served by a palliative rather than a general home care team. In contrast, the observed associations with tube feeding and pressure ulcers may be better explained as proxy measures for clinical status rather than risk factors for death.

Difficulty with comprehension was strongly associated with readmission. Older adults with complex comorbidities and communication problems have been shown to have much higher rates of medication nonadherence that may trigger an unplanned readmission (Steinman & Hanlon, 2010). Difficulty with comprehension may also hinder the patient's ability to manage and negotiate their care, giving rise to unmet needs (Naylor, Stephens, Bowles, & Bixby, 2005). Having either the patient or caregiver optimistic about discharge but not both was also strongly associated with readmission. In cases of disagreement about discharge potential, patients were 3.5 times more likely to be positive toward discharge. One explanation for this finding is that loved ones often assume the caregiver role without adequate preparation. As a result, caregivers may experience stress and negative health consequences (Nahm et al., 2012). The effects of caregiver distress may be further perpetuated by contributing to poor patient outcomes

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or necessitating early discontinuation of home care (Arai, Sugiura, Washio, Miura, & Kudo, 2001; Kao & McHugh, 2004). Factors identified in this study point to a broad approach for preventing readmissions among high-risk patients. Care models that emphasize self-management and knowledge of red flags would be readily applicable. As well, the significance of subjective appraisals as protective (i.e., rehabilitation potential) and risk (i.e., discharge potential) factors underscores the need to address patient, caregiver, and clinician expectations and readiness for the transition. Teaching of problem-solving techniques to informal caregivers—that has been shown to improve caregiving competence, coping, and perceived stress among caregivers of home care recipients—could be part of the discharge planning process (Chiu, Pauley, Wesson, Pushpakumar, & Sadavoy, 2015).

A novel contribution of this study was the inclusion of depression as a health-based outcome rather than death or readmission alone. Few studies have examined declines in health status after hospital discharge (Fortinsky, Covinsky, Palmer, & Landefeld, 1999; Francis & Kapoor, 1992). Depression was selected as a global indicator of daily functioning, emotional coping, and fit with the physical and social environment (Fortinsky et al., 1999). The highly individualized experience of depression also allowed for a more inclusive definition of adverse outcomes including impaired quality of life, pain, and other somatic symptoms. In this study, the proportion of patients showing symptoms of new possible depression or failure to improve possible depression was at least twice as high as patients who died or were readmitted. Many predictors in this study have been previously identified in the literature, including baseline depression severity, multimorbidity, polypharmacy, and poor personal relations (Fiske, Wetherell, & Gatz, 2009; Whisman & Uebelacker, 2009). The current study found a significant protective effect of high social engagement that supports strategies to reduce social isolation. Another study using RAI-HC data from Ontario concluded that older persons with depressive symptoms were much less likely to receive antidepressants, suggesting that depression is typically undertreated in the community (Szczerbińska, Hirdes, & Zyczkowska, 2012). Nonpharmacological

approaches to treating depression may be effective in the home care setting. A meta-analysis of 13 studies showed that patients receiving case management were significantly more likely to achieve 50% improvement on the baseline depression score and/or achieve scores below the threshold for major depression (Genischen et al., 2006). A primary care model also showed that primary care nurses who took on a case management role significantly reduced the severity of depression symptoms in depressed patients with chronic comorbidities (Murphy, Ekers, & Webster, 2014). Other nonpharmacological interventions that have been adapted for depression in late life include behavioral therapy and life review therapy (Fiske et al., 2009). Thus, depression is an important indicator of successful care transitions, and its symptoms can be appropriately addressed in the home care setting. The interRAI suite of instruments can improve the health system's response to clinical or even subclinical mental health needs. As interRAI assessments can be viewed across time and settings, outcome measures such as the DRS enable the CCC care team and home care case managers to detect and monitor rates of decline or improvement over time with the goal of managing or even reversing the process. This work is in line with the field of behavioral health that broadens the definition of high-quality health care to include both medical and behavioral health care. Recognizing that physical and psychosocial symptoms may be more related to stress rather than diseases is the first step to addressing the treatment gap for life stressors and crises, health risk behaviors, and mental health needs that is likely to improve patient outcomes.

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Study Limitations and Strengths

A limitation of the study is that RAI-HC assessments are only completed for long-stay home care patients, so patients expected to be on service for fewer than 60 days were excluded from the sample. This study was unable to distinguish preventable readmissions from all-cause readmissions. Subsequent research would be needed to determine whether there are predictors unique to preventable readmissions. It is also important to acknowledge that this study spans the last decade and therefore dates back to 2003. Although conclusions drawn from older data may not readily apply to the present, the CCC patient profile has not changed as dramatically as in the past. The Ontario hospital system underwent major restructuring during the mid-1990s and had begun to stabilize by the mid-2000s (Hirdes et al., 2003). For instance, the proportion of CCC patients in the highest resource intensity group was 18% in 1996 compared with 51% in 2007 and 59% in 2012 (Canadian Institute for Health Information, 2008-2013). Similarly, the proportion of CCC patients in the lowest resource intensity group was 23% in 1996 compared with 4% in 2007 and 5% in 2012. Nevertheless, caution should be exercised in extrapolating these study findings to local settings. A strength of this study was the use of clinical assessment data that is routinely collected for all patients receiving CCC and long-stay home care services in Ontario. This study also leveraged common items (including definitions and measurement) and summary scales shared between the two assessment instruments that provided a longitudinal account of the discharge process.

CONCLUSION

This work has demonstrated the value of linking comprehensive, standardized assessments to identify risk and protective factors for persons discharged from CCC to the community with home care services. Where the goal is to detect and address potential issues early for the well-being of the patient and health care system, this study has shown that data collected on admission to CCC can be used to trigger early discharge planning processes and inform targeted interventions. Future work should continue to explore other care transitions using the continuum of

interRAI assessments and foster collaborative opportunities among organizations.

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