

Development of a Complex Care Transition Team to Improve the Transition of Patients With Complex Care Needs to the Community

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ABSTRACT

Purpose: Health care systems have historically struggled to provide adequate care for patients with complex care needs that often result in overuse of hospital and emergency department resources. Patients with complex care needs generally have increased expenses, longer length of hospital stays, an increased need for care management resources during hospitalization, and high readmission rates. Mayo Clinic in Arizona aimed to ensure successful transitions for hospitalized patients with complex care needs to the community by developing a complex care transition team (CCTT) program. With typical care management models, patients are assigned to registered nurse case managers and social workers according to the inpatient nursing unit rather than patient care complexity. Patients with complex care needs may not receive the amount of time needed to ensure an efficient and effective transition to the community setting. Furthermore, after transitioning to the community, patients with complex care needs often do not have access to care management resources if further care coordination needs arise.

Primary Practice Setting: Acute care hospital in the US Southwest.

Methodology and Sample: The CCTT was composed of a registered nurse case manager, social worker, and care management assistant, with physician advisor support. The CCTT followed patients with complex care needs during their hospitalization and transition to the community for 90 days after discharge. The number of inpatient admissions and hospital readmission rates were compared between 6 months before and after enrollment in the CCTT program. Cost savings for decreased hospital length of stay, emergency department visits, and hospital readmissions were also determined.

Results: The CCTT selected patients according to a *complex care algorithm*, which identified patients who required high use of the health care system. The CCTT then followed this cohort of patients for an average of 90 days after discharge. A total of 123 patients were enrolled in the CCTT program from July 1, 2019, to April 30,

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2021, and 80 patients successfully graduated from the program. Readmission rates decreased from 51.2% at 6 months before the intervention to 22.0% at 6 months after the intervention. This reduced readmission rate resulted in a cost savings of more than \$1 million.

Implications for Case Management Practice: The outcomes resulting from implementation of the multidisciplinary CCTT highlight the need for a patient-specific approach to transitioning care to the outpatient setting. The patient social determinants of health that often contributed to overuse of health care resources included poor access to outpatient specialists, difficulty navigating the health care system due to illness or poor health literacy, and limited social support. The success of the CCTT program prompted the implementation of other specialty-specific pilot programs at Mayo Clinic in Arizona. The investment of time and resources, including dedicated personnel to follow patients with high hospital service usage, allows health care systems to reduce emergency department visits and hospital admissions and to provide patients with the best opportunity for success as they transition from the inpatient to outpatient setting.

Key words: case manager, complex care, cost savings, discharge planning, social worker

In the United States, a small proportion of patients account for a large component of health care expenditures (Cohen, 2001). Treatment of patients with complex care needs can substantially increase hospital readmission and emergency department (ED) revisit rates. Moreover, patients with complex care needs often have a considerable disease burden and poor health outcomes despite their increased use of health care resources (Bell et al., 2017). Care coordination for such patients is challenging, and patients may have trouble navigating the health care system after discharge. Care models have been proposed at other institutions to address the needs of similar cohorts of patients, primarily in the outpatient setting (Anderson et al., 2017; Badger et al., 2004; Barbosa et al., 2023; Berghofer et al., 2012; Chartrand et al., 2023; Koehler et al., 2009; Mercer et al., 2015; Naylor et al., 1999; Pham et al., 2016; Sevak et al., 2018; Sledge et al., 2006; Stewart et al., 2023; Williams et al., 2014; Xiang et al., 2019). When patients are connected with a case manager through their primary care office or insurance, the case manager often does not have the benefit of having a prior relationship with the patient, and inpatient medical teams are needed to help bridge the transition of care. Therefore, a program was developed to improve the transition of hospitalized patients with complex care needs to the community after discharge.

METHODS

This project was approved by the Mayo Clinic Hospital Practice Committee. Mayo Clinic in Arizona, an acute care hospital, aimed to improve successful transitions to

the community for hospitalized patients with complex care needs by developing a complex care transition team (CCTT) program. Case management and hospital leadership recognized the need for additional resources, and 2 full-time employees were reallocated for the CCTT program. The multidisciplinary CCTT was composed of one registered nurse case manager (RNCM) and one licensed master social worker (LMSW) who received support from a daily assigned care management assistant, senior care management staff, and a physician advisor when needed. The CCTT program was initiated on July 1, 2019, and the CCTT included the same RNCM and LMSW for more than 3 years, which promoted the continuity and integrity of the CCTT program and its processes.

The primary role of the CCTT RNCM was to provide health-related assistance, such as helping with triage, providing education about prescription medication use, and completing discharge assessments. The primary role of the CCTT LMSW was to serve as an advocate, complete psychosocial assessments, assess and address environmental/situational barriers and concerns, and provide outpatient resources. Both the RNCM and LMSW assisted with setting up appointments and establishing connections between patients and clinicians or agencies.

The goal of the CCTT program was to reduce hospital length of stay, 30-day readmission rates, and ED visits for patients with identified complex care needs by developing and implementing a multidisciplinary, comprehensive plan of care before hospital discharge, which included a follow-up plan for up to 90 days after discharge.

Complex Care Algorithm Score

To identify patients with complex care needs during their hospitalization, the CCTT developed a *complex care algorithm* that used data available in the electronic health record. Risk factors were chosen according to previously published evidence and the experience at Mayo Clinic in Arizona (Ludman et al., 2013; Szekendi et al., 2015; van Walraven et al., 2010;

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Williams et al., 2014). A complex care algorithm score was derived from major health diagnoses, behavioral health diagnoses, type of insurance coverage, use of high-risk medications, number of readmissions and ED visits during the past 12 months, and LACE + index score (van Walraven et al., 2010), which is calculated from length of stay, acuity of admission, Charlson Comorbidity Index score, ED visits in the past 6 months, and additional variables (Table 1).

TABLE 1
Complex Care Algorithm Scoring for an Example Patient

| Algorithm element | Criteria | Points |
|-------------------|------------------------------------|--------|
| Diagnoses | Congestive heart failure, diabetes | 2 |
| Behavioral health | Depression | 1 |
| Medications | Anticoagulants, insulin | 2 |
| Payer | Medicare | 1 |
| Hospitalizations | 10 | 5 |
| ED visits | 9 | 3 |
| LACE+ index score | 67 (high) | 2 |
| Total | | 16 |

Abbreviations: ED, emergency department; LACE+, length of stay, acuity of the admission, Charlson Comorbidity Index score, ED visits in the past 6 months, and additional variables.

Patients who are frequently admitted to US academic medical centers often have complex chronic conditions and behavioral comorbid conditions that contribute to acute hospitalizations (Szekendi et al., 2015). The first criterion in the complex care algorithm score comprised diagnoses requiring long hospitalization times, such as congestive heart failure, diabetes, chronic obstructive pulmonary disease, pneumonia, and chronic gastrointestinal tract disease. Patients received 1 point for any of these conditions. All patients undergoing heart and liver transplants and those who underwent kidney transplant within the past 12 months were excluded from this score because separate case managers and social workers are designated to assist these patients at our institution.

Patients were assigned 1 point for a behavioral health diagnosis. Uninsured/underinsured patients or those with government-funded health insurance and patients on high-risk medications, such as opioids, anticoagulants, or insulin, were also assigned 1 point. The number of hospitalizations in the past 12 months was divided by a factor of 2, and the number of ED visits in the past 12 months was divided by a factor of 3 and added to the algorithm score.

The LACE+ index is a logistic regression-based risk prediction model that was developed to predict the risk of postdischarge death or urgent readmission

for 30 days (van Walraven et al., 2010). It allows for accurate estimation of the risk of important discharge outcomes and hospital readmissions. The additional variables included in the LACE+ index score comprised patient age and sex, acute diagnoses and procedures performed, and number of elective and urgent admissions to the hospital in the preceding year.

Selecting Patients for the CCTT Program

The CCTT retrospectively reviewed a cohort of patients and determined that patients with a complex care algorithm score of 10 or more had a readmission rate of 34.4%. Therefore, patients with a score of at least 10 were primarily selected for enrollment in the CCTT program. A representative example of a patient with a complex care algorithm score greater than 10 is shown in Table 1. Briefly, the hypothetical patient is an 89-year-old woman with atrial fibrillation, congestive heart failure, diabetes, and depression. She is on an anticoagulant for atrial fibrillation and insulin for diabetes. She has Medicare insurance and has had 10 hospitalizations in the past 12 months, as well as 9 ED visits that did not result in hospitalization. Her LACE+ index score for the last hospitalization was 67, which is considered high.

Potential participants in the CCTT program were typically identified through a reporting system by using the complex care algorithm for all patients who were hospitalized at Mayo Clinic in Arizona from July 1, 2019, to April 30, 2021. The CCTT RNCM and LMSW reviewed patient reports daily to identify and select patients who met the criteria for participation in the CCTT program (ie, complex care algorithm score ≥ 10). Eligible patients for the CCTT program were also identified through referrals from medical staff, leadership, and/or other case management staff.

When a patient was deemed an appropriate candidate for the CCTT program, they were visited by either

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TABLE 2
Outpatient Follow-Up Phases in the CCTT Program

| Phase | Time after hospital discharge, d | Follow-up after discharge |
|--------------|--|--|
| 1 | 0-15 | RNCM call within 24 h LMSW call within 1 wk |
| 2 | 16-30 | Weekly calls from RNCM or LMSW |
| 3 | 31-60 | Biweekly calls from RNCM or LMSW |
| 4 | 61-90 | Biweekly calls from RNCM or LMSW Graduation at 90 d or transition to continuation phase |
| Continuation | >90 | Weekly calls from RNCM or LMSW (until patient is graduated) |
| Readmission | Does not restart 90-d follow-up period | RNCM call within 24 h LMSW call within 1 wk Biweekly calls restart |

Abbreviations: CCTT, complex care transition team; LMSW, licensed master social worker; RNCM, registered nurse case manager.

the RNCM or LMSW at the bedside during their hospitalization. These patients or their surrogate medical decision maker were educated about the CCTT program and were asked for their permission for inpatient and outpatient follow-up for 90 days. During this visit, patients were provided with direct contact information for the CCTT and were advised that they could call at any time during the week if they needed assistance before their check-in call the next day.

The CCTT RNCM and LMSW received handoff information from the assigned floor case management team and typically took over the patient's case management and discharge needs for the remainder of the hospitalization period. The CCTT developed and implemented individualized, multidisciplinary, and comprehensive transitional care plans that involved the patient, family, medical team, and postacute care practitioners who would be assuming care for the patient after discharge.

Outpatient Follow-up

The phases of outpatient follow-up for patients in the CCTT program are outlined in Table 2 and shown in Figure 1. Follow-up check-in calls were frequent

during the first phase of the follow-up (*phase 1*), which spanned from discharge to 15 days. Within 24 hours after hospital discharge, the CCTT RNCM called the patient or primary caregiver for the first check-in. Medications were reviewed, assistance was provided for the needed follow-up appointments, and general questions were answered. Within 1 week after discharge, the CCTT LMSW called to address any other potential social needs. From 16 to 30 days after discharge (*phase 2*), either the RNCM or LMSW contacted the patient or primary caregiver once per week for weekly check-ins. From 31 to 60 days after discharge (*phase 3*), patients were called biweekly (ie, every 2 weeks) unless they required more assistance. From 61 to 90 days after discharge (*phase 4*), patients were called biweekly until they graduated from the CCTT program at 90 days. If the patient required postacute care services (eg, home health care) any time after discharge, the CCTT would contact the agencies providing those services on the same day of the check-in for an update. Information about the services received, frequency of the services, and anticipated end of service/recertification was ascertained.

At 90 days after discharge, the patient's goals, needs, and hospitalizations/ED encounters were

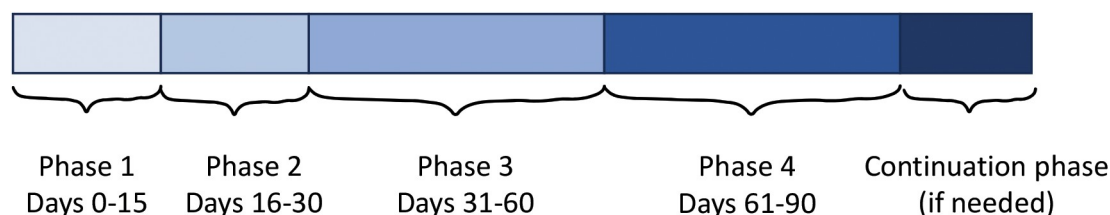


FIGURE 1

Diagram illustrating the follow-up phases of the complex care transition team (CCTT) program. Follow-up by the CCTT began with a telephone call to the patient within the first 24 hours after discharge and then weekly for the first 30 days. Thereafter, the CCTT contacted the patient with biweekly calls to ensure that goals were being met until the graduation period or continuation phase.

reviewed and discussed among the larger team. Whether graduation from the CCTT program was appropriate or the patient would benefit from longer follow-up was determined. Patients who required longer follow-up were included in the *continuation phase* and received weekly check-in calls until they no longer required follow-up and were graduated from the CCTT program.

For patients who were discharged to a postacute care facility, such as acute/inpatient rehabilitation, a skilled nursing facility, or a long-term acute care hospital, the CCTT called the facilities weekly to check on the status of the patient and obtained information about the anticipated discharge date and plan. Once the patient was discharged from that facility, the phased follow-up process described above was started.

If at any time during the 90-day follow-up period, a patient was readmitted to the hospital (*readmission phase*), the CCTT completed a psychosocial assessment, followed the patient throughout hospitalization, and coordinated the patient's discharge. In cases when patients visited the ED but were not admitted, the RNCM performed a check-in call within 24 hours after the encounter to address any questions or needs, and the LMSW called within 1 week after discharge. Biweekly calls were then restarted, but the 90-day follow-up period was not restarted.

Statistical Methods

Continuous variables were summarized as median (range), and categorical variables were summarized as frequency (%). For each patient enrolled in the CCTT program, the number of inpatient admissions and the 30-day readmission rate during the 6-month periods before (*preintervention*) and after (*postintervention*) starting in the CCTT program was determined. Poisson regression mixed

In this project, the lack of timely outpatient follow-up was one of the greatest factors contributing to increased ED visits and hospitalizations. Readmission rates decreased from 51.2% at 6 months before the (CCTT) intervention to 22.0% at 6 months after the intervention. This reduced readmission rate resulted in a cost savings of more than \$1 million.

models with random patient-level intercepts were used to assess preintervention vs postintervention differences in the number of inpatient admissions and readmission rates. Patients who were transferred to hospice or who had less than 6 months of observable follow-up were excluded from statistical analyses. The primary analyses were conducted in an intent-to-treat manner (ie, all enrolled patients who met inclusion criteria were included regardless of program adherence). The analyses were then repeated for the cohort of patients who graduated from the CCTT program. Relative risk (RR) (95% CI) values were determined from the regression models. Cost reduction analysis was performed by comparing the costs in Arizona for initial hospital admissions and readmissions with those from our institution during the preintervention and postintervention periods. In addition, cost savings from the preintervention period to the postintervention period were calculated for ED visits and hospital length of stay. *P* values less than .05 were

TABLE 3
Inpatient and Readmission Rate Outcomes of the CCTT Program^a

| Inpatient admissions/readmissions | Preintervention ^b | Postintervention ^c | Relative risk (95% CI) | P |
|-----------------------------------|------------------------------|-------------------------------|------------------------|-------|
| All patients (N = 123) | | | | |
| Inpatient admissions | 2.0 (0.0-6.0) | 1.0 (0.0-8.0) | 0.50 (0.41-0.60) | <.001 |
| Readmission rate | 63 (51.2) | 27 (22.0) | 0.43 (0.27-0.66) | <.001 |
| Graduated patients (n = 80) | | | | |
| Inpatient admissions | 2.0 (0.0-6.0) | 1.0 (0.0-5.0) | 0.37 (0.28-0.48) | <.001 |
| Readmission rate | 40 (50) | 12 (15) | 0.30 (0.15-0.55) | <.001 |

Abbreviation: CCTT, complex care transition team.
^aInpatient admissions are summarized as median (range), and readmission rate is summarized as No. (%).
^bThe preintervention period includes the number of inpatient admissions and hospital readmission rate occurring 6 months before the patient was enrolled in the CCTT program.
^cThe postintervention period includes the number of inpatient admissions and hospital readmission rate occurring 6 months after the patient was enrolled in the CCTT program.

considered statistically significant. All analyses were conducted with R software, v4.1 (The R Foundation).

RESULTS

A total of 123 hospitalized patients with complex care needs were included in the CCTT program during the study period. Of these patients, 80 successfully completed and were therefore graduated from the 90-day CCTT program. The continuation phase was needed in some cases ($n = 42$). Patients who requested removal from the program were removed from the list and added to the patient dropout group ($n = 11$). For patients who did not return our calls, 3 attempts were made, and then they were added to the removed patient group ($n = 8$). If at any time during the study period a patient enrolled in hospice care or died ($n = 24$), the patient was graduated from the CCTT program.

CCTT Program Outcomes

The primary outcomes of interest were number of inpatient admissions and 30-day hospital readmission rates. All patients who were not transferred to hospice and who had at least 6 months of follow-up (intent-to-treat) were included in the initial outcomes analysis. The median (range) number of inpatient admissions for all patients decreased by 50% from the preintervention (2.0 [0.0-6.0]) to the postintervention (1.0 [0.0-8.0]) period (RR, 0.50; 95% CI, 0.41-0.60; $P < .001$) (Table 3). Overall, 63 (51.2%) readmissions occurred during the preintervention period, whereas only 27 (22.0%) readmissions occurred during the postintervention period (RR, 0.43; 95% CI, 0.27-0.66; $P < .001$). When the CCTT performed this analysis for only patients who graduated from the program, the magnitude of the preintervention to postintervention effect was greater. The median (range) number of admissions decreased from 2.0 (0.0-6.0) during the preintervention period to 1.0 (0.0-5.0) during the postintervention period (RR, 0.37; 95% CI, 0.28-0.48; $P < .001$). The number of readmissions decreased from 40 (50%) during the preintervention period to 12 (15%) during the postintervention period (RR, 0.30; 95% CI, 0.15-0.55; $P < .001$).

Case Study

A 30-year-old woman with HIV/AIDS was hospitalized multiple times at Mayo Clinic in Arizona for weakness, nausea/vomiting, electrolyte imbalance, failure to thrive, weakness, and severe caloric deficit requiring placement of a gastronomy-jejunostomy tube for enteral feeding. The CCTT set up home health service for

her home tube feeds and arranged medical equipment for the home, including a wheelchair, hospital bed, Hoyer lift, and bedside commode. The CCTT also provided HIV/AIDS resources and caregiver resources for the patient and her mother. After a hospital readmission, the CCTT arranged for admission of the patient to a local acute rehabilitation hospital for intensive physical therapy and occupational therapy for treatment of severe deconditioning. The patient was readmitted to the hospital once more and then transferred to an out-of-state inpatient eating disorder facility to improve her nutritional intake, which was successful.

Although the patient continued to progress with treatment, the CCTT followed this patient beyond the typical 90 days. The CCTT worked closely with the patient and her mother during hospitalization and performed weekly check-in telephone calls after discharge. Services were coordinated for the patient after discharge and between hospitalizations. Once the patient returned home from the inpatient facility, the CCTT helped to connect the patient with a clinician in the community who specialized in HIV/AIDS treatment. After the patient's goals were met and she was thriving at home, the patient graduated from the CCTT program.

Financial Outcomes of the CCTT Program

From July 1, 2019, to April 30, 2021, the CCTT program decreased the cost of readmissions by \$1.76 million (Figure 2). The CCTT program also decreased the costs of ED visits by \$380,000 and the cost of inpatient stays by \$2.35 million. In contrast, the cost of maintaining the CCTT program during this period, which included the salaries of the RNCM and LMSW, was \$443,000. Therefore, the overall estimated cost savings of the CCTT program was \$4.05 million.

DISCUSSION

Lessons Learned

Patients with complex care needs often require a substantial number of resources and need help transitioning from the inpatient to outpatient setting. Hospital readmissions and ED visits are common among this patient population. Implementing the CCTT program helped to address gaps in care for patients with high health care complexity and high resource usage. The CCTT was able to connect with patients and families for at least 90 days and helped to transition them to the outpatient setting by addressing their complex health care needs. Several enrollees in the CCTT program expressed to the CCTT that they had a better patient experience while participating in the program and felt empowered to succeed. The CCTT model can be easily applied by other institutions.

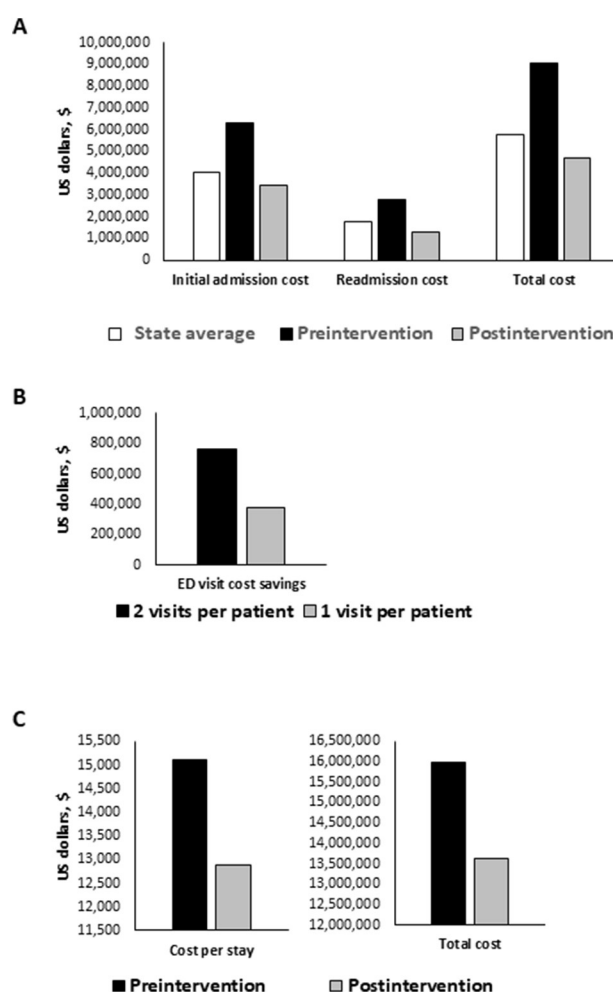


FIGURE 2

Cost savings of the complex care transition team (CCTT) program. A, Cost savings for hospital readmissions. The readmission rate without the CCTT intervention and during the preintervention period was approximately 43.8%, which decreased to 31.2% during the postintervention period. The average hospital cost for Arizona was used to estimate cost savings. This resulted in a total cost savings of \$1,092,829. B, Cost savings for emergency department (ED) visits. Because the CCTT program decreased the average number of ED visits per patient enrolled in the program from 2 visits to 1 visit, this resulted in an average cost savings of \$381,261 per patient. C, Cost savings resulting from decreased inpatient length of stay. Because the inpatient length of stay decreased from an average of 6.8 days during the preintervention period to 5.8 days during the postintervention period, this resulted in a total average cost savings of \$2,349,359.

After the CCTT was created, an average census of 30 patients was shared between the RNCM and LMSW, allowing an appropriate amount of time and attention for each patient. The CCTT provided timely interventions and quality care in both outpatient and inpatient settings. Limiting enrollment to only patients with a complex care algorithm score of at least 10 was challenging, and patients with scores less than 10 were occasionally enrolled if the CCTT deemed that they would benefit from participation in the CCTT program.

One of the greatest challenges that the CCTT faced was securing outpatient follow-up. Primary and specialty care has become increasingly difficult to find. A previous study reported that high users of

health care resources do not have good access to primary and preventive care (Bell et al., 2017). In this project, the lack of timely outpatient follow-up was one of the greatest factors contributing to increased ED visits and hospitalizations.

Many of the patients at Mayo Clinic in Arizona have complex care needs and require novel support based on their psychosocial and financial needs. The CCTT identified various social determinants of health for patients enrolled in the CCTT program, including education, support networks, and socioeconomic factors, that were important contributors to their health outcomes. To help garner resources, the CCTT worked closely together and met weekly to discuss and address ongoing issues among the patients in the CCTT program.

Limitations

An important limitation of this study was that 30-day readmission rates were determined for only 6 months before and after enrolling in the CCTT program. At times, patients may be high users of health care resources because of an acute phase in their medical condition, whereas their usage may be considerably decreased at other times. In a previous analysis of adult *superusers* of the health care system, fewer than half of these patients had high health care usage by 7 months after their identification and only 28% at had high usage by 12 months (Johnson et al., 2015). Conversely, patients who were previously considered to have a reduced risk of ED visits and hospitalizations may have increased usage after the initial period of observation. Following patients for a longer period, such as 12 months, may provide a better perspective of the long-lasting effects of the intervention.

Another limitation of this study was that the CCTT program patient population was not randomized. Evaluating readmission rates between patients who received the intervention (ie, enrollment in the CCTT program) and those who did not would have most likely affected the results. Further study is needed to strengthen the preliminary findings.

Implications for Case Management Practice

The outcomes of the CCTT program highlight the need for a patient-specific approach to transitioning care to the outpatient setting. The social determinants of health that often contributed to overuse of health care resources included poor access to outpatient specialists, difficulty navigating the health care system due to illness or health literacy, and limited social support (Bell et al., 2017). The success of the CCTT program has confirmed the need for this work, and hospital leadership allocated 2 full-time employees for the CCTT program indefinitely. Additionally, another pilot program in otolaryngology has been implemented at Mayo Clinic in Arizona for the past 2 years. The investment of time and resources, including dedicated personnel to follow patients who are high users of hospital services, allows health care systems to reduce ED visits and hospital readmissions and to provide patients with the best opportunities for success as they transition from the inpatient to outpatient setting.

REFERENCES

- Anderson, D., Patch E., Oxandale B., Kincade A., Gamber A., & Ohm R. (2017). Nursing student coaches for emergency department super utilizers. *Journal of Nursing Education*, 56(1), 27–30. <https://doi.org/10.3928/01484834-20161219-06>
- Badger, T., Gelenberg A. J., & Berren M. (2004). Consultative intervention to improve outcomes of high utilizers in a public mental health system. *Perspectives in Psychiatric Care*, 40(2), 53–60, 69. <https://doi.org/10.1111/j.1744-6163.2004.00053.x>
- Barbosa, S. M., Zacharias F. C. M., Schonholzer T. E., Carlos D. M., Pires M. E. L., Valente S. H., . . . Pinto I. C. (2023). Hospital discharge planning in care transition of patients with chronic noncommunicable diseases. *Revista Brasileira de Enfermagem*, 76(6), e20220772. <https://doi.org/10.1590/0034-7167-2022-0772>
- Bell, J., Turbow S., George M., & Ali M. K. (2017). Factors associated with high-utilization in a safety net setting. *BMC Health Services Research*, 17(1), 273. <https://doi.org/10.1186/s12913-017-2209-0>
- Berghofer, A., Hartwich A., Bauer M., Unutzer J., Willich S. N., & Pfennig A. (2012). Efficacy of a systematic depression management program in high utilizers of primary care: A randomized trial. *BMC Health Services Research*, 12(1), 298. <https://doi.org/10.1186/1472-6963-12-298>
- Chartrand, J., Shea B., Hutton B., Dingwall O., Kakkar A., Chartrand M., . . . Backman C. (2023). Patient- and family-centred care transition interventions for adults: A systematic review and meta-analysis of RCTs. *International Journal for Quality in Health Care*, 35(4), mzad102. <https://doi.org/10.1093/intqhc/mzad102>
- Cohen, S. B. (2001). The concentration of health care expenditures and related expenses for costly medical conditions, 2012. In *Statistical brief (Medical Expenditure Panel Survey [US])*, Rockville, MD: Agency for Healthcare Research and Quality.
- Johnson, T. L., Rinehart D. J., Durfee J., Brewer D., Batal H., Blum J., . . . Gabow P. (2015). For many patients who use large amounts of health care services, the need is intense yet temporary. *Health Affairs*, 34(8), 1312–1319. <https://doi.org/10.1377/hlthaff.2014.1186>
- Koehler, B. E., Richter K. M., Youngblood L., Cohen B. A., Prengler I. D., Cheng D., & Masica A. L. (2009). Reduction of 30-day postdischarge hospital readmission or emergency department (ED) visit rates in high-risk elderly medical patients through delivery of a targeted care bundle. *Journal of Hospital Medicine*, 4(4), 211–218. <https://doi.org/10.1002/jhm.427>
- Ludman, E. J., Peterson D., Katon W. J., Lin E. H., Von Korff M., Ciechanowski P., . . . Gensichen J. (2013). Improving confidence for self care in patients with depression and chronic illnesses. *Behavioral Medicine*, 39(1), 1–6. <https://doi.org/10.1080/08964289.2012.708682>
- Mercer, T., Bae J., Kipnes J., Velazquez M., Thomas S., & Setji N. (2015). The highest utilizers of care: Individualized care plans to coordinate care, improve healthcare service utilization, and reduce costs at an academic tertiary care center. *Journal of Hospital Medicine*, 10(7), 419–424. <https://doi.org/10.1002/jhm.2351>
- Naylor, M. D., Brooten D., Campbell R., Jacobsen B. S., Mezey M. D., Pauly M. V., & Schwartz J. S. (1999). Comprehensive discharge planning and home follow-up of hospitalized elders: A randomized clinical

trial. *JAMA*, 281(7), 613–620. <https://doi.org/10.1001/jama.281.7.613>

Pham, Q. H., Li S. X., & Williams B. C. (2016). Risk factors and effects of care management on hospital readmissions among high users at an academic medical center. *Care Management Journals*, 17(3), 134–139. <https://doi.org/10.1891/1521-0987.17.3.134>

Sevak, P., Stepanczuk C. N., Bradley K. W. V., Day T., Peterson G., Gilman B., . . . Moreno L. (2018). Effects of a community-based care management model for super-utilizers. . *The American Journal of Managed Care*, 24(11), e365–e370. <https://www.ncbi.nlm.nih.gov/pubmed/30452205>

Sledge, W. H., Brown K. E., Levine J. M., Fiellin D. A., Chawarski M., White W. D., & O'Connor P. (2006). A randomized trial of primary intensive care to reduce hospital admissions in patients with high utilization of inpatient services. *Disease Management*, 9(6), 328–338. <https://doi.org/10.1089/dis.2006.9.328>

Stewart, J., Bradley J., Smith S., McPeake J., Walsh T., Haines K., . . . McAuley D. (2023). Do critical illness survivors with multimorbidity need a different model of care? *Critical Care*, 27(1), 485. <https://doi.org/10.1186/s13054-023-04770-6>

Szekendi, M. K., Williams M. V., Carrier D., Hensley L., Thomas S., & Ceres J. (2015). The characteristics of patients frequently admitted to academic medical centers in the United States. *Journal of Hospital Medicine*, 10(9), 563–568. <https://doi.org/10.1002/jhm.2375>

van Walraven, C., Dhalla I. A., Bell C., Etchells E., Stiell I. G., Zarnke K., . . . Forster A. J. (2010). Derivation and validation of an index to predict early death or unplanned readmission after discharge from hospital to the community. *Canadian Medical Association Journal*, 182(6), 551–557. <https://doi.org/10.1503/cmaj.091117>

Williams, B. C., Paik J. L., Haley L. L., & Grammatico G. M. (2014). Centralized care management support for “high utilizers” in primary care practices at an academic medical center. *Care Management Journals*, 15(1), 26–33. <https://doi.org/10.1891/1521-0987.15.1.26>

Xiang, X., Zuverink A., Rosenberg W., & Mahmoudi E. (2019). Social work-based transitional care intervention for super utilizers of medical care: A retrospective analysis of the bridge model for super utilizers. *Social Work in Health Care*, 58(1), 126–141. <https://doi.org/10.1080/00981389.2018.1547345>

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