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## ECHO-CT: An Interdisciplinary Videoconference Model for Identifying Potential Postdischarge Transition-of-Care Events

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**BACKGROUND:** Discharge from the hospital to a post-acute care setting can be complex and potentially dangerous, with opportunities for errors and lapses in communication between providers. Data collected through the Extension for Community Health Outcomes–Care Transitions (ECHO-CT) model were used to identify and classify transition-of-care events (TCEs).

**METHODS:** The ECHO-CT model employs multidisciplinary videoconferences between a hospital-based team and providers in post-acute care settings; during these conferences, concerns regarding the patient's care transition were identified and recorded. The videoconferences took place from January 2016 to October 2018 and included patients discharged from inpatient medical and surgical services to a total of eight

participating post-acute care facilities (skilled nursing facilities or long-term acute care hospitals).

**RESULTS:** During the interdisciplinary videoconferences in this period, 675 patients were discussed. A total of 139 TCEs were identified; 58 (41.7%) involved discharge communication or coordination errors and 52 (37.4%) were classified as medication issues.

**CONCLUSION:** The TCEs identified in this study highlight areas in which providers can work to reduce issues arising during the course of discharge to post-acute care facilities. Standardized processes to identify, record, and report TCEs are necessary to provide high-quality, safe care for patients as they move across care settings. *Journal of Hospital Medicine* 2021;16:93-96. © 2021 Society of Hospital Medicine

As the population of the United States continues to age, hospitals are seeing an increasing number of older patients with significant medical and social complexity. Medicare data have shown that an increasing number require post-acute care after a hospitalization.<sup>1</sup> Discharges to post-acute care settings are often longer and more costly compared with discharges to other settings, which suggests that targeting quality improvement efforts at this transition period may improve the value of care.<sup>2</sup>

The transition from the hospital setting to a post-acute care facility can be dangerous and complicated due to lapses in communication, medication errors, and the complexity of medical treatment plans. Suboptimal transitions in care can result in adverse events for the patient, as well as confusion in medication regimens or incomplete plans for follow-up care.<sup>3</sup>

The Project ECHO (Extension for Community Healthcare Outcomes) model was first developed and launched by Sanjeev Arora, MD, in New Mexico in 2003 to expand access to subspecialist care using videoconferencing.<sup>4</sup> We first applied this model

in 2013 to evaluate the impact of this interdisciplinary videoconferencing tool on the care of patients discharged to post-acute settings.<sup>5</sup> We found that patients participating in the Extension for Community Healthcare Outcomes–Care Transitions (ECHO-CT) model experienced decreased risk of rehospitalization, decreased skilled nursing facility (SNF) length of stay, and reduced 30-day healthcare costs, compared with those patients not enrolled in this program; these outcomes were likely due to identification and correction of medication-related errors, improved care coordination, improved disease management, and clarification of goals of care.<sup>6</sup> Though these investigations did identify some issues arising during the care transition process, they did not fully describe the types of problems uncovered. We sought to better characterize the clinical and operational issues identified through the ECHO-CT conference, hereafter known as transition-of-care events (TCEs). These issues may include new or evolving medical concerns, an adverse event, or a “near miss.” Identification and classification of TCEs that may contribute to unsafe or fractured care transitions are critical in developing systematic solutions to improve transitions of care, which can ultimately improve patient safety and potentially avoid preventable errors.

### METHODS

#### ECHO-CT Multidisciplinary Video Conference

We conducted ECHO-CT at a large, tertiary care academic medical center. The project design for the ECHO-CT

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TABLE 1. Demographic Information for Patients Discussed in ECHO-CT Program

	Patients without TCEs	Patients with TCEs
No. of hospitalizations	588	155
No. of patients (N)	543	132
Sex, Female, No. (%)	332 (61.1)	83 (62.9)
Race, No. (%)		
White		
African American	390 (71.8)	96 (72.7)
Asian	102 (18.8)	30 (22.7)
Hispanic	12 (2.2)	2 (1.5)
Other	15 (2.8)	1 (0.8)
	24 (4.4)	3(2.3)
Service, No. (%)		
Surgical	194 (35.7)	52 (39.4)
Medical	349 (64.3)	80 (60.6)
Average age, (range), y	77 (32-100)	76 (33-97)
Average No. of diagnoses	18	21
Average No. of medications	15	18

Abbreviation: TCE, transition-of-care event.

program has been previously described.<sup>5</sup> In brief, the program is a weekly, multidisciplinary videoconference between a hospital-based team and post-acute care providers to discuss patients discharged from inpatient services to post-acute care sites, including SNFs and long-term acute care hospitals (LTACHs), during the preceding week. All patients discharged from the tertiary care inpatient site to one of the eight participating SNFs or LTACHs, from either a medical or surgical service, are eligible to be discussed at this weekly interdisciplinary conference. Long-term care facilities were not included in this study. The ECHO-CT program used HIPAA (Health Insurance Portability and Accountability Act)-compliant videoconferencing technology to connect hospital and post-acute care providers.

During the videoconferences, each patient's hospital course and discharge documentation are reviewed by a hospitalist, and a pharmacist performs a medication reconciliation of each patient's admission, discharge, and post-acute care medication list. The discharging attending, primary care providers, residents, other trainees, and subspecialist providers are invited to attend. Typically, the interdisciplinary team at the post-acute care sites includes physicians, nurse practitioners, physical therapists, social workers, and case managers. Between 10 and 20 patients are discussed in a case-based format, which includes a summary of the patient's hospital course, an update from the post-acute care team on the patient's care, and an opportunity for a discussion regarding any concerns or questions raised by the post-acute care or inpatient care teams. The content and duration of discussion typically lasts approximately 3 to 10 minutes, depending on the needs of the patient and the care team. Each of the eight post-acute care sites par-

ticipating in the project are assigned a 10- to 15-minute block. A copy of the ECHO-CT session process document is included in the Appendix.

### Data Collection

At each interdisciplinary patient review, TCEs were identified and recorded. These events were categorized in real time by the ECHO-CT data collection team into the following categories: medication related, medical, discharge communication/coordination, or other, and recorded in a secured, deidentified database. For individuals whose TCEs could represent more than one category, authors reviewed the available information about the TCEs and determined the most appropriate category; if more than one category was felt to be applicable to a patient's situation, the events were reclassified into all applicable categories. Data about individual patients, including gender, age at the time of discharge, and other demographic information, were obtained from hospital databases. Number of diagnoses included any diagnosis billed during the patient's hospital stay, and these data were obtained from a hospital billing database. Average number of medications at discharge was obtained from a hospital pharmacy database.

### RESULTS

A total of 675 patients (experiencing 743 hospitalizations) were discharged from a medical or surgical service to one of the participating post-acute care sites from January 2016 to October 2018, and were discussed at the interdisciplinary conference. During that time, 139 TCEs were recorded for review, involving 132 patients (Table 1). Patients who experienced TCEs were noted to have a slightly higher average number of diagnoses

TABLE 2. Examples of Identified Postdischarge Transition-of-Care Events (TCEs)

	No. of TCEs (%) N = 139	Representative examples
Discharge communication/coordination	58 (41.7)	<p>Discharge summary or other crucial paperwork did not arrive with patient at post-acute care facility.</p> <p>Postdischarge follow-up appointments were missing or not scheduled in a timely fashion.</p> <p>Patients were discharged to post-acute care site without appropriate postoperative devices or documentation of recommended duration of use (eg, sling, cervical collar).</p> <p>Past medical history was inappropriately or inadequately documented.</p> <p>Postoperative anticoagulation plans were inadequately communicated to the post-acute care team.</p> <p>Certain medications required at the time of patient arrival at SNF were difficult to arrange (eg, posttransplant immunosuppression medications not routinely available at SNF).</p> <p>There were discrepancies noted in patients' documented code status.</p> <p>Inadequate documentation was provided about the desired/expected course for new medications (eg, steroids, antibiotics).</p> <p>Mental status and delirium were poorly documented.</p>
Medication	53 (37.4)	<p>Medication reconciliation was incorrect or had notable omissions, discrepancies, duplicates, or dosing errors.</p> <p>Adjustments to medications based on changing renal function (reduction in NSAIDs, dosing of antibiotics) were recommended.</p> <p>Lifelong antibiotic therapy was inadvertently omitted from discharge medication list and was not continued at SNF.</p> <p>Duplicate medications, or medications from the same class (eg, beta blockers) were listed.</p> <p>Anticoagulation concerns were noted (eg, discharged on incorrect dosage of enoxaparin; documentation of DVT treatment not included for patient arriving with coumadin and subtherapeutic INR).</p> <p>Posttransplant immunosuppression regimen was left off of discharge medication list.</p>
Medical	27 (19.4)	<p>Pain medications were discontinued at hospital discharge, resulting in a patient arriving in severe pain.</p> <p>Patient arrived at SNF with hypoglycemia.</p> <p>Patient arrived to SNF with apparent hypoxia and new oxygen requirement.</p> <p>Patient with recent DVT was noted to have persistent subtherapeutic INR.</p> <p>Patient did not have appropriate lab monitoring, including preoperative or postoperative bloodwork, prior to SNF arrival.</p> <p>Patient was noted to have new anemia; SNF had limited capacity to evaluate and treat.</p>
Other	2 (1.4)	<p>Patient had health insurance issue that was not addressed, and did not receive inpatient social work assessment.</p> <p>Patient did not receive adequate care at home.</p>

Abbreviations: DVT, deep vein thrombosis; INR, international normalized ratio; NSAID, nonsteroidal anti-inflammatory drug; SNF, skilled nursing facility; TCE, transition-of-care event.

than did those in the non-TCE group (21 vs 18, respectively) and number of medications (18 vs 15).

Representative examples of TCEs are provided in Table 2. Fifty-eight issues were identified as discharge communication or coordination issues (eg, discharge summary was late or missing at time of discharge to facility, transitional issues were unclear, follow-up appointments were not appropriately scheduled or documented). An additional 52 TCEs were identified as pharmacy or medication issues (eg, medications were inadvertently omitted from discharge medication list, prehospital medication list was incorrect). Medical issues accounted for an additional 27 concerns (eg, patient was hypoglycemic on arrival, inadequate pain control, discovery of new acute medical issues or medical diagnoses that were not clearly documented or communicated by the inpatient team). "Other" issues (two) included unaddressed social concerns, such as insurance issues.

## DISCUSSION

The ECHO-CT model unites hospital and post-acute care providers to improve transitions of care and is unique in its focus on the transition from hospital to post-acute care rather than

to home care. In 2 years of data collection, we identified several TCEs encompassing a range of concerns. Of the 675 patients discussed, 132 (20%) were noted to have a TCE. When these percentages are applied to the 140 million Medicare hospital discharges that took place during 2000 to 2015, we would estimate nearly 5.5 million TCEs, or 375,000 TCEs per year, that may have affected this population.

The majority of TCEs were communication and coordination errors. Missing or incomplete discharge paperwork, inadequate documentation of inpatient care, and confusion about medical devices or postoperative needs (eg, slings, braces, wound care, drains) were commonly reported. Follow-up appointments with specialists were often not appropriately scheduled or communicated. This may have resulted from unstandardized discharge documentation and a lower priority given to documentation in the setting of multiple clinical demands (eg, direct patient care, complex care coordination, and clinical paperwork and charting). Studies have demonstrated that fewer than one-third of discharge summaries are received by outpatient providers before postdischarge follow-up, and additionally that nearly 40% of patients did not undergo recommended workups for medical issues identified during their

hospital stay.<sup>7,8</sup> All of this is problematic because appropriate documentation in discharge summaries is associated with a decreased risk of hospital readmission.<sup>9</sup>

Pharmacy issues were the second most common TCE identified. One member of the post-acute care team noted that “omissions, additions, and replacements” relating to medications were common occurrences. Additionally, it was noted that medications were inadvertently continued for longer than planned or not adjusted appropriately with changing clinical parameters, such as renal function. The results of our analysis are consistent with current literature, which suggests that up to 60% of all medication errors occur during the period surrounding transitions of care.<sup>10</sup>

There were several limitations to this investigation. Though recording of identified TCEs occurred in real time, analysis of these identified events occurred retrospectively; therefore, investigators had limited ability to retroactively review or recategorize recorded issues, which potentially could have resulted in misclassification or misinterpretation. Additionally, the data were intended to be descriptive; therefore, outcomes such as hospital readmission and patient harm could not be linked to specific TCEs. Furthermore, it is possible that events were not detected by either the postdischarge team or the hospital-based team and, therefore, not captured in this analysis. Further work would be helpful to determine the root causes underlying the identified issues in care transitions, with the goal of improving patient safety and avoiding preventable errors during transitions of care. Although there is comprehensive literature related to errors and medication-related adverse events,<sup>11</sup> there is not a consensus of how to classify and report, in a standardized fashion, events arising during the transition period. A validated structure for systematically identifying, monitoring, recording, and reporting issues arising during care transitions will be critical in preventing errors and ensuring patient safety during this high-risk period.

## CONCLUSION

Our model is a unique intervention that uses the expertise and engagement of an interdisciplinary team and seeks to identify and remedy issues arising during transitions of care—in real time—to prevent direct harm to vulnerable patients. We have already implemented interventions to improve care based on our experiences with this videoconference-based program. For example, direct feedback was given to discharging teams to improve the discharge summary and associated documentation, and changes to the medication-ordering system were implemented to address specific medication errors discovered. The TCEs identified in this investigation highlight specific areas for improvement with the goal of providing high-quality care for patients and seamless transitions to post-acute

care. As health systems and hospitals face new challenges in communication and care coordination, especially due to the recent COVID-19 pandemic, the technology and communication methods used in the ECHO-CT model may become even more relevant for promoting clear communication and patient safety during transitions of care.

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