BRIEF REPORT

Extension for Community Healthcare Outcomes—Care Transitions: Enhancing Geriatric Care Transitions Through a Multidisciplinary Videoconference

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OBJECTIVES: To examine whether a novel videoconference that connects an interdisciplinary hospital-based team with clinicians at postacute care sites improves interprofessional communication and reduces medication errors.

DESIGN: Prospective cohort.

SETTING: One tertiary care medical center and eight postacute care sites.

PARTICIPANTS: Hospital-based providers (hospitalists, geriatricians, pharmacists, social workers, medical trainees, and subspecialists) and postacute care clinicians.

INTERVENTION: All patients discharged to eight postacute care sites were discussed in a weekly videoconference.

MEASUREMENT: Preliminary data including demographic characteristics of the patients discussed, postacute care provider satisfaction survey results, and data on medication errors are reported.

RESULTS: Over 2 years, 907 patients were discussed; 84.6% were discussed with staff at subacute skilled nursing facilities and the remainder with clinicians at one long-term acute care facility. They had an average hospital length of stay of 6.8 days. Postacute care providers felt that the videoconference enhanced communication and provided much-needed access to information and hospital staff. Of the 106 pharmacy discrepancies identified, 16% involved an omission of a medication.

CONCLUSION: As increasing numbers of older adults are discharged to postacute care facilities, they face high-risk care transitions. Extension for Community Healthcare Outcomes—Care Transitions (ECHO-CT) facilitates interdisciplinary communication between hospital and postacute care providers, who normally have minimal interaction. Preliminary data suggests that ECHO-CT may improve the transitions of care processes between these sites. **J Am Geriatr Soc 2016.**

Key words: hospital medicine; medication reconciliation; postacute care; readmissions

The number of hospitalized older adults discharged to postacute care facilities is increasing.[1] Discharge from hospitals to postacute care facilities is a challenging and potentially dangerous care transition because of gaps in communication and changes in providers, medication formularies, and treatment plans. Transitions of care involve disproportionate numbers of older adults because older adults account for the largest percentage of transfers to postacute care facilities. The risk of iatrogenic errors, miscommunication, and rehospitalization from skilled nursing facilities is greater for cognitively impaired and frail older adults because they are less likely to be able to participate actively in the transition process.[2] Adverse health outcomes are often tied to poor-quality transitions, including inconsistencies with medications and follow-up care.[3] Careful coordination of care across healthcare settings is needed to ensure safe transfers, but institutional 'siloing,' often coupled with adverse financial incentives, leads to fragmented care marked by disjointed communication.[4–7] Postacute care providers typically receive no oral sign-out and rely on written, nonstandardized discharge documentation of varying quality. It can also be difficult to access the discharging team if questions related to the hospitalization arise.

The goal of this report is to describe a novel telehealth videoconference program, Extension for Community Healthcare Outcomes—Care Transitions (ECHO-CT), and report on its early clinical experience and results. ECHO-CT uses a multidisciplinary case-based model to connect hospital-based physicians, social workers, and pharmacists with postacute care providers to enhance communication

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and improve care transitions of individuals discharged to postacute care facilities.

METHODS

Description of the Program

Dr. Sanjeev Arora developed Extension for Community Healthcare Outcomes (Project ECHO™) at the University of New Mexico in 2003 as a healthcare outreach program using videoconferencing technology to disseminate specialized knowledge to remote, underresourced communities where medical care was scarce.[8] Project ECHO has demonstrated better outcomes at lower cost to patients, clinical specialists, New Mexico's healthcare system, and Medicaid.[9] Although originally designed to improve access to complex hepatitis C treatment regimens, Project ECHO now operates out of more than 30 universities in the United States and has expanded to include multiple different clinical topics.

Project ECHO-Care Transitions Intervention

ECHO-CT launched in 2013 as the first Project ECHO to focus on the transitional care of older adults discharged to postacute care facilities. Before the start of ECHO-CT, there was little infrastructure in place at the hospital or postacute care sites to support care transitions for patients discharged to facilities. ECHO-CT uses videoconferencing technology that is compliant with the Health Insurance Portability and Accountability Act and includes a videoconferencing bridge, gatekeeper, firewall traversal server, and recording and streaming systems (Real Presence Videoconferencing Infrastructure, Polycom, San Jose, CA) to connect the postacute care sites with a hospital-based team to improve the quality and safety of care transitions for patients discharged to postacute care facilities. The ECHO-CT multidisciplinary hospital-based team includes a physician facilitator, pharmacist, social worker, and program administrator. Primary care providers and the discharging attending physician, subspecialists, and residents are invited to participate. The team meets weekly via videoconferencing with an interdisciplinary group of providers, including physicians, nurse practitioners, physical therapists, social workers, and care managers at eight postacute care sites. As part of a care transitions curriculum, internal medicine residents also participate throughout the year at the hospital and postacute care sites. Although there are fluctuations in the number of attendees, there are usually between five and 10 participants on the hospital side and fewer than five from each postacute care facility. At the weekly videoconferences, all patients discharged from Beth Israel Deaconess Medical Center over the past week to the participating postacute care facilities are discussed. Before the weekly conference, postacute care staff fax each patient's medication administration record to the ECHO-CT administrator. The hospital-based team includes a hospitalist who prepares for the conference by spending 10 minutes reviewing each patient's hospital course and discharge documentation and a pharmacist who performs a medication reconciliation by reviewing each patient's admission and discharge medication lists as well as their postacute care medication administration record.

Typically 10 to 20 patients are discussed in a scripted case-based format as follows. First, the ECHO-CT physician facilitator or medical resident presents a brief summary of the patient's hospitalization. Next, staff members at the postacute care facility provide an update on the patient's current condition. The majority of the conversation is then focused on addressing any concerns related to the patient's care. The content and duration of this discussion varies depending on the individual needs of the patient and care team but often includes issues related to medication management and reconciliation, current medical problems that the patient may be experiencing, social needs after discharge from the postacute care facility, goals of care, advance care planning, and clarification of discharge instructions or follow-up needs.

Each postacute care site is scheduled for a discrete 15-minute block, during which each patient discussion may take from 3 to 10 minutes. Time permitting, the staff members at the postacute care facility may provide feedback regarding potential areas of improvement in the discharge process. The goal of the case discussions is to improve communication and reduce care fragmentation; the standardized discussions are intended to be bidirectional, with hospital and postacute care providers posing questions about care transfers and collaborating to troubleshoot patient and systems challenges that arise in the transition of care.

Enrollment of Patients

Patients are identified from a list of those recently discharged to participating facilities that the hospital provides to the ECHO-CT program administrator. All patients discharged to the postacute care sites over the past 7 days are included on the agenda for discussion. Before the video sessions each week, the hospital-based project team communicates with the postacute care sites using secure email and fax. The ECHO-CT program administrator contacts the postacute care facilities before the weekly conference to obtain the postacute care site medication administration records and to solicit any questions or concerns about the discharging team's treatment plan.

Outcomes

The goal of ECHO-CT is to use multidisciplinary videoconferencing to improve care transitions for elderly adults discharged to postacute care sites. The primary endpoint is a reduction in hospital readmission rates within 30 days of discharge; secondary outcomes are to reduce postacute care length of stay, mortality, healthcare use, and costs. This report will focus on initial findings, including patient characteristics, medication reconciliation data, and postacute care satisfaction survey results.

RESULTS

Study Characteristics

Since the start of the project in 2013, 907 cases have been discussed. Their characteristics are described in Table 1.

Table 1. Demographic Data on Patients Discussed (N = 907) During Extension for Community Healthcare Outcomes—Care Transitions Sessions

Variable	Value
Female, n (%)	583 (64.3)
Age, mean ± SD	79.2 ± 11.1
Hospital length of stay, days, mean ± SD	6.8 ± 7.6
Discharge location, n (%)	
Subacute skilled nursing facility	767 (84.6)
Site, n (% of skilled nursing facility)	
1	185 (24.1)
2	142 (18.5)
3	137 (17.9)
4	116 (15.1)
5	81 (10.6)
6	70 (9.1)
7	36 (4.7)
Long-term acute care hospital	140 (15.4)
Most common discharge diagnoses (from 522 case discussions[a]), n (%)	
Musculoskeletal pain	82 (15.7)
Hip fracture	41 (7.9)
Gastrointestinal pathology	38 (7.3)
Heart failure	37 (7.1)
Renal failure	31 (5.9)
Delirium	28 (5.4)

[a]Only 522 cases were available because discharge diagnoses were not collected during the first year, and some discharge diagnoses were not documented clearly in subsequent years.
SD = standard deviation.

Patients had a mean age of 79.2 ± 11.1, and 583 (64.3%) were female. The average age and sex distribution remained the same after removing repeat admissions for patients who were discussed multiple times. The average length of hospital stay was 6.8 days. In 2014, information on discharge diagnoses began to be collected; the most frequent discharge diagnoses for the 522 patients discussed were musculoskeletal pain (15.7%), hip fracture (7.9%), gastrointestinal pathology (7.3%), heart failure (7.1%), renal failure (5.9%), and delirium (5.4%). After discharge from the hospital, 84.6% of patients in this cohort went to skilled nursing facilities and 15.4% to long-term acute care facilities.

Pharmacy Recommendations

ECHO-CT sessions included recommendations from the hospital-based pharmacist, who compared the admission, inpatient, discharge, and postacute care medication lists. This comparison allowed the pharmacist to discern any medication discrepancies that emerged during care transitions. These primarily were problems in prescribing, such as missing dose, addition of an inappropriate medication, or omission of a necessary medication. The pharmacist also identified deficiencies in drug monitoring (e.g., lack of monitoring of drug levels, inappropriate dosing for changing renal function) and optimization of therapy (e.g., need for a bisphosphonate in a patient with osteoporotic fracture). There were 106 pharmacy interventions. Based on discussions that took place during ECHO-CT, whether the patient may have experienced harm (adverse events) from medication reconciliation deficiencies was also determined.

Table 2. Discrepancies and Deficiencies According to Type and Associated Adverse Events Identified During Extension for Community Healthcare Outcomes—Care Transitions Project

	Total, n = 106	Potential Adverse Drug Event	Adverse Drug Event
Type		n (%)	
Addition	6 (6)	0	1 (17)
Dose	8 (8)	1 (13)	1 (13)
Optimize	32 (30)	N/A	N/A
Length	3 (3)	0	0
Route	1 (1)	0	0
Monitor	39 (37)	0	0
Omission	17 (16)	31 (79)	3 (8)

N/A = not available.

Medication discrepancies were categorized according to the Instrument to Characterize Unintentional Medical Discrepancy,[10] with the addition of errors in monitoring and omission that were not included in the instrument (Table 2). Of the 106 total pharmacist recommendations, 1% showed incorrect route, 3% were missing length of treatment, 16% resulted from omission of a drug, and 6% were inappropriate additions of a drug, of which 17% resulted in an adverse drug event (ADE), defined as "an injury resulting from medical intervention related to a drug."[11] Eight percent of medication reconciliation discrepancies were related to an incorrect dose, 13% of which were ADEs, and another 13% were discrepancies with the potential to result in injury (although injury had not yet resulted).

The pharmacist-led medication reconciliation also revealed numerous deficiencies in monitoring serum medication levels and in serum testing for kidney and liver function, all of which are essential for determining appropriate medication dosing in elderly adults. Of these deficiencies, 37% involved lack of monitoring, 8% of which were associated with an ADE and 79% with a potential ADE. Other deficiencies that were addressed included therapeutic optimization, which accounted for 30% of deficiencies, one of the most common of which was the absence of bisphosphonate therapy in the setting of an osteoporotic fracture. Overall, six of the 106 deficiencies were associated with the anticoagulants warfarin, heparin, enoxaparin, and rivaroxaban.

Postacute Care Provider Survey Results

Because the goal of the ECHO-CT program includes improving communication between hospital-based and postacute care providers, satisfaction surveys were administered to explore the experience of the postacute care staff (Table 3). Respondents, which included physicians, nurse practitioners, and care managers, indicated that ECHO-CT enhanced communication, provided important access to

Table 3. Responses from Skilled Nursing Facility Survey on Attitudes and Utility of Extension for Community Healthcare Outcomes—Care Transitions (ECHO-CT) Project

Survey Question	Respondents, n	Mean ± Standard Deviation[a]
ECHO-CT clinics are an effective way to address communication gaps in the transitions of care process.	12	3.58 ± 1.68
Having real-time access to clinicians from the hospital is important to me.	12	4.33 ± 0.89
ECHO-CT clinics have helped me to provide excellent patient care.	12	3.34 ± 1.56
I have incorporated advice from ECHO-CT clinics into my treatment plans for my patients.	11	3.64 ± 1.50
The outcomes of ECHO-CT clinics are worth the time commitment.	12	3.25 ± 1.60
Preparing ECHO-CT forms beforehand takes too much time.	12	2.67 ± 1.23
I have sufficient time to present my patient(s) during an ECHO-CT clinic.	12	4.33 ± 0.78

All seven sites were invited to participate in the survey; six responded. After administration of this survey, an additional site was enrolled in the program.

[a]Likert scale 1–5: 1 = strongly disagree, 5 = strongly agree.

clinicians and clinical information, and helped staff provide excellent care. The survey also revealed that the providers at postacute care sites felt that the time and structure of ECHO-CT was effective and not overly time or work intensive.

DISCUSSION

Vulnerable elderly adults account for the largest proportion of patients discharged from an acute hospital to a postacute care facility. The transition of care occurring when a patient is discharged from the hospital is a high-risk interlude, when medication errors, communication lapses, and failures of coordination of care are more likely to occur. The transition to a postacute care setting is fraught with care fragmentation and introduces healthcare providers who may not have the infrastructure or resources available to communicate with the hospital-based or primary care team. The discharging team also faces challenging communication dilemmas, questions about ownership of pending test results, and ambiguity about the postacute care facility's ability to follow up on abnormal studies.

This report describes ECHO-CT, a novel videoconferencing initiative that aims to enhance communication and share knowledge between the hospital and postacute care facilities. The preliminary results of the study show that postacute care providers value this conference and do not feel that it is too time intensive or redundant, although some felt that preparing ECHO-CT forms beforehand took too much time. The study also suggests that a pharmacist's medication reconciliation at the time of transition from the hospital to the postacute care site may reduce medication errors and adverse events related to medication administration discrepancies.

Previous studies of efforts to facilitate safer discharges and improve care transitions have focused on predischarge interventions such as discharge navigators and enhanced discharge medication list review and postdischarge interventions such as follow-up telephone calls and specialized postdischarge clinics.[12,13] ECHO-CT is a novel attempt to bridge the pre- and postdischarge settings in a vulnerable population. Unlike patients who are discharged home, those who are discharged to postacute care are often unable to engage fully in the care transition because their mental status and the structure of a rehabilitation program may prevent them from true medication self-management, being aware of medical "red flags," and interfacing with a patient-centered medical record.[14] ECHO-CT attempts to act as a proxy for these functions by using a pharmacist to complete a multilayered medication reconciliation, bringing the online medical record to postacute care through videoconferencing, and highlighting follow-up appointments that the postacute care staff may not have access to remotely. In contrast to other interventions, the video communication aspect of ECHO-CT establishes personal relationships and a sense of teamwork between care providers on the sending and receiving sides of care.

There are several limitations to this study. Its setting may be difficult to reproduce, because one of the participating postacute care facilities is a large academic facility that may be more inclined than most to participate in the intervention. Reimbursement to clinicians for this kind of care coordination is not yet available in traditional fee-for-service models, making this intervention challenging to institute in community-based settings.

Although videoconferencing may not be feasible at all hospitals, weekly postdischarge teleconferencing is inexpensive and requires few resources and may provide a useful bridge between sites. As the "graying of America" continues, and the transition from hospital to postacute care site becomes more common, improved avenues for communication between sites will help to address the perils patients face during care transitions.

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Conflict of Interest: Dr. Abrams is a trustee at Hebrew Senior Life.

Author Contributions: Grace Farris developed the structure of paper, wrote introduction, design, survey results section and discussion. Mousumi Sircar wrote the study characteristics section and a significant portion of the pharmacy section and created data set for the

demographic and pharmacy sections. Jonathan Bortinger wrote a portion of the pharmacy section. Amber Moore contributed edits to the entire paper and wrote a portion of the design section. J. Elyse Krupp performed data analysis and compiled all tables. John Marshall collected pharmacy data and wrote a portion of the pharmacy section. Alan Abrams was responsible for some of the study design and contributed edits to the paper. Lewis Lipsitz designed the study and contributed edits to the paper. Melissa Mattison designed study and wrote an early version of the introduction and edited the final version.

Sponsor's Role: The sponsor did not play a role in study design, methods, subject recruitment, or data collection and analysis.

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SUPPORTING INFORMATION

Additional Supporting Information may be found in the online version of this article:

Appendix S1. Example of Scripted Format of Extension for Community Healthcare Outcomes—Care Transitions Sessions

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