

# Implementation of a Pharmacist-Managed Transitions of Care Tool

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**Purpose:** To improve, expand, and sustain a pharmacist-based transitions of care (TOC) program and to assess interventions targeting veterans at high risk for adverse outcomes.

**Methods:** A TOC program was developed and piloted at the Richard L. Roudebush Veterans Affairs Medical Center (RLRVAMC). Following success of the pilot project, targeted interventions were identified to improve and expand the program. Patients deemed high risk for readmission by an acute care pharmacist were identified and referred for continued postdischarge follow-up. The study population included patients discharged to the community with primary care established within the RLRVAMC system. Eligible patients were entered into a TOC database by the referring acute care pharmacist. A pharmacist in the primary care clinic reviewed then contacted the patient within 1 week of discharge. Appropriate documentation of each visit was completed in the electronic health re-

cord. Data collection included background information, time to follow-up, medication discrepancies, pharmacist interventions, emergency department visits, and hospital readmissions.

**Results:** A total of 139 patients were included, of which 99 patients were reached for pharmacist follow-up. There were 43 medication-related discrepancies among all patients. The most common discrepancy was taking the wrong dose of a prescribed medication. Additional counseling was provided to 75% of patients. The subset of patients who were reached by a pharmacist had decreased index (5.1% vs 15.0%;  $P = .049$ ) and all-cause readmissions (8.1% vs 27.5%;  $P = .03$ ) at 30 days compared with those who did not receive pharmacist follow-up, respectively.

**Conclusions:** This study demonstrated that implementation and expansion of a pharmacist-based TOC process is effective in communicating high-risk patients and intervening on medication-related issues postdischarge.

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Effective transitions of care (TOC) are essential to ensure quality continuity of care after hospital discharge. About 20 to 30% of patients experience an adverse event (AE) in the peridischarge period when discharged to the community.<sup>1</sup> Additionally, about two-thirds of AEs are preventable.<sup>1</sup> The Joint Commission has identified various breakdowns in care that are associated with poor outcomes, including a lack of standardized discharge procedures, limited time dedicated to discharge planning and processes, and patients who lack the necessary resources or skills to implement discharge care plans.<sup>2</sup>

## BACKGROUND

The most impactful TOC programs are those that target patients who are at high risk for readmission or adverse outcomes.<sup>3</sup> Factors such as advanced age, polypharmacy, cognitive impairment, and lack of social support are patient characteristics that have been associated with unfavorable outcomes after discharge.<sup>4</sup> To identify this subset of high-risk individuals, various risk assessment scores have been developed, ranging from those that are used locally at the facility level to those that are nationally validated. The LACE score (Length of hospital stay; Acuity of the ad-

mission; Comorbidities measured with the Charlson comorbidity index score; and Emergency department visits within the past 6 months) is a validated index scoring tool that is used to identify medical and surgical patients at risk for readmission or death within 30 days of hospital discharge. On a 19-point scale, a score of  $\geq 10$  is considered high risk.<sup>5</sup> Specific to the US Department of Veterans Affairs (VA), the Care Assessment Needs (CAN) score was developed to risk stratify the veteran population. The CAN score is generated using information including patient demographics, medical conditions, VA health care utilization, vital signs, laboratory values, medications, and socioeconomic status. This score is expressed as a percentile that compares the probability of death or admission among veterans at 90 days and 1 year postdischarge. Veterans in the 99th percentile have a 74% risk for these adverse outcomes at 1 year.<sup>6</sup>

The Joint Commission states that a fundamental component to assuring safe and effective TOC is medication management, which includes the involvement of pharmacists.<sup>2</sup> TOC programs with pharmacist involvement have shown significant improvements related to reduced 30-day hospital readmissions and health care costs in

addition to significant medication-related interventions.<sup>7-9</sup> While this body of evidence continues to grow and demonstrates that pharmacists are an integral component of the TOC process, there is no gold standard program. Brantley and colleagues noted that a weakness of many TOC programs is that they are one dimensional, meaning that they focus on only 1 element of care transitions or 1 specific patient population or disease.<sup>10</sup>

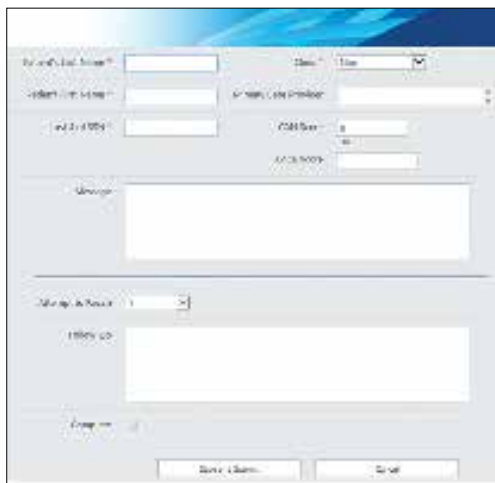
There is well-supported evidence of high-impact interventions for pharmacists involved early in the admission process, but data are less robust on the discharge process.<sup>11,12</sup> Therefore, the primary focus of this project was to develop a pharmacist-based TOC program and implement a process for communicating high-risk patients who are discharging from our hospital across the continuum of care.

### SETTING

The Richard L. Roudebush VA Medical Center (RLRVAMC) is a tertiary care referral center for veterans in Indiana and eastern Illinois. Acute care clinical pharmacists are fully integrated into the acute care teams and practice under a comprehensive care model. Pharmacists attend daily patient care rounds and conduct discharge medication reconciliation for all patients with additional bedside counseling for patients who are being discharged home.

Primary care services are provided by patient aligned care teams (PACTs), multidisciplinary teams composed of physicians, advanced practice nurses, pharmacists, mental health care providers, registered nurses, dieticians, and care coordinators. Ambulatory Care or PACT clinical pharmacists are established within each RLRVAMC PACT clinic and provide comprehensive care management through an independent scope of practice for several chronic diseases, including hypertension, type 2 diabetes mellitus (T2DM), dyslipidemia, hypothyroidism, and tobacco cessation. Prior to this project implementation, there was no formalized or standardized method for facilitating routine communication of patients between acute care and PACT pharmacists in the TOC process.

**FIGURE 1** Transitions of Care Referral Tool

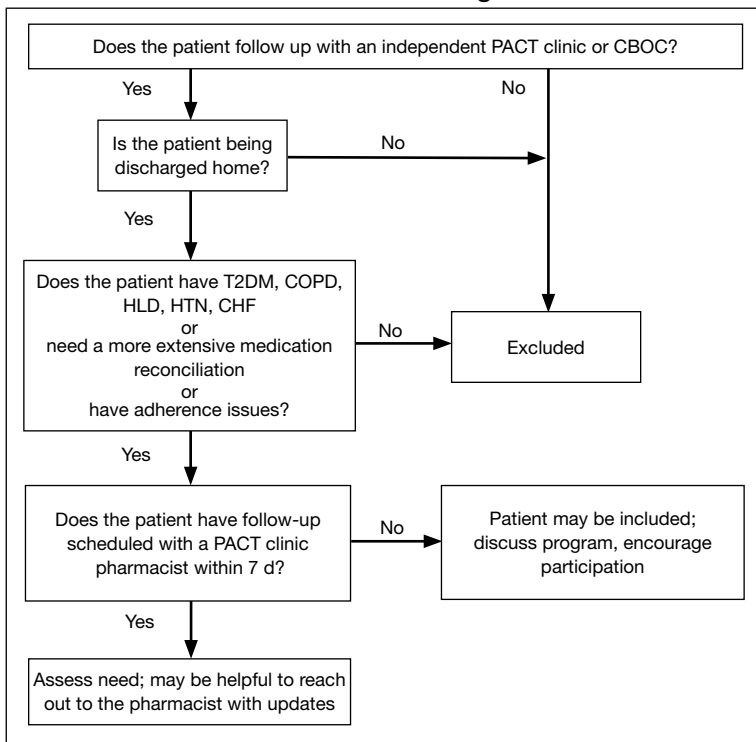


### Pilot Study

In 2017, RLRVAMC implemented a TOC pharmacy program pilot. A pharmacy resident and both acute care and PACT clinical pharmacy specialists (CPSs) developed the service. The pilot program was conducted from September 1, 2017 to March 1, 2018. The initial phase consisted of the development of an electronic TOC tool to standardize communication between acute care and PACT pharmacists. The TOC tool was created on a secure site accessible only to pharmacy personnel and not part of the formal medical record. (Figure 1).

The acute care pharmacist identified high-risk patients through calculated CAN and LACE scores during the discharge process and offered PACT pharmacist follow-up to the patient during bedside discharge counseling. Information was then entered into the TOC tool, including patient identifiers and a message with specific information outlining the reason for referral. PACT pharmacists routinely reviewed the tool and attempted to phone each patient within 7 days of discharge. Follow-up included medication reconciliation and chronic disease management as warranted at the discretion of the PACT pharmacist. All postdischarge follow-up appointments were created and documented in the electronic health record. A retrospective chart review was completed on patients who were entered into the TOC tool.

Patients were eligible for referral if they were discharged during the study period

**FIGURE 2** Transitions of Care Tool Algorithm

Abbreviations: CBOC, community-based outpatient clinic; CHF, congestive heart failure; COPD, chronic obstructive pulmonary disease; HLD, hypersensitivity lung disease; HTN, hypertension; PACT, patient aligned care team; T2DM, type 2 diabetes mellitus.

with primary care established in one of the facility's PACT clinics. Additionally, patients had to meet  $\geq 1$  of the following criteria, deeming them a high risk for readmission: LACE score  $\geq 10$ , CAN score  $\geq 90$ th percentile, or be considered high risk based on the discretion of the acute care pharmacist. Patients were included in the analysis if they met the CAN or LACE score requirement. Patients were excluded if they received primary care from a site other than a RLRVAMC PACT clinic. This included non-VA primary care, home-based primary care, or VA community-based outpatient clinics (CBOCs). Patients also were excluded if they required further institutional care postdischarge (ie, subacute rehabilitation, extended care facility, etc), discharged to hospice, or against medical advice.

The average referral rate per month during the pilot study was 19 patients, with 113 total referrals during the 6-month study period. Lower rates of index emergency department (ED) visits (5.3% vs 23.3%) and readmissions (1% vs 6.7%)

were seen in the group of patients who received PACT pharmacist follow-up postdischarge compared with those who did not. Additionally, PACT pharmacists were able to make  $> 120$  interventions, averaging 1.7 interventions per patient. Of note, these results were not statistically analyzed and were assessed as observational data to determine whether the program had the potential to be impactful. The results of the pilot study demonstrated positive outcomes associated with having a pharmacist-based TOC process and led to the desire for further development and implementation of the TOC program at the RLRVAMC. These positive results prompted a second phase project to address barriers, make improvements, and ensure sustainability.

## METHODS

Phase 2 was a quality improvement initiative; therefore, institutional review board approval was not needed. The aim of phase 2 was to improve, expand, and sustain the TOC program that was implemented in the pilot study. Barriers identified after discussion with acute care and PACT pharmacists included difficulty in making referrals due to required entry of cumbersome readmission risk factor calculations, limiting inclusion to patients who receive primary care at the main hospital facility, and the expansion of pharmacy staff with new pharmacists who were not knowledgeable of the referral process.

## Design

To overcome barriers, 4 main targeted interventions were needed: streamlining the referral process, enhancing pharmacy staff education, updating the discharge note template, and expanding the criteria to include patients who receive care at VA CBOCs. The referral process was streamlined by removing required calculated readmission risk scores, allowing pharmacist judgement to take precedence for referrals. Focused face-to-face education was provided to acute care and PACT pharmacists about the referral process and inclusion criteria to increase awareness and provide guidance of who may benefit from entry into the tool. Unlike the first phase of the study, education was provided for

outpatient staff pharmacists responsible for discharging patients on the weekends. Additionally, the pharmacists received a printed quick reference guide of the information covered during the education sessions (Figure 2). Referral prompts were embedded into the standard pharmacy discharge note template to serve as a reminder to discharging pharmacists to assess patients for inclusion into the tool and provided a direct link to the tool. Expansion to include VA CBOCs occurred post-pilot study, allowing increased patient access to this TOC service. All other aspects of the program were continued from the pilot phase.

Patients were eligible if they were discharged from RLRVAMC between October 1, 2018 and February 28, 2019. Additionally, the patient had to be established in a PACT clinic for primary care and have been referred to the tool based on the discretion of an acute care pharmacist. Patients were excluded if they were discharged against medical advice or to any facility where the patient and/or caregiver would not be responsible for medication administration (eg, subacute rehabilitation, extended care facility), or if the patient refused pharmacy follow-up.

### Outcomes

The primary outcomes assessed were all-cause and index ED visits and readmissions within 30 days of discharge. All-cause ED visits and readmissions were defined as a second visit to RLRVAMC, regardless of re-admission diagnosis. Index ED visits and readmissions were defined as those that were related to the initial admission diagnosis. Additional data collected and analyzed included the number of patients referred by pharmacists, number and type of medication discrepancies, medication changes, counseling interventions, time to follow-up postdischarge, and number of patients added to the PACT pharmacist's clinic schedule for further management. A discrepancy identified by a PACT pharmacist was defined as a difference between the discharge medication list and the patient-reported medication list at the time of follow-up. Patients who were referred to the TOC tool but were unable to be reached by

**TABLE 1** Study Exclusions (n = 33)

Reasons for Exclusion	Excluded, No. (%)
Appropriate follow up already scheduled within 7 d	19.0 (57.6)
Home-based primary care	10.0 (30.3)
Duplicate tool submission	2.0 (6.1)
Non-RLRVAMC primary care	1.0 (3.0)
Patient deceased before follow-up	1.0 (3.0)

Abbreviation: RLRVAMC, Richard L. Roudebush Veterans Affairs Medical Center.

telephone served as the control group for this study.

### Data Collection

A retrospective chart review was completed on patients entered into the tool. Data were collected and kept in a secured Microsoft Excel workbook. Baseline characteristics were analyzed using either a  $\chi^2$  for nominal data or Student *t* test for continuous data. The primary outcomes were analyzed using a  $\chi^2$  test. All statistical tests were analyzed using MiniTab 19 Statistical Software.

## RESULTS

Pharmacists added 172 patients into the TOC tool; 139 patients met inclusion criteria. Of those excluded, most were because the PACT pharmacist did not attempt to contact the patient since they already had a primary care visit scheduled postdischarge (Table 1). Of the 139 patients who met the inclusion criteria, 99 were successfully contacted by a PACT pharmacist. Most patients were aged in their 60s, male, and white. Both groups had a similar quantity of outpatient medications on admission and medication changes made at discharge. Additionally, both groups had a similar number of patients with hospitalizations and/or ED visits in the 3 months before hospital admission that resulted in TOC tool referral (Table 2).

### Hospital Readmission

Hospital 30-day readmission rates for patients who were successfully followed by pharmacy compared with those who were not were 5.1% vs 15.0% ( $P = .049$ ) for index readmissions and 8.1% vs 27.5% ( $P = .03$ ) for

**TABLE 2** Patient Demographics

Characteristics	Follow-up		P Value
	Successful (n = 99)	Unsuccessful (n = 40)	
Age, mean (SD), y	68.0 (10.7)	64.0 (11.0)	.10
Male, No. (%)	95.0 (96.0)	40.0 (100.0)	.20
Medications on admission, mean (SD), No.	13.5 (6.8)	11.4 (7.6)	.13
Medication changes at discharge, mean (SD), No.	4.8 (3.2)	5.4 (4.5)	.47
Patients with hospital admission in previous 3 months, No. (%)	18.0 (18.2)	8.0 (20.0)	.80
Patients with ED visit in previous 3 months, No. (%)	28.0 (28.3)	9.0 (22.5)	.49
Diagnoses on admission, No. (%)			
Heart failure	20.0 (14.4)		
ACS-related conditions	16.0 (11.5)		
Infection-related conditions	16.0 (11.5)		
COPD	15.0 (10.8)		
Gastrointestinal related	15.0 (10.8)		

Abbreviations: ACS, acute coronary syndrome; COPD, chronic obstructive pulmonary disease; ED emergency department.

all-cause readmissions. No statistically significant difference existed between those patients with follow-up compared with those without follow-up for either index (10.1% vs 12.5%, respectively;  $P = .68$ ) or for all-cause ED visit rates (15.2% vs 20.0%, respectively;  $P = .49$ ).

### Patient Encounters

The average time to follow-up was 8.8 days, which was above the predetermined goal of contact within 7 days. Additionally, this was a decline from the initial pilot study, which had an average time to reach of 4.7 days. All patients reached by a pharmacist received medication reconciliation, with  $\geq 28\%$  of patients having  $\geq 1$  discrepancy. There were 43 discrepancies among all patients. Of the discrepancies, 25 were reported as errors performed by the patient, and 18 were from an error during the discharge process. The discrepancies that resulted from patient error were primarily patients who took the wrong dose of prescribed medications. Other patient discrepancies included taking medications not as scheduled, omitting medications (both intentionally and mistakenly), continuing to take medications that had been discon-

tinued by a health care provider and improper administration technique. Examples of provider errors that occurred during the discharge process included not ordering medications for patient to pick up at discharge, not discontinuing a medication from the patient's profile, and failure to renew expired prescriptions.

Additional counseling was provided to 75% of patients: The most common reason for counseling was T2DM, hypertension, and dyslipidemia management. PACT pharmacists changed medication regimens for 27.3% of patients for improved control of chronic diseases or relief of medication AEs.

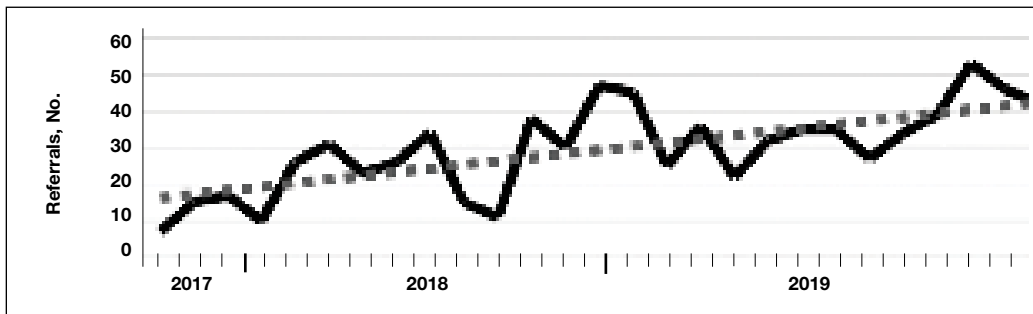
At the end of each visit, patients were assessed to determine whether they could benefit from additional pharmacy follow-up. Thirty-seven patients were added to the pharmacist schedules for disease management appointments. The most common conditions for these appointments were T2DM, hypertension, tobacco cessation, and hyperlipidemia. Among the 37 patients who had pharmacy follow-up, there were 137 additional pharmacy appointments within the study period.

### Program Referrals

After expansion to include the VA CBOCs, elimination of the elevated LACE or CAN score requirement, and additional staff education, the rate of referrals per month increased during phase 2 in comparison to the pilot study (Figure 3). There were a mean (SD) of 34 (10) referrals per month. Although not statistically analyzed, it is an objective increase in comparison to a mean 19 referrals per month in the pilot study.

### DISCUSSION

The continued development and use of a pharmacist-driven TOC tool at RLRVAMC increased communication and follow-up of high-risk patients, demonstrated the ability of pharmacists to identify and intervene in medication-related issues postdischarge, and successfully reduce 30-day readmissions. This program emphasized pharmacist involvement during the discharge process and created a standardized mechanism for TOC follow-up, addressing multiple areas that were

**FIGURE 3** Transitions of Care Referral Rates

identified by The Joint Commission as being associated with poor outcomes. The advanced pharmacy practice model at RLRVAMC allowed for a multidimensional program, including prospective patient identification and multiple pharmacy touchpoints. This is unique in comparison to many of the one-dimensional programs described in the literature.

Polypharmacy has been identified as a major predictor of medication discrepancies postdischarge, and patients with  $\geq 10$  active medications have been found to be at highest risk.<sup>13,14</sup> Patients in this study had a mean 13 active medications on admission, with a mean 5 medication changes at discharge. PACT pharmacists documented 28 of 99 patients with  $\geq 1$  medication-related discrepancy at post-discharge reconciliation. This 28% discrepancy rate is consistent with discrepancy rates previously reported in the literature, which ranged from 14 to 45% in large meta-analyses.<sup>14,15</sup> The majority of these discrepancies (58%) were related to patients who took the wrong dose of a prescribed medication.

Targeted interventions to overcome barriers in the pilot study increased the referral rates to the TOC tool; however, the increase in referral rate was associated with increased time to follow up by ambulatory care pharmacists. The extended follow-up times were seen most often in the 2 busiest primary care clinics, one of which is considered a teaching clinic for medical residents. Pharmacists were required to integrate these calls into their normal work schedule and were not provided additional time for calling, allowing for an increased follow-up time. The increased follow-up time likely contrib-

uted to the increased number of patients excluded due to already having PACT follow-up, giving more time for the primary care provider to have an appointment with the patient. The ambulatory care pharmacist could then determine whether further intervention was needed. In the summer of 2018, a decrease in referral rates occurred for a short time, but this is likely explained by incoming new residents and staff within the pharmacy department and decreased awareness among the new staff. The enhanced staff education took place during September 2018 and led to increased referral rates compared with those seen in months prior.

PACT pharmacists were not only able to identify discrepancies, but also provide timely intervention on a multitude of medication-related issues by using their scope of practice (SOP). Most interventions were related to medication or disease counseling, including lifestyle, device, and disease education. The independent SOP of our PACT pharmacists is a unique aspect of this program and allowed pharmacists to independently adjust many aspects of a patient's medication regimen during follow-up visits.

The outcomes of 30-day index and all-cause readmissions, as well as index and all-cause ED visit rates, were lower in the subset of patients who received PACT pharmacist follow-up after discharge (Table 3). The difference was most pronounced in the all-cause readmission rates: Only 8.1% of patients who received PACT follow-up experienced a readmission compared with 27.5% of those who did not. The difference between the groups regarding ED visit rates were not as pronounced, but this may be attributed to a limited sample size. These

**TABLE 3** Primary Outcomes

30-Day Outcomes	Follow-up		P Value
	Successful, No. (%) (n = 99)	Unsuccessful, No. (%) (n = 40)	
All-cause emergency department visit	15.0 (15.2)	8.0 (20.0)	.49
Index emergency department visit	10.0 (10.1)	5.0 (12.5)	.68
All-cause readmission	8.0 (8.1)	11.0 (27.5)	.03
Index readmission	5.0 (5.1)	6.0 (15.0)	.049

data indicate that the role of the pharmacist in identifying discrepancies and performing interventions at follow-up may play a clinically significant part in reducing both ED visit rates and hospital readmissions.

### Limitations

There are some limitations identified within this study. Although the referral criteria were relaxed from the pilot study and enhanced education was created, continued education regarding appropriate referral of TOC patients continues to be necessary given intermittent staff change-over, incorporation of pharmacy trainees, and modifications to clinic workflow. Patients who were discharged to facilities were not included. This ensured that appropriate and consistent PACT pharmacist follow-up would be available, but likely reduced our sample size.

Although performing this study in a closed health care system with pharmacists who have independent SOPs is a strength of our study, also it can limit generalizability. Not all facilities house both acute care and ambulatory care in one location with wide SOPs to allow for comprehensive and continued care. Last, this study used convenience sampling, potentially introducing selection bias, as patients unable to be reached by PACT pharmacists may inherently be at increased risk for hospital readmission. However, in the 3 months preceding the hospital admission that resulted in TOC tool referral, both groups had a similar number of patients with hospital admissions and ED visits.

The TOC tool has become fully integrated into the daily workflow for both

acute care and PACT pharmacists. After the conclusion of the study period, the referral rates into the tool have been maintained at a steady level, even surpassing the rates seen during the study period. In comparison with the pilot study, PACT pharmacists reported a subjective increase in referrals placed for procedures such as medication reconciliation or adherence checks. This is likely because acute care pharmacists were able to use their clinical judgement rather than to rely solely on calculated readmission risk scores for TOC tool referral.

The success of the TOC program led to the expansion to other specialty areas. ED pharmacists now refer patients from the ED who were not admitted to the hospital but would benefit from PACT follow-up. Additionally, the option to refer hematology and oncology patients was added to allow these patients to be followed up by our hematology/oncology CPSs by phone appointments. Unique reasons for follow-up for this patient population include concerns about delayed chemotherapy cycles or chemotherapy-associated AEs.

### CONCLUSIONS

This study outlines the creation and continued improvement of a pharmacist-based TOC program. The program was designed as a method of communication between acute care and PACT pharmacists about high-risk patients. The creation of this program allowed PACT pharmacists not only to identify discrepancies and make interventions on high-risk patients, but also demonstrate that having pharmacists involved in these programs may have a positive impact on readmissions and ED visits. The success of the TOC tool at the RLRVAMC has led to

its expansion and is now an integral part of the daily workflow for both acute care and PACT pharmacists.

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The authors report no actual or potential conflicts of interest with regard to this article.

### Disclaimer

The opinions expressed herein are those of the authors and do not necessarily reflect those of *Federal Practitioner*, Frontline Medical Communications Inc., the US Government, or any of its agencies.

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