

Improving Post Discharge Medication Adherence: A Collaboration between an Academic Medical Center and a Community Pharmacy Chain

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ABSTRACT

Objective: To describe a collaborative transition of care service (TOC) model between an academic hospital and a community pharmacy chain. **Methods:** Eligible patients included hospitalized adults who had one or more discharge prescriptions sent to one of the designated community pharmacies. Discharge medication lists were faxed from the hospital to each patient's preferred community pharmacy. Patients who had not picked up their discharge medications after 24 hours were called by a community pharmacy resident or intern. The purpose of the call was to encourage patients to pick up their discharge medications and to stress the importance of medication adherence. The community pharmacy resident or intern used the faxed discharge medication list to update the community pharmacy medication profile and deactivated medications that were discontinued post hospitalization. **Results:** The collaborative TOC service began February 2016 and included 22 patients through April 2016. A total of 15 patients picked up their medications within 24 hours post discharge. Of the seven patients who did not pick up their medications with 24 hours, four patients were successfully reached by pharmacy and picked up their medications between 24-48 hours post discharge. Each call lasted two to four minutes. Key lessons learned included providing a robust training program for pharmacy staff at participating community pharmacies and for residents at the hospital prior to and during service implementation. Barriers encountered included difficulty

contacting patients, unable to change active prescriptions for medications that are modified during hospitalization, and the process of manually identifying discharge patients. **Conclusion:** A collaborative TOC service between an academic hospital and a community pharmacy is a feasible model that can be adopted by other institutions seeking to improve TOC upon hospital discharge. Further study is needed to assess the impact of this unique model on time to discharge medication pick up, adherence, and hospital readmissions.

Key words: Transition of care, community pharmacy, academic hospital, medication adherence, medication safety, medication adherence

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INTRODUCTION

Delays in starting discharge medications are associated with deleterious patient outcomes such as increased morbidity and mortality, hospital readmissions, and financial reimbursement penalties.^[1] This is concerning given 28% of patients fail to start taking one or more prescriptions within seven days of hospital discharge and 24% within 30 days.^[2] Significant increases in morbidity and mortality due to delays in initiating discharge prescriptions have been demonstrated. In one study, 7,402 post drug-eluting stent patients were prescribed clopidogrel upon discharge and 16% failed to start clopidogrel on the date of discharge. Compared to 12.2% of patients who picked up clopidogrel on the day of discharge, 28.9% of patients who did not pick up clopidogrel experienced a myocardial infarction or died within 30 days of discharge.^[3] In a similar study of patients admitted for acute myocardial infarction, 26% of patients failed to initiate post discharge prescriptions 120 days post hospitalization, which was associated with an 80% increase in mortality.^[4] Delays in starting discharge medications may also contribute to increased hospital readmissions and thus result in financial reimbursement penalties from the Centers for Medicare and Medicaid Services (CMS).^[5-8] Under CMS's Hospital Readmissions Reduction Programs, CMS may hold up to 3% of reimbursement for hospitals that have higher than expected readmission rates.^[9] In 2016, CMS withheld \$528 million from 2,665 hospitals due to excess readmissions.^[10]

Partly due to potential financial and clinical repercussions associated with excess readmissions, hospitals, ambulatory care clinics and community pharmacies have developed a wide range of Transition of Care (TOC) models. Although pharmacists are involved in many of the TOC models, the services they perform largely depend on the setting and needs of their practice.^[11-13] While there are reports of community pharmacists performing TOC services in the literature, they are limited.^[14] In one such TOC service, patients with congestive

heart failure, chronic obstructive pulmonary disease, or pneumonia were discharged from two hospitals and referred to a community pharmacy for in-person medication therapy management (MTM) with a pharmacist. This intervention decreased 30 day hospital readmissions by 13%.^[14] However, this TOC service was limited to patients with specific indications.^[14] To our knowledge, there are no published reports describing a TOC service, involving community pharmacy for patients irrespective of indication, or aimed at reducing time to pick up discharge medications.

Discharge medication reconciliation decreases preventable medication errors, such as omissions, duplications, or drug interactions, which ultimately mitigates patient harm and decreases unnecessary burdens on the healthcare system.^[15] Although hospital pharmacists perform medication reconciliation frequently, limited literature describes medication reconciliation performed at the community pharmacy setting. In one study conducted in a rural independent pharmacy, pharmacists requested discharging facilities to fax discharge medication lists to their pharmacy.^[15] Upon receiving discharge medication list, pharmacists performed medication reconciliation and discussed their findings at the time of patient counseling. The pharmacists identified new medications started in the hospital (70%) as

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the most common type of medication discrepancy, followed by dosing changes (17%) and discontinuation (without re-starting on discharge) of chronic medications during admission (13%).^[15] However, discharge medication lists were not available to the pharmacists in 25% of the cases, preventing them from performing post discharge medication reconciliations at the community pharmacy settings.^[15] Although post discharge medication reconciliation may be performed as part of the MTM process at community pharmacies, there are no published reports describing post discharge medication reconciliation integrated into the daily pharmacy workflow in a community pharmacy, or hospitals proactively sending such records to community pharmacy.

There is a paucity of literature describing collaborations, including TOC services between hospitals and community pharmacists. Such a model could decrease delays in picking up discharge prescriptions and improve medication safety through post discharge medication reconciliation. It is unknown if such a partnership is feasible or effective. Therefore, the purpose of this manuscript is to describe TOC collaboration between an academic hospital TOC service and community pharmacists, highlighting a description of the service and lessons learned.

DESCRIPTION OF THE INTERVENTION

Setting

This collaborative TOC service took place at an academic hospital and a community pharmacy chain. The academic hospital is a 637 bed, level II trauma center.^[16] An average of 46,000 inpatient visits and more than 100,000 emergency department visits are conducted each year.^[16] The community pharmacy chain is one of the largest national grocery chain pharmacies, currently operating 146 community pharmacies in Colorado.^[17] These pharmacies offer immunization consultations, MTM services, point-of-care screenings, and diabetes coaching programs in select stores. All community pharmacists employed by this chain are certified to provide MTM services, diabetes counseling, and immunization consultation.

Patient eligibility

Patients were eligible for this study if they were at least 18 years of age and had at least one discharge medication prescribed which was electronically sent to one of the participating community pharmacies in the surrounding area by a hospitalist. Patients were excluded if they were discharged to a non-home setting, or had a preexisting quantity of the discharge medication at home that was expected to cover at least four days of the post discharge regimen. For each patient, any prescriptions which were not electronically sent to the participating community pharmacy were excluded. Patients who were only prescribed durable medical equipment upon discharge were not eligible. The study team identified eligible patients Monday through Friday through review of the hospital's electronic health record (EHR).

Description of intervention

Prior to the collaborative TOC service described here, the hospital had recently established a pharmacy TOC service, staffed by pharmacy residents, which we will refer to as the hospital TOC service. The TOC intervention described here, which is collaboration between the hospital and community pharmacies will be referred to as the collaborative TOC service.

Collaborative TOC service activities completed at the hospital

Among other activities, for each patient enrolled in the collaborative TOC service, the pharmacy resident prints out a comprehensive discharge medication list, including medications that were new,

modified, or discontinued at the time of discharge. The medication list is faxed to the patient's preferred community pharmacy with guidance for the community pharmacist on the reason the list was sent, and suggestions regarding what to do with the information, such as deactivating discontinued medications from auto-refill programs and updating the medication profile.

Collaborative TOC service activities completed at the community pharmacy

Upon receiving the comprehensive discharge medication list at the patient's preferred community pharmacy, a community pharmacist or a delegated pharmacy student intern reviewed and reconciled medication changes on the discharge medication list with the patient's medication profile in the community pharmacy's information system. For all newly prescribed medications on the discharge medication list, a community pharmacist or a delegated pharmacy student intern verified entry of the medications into the community pharmacy system was correct. If the newly initiated medication was a self-care product, a clinical note was inputted into the community pharmacy information system and the patient was instructed to purchase such product at the time of consultation. For medication changes requiring changes to active prescriptions, a community pharmacist entered a clinical note under the existing prescription, which alerts the community pharmacist to contact the patient's primary care provider when a new refill is requested to get a verbal order if appropriate. For all discontinued medications on the discharge medication list, the community pharmacist or the pharmacy student intern deactivated these medications from the community pharmacy's information system, including those that were enrolled in the auto-fill programs.

If a patient did not pick up his or her discharge medications within 24 hours post discharge, a community pharmacist or a delegated student intern personally called to remind the patient to pick up the discharge medications. This is in addition to any automated notifications patients received, either through voice notification or text message, at the time when prescriptions are ready and then 3 and 7 days later. During the personal call from the pharmacist or intern, the caller screened for and mitigated barriers to medication access (e.g., cost, lack of transportation), and provided patient education on the importance of timely initiation of discharge medications, including the relationship with poor outcomes and hospital readmissions. Furthermore, the caller answered any medication related questions and counseled on discharge medications as appropriate. If the caller was not able to reach the patient on the first attempt, the caller left a voice-mail (when able) for the patient to call the pharmacy. If the patient still had not picked up his prescriptions within 48 hours, a second call was placed. If the patient called back and was not able to reach the original caller, a trained pharmacy staff member would complete the follow up call, identifying medication access barriers, discussing the importance of post discharge therapy continuation, and documenting the patient encounter in the community pharmacy's information system.

Personnel training and preparation

First-year post-graduate pharmacy residents staff the hospital TOC service four hours each evening Monday through Friday and also assist with the collaborative TOC service. For standardization, all pharmacy residents received a live, four-hour orientation focused on the essential components of the collaborative TOC service including locating and printing discharge medication lists, using the EHR to identify community pharmacy contact information, and documentation. Written orientation handouts were given to the residents for future reference. In the participating community pharmacies, a total of two pharmacists, one pharmacy intern, one pharmacy student, and seven pharmacy technicians received a 15 minute one-on-one training

on the collaborative TOC service, which included instructions on how to conduct follow up telephone calls, identify barriers for medication access, discussion on importance of post discharge therapy continuation, and documenting the patient encounter in the community pharmacy's information system. On-going training, oversight, and support was provided by the collaborative TOC service leadership throughout the intervention to residents and pharmacy staff at participating community pharmacies. This study was approved by the Colorado Multiple Institutional Review Board.

Outcome measures

Process and clinical outcomes are being tracked. Process outcomes include proportion of eligible patients, number of call attempts, time spent per call, and whether the patient was reached. Clinical outcomes include pick up status and time from hospital discharge to pick up for each discharge prescription. In addition, demographic and clinical characteristics of each patient and call are being collected, including caller identity (pharmacists or pharmacist trainees), outcome of follow up call, voicemail status, reasons for not picking up discharge prescriptions, Charlson Comorbidity Index (CCI),^[18] history of previous emergency department (ED) visits and hospital admissions, number of discharge prescriptions, and use of the pharmacy prescription notification system. Prescription characteristics are being collected including medication name, drug class, strength, frequency (scheduled vs. as needed), and controlled substance classification (CII-CV). Finally, details of all subsequent ED visits and hospital readmissions for each patient are being collected.

Preliminary results

From February 2016 to April 2016, a total of 22 patients were eligible for the collaborative TOC service between the hospital and community pharmacies. The mean patient age was 65 years (range 38 to 85 years), with the majority being Caucasian females [Table 1]. A total of 64 post discharge medications (mean=three per patient) were prescribed [Table 2]. Of those, antihypertensives, antimicrobials, and gastrointestinal agents accounted for more than 40% of all discharge medications prescribed in this group. The mean time to pick up medications was 21 hours post discharge. A total of 15 patients (68.3%) picked up their medications within 24 hours post discharge [Table 3]. The community pharmacy was able to reach four patients who did not pick up their prescriptions within 24 hours post discharge. The study team reached two patients on the first attempt and two patients on the second attempt. Three patients were never reached and did not pick up their discharge prescriptions. The discharge prescriptions that were not picked up included an antiviral (oseltamivir), gastrointestinal agent (pantoprazole), antimicrobial (levofloxacin), and thiamine. Of the four patients reached, one patient (4.5%) picked up discharge prescriptions within 36 hours post discharge and three patients (13.6%) picked up their discharge prescriptions between 72 and 110 hours post discharge. Malignancy and metastatic solid tumor are two comorbidities that may affect patients' ability to pick up discharge prescriptions within 24 hours post discharge [Table 4]. Each call lasted between two and four minutes. Patients cited the lack of time to pick up discharge prescription from their community pharmacies was the most common reason that caused delay in picking up discharge prescriptions in a timely manner (within 24 hours post discharge). Other reasons that caused delay in picking up discharge prescriptions included cost of prescription, lack of transportation, and no knowledge that discharge prescriptions were available for pick up at the community pharmacy.

DISCUSSION

To the best of our knowledge, this is the first prospective study describing a unique TOC model in which hospital pharmacists collaborate with

community pharmacists. The purpose of this collaboration is to decrease time to pick up discharge prescriptions and improve medication safety through post discharge medication reconciliation. Although too early to draw conclusions regarding reduction in readmissions and ED visits, the model appears to be feasible. In our collaborative TOC model, which took place in multiple, high volume (400-500 prescriptions daily) community pharmacy stores, community pharmacists received discharge medication lists directly and automatically from hospital pharmacists, streamlining the medication reconciliation process for the community pharmacists. Others have questioned feasibility of community pharmacists performing medication reconciliation in high volume stores,^[15] however, because our process allowed for the community pharmacist to receive a reconciled discharge medication list from the hospital, it streamlined the process in the community pharmacy, which may be one reason our model was considered feasible in such high volume stores. In addition to identifying medication discrepancies, community pharmacists and pharmacy student interns also took necessary actions to resolve each medication discrepancy, such as flagging modified prescription with clinical notes and deactivated discontinued medications from auto refills programs, which is an essential step to prevent avoidable medication errors from occurring between each care transition. In a retrospective, observational study conducted in an inner city hospital, a research team contacted selected patients with acute coronary syndrome 14 days after hospital discharge. Of these patients, 40% reported they picked up discharge prescriptions from hospital outpatient pharmacies within the first 24 hours post discharge and an additional 20% of patients picked up post discharge medications between 24 and 48 hours, while 22% did not pick up their post discharge medications.^[19] In our collaborative TOC model, community pharmacists contacted patients if they did not pick up their prescriptions 24 hours post discharge, which is in

Table 1: Baseline characteristics of study participants (n=22)

Characteristics	n (%)
Age (years), mean (SD)	65 (38-85)
Gender	
Male	8 (36.3)
Race	
Black or African American	1 (4.5)
Hispanic	2 (9.1)
Caucasian	17 (77.3)
More than 1 race/other/unknown	2 (9)
Prescription Insurance	
Medicare	12 (54.5)
Medicaid	2 (9)
Private	7 (31.8)
Self-pay	1 (4.5)
Comorbidities	
Cerebrovascular disease	4 (18.2)
Congestive heart failure	2 (9.1)
Chronic pulmonary disease	3 (13.6)
Dementia	2 (9.1)
Diabetes mellitus with no complications	6 (27.3)
Diabetes mellitus with complications	3 (13.6)
Malignancy (no malignant neoplasm of skin)	4 (18.2)
Metastatic solid tumor	4 (18.2)
Myocardial infarction	1 (4.5)
Renal disease	4 (18.2)
Severe liver disease	1 (4.5)
Charlson Comorbidity Index, mean (SD)	4 (0-6)

Table 2: Frequency of most commonly prescribed discharge medications (n=64)

Medication class	n (%)
Antidepressant	1 (1.6)
Anti-hyperglycemic	4 (6.3)
Antihypertensive	13 (20.3)
Antimicrobial	11 (17.2)
Anti-platelet	1 (1.6)
Antipsychotic	1 (1.6)
Dyslipidemia agent	3 (4.7)
Gastrointestinal	10 (15.7)
Non-opioid analgesics	2 (3.1)
Opioid analgesics (CII-V)	3 (4.7)
Respiratory agents	2 (3.1)
Other	13 (20.3)

Table 3: Frequency of discharge prescription picked up by time (n=22)

Time Interval	n (%)
0-24 hours	15 (68.3)
25-48 hours	1 (4.5)
>48 hours	3 (13.6)
Never pick up prescriptions	3 (13.6)

Table 4: Baseline characteristic based on timing of discharge prescription pick up

Characteristics	0-24 hours n=15	25-48 hours n=1	>48 hours n=3	Never picked up n=3
Age (years), mean (SD)	65 (38-86)	62	76 (65-88)	58 (57-60)
Gender				
Male	5		2	1
Female	10	1	1	2
Race				
Black or African American	1			
Hispanic	1			1
Caucasian	12	1	3	1
More than 1 race/other/unknown	1			1
Prescription Insurance				
Medicare	8		3	1
Medicaid	1	1		
Private	5			2
Self-pay	1			
Comorbidities				
Cerebrovascular disease	2		2	
Congestive heart failure	2			
Chronic pulmonary disease	3			
Dementia	2			
Diabetes mellitus with no complications	5	1		
Diabetes mellitus with complications	3			
Malignancy (no malignant neoplasm of skin)	3		1	
Metastatic solid tumor	1		1	2
Myocardial infarction	1			
Renal disease	4			
Severe liver disease				1

addition to the standard automated notifications they received after their prescriptions has been processed and ready for pick up at the community pharmacy. This intervention may shorten time to pick up discharge prescription and minimize therapy disruptions that can lead to preventable adverse outcomes, but further study is needed to draw any conclusions. Although patients in our study were more likely to pick up their medications within 24 hours of discharge, our study supports the finding that there is a delay in picking up discharge medications post hospitalization, which may be contributing to poor control of existing conditions, medication-related adverse events, ED visits, and hospital readmissions.^[17] Therefore, it is necessary to develop effective TOC models that aim to minimize delays in medication initiation after discharge to reduce preventable adverse outcomes.

Although community pharmacy-based TOC programs have proven effective at reducing hospital readmissions,^[14] 70% of community pharmacists perceive time as a major barrier to providing these services in the community setting.^[8] The TOC model we describe took minimal time out of the workflow and utilized pharmacist trainees to minimize impact on the pharmacists. Overall, this TOC model was generally perceived by the community pharmacies and pharmacists as feasible and further expands upon TOC models that involve community pharmacists by partnering community and hospital pharmacists.

Lessons learned

Important lessons were realized during this three-month intervention. Providing strong training programs for pharmacy staff at participating community pharmacies and for residents at the hospital was vital to the successful implementation of this service. The main role of community pharmacy staff was to update the patient's medication profile in the pharmacy information system and assist the study team in calling patients and answering patient calls. By providing both written and in-person training prior to implementation and on-going training during the study, it provided residents and community pharmacy staff with support, and most importantly engaged participation, which was paramount to ensuring the service was successful.

One challenge encountered throughout the implementation of this intervention was patient recruitment. Since only patients who were discharged from the hospitalist medicine teams with electronic prescriptions sent to a participating community pharmacy were eligible for this study, it limited the number of patients who could benefit from this collaborative TOC intervention. Moving forward, this service will be expanded to other patient populations at the hospital, which will increase the number of patients eligible for and impacted by this collaborative TOC model.

One challenge faced throughout the implementation of this intervention was contacting patients. Reasons for the high no-response rate are unknown, but may be due to appointments with multiple providers shortly after discharge or the need to return to work immediately after hospitalization. Future research is needed to understand reasons for patient non-response immediately post discharge and explore options to improve response and decrease time to pick up post discharge prescriptions.

Another limitation encountered in this collaborative TOC model was the community pharmacists' inability to modify active prescriptions in the community pharmacy information system to reflect changes in strength or direction on the discharge medication list, since changes on the discharge medication list are not considered active prescriptions under current Colorado pharmacy regulations.^[20] As the role of the pharmacist expands, advocating for community pharmacists' ability to amend active prescriptions to reflect discharge medication lists is an important conversation to explore.

A final limitation identified during the implementation of this service was the process of identifying patients who were eligible. Currently, hospital pharmacists perform chart reviews every day to identify eligible patients and manually fax each discharge medication list to the patient's preferred community pharmacy. As this service continues to expand, it would be ideal for the hospital's EHR to automatically route discharge medication lists to a patient's preferred community

pharmacy at the time of discharge, perhaps by recording the patient's preferred pharmacy during an initial medication reconciliation encounter or prior to discharge.

CONCLUSION

A collaborative TOC service between an academic hospital and a community pharmacy is a feasible model that can be adopted by other institutions seeking to improve TOC upon hospital discharge. Further study is needed to assess the impact of this unique model on time to discharge medication pick up, adherence, and hospital readmissions.

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