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Implementing a Pharmacist-Led Medication Management Pilot to Improve Care Transitions

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Key Words: Transitions of care, care coordination, medication management, drug therapy problem

Abstract

Purpose: The purpose of this project was to design and pilot a pharmacist-led process to address medication management across the continuum of care within a large integrated health-system.

Summary: A care transitions pilot took place within a health-system which included a 150-bed community hospital. The pilot process expanded the pharmacist's medication management responsibilities to include providing discharge medication reconciliation, a patient-friendly discharge medication list, discharge medication education, and medication therapy management (MTM) follow-up. Adult patients with a predicted diagnosis-related group (DRG) of congestive heart failure or chronic obstructive pulmonary disease admitted to the medical-surgical and intensive care units who utilized a primary care provider within the health-system were included in the pilot. Forty patients met the inclusion criteria and thirty-four (85%) received an intervention from an inpatient or MTM pharmacist. Within this group of patients, 88 drug therapy problems (2.6 per patient) were identified and 75% of the drug therapy recommendations made by the pharmacist were accepted by the care provider. The 30-day all-cause readmission rates for the intervention and comparison groups were 30.5% and 35.9%, respectively. The number of patients receiving follow-up care varied with 10 (25%) receiving MTM follow-up, 26 (65%) completing a primary care visit after their first hospital discharge, and 23 (58%) receiving a home care visit.

Conclusion: Implementation of a pharmacist-led medication management pilot across the continuum of care resulted in an improvement in the quality of care transitions within the health-system through increased identification and resolution of drug therapy problems and MTM follow-up. The lessons learned from the implementation of this pilot will be used to further refine pharmacy care transitions programs across the health-system.

Introduction

Healthcare literature is rich with evidence indicating the United States has a history of struggling with post-acute care transitions that lead to increased hospital readmissions and healthcare costs.¹⁻² A significant contributing factor in the complexity of these transitions is the presence of medication discrepancies or drug therapy problems. According to Forster et al., an adverse event occurs in nearly 20% of patients discharged from the hospital to home setting.³ Sixty-six percent of these adverse events are drug-related, making it the most common type of adverse event experienced across the continuum of care. Other studies show the prevalence of drug therapy problems in patients being discharged from the hospital ranges from 14 - 60%.⁴⁻⁶ The literature also shows that when pharmacists are involved in care transitions and take measures to decrease the prevalence of drug therapy problems, the quality of the discharge process is improved and rehospitalization rates and preventable adverse drug events are lowered.⁴⁻⁷ This provides compelling evidence to support the need to identify and eliminate gaps in the care transitions process, especially drug therapy problems, in order to improve care transitions.

While these studies show that incorporating pharmacists into the care transitions process has the potential to improve medication use and patient outcomes, it is often difficult to develop a care transitions program that would meet an institution's and patient population's specific needs and fit within the institution's operating structure. Several organizations have created guidelines to assist institutions in the creation of care transitions programs which aim to decrease unnecessary healthcare utilization and improve quality of care.⁸⁻¹¹ Two examples of such programs include Project BOOST and Project RED sponsored by the Society of Hospital Medicine and the Agency for Healthcare Research and Quality, respectively.^{8,9} Each of these projects includes medication management as an essential intervention component of the discharge process. While these programs provide robust outlines on which types of services should be included in the hospital discharge process, they do not encompass institution-specific details on how to implement sustainable processes or discuss the outpatient interventions that are needed to ensure a complete transition.

The objective of this project was to design and pilot a pharmacist-led process to address medication management

across the continuum of care within Fairview Health Services (FHS).

Background

FHS is a large, integrated health care system in Minnesota that has made a commitment to work toward creating an accountable care organization. Within this commitment falls the need to address the current gaps in care transitions while keeping in mind the goals set forth in the Institute for Healthcare Improvement's *Triple Aim*[™].¹² These goals include to improve the health of the population; enhance the patient experience of care (including quality, access, and reliability); and reduce, or at least control, the per capita cost of care.¹²

In helping FHS move toward accomplishing the *Triple Aim*[™], a team consisting of pharmacists, physicians, nurses, and care coordinators across the healthcare system was organized under an outside project management team to address the quality of care transitions post-hospital discharge. This guiding interdisciplinary team decided to pilot a care transitions project at Fairview Ridges Hospital, a 150-bed community hospital within FHS in Burnsville, MN and surrounding Fairview primary care clinics.

As part of the care transitions pilot, Fairview Pharmacy Services, the pharmacy service line for FHS, was tasked with addressing medication management across the continuum of care. Pharmacists would be responsible for providing discharge medication reconciliation, an accurate, patient-friendly discharge medication list, discharge medication education, and MTM follow-up. Historically, at this institution inpatient nurses had been responsible for discharge medication reconciliation and teaching with pharmacists providing consulting services as requested. MTM services were not routinely offered to discharged patients.

Methods

The care transitions pilot was conducted from October 4, 2010 – January 28, 2011. Approval from the University of Minnesota Institutional Review Board was obtained. Adult (18 years of age or older), FHS-attributed (i.e., utilizing FHS as a primary care provider) patients who were admitted to the medical-surgical or intensive care units with a predicted diagnosis-related group (DRG) of congestive heart failure (CHF) or chronic obstructive pulmonary disease (COPD) were included in the pilot. Non-FHS attributed patients admitted to the medical-surgical or intensive care units with a predicted DRG of CHF or COPD who received usual care were tracked retrospectively as a comparison group. The diagnoses of CHF and COPD were chosen because the literature supports an increased risk for readmissions and healthcare resource utilization in these patients.^{13,14}

Included patients were identified by medical-surgical and intensive care unit care coordinators with a nursing background and tracked in the care coordination software program (Plex Online[®]). All included patients were followed throughout their hospital stay by a decentralized pharmacist and their progress was documented on a pharmacy paper monitoring form. Charge nurses, care coordinators, social workers, and a discharge liaison pharmacy technician attended daily discharge rounds. The care coordinator and discharge liaison pharmacy technician communicated pilot inclusion and discharge times to the decentralized pharmacist verbally and through the use of Plex Online.

Once discharge orders were written by the inpatient provider, the decentralized pharmacist received notification in the inpatient electronic health record (Sunrise Clinical Manager[™] Eclipsys[®]). The decentralized pharmacist reconciled pre-admission medication lists, current admission orders, and discharge medication lists. If any drug therapy problems were found, the decentralized pharmacist contacted the inpatient provider, discussed any drug therapy concerns, and provided drug therapy recommendations. Once discharge medication reconciliation was complete, the decentralized pharmacist created a discharge medication list with patient-friendly language using Assurance System[™] software[®] (a documentation system historically used by the MTM pharmacists). The discharge medication list contained the medication name, directions, indication, time the next dose was due, and a summary of any medication regimens had been initiated, discontinued, or modified during the patient's hospital stay.

Using the discharge medication list as a guide, the decentralized pharmacist provided medication education to the patient, patient's caregiver, or both. To guide pharmacists in the education process, a script was created and used (see **Appendix A**). The decentralized pharmacist emphasized differences between discharge and pre-admission medication regimens, answered questions from the patient or patient's caregiver, and provided a copy of the discharge medication list to the patient or patient's caregiver.

Upon completing discharge medication education, the decentralized pharmacist used the Assurance System[™] to document concerns or interventions addressed with the inpatient provider, regimens that had been initiated, discontinued, or modified during the patient's hospital stay, the patient's level of understanding, any drug therapy problems identified and resolved, and follow-up recommendations for the MTM pharmacist. A note template

was created in the Assurance System™ to facilitate this documentation process (see **Appendix B**).

Hospital-based pharmacy services (in-person) and MTM services (in-person or via telephone) were offered on weekdays during daytime hours only. All patients were offered primary care, home care, and MTM visits upon discharge. The referral for MTM services was made during the home care visit. A process flow map for the care transition pilot may be visualized in **Figure 1**.

Outcome Measures

The primary outcome measures were the number and characterization of drug therapy problems identified by the inpatient and MTM pharmacists and the percent of drug therapy recommendations accepted by providers in the intervention group. The secondary outcome measures included the difference in 30-day all-cause hospital readmission rates to any FHS hospital between the intervention and comparison groups and the percent of intervention patients who received follow-up care.

Results

During the four month pilot period, 40 patients met the inclusion criteria. The average age was 76 (37-96). These patients had an average of 9 (4-16) medical conditions and 15 (6-27) medications ordered at discharge. **Table 1** compares baseline characteristics of both the intervention and comparison groups. Thirty-four patients (85%) received an intervention from an inpatient or MTM pharmacist. Within this group of patients, 88 drug therapy problems (2.6 per patient) were identified and 75% of the drug therapy recommendations made by the pharmacist were accepted by the care provider. The most common types of drug therapy problems identified were needs additional therapy (30%), dosage too high (24%), dosage too low (17%), adverse drug reaction (13%), unnecessary drug therapy (8%), compliance (6%), and different drug needed (3%) [See **Figure 2**]. **Table 2** provides several illustrative examples of the types of drug therapy problems that were identified. On average, the inpatient pharmacist intervention took 92 minutes to complete.

The 30-day all-cause readmission rates for the intervention and comparison groups were 30.5% and 35.9%, respectively (See **Figure 3**). The number of patients receiving follow-up care varied with 10 (25%) receiving MTM follow-up, 26 (65%) receiving a primary care visit after their first hospital discharge, and 23 (58%) receiving a home care visit.

Discussion

Drug therapy problems during care transitions were common

with an average of 2.6 problems identified per patient seen by a pharmacist. Pharmacists were able to not only successfully identify these problems but also resolve them 75% of the time. The need for additional therapy was the most common drug therapy identified in the pilot. Often, the reason for this drug therapy problem resulted from providers inadvertently omitting medications being used to treat a chronic medical condition unrelated to the current hospital admission (e.g., a prior to admission osteoporosis prevention medication for a patient admitted for a CHF exacerbation). Other benefits realized during the pilot include increased visibility of the pharmacist to patient and increased collaboration between interdisciplinary team members. Patients seemed generally satisfied with pharmacist-provided discharge medication education with one patient who remarked that his discharge medication list and education were “the best thing since peanut butter.” In addition to increasing pharmacist participation in the discharge process, this pilot represented a landmark in pharmacy practice within FHS as it required the collaboration of pharmacists between various care settings, including inpatient, MTM, and retail, to ensure optimal medication management.

The collective interventions made by the interdisciplinary team during the pilot period appeared to show a trend toward decreased readmissions with 30-day all-cause readmission rates for the intervention and comparison groups of 30.5% and 35.9%, respectively. This decrease in resource utilization is consistent with other reports in the literature.^{4,6,8,9}

Historically, the post-hospital discharge MTM capture rate was essentially zero since MTM services were not offered to patients. During the pilot, the post-hospital discharge MTM capture rate was 25%, allowing for increased pharmacist involvement in medication management in the outpatient setting. Although no comparative data was available on home care and primary clinic follow-up rates in the comparison group, anecdotal reports from staff suggest that follow-up rates increased in the intervention group during the pilot period.

Limitations

One of the most significant challenges was the lack of dedicated resources. Additional staffing resources were not available for the pilot. All interdisciplinary team members incorporated the additional discharge process tasks into their daily workflow which created prioritization challenges and resulted in services not being equally provided to all patients involved in the pilot.

Since this project was not powered to detect a significant

difference between the intervention and comparison groups, additional studies with adequate power would be needed to draw statistically supported conclusions. Due to lack of data access, rehospitalizations were only tracked for FHS hospitals which may have resulted in missed opportunities to capture rehospitalizations. Additionally, it is difficult to compare the intervention and comparison groups given the challenges associated with categorizing patients based a predicted DRG. At the conclusion of the pilot, it was found that while the patient may have had a predicted DRG of CHF or COPD, the coding process may have resulted in a final unrelated DRG being coded.

Several communication challenges arose during the pilot. These challenges included conveying process changes throughout the project both in and between departments, sharing patient discharge dates and times consistently, and documenting in multiple electronic health record systems (e.g., Plex Online, Sunrise Clinical Manager™ Eclipsys, and Assurance™ Systems). Other logistically driven challenges included not having the staffing capacity to provide the service on evenings and weekends and developing a new referral process that met the requirements of various healthcare settings to which the patient was being discharged (e.g., home care services, transitional care facilities, and primary care clinics).

Future Plans

Despite the various challenges encountered in this pilot, several key learning points were realized and will be used to refine and implement future medication management programs across the continuum of care. One change currently underway is the implementation of a single electronic health record (Epic®^d) for all inpatient and outpatient practice sites. It is anticipated that the implementation of this shared record will eliminate duplication of work and decrease the amount of time needed to find pertinent patient information.

Another change taking place is the revision of the pharmacist's intervention process. This involves reviewing each step in the discharge process from the patient's admission to follow-up by the MTM pharmacist and streamlining work processes in order to increase patient capacity for pharmacists. This also involves refining the MTM referral process to ensure consistent communication.

Opportunities for increased staffing capacities are also being assessed, including increased pharmacy resident involvement. The recent expansion of Fairview Pharmacy Services' residency program will not only provide residents with the opportunity to help shape new care transitions

programs but will also help to allow for more consistent staffing of care transitions services.

A group of pharmacists within FHS will also focus on developing pharmacy-specific risk stratification criteria based on reports in the literature and institution-specific patient populations. These criteria include the number of medications, use of high risk medications (e.g., hypoglycemics, narcotics, anticoagulants), number of modifications in the medication regimen during a hospital stay or clinic visit, and hospital admission history.^{4,7-9} Institution-specific risk stratification calculation programs are also being considered.

Conclusion

Implementation of a pharmacist-led medication management pilot across the continuum of care resulted in an improvement in the quality of care transitions within FHS through increased identification and resolution of drug therapy problems and MTM follow-up. The lessons learned from the implementation of this pilot will be used to further refine pharmacy care transitions programs across FHS.

Footnotes

^aPlex Online, Plex Systems, Inc., Auburn Hills, MI

^bSunrise Clinical Manager™ Eclipsys (FCIS), Allscripts™, Chicago, IL

^cAssurance System™, Medication Management Systems, Inc., Plymouth, MN

^dEpic®, Epic Systems Corporation, Verona, WI

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Table 1. Patient Characteristics by Intervention or Comparison Group

Characteristic	Intervention (n = 40)	Comparison (n = 40)
Mean patient age in years (range)	76 (37-96)	72 (36-95)
Number of female patients (% of total patients)	27 (68%)	20 (50%)
Number of patients with predicted DRG of CHF (% of total patients)	24 (60%)	24 (60%)
Number of patients with predicted DRG of COPD (% of total patients)	16 (40%)	16 (40%)
Mean number of medical conditions per patient (range)	9 (4-16)	7 (3-14)
Mean number of discharge medications per patient (range)	15 (6-27)	14 (3-27)

CHF = Congestive heart failure, COPD = Chronic obstructive pulmonary disease
 DRG = Diagnosis-related group

Table 2. Illustrative Examples of Drug Therapy Problems

Drug Therapy Problem	Description
Needs additional therapy: Preventative therapy	Patient with CHF and cardiovascular risk factors was started on aspirin while an inpatient. During pharmacist review of discharge orders, aspirin was not ordered. New discharge order for aspirin was obtained.
Dose too high: Dose too high	Patient with atrial fibrillation was taking a lower dose of an anticoagulant (warfarin) in the hospital than what was being taken prior to admission. Discharge orders were written to resume home dose and start an interacting antibiotic that increases bleeding risk. Based on inpatient dosing patterns and labs, discharge anticoagulant dose was lowered.
Different drug needed: Dosage form inappropriate	Patient with COPD had a discharge order for an albuterol inhaler. During medication education, the pharmacist discovered the patient was using the inhaler by the incorrect route (intranasally instead of inhaled through the mouth) and was unable to manipulate the inhaler through the correct route. Discharge order was changed from an inhaler to nebulers.
Adverse drug reaction: Unsafe drug for patient	Patient with CHF and chronic pain was taking a nonsteroidal anti-inflammatory drug which was contributing to CHF symptoms. Pain medication changed to acetaminophen to avoid exacerbation of symptoms.

CHF = Congestive heart failure, COPD = Chronic obstructive pulmonary disease

Appendix A

Pharmacist Discharge Education Script

Acknowledge: "Good morning / afternoon / evening _____." (see KBC Adult Patient Profile in FCIS under Documents to determine how patient prefers to be addressed)

Introduce: "My name is _____ and I am one of the hospital pharmacists and I'm here to talk to you about your medications."

Duration: "If it is ok with you, I'd like to take the next 5-10 minutes to go over the medications your doctor is sending you home on today."

Explanation: Using the discharge medication list, highlight the new, changed or discontinued medications. State the name of the medication, what it's treating, and any pertinent information (side effects, special instructions, etc.). Ask the patient if he/she has any questions.

Tell the patient that a scheduler will be calling them sometime within the next week to set-up a time to talk to another pharmacist. This pharmacist will help answer any questions the patient may have and will make sure that the patient's medications are working well (helping him/her meet his/her goals of therapy), are safe for him/her to take, and that they fit with his/her lifestyle. This specialized pharmacist can meet with the patient over the phone or in the clinic, whichever the patient/family prefers. There is no charge for this service.

Thank you: "Thank you for your time. It was a pleasure to meet you _____."

Appendix B

Pharmacy Discharge Medication Consult

CONCERNS/RECOMMENDATIONS SHARED WITH INPATIENT PROVIDER:

EDUCATION:

Patient was informed to STOP taking the following HOME medications:

Patient was informed to start taking the following NEW/CHANGED medications:

Patient was educated on the following for each discharge medication:

- Rationale for therapy

- Duration of treatment

- Dosing and or monitoring drug levels

- Common side effects

- Importance of compliance

- Drug/food interactions

- Missed doses

- Self monitoring parameters

OUTCOMES:

- Patient verbalized understanding

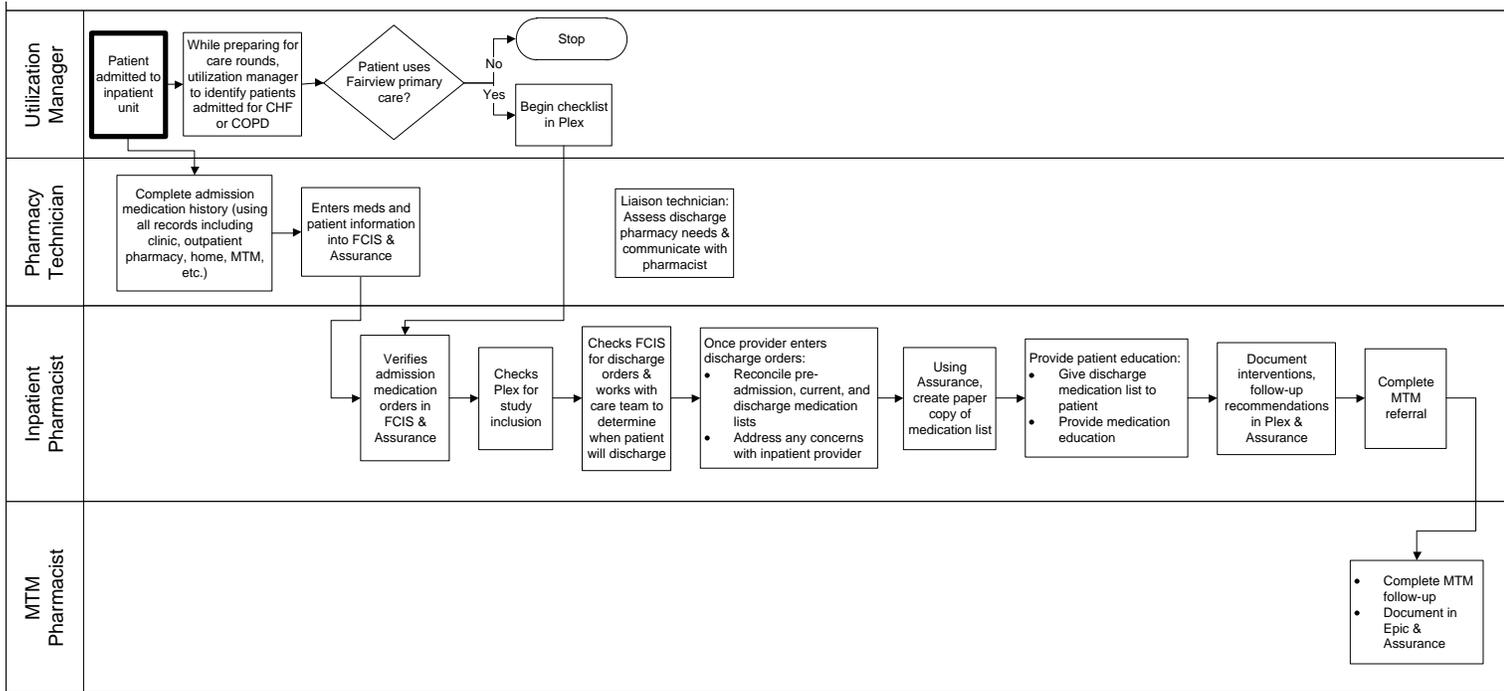
- Patient unable to express complete understanding

- Patient's family member verbalized understanding

- Unable to complete education due to ***

IMPORTANT FOLLOW UP NOTES:

Figure 1. Pharmacy Care Transitions Workflow



CHF = Congestive heart failure, COPD = Chronic obstructive pulmonary disease, MTM = Medication Therapy Management
 Note: Plex, FCIS, Assurance, and Epic are software systems outlined in *Footnotes*

Figure 2. Types of Drug Therapy Problems Found in Intervention Group

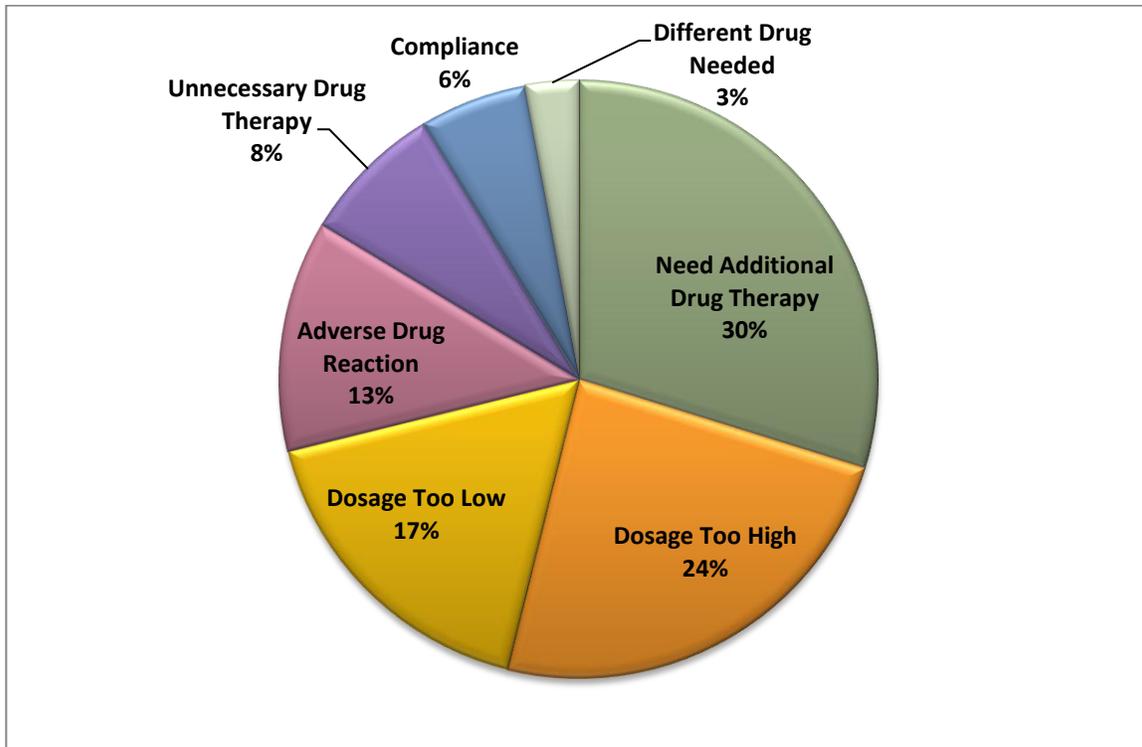


Figure 3. 30-Day All-Cause Readmission Rates for Intervention and Comparison Groups

