Pharmacists’ Involvement in Medication Management Along the Continuum of Care: Challenges, Lessons Learned, and Implications for Health Systems

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ABSTRACT

• **Background:** Medication management is becoming more complex, with new medications entering the market, drug prices increasing, and patients transferring into and out of the hospital. Transitions of care services are being implemented to prevent readmissions and increase patient satisfaction. Pharmacists play a key role by expanding clinical services provided to patients around medication management.

• **Objective:** To describe a pharmacy transitions of care model at a large academic teaching hospital and lessons learned during implementation.

• **Methods:** A pharmacy bundle of services was initially developed in a medical patient population and included medication reconciliation, patient education targeting high-risk medications, post-discharge follow-up phone calls, and bedside discharge prescription delivery. This bundle was expanded to other patient populations through the use of residency-trained pharmacists, pharmacy residents, pharmacy students, and certified pharmacy technicians.

• **Results:** Challenges were faced when implementing our transitions of care services, including expanding care coordination team coverage with existing resources, training pharmacy staff in new roles, determining the needs of patients cared for by teams we had not previously been integrated into, and creating our discharge prescription delivery program. During this process, we learned to rethink the role of pharmacists on our team, value the support within our institution to create change in order to improve patient care, and continuously evaluate this process.

• **Conclusion:** We are at an opportune time to expand the scope of the inpatient pharmacist to provide advanced medication-related services to patients. Residency training is creating individuals who will thrive in these new models.

Medication management around the acute care inpatient stay is a challenging but crucial task to ensure patient safety and desired clinical outcomes. The first step in successful medication management is to understand the patient’s medication regimen in the home environment. Patients may take medications differently than prescribed; skip medication doses intentionally to make a supply last longer; use over-the-counter medications, herbal supplements, or someone else’s medication based on the recommendation of family or friends; or discontinue medications based on side effects or media influence. Over the course of the inpatient stay, medication management involves adjusting doses based on changes in organ function, detecting side effects and potential drug interactions, and monitoring clinical outcomes to ensure appropriate drug therapy is being prescribed. As the patient approaches discharge, ensuring the patient understands the indications for his/her medications, has self-monitoring techniques to

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recognize efficacy or adverse effects, and has access to discharge medications is important. Lastly, long-term medication management includes patient access to pharmacological expertise over time. Pharmacists’ involvement in medication therapy management services and patient-centered medical homes is key to ensuring safe and effective medication use over time.

In 2009, the Johns Hopkins Health System Readmission Prevention Task Force developed strategies to reduce preventable readmissions and improve transitions of care. In 2011, a new multidisciplinary approach to patient care was implemented at the Johns Hopkins Hospital (JHH) to optimize care coordination and improve acute care management. Using this approach, care coordination teams composed of physicians, nurses, pharmacists, nurse case managers, social workers, physical/occupational therapists, nutritionists, and home care coordinators meet on a daily basis to discuss the inpatient and discharge care needs of patients in order to improve care transitions and reduce preventable readmissions. In 2012, JHH was awarded a 3-year innovation grant from the Centers for Medicaid & Medicare Services (CMS) that would assist with expansion of these care coordination teams to every unit of the hospital. Prior to implementation of the care coordination model at JHH in 2011, there were 3 pharmacists who consistently rounded on 3 inpatient medicine teams (one pharmacist also had operational responsibilities). Pharmacists were deemed by the task force to be key providers of medication management and, thus, essential members of the care coordination team. Due to an inability to hire a new pharmacist for every care coordination team, the department of pharmacy needed to determine how to provide consistent pharmacist coverage utilizing current resources. This report describes the challenges faced and lessons learned by our adult inpatient pharmacy division when implementing a pharmacy bundle of services to improve care transitions for an adult patient population.

**Setting**

JHH is an 1192-bed academic teaching hospital located in Baltimore, Maryland. At JHH, the department of pharmacy has 4 inpatient divisions that service the medication needs of different patient populations: medicine, critical care/surgery, oncology, and pediatrics. The adult inpatient pharmacy division covers medicine units in addition to obstetrics, neurology, and surgery units. It is responsible for 486 inpatient beds on 22 units and was the first division to provide the pharmacy bundle of services described below. Currently, 11 rounding and 5 operational pharmacists provide care coordination and order verification support, respectively, for the division during day shift.

**Program Overview**

Rounding pharmacists on care coordination teams address acute care medication issues and provide a bundle of services that includes targeted patient education, medication reconciliation, post-discharge follow-up phone calls, and discharge prescription planning. The full details of these services have been described [1]. Briefly, patients newly initiated on medications deemed “high-risk” (eg, anticoagulation, insulin, metered dose inhalers, dual antiplatelets) receive education by a member of the pharmacy team (ie, pharmacist, pharmacy resident, or pharmacy student) prior to discharge. Those patients who receive education are offered a post-discharge follow-up phone call to assess for any questions or issues. Patients who accept this service are contacted 48 to 72 hours post-discharge. Specific patient populations (eg, patients with congestive heart failure, diabetes) are also targeted for completion of medication reconciliation. If patients are being discharged with prescriptions, they are offered our “Meds for Home” service. Patients who accept this service have their prescriptions filled at one of our outpatient pharmacies and delivered to the unit prior to discharge. Highly trained certified pharmacy technicians, called “Meds for Home” coordinators (MHCs; previously known as transitions pharmacist extenders), facilitate this process.

**Challenges Faced**

**Care Coordination Team Coverage**

One challenge to implementation of the pharmacy bundle of services was providing consistent team coverage with adequately trained pharmacists. It was not feasible to hire a pharmacist to cover each of the care coordination teams. To address gaps in coverage, we initially utilized postgraduate year 1 and 2 (PGY1 and 2) pharmacy residents on an internal medicine rotation to cover care coordination teams without a rounding pharmacist. However, this method proved unreliable as a pharmacy resident was not scheduled for an internal medicine rotation each month. In the beginning, our division had 3 rounding and 9 operational pharmacists during day shift. To provide sufficient clinical coverage while still adequately addressing order verification needs, a major restructur-
ing of our pharmacy model was necessary. We increased the bed-to-pharmacist ratio for order verification, which allowed the number of operational pharmacists to decrease from 9 to 5. Those 4 remaining pharmacists were now available to serve as rounding pharmacists. Along with hiring 2 additional rounding pharmacists with funding from the CMS innovation grant, we were able to increase the number of care coordination teams consistently covered from 3 to 9.

Although we expanded pharmacist coverage of care coordination teams, time constraints prevented all patients who met criteria for patient education or medication reconciliation to have these services completed in a timely manner or at all by a pharmacist. Our rounding pharmacists’ responsibilities also included participation in high-level activities such as order set reviews for a new provider order entry system, ambulatory clinic time, stewardship activities, and quality improvement projects. In order to increase our scope, we utilized pharmacy technicians, students, and residents to assist with completing these tasks. All pharmacy students and residents on rotation within our division participated in a daily huddle Monday through Friday. Rounding pharmacists whose unit had patient education needs that could not be met by that pharmacist submitted requests by a set time. Those patient education tasks were then divided amongst the pharmacy learners at the huddle for completion. Prior to being allowed to independently counsel patients, pharmacy learners’ patient education skills were evaluated by preceptors. To facilitate timely completion of medication histories, technicians were hired. These medication history technicians are available Monday through Friday to complete medication histories for patients admitted to specific medicine units, ideally within 24 hours of admission. Rounding pharmacists are notified of completion of medication histories via our electronic medical record and reconcile that list with the patient’s inpatient medication list. Any clinically relevant discrepancies are communicated to providers. Pharmacy learners may also collect medication histories.

Training Rounding Pharmacists
Another challenge we faced was providing adequate training for operational pharmacists transitioning to a rounding position. Residency training is crucial in providing the level of skill necessary to identify complex drug therapy problems, adjust treatment regimens, and create plans where limited data exist to drive drug therapy recommendations [2,3]. Rotations during the final year of pharmacy school provide exposure to interacting with patients and providers. Completion of PGY1 residency training allows a pharmacist to practice as a generalist with a broad range of experiences provided during the year to identify medication-related problems. PGY2 residency training allows the pharmacist to spend a concentrated year in the chosen area of expertise and gain a deeper knowledge of medication use in a specific patient population or area of practice [2]. After 2 years of clinical residency training, pharmacists have the skills to interact with patients and multidisciplinary teams to optimize medication regimens, provide medication education, and measure the value they bring to the health care of patients.

Some of the operational pharmacists who were transitioning to the rounding pharmacist role had no training beyond pharmacy school or had only completed a PGY1 pharmacy residency. Initially, training for this new role lasted only a few days and consisted of orientation to the unit and observation of care coordination rounds. We learned that this brief amount of training was insufficient, even for those with PGY1 pharmacy residency training. In order to ensure that these rounding pharmacists could successfully provide the bundle of services and meet the high clinical demands of the inpatient service, we developed a comprehensive training program. Those interested in transitioning from an operational to a rounding pharmacist role must now complete a 6-week training program. The first 2 weeks consists of improving patient education and medication history skills. The remaining 4 weeks are spent honing clinical rounding skills. Rounding pharmacists-in-training also receive a formal review of their performance utilizing an evaluation form developed by the American Society of Health-System Pharmacists (ASHP) for pharmacy residents.

Establishing a Pharmacy Bundle and the Role of a Rounding Pharmacist on New Units
Some of the units implementing care coordination teams, such as neurology, did not previously have a pharmacist rounding on those units. Furthermore, these units had a high patient census (eg, 60 patients), which made it difficult for one pharmacist to clinically evaluate every patient. Multiple specialty teams also admitted patients to a single unit, which made it challenging for the pharmacist to develop strong working relationships with providers. As such, rounding pharmacists deployed to those units
had difficulty establishing their role on the team, especially for those pharmacists without or with only 1 year of postgraduate training. To address this issue, a PGY2-trained pharmacist rounded on the unit to assess which areas/teams had the greatest need for a pharmacist. Completing this needs assessment on these units allowed for the rounding pharmacist to more effectively use his/her time. It also allowed for a smoother transition from operational to rounding pharmacist by removing the burden of establishing a brand new role and identifying necessary tasks to be completed throughout the day.

We also discovered on these new care coordination units that our patient criteria for education and medication reconciliation were not universal. We developed and initiated our pharmacy bundle of services in a medical patient population. As we expanded these services to other patient care areas, the targeted list of medications/conditions changed. For example, surgical patients had a greater need for education around opioid therapy and complex bowel regimens while neurology patients needed education regarding antiepileptic regimens. Similarly, patients requiring medication reconciliation also changed. Nurses were performing medication reconciliation for patients with elective surgeries and had a system that worked for that population. Therefore, we did not need to focus efforts for this population around medication reconciliation and could shift our focus more towards medication education.

### Optimizing the Delivery of Discharge Prescriptions

The Meds for Home workflow has been updated multiple times since implementation. These changes resulted from early and frequent meetings with nurses, case managers, providers, and the pharmacy team. The Meds for Home service uses an outpatient pharmacy located within the hospital that has high prescription volumes at baseline to fill discharge prescriptions. Due to the volume of outpatient prescriptions and unexpected discharges, delays in prescription delivery occurred. To improve efficiency, a separate workflow and space were designated for filling Meds for Home prescriptions. Initially, MHCs were visiting floors to pick-up and deliver prescriptions at set times (ie, 10 am, 2 pm, and 5 pm). Instead of using set pick-up and delivery times, the Meds for Home service now uses a rolling 2-hour turnaround time during service hours. Additionally, providers, case managers, and units were educated to provide discharge prescriptions, especially those requiring prior authorization, as early as possible to expedite service. By identifying these issues early in the process, we were able to develop a different strategy that worked for the units, providers, and pharmacy.

### Lessons Learned

The time of transition from one level of care to another is a vulnerable time for patients, as it is a time when medication-related problems often arise. In an elderly patient population, one study demonstrated that contributing factors for medication discrepancies following hospital discharge included unintended nonadherence and inadequate discharge instructions, and patients experiencing a medication discrepancy were at a significantly higher risk of readmission [4]. Hospital readmissions have also been linked to a lack of adequate follow-up in the outpatient setting [5]. Pharmacists should become more involved in preventing medication-related problems during the times of transition by performing activities such as medication reconciliation, patient education, and assessment of patient outcomes post-discharge [6,7]. Studies have demonstrated that pharmacists are able to reduce medication-related adverse events during and after hospitalization by completing these activities [8–10]. Residency-trained pharmacists are well-equipped to provide these services and are needed to create new processes and models to meet the ever changing demands of health care payers and accrediting bodies. ASHP recommends pharmacists entering into careers in health systems be at least PGY1-trained while the American College of Clinical Pharmacy (ACCP) envisions all pharmacists involved in direct patient care complete residency training [11,12].

Health systems will continue to be challenged with transforming pharmacy models to allow for this influx of highly trained individuals in a time of budget constraints. Below, we describe the lessons we learned while implementing our pharmacy bundle of services and think are essential for other institutions to consider when initiating their own services.

### Rethink the Role of the Pharmacist

As health systems acquire smaller hospitals, the role of the pharmacist may need to be redefined and reinvented. The responsibilities of a pharmacist in a large academic hospital may be different than those of a pharmacist with the same skill set in a community hospital. However, despite the difference in practice setting, the same core pharmacy services around medication use can still be deployed. Participation in transitions of care activities is a
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relatively new concept for many pharmacists as residency training programs traditionally focused on caring for patients within a defined setting such as the intensive care unit or ambulatory care. The pharmacy profession should define the role of the clinical pharmacist in order to make the incorporation of transitions of care responsibilities into job expectations easier for all. The ACCP outlines this need and sets forth recommendations for clinical pharmacists’ responsibilities within the health care team to include assessing patients and medication regimens, developing and implementing medication-related therapy plans, and evaluating clinical outcomes [13]. Pharmacy leadership organizations, including ASHP and ACCP, offer resources providing the vision of pharmacy practice and expectations for which institutions should be reaching. Pharmacy departments should use these resources to complete gap analyses of current processes and those envisioned for the future to help guide efforts for change at their own institutions.

Obtain Support Within Your Institution
Gaining support from hospital leadership for advancing pharmacists’ involvement in patient care is instrumental. Without leadership support at both the institutional and department of pharmacy levels, pharmacists with advanced training may be hindered from practicing at the top of their license. Furthermore, support by leadership of pharmacy residency programs and experiential student learning sites at the institution is also important. Pharmacy residents and students became indispensable in our model and allowed us to expand our reach to more patients. We used residents to cover additional teams that were previously uncovered by a rounding pharmacist and, along with students, provide medication reconciliation, patient education, and follow-up phone calls to more patients. Requiring participation in the pharmacy bundle of services for rotations also allowed us to train these individuals about the value of transitions of care and see the challenges patients face in gaining access to medications. In a survey of academic medical center executives, pharmacy directors, and pharmacists at 8 institutions, residents were noted to add value to the institution through decreasing drug-related errors and drug costs, expansion of clinical services, and enhancing opportunities for research [14].

Support from other disciplines is also essential. Collaborating with other disciplines should occur prior to, during, and beyond implementation. We collaborated with providers, nurses, case managers, social workers and many other disciplines during all phases of the process. Being inclusive during the planning process allowed everyone to understand each other’s role and to provide input on how we could work together to best utilize everyone’s resources. This multidisciplinary approach to developing pharmacy services also allowed an opportunity to collaborate on research and evaluate our processes with other disciplines.

Tracking interventions will demonstrate the value of pharmacists, technicians, and other pharmacy team members participating in these advanced roles. This information will be useful when justifying the practice model to hospital leadership and for recruiting new pharmacists, residents, and technicians to the institution. Additionally, defining both outcome (eg, 30-day readmission rates, HCAHPS scores) and process (eg, number of patient education sessions performed, number of medication discrepancies reconciled) measures upfront is important in order for those involved to understand how their work will be assessed. These data will be useful in determining whether the intervention is making an impact early on and allow for restructuring of the process if not.

Create Depth in Your Team While Engaging Current Resources
We spent a significant amount of time planning the implementation of our pharmacy bundle of services, collaborating with other disciplines, and training our pharmacy team members. We hired highly trained and competent people into new positions and ensured everyone clearly understood their responsibilities. This was a critical step in order to ensure we were providing optimal care to our patients and integrating leaders into our team. We also utilized our current workforce to fill new clinical rounding pharmacist or technician roles. For those pharmacists who had not completed a residency, we required the pharmacists to complete a compact training program similar to that required of our residents [1]. This training ensured that important services were being performed adequately by each rounding pharmacist. Similarly, technicians transitioning from a primarily medication dispensing role to a MHC or medication history role received extensive training to assist with developing their new skill set.

Creating relationships with an outpatient pharmacy is essential to ensure patients are discharged from the hospital on medications they can afford long-term.
We are fortunate to have 5 outpatient pharmacies on the JHH campus that are under the Johns Hopkins Health System umbrella, which made collaboration between the inpatient and outpatient teams seamless. However, many hospitals may not be directly affiliated with an outpatient pharmacy with which to collaborate or may contract with a retail chain pharmacy. In the latter case, inpatient and outpatient pharmacies must work together to define roles around transitions of care and how to best serve the patient in a collaborative manner. If no onsite outpatient pharmacy exists, dedicated resources should be acquired to serve as a liaison between the inpatient team and the outpatient pharmacy. These resources may work through issues such as formulary preferences, prior authorization requests, and connecting the patient to the medication either through bedside delivery or filling at the patient’s community pharmacy. Community pharmacies recognize the cost benefit they could gain through 340B pricing and specialty drug dispensing when working in collaboration with healthcare systems. However, health systems must be aware that collaborating with outpatient pharmacy partnerships will create further challenges as providers ensure patient preference for use of a particular pharmacy is honored and cost-sharing is incorporated into models.

**Continuously Reevaluate Your Services**

As implementation of our pharmacy bundle of services began, meeting early and often was essential to identify issues and adjust our workflow to resolve those issues quickly. When the inpatient component of the pharmacy bundle of services was first implemented, rounding pharmacists and pharmacy leadership initially met on a weekly basis to provide feedback on the practice model and develop resolutions for any issues. However, it is important to also include other disciplines in the evaluation process. For the Meds for Home program, pharmacy leadership not only met with MHCs but also with providers, nurses, case managers, and social workers for feedback on how to improve the service. Although the workflow of our pharmacy bundle of services is more established, evaluations still occur albeit less frequently.

**Conclusion**

Pharmacists’ involvement in transitions of care should become part of the daily responsibility. Health systems should understand how efforts to expand pharmacists’ interventions align with overall hospital goals. Many hospitals may already have programs in place to help with transitions of care. Pharmacists can help expand current efforts through increased visibility to physicians and patients as well as collaboration with outpatient pharmacies to ensure medications are effective and affordable for patients long-term.

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