Thinking Outside the Pillbox

Improving Medication Adherence and Reducing Readmissions

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High hospital readmission rates are seen by many as a key contributor to rising health care costs in the U.S. New government payment reforms are tackling the problem by penalizing hospitals for such readmissions, and innovative providers are responding with better planning and follow-up care after a patient is discharged. Medication management by health care teams is at the heart of this effort.

Innovative models of discharge planning and follow-up care not only point the way toward broader success in reducing hospital readmissions, they also highlight the valuable role of medication management in improving patient outcomes and the need for improved medication adherence throughout the health care system.

Introduction

Every year nearly one in five Medicare patients discharged from the hospital is readmitted within 30 days, a costly reality viewed by many policymakers as symptomatic of a failing U.S. health care system.[1] To help address this problem, the Affordable Care Act required creation of a Readmission Reduction Program which, starting in October 2012, reduces by up to one percent payments to hospitals with excess readmissions for heart failure, heart attack and pneumonia. Maximum payment reductions will increase to three percent of hospital payments by 2015, at which point the Centers for Medicare and Medicaid Services (CMS) can expand the penalty to other conditions, including chronic obstructive pulmonary disorder and select cardiovascular procedures. Numerous private payers are also negotiating payment penalties for hospitals with high readmission rates.

As a result, hospitals are improving their discharge planning processes and providing transitional patient care after hospital discharge. Medication management is at the core of advanced discharge planning and transitional care.[2] This reflects three realities: adverse events are a major cause of avoidable hospital readmissions; more post-discharge adverse events are related to drugs than other causes;[3] and lack of adherence to medications prescribed at discharge has been shown to be a driver of post-discharge adverse drug events.[4]

While reducing readmission rates clearly poses challenges and some hospitals have objected to the new payment penalties, the path toward fewer readmissions has been charted by innovative institutions. Several models of discharge planning and transitional care have been documented in the medical literature. These models, described below, can serve as teaching examples for hospitals now faced with reshaping their care processes to reduce their readmission rates.

The new care models incorporate comprehensive medication reconciliation before discharge, and once again in the home or other outpatient care setting.

They provide continuing (if time-limited) supervision of patient medication use, and generally ensure an early follow-up visit with the patient's primary care physician. Some of these models also entail outreach to family members, primary care physicians and community pharmacists while the patient is still hospitalized in order to compile patient medication data. In short, the success of these models is dependent, at least in part, on establishing effective practices for medication management and patient adherence not only in the hospital but also in the home and community.

How Big Is The Problem?
Hospital Readmissions and Medication Problems in Context

Hospital readmissions are costly and frequently occur soon after discharge. Estimates of the total cost of readmissions range from $15 billion to $25 billion per year.[5] The Medicare Payment Advisory Committee (MedPAC) estimates that readmissions cost about $7,200 per case.[6] About two-thirds occur within 15 days of discharge.[7] Almost 20 percent of hospitalized Medicare beneficiaries are readmitted within 30 days, of which over half (13 percent) are potentially avoidable.[8]

A significant proportion of hospital readmissions are caused by medication-related adverse events. Researchers have estimated that up to 19 percent of discharged patients experienced an adverse event after discharge, of which roughly two-thirds were attributed to medications.[9] One study found that one-third of adverse drug events resulting in a hospital admission were related to non-adherence.[10] The aggregate cost of hospital admissions related to medication adherence has been estimated to be roughly $100 billion per year and estimates of the share of hospital admissions related to non-adherence are as high as 10 percent.[11,12]

Why Is It A Problem?
Readmissions and Medication Problems as a By-Product of Fragmented Sources of Care

Avoidable hospital readmissions have persisted despite the introduction of numerous health care services originally designed to improve the hospital discharge process for newly discharged patients. In many ways the new models of advanced discharge planning and transitional care seek to restore the continuity in care that was once provided by primary care or other community-based physicians.

In decades past, community-based physicians not only authorized a patient's admission to the hospital, they performed regular hospital rounds, supervised overall patient care and authorized the patient's discharge. In theory, medication management was seamless because the admitting physician, the discharging physician and the "receiving" physician in the community were the same individual. Today many factors are likely to render medical practice more complex: a greater number of conditions that can be treated as chronic, a greater number of treatment options, and rising prevalence of some chronic conditions, such as diabetes. More patients with chronic conditions are managed by primary care physicians in their offices and also referred to specialists as well. This means that recently hospitalized patients are likely to see multiple physicians both inside and outside the hospital, and must manage medication orders written by multiple doctors. Reductions in hospital length of stays and the treatment of increasingly complex conditions also leave many discharged patients with a need for intensive short-term assistance.

Hospitalists, home health care, disease management services and post-acute care facilities assist patients and physicians in dealing with the increased complexity of care described above. However, these additional services create a heightened need for communication and coordination with hospital staff and community-based physicians, particularly in the management of medications. Below we enumerate the role each of these services plays and why they create a need for better coordination.

Hospitalists: Hospitalists are hospital-based physicians who specialize in the delivery of comprehensive medical care to hospitalized patients.[13] By serving this role, hospitalists reduce or eliminate the need for primary care physicians to go to the hospital to care for their admitted patients. The employment of hospitalists has risen rapidly over the last 20 years, and hospitalists have now largely replaced admitting physicians in supervising hospital care and in authorizing patient discharge. The rise of hospitalists has also increased the need for coordination with community-based physicians, especially around medication management.[14] The hospitalist profession has responded with quality initiatives to tighten standards of medication management in the hospital and to formalize communications with the patient's community-based providers (see Project BOOST, below).

Home health services: Home health services, also called Visiting Nurse Associations, provide a broad range of professional health care and support services in the home. These services can be provided following a hospital discharge or at other times when a person needs ongoing care that cannot be provided by their friends and relatives.[15] These services are frequently provided by a nurse and may include counseling of patients and caregivers about the proper use of medications, as well as assessing and monitoring medication use. A home health nurse may be constrained by state scope-of-practice rules; for example, the nurse may or may not be authorized to prescribe or re-prescribe medications based on a medication reconciliation done in the home.[16] Nurses' ability to effectively manage medications may also be limited by poor communication with hospital staff and the patient's primary care provider.[17]

Disease management: Disease management represents another source of supplementary care for discharged patients. Disease management seeks to (1) support the physician or practitioner/patient relationship and plan of care; (2) prevent exacerbations and complications utilizing evidence-based practice guidelines and patient empowerment strategies; and (3) evaluate outcomes on an on-going basis.[18] Disease management may be provided by a third-party vendor on behalf of the patient's insurer and the disease management provider may not directly communicate with the patient's physician(s). Disease management services are usually provided via telephone to reduce cost. This remote intervention by someone who may not be coordinated with the patient's primary care team can contribute to discontinuity of care. However, these interventions can improve outcomes, as has been shown by a study of telephonic communication with heart failure patients.[19]

Post-acute care: Many patients are not discharged directly from the hospital to the home, but instead go to long-term acute care hospitals, inpatient rehabilitation hospitals or skilled nursing facilities where, in addition to rehabilitative services, they can receive around-the-clock medication management. Home health care services provided post-discharge are also considered post-acute care services. Transferring patients from short-term acute care hospitals to post-acute providers increases the number of times information needs to be passed between providers and increases the opportunity for errors and medication errors in particular.[20]

Solutions to the Problem

The Role of Advanced Discharge Planning and Transitional Care

Over the past five years, reduction of readmissions has become a high-priority quality improvement initiative. This is due in part to a widely cited article by Drs. Stephen Jencks, Mark Williams and Eric Coleman that quantified the costs of avoidable readmissions just as the health care reform debate commenced in 2009. The article also summarized literature on readmissions to suggest that improvements in community-based services alone were unlikely to reduce readmissions significantly,

and that more promising approaches would entail improved hospital discharge processes and tighter coordination between hospitals and community-based services.[21]

Several models of advanced discharge planning and transitional care aimed at reducing readmissions have been documented in the academic literature. They include:

- The Transitional Care Model (Mary Naylor, PhD, RN and colleagues at the University of Pennsylvania School of Nursing);
- The Care Transitions Intervention (Eric Coleman, MD, MPH and colleagues at the University of Colorado); and
- Project RED (Brian Jack, MD and colleagues at Boston Medical Center).

Large, integrated delivery systems such as Kaiser Permanente have undertaken internal improvement initiatives to adopt advanced discharge planning and transitional care. Broader adoption is also being encouraged by the Institute for Healthcare Improvement (IHI) and its State Action on Avoidable Rehospitalizations (STAAR) initiative, now underway in Michigan, Massachusetts and Washington; the Society for Hospital Medicine's Project BOOST, in over 60 hospitals nationwide; and the American College of Cardiology Hospital to Home Initiative (co-sponsored by IHI), which involves several hundred hospitals around the United States. Medication management and patient adherence are key elements of these initiatives. For example, Hospital to Home recently implemented an eight-month campaign-within-the-campaign called "Mind Your Meds" focusing on improving medication management and adherence.

All of the new models of care involve multiple steps that occur both pre- and post-discharge. All involve multi-disciplinary health care teams. They differ in how and when they use various care team members, as well as in the emphasis placed on certain steps. However, all the models share the following core attributes:

An accountable leader or manager: Designation of one person responsible for ensuring that all tasks are accomplished, from hospital admission to discharge and through a designated period of follow-up.

Teamwork: Coordination between team members from multiple disciplines (nurses, physicians, hospital and community pharmacists and others) based on which professionals are available with the right skills, at the right time, at an appropriate cost. For example, in the Kaiser Permanente system, registered nurses conduct home visits to discharged patients and complete at-home medication reconciliations via electronic consultation with a Kaiser Permanente pharmacist.

Medication reconciliation and clinical management of medications: Medication reconciliation requires explaining differences between the medicines a patient was taking before admission to the hospital and the medicines prescribed for the patient after hospital discharge. Compiling an accurate list of medications that a patient was taking prior to hospitalization is a challenging task that frequently requires care coordinators to contact family members, primary care physicians and community pharmacists for information. Without an accurate list of medications the patient was taking prior to hospitalization, it is impossible to accurately document all of the regimen changes as a result of the hospitalization. This can leave the patient unclear about which prescriptions he or she should take and potentially lead to discrepancies in the medication regimen and even adverse drug events.

Patient and caregiver education, counseling and engagement: Transitional care teams communicate directly with patients and their caregivers about how the patient's care plan, including medications, can help them reach their goals for daily living. Since recently hospitalized patients are often temporarily or permanently impaired in their ability to self-manage, transitional care coordinators work to engage and educate family members or other caregivers as much as possible. Many programs utilize "teach back" methods in which patients and caregivers are asked to demonstrate that they understand medication instructions by explaining them in their own words back to care team staff. The programs also generally provide "patient-centered" written instructions that accommodate different languages and literacy levels.

The new transitional care models aim for a high level of "patient-centeredness." Kathleen McCauley, PhD, a nurse educator and co-investigator of the Naylor/Transitional Care Model, has characterized transitional care's objective as one in which "clinical results (are) driven by patient goals." In transitional care the medication regimen is not constructed solely on the basis of clinical practice guidelines but shaped by patient goals and preferences – preferences that may directly influence which medications are prescribed and how they are dosed and administered. In Nurse McCauley's view, the ideal outcome is not purely clinical but whether a patient who wants to go to church on Sunday can do so.[22]

Follow-up: New care models also provide a follow-up home visit, a scheduled office visit with a nurse or physician, or both, soon after discharge. Kaiser Permanente schedules a home visit by the nurse care coordinator within 48 hours, while a Hospital to Home initiative called "See You in Seven" promotes a visit with the community physician within seven days of discharge. Since scheduling early follow-up visits can be difficult on short notice, some transitional care providers also create fallback sources of help, such as providing access to hospital-based providers for consultation about medication problems if the patient's regular physician is unavailable.

In some cases, home visits allow care coordinators to physically check on all the medications present in the home, to monitor medication use and adherence, and to conduct a new medication reconciliation, if necessary. Kaiser Permanente reports that in a majority of patient cases referred to transitional care, home inspection reveals medication list discrepancies with the patient's formal medical record.[23]

A summary of the key medication management and patient adherence components of each of the aforementioned transitional care models can be found in Appendix I.

Barriers to Implementation and Successful Outcomes

Like many innovations in health care, new models of discharge planning and transitional care face both barriers to broader implementation and constraints that limit their effectiveness. Practitioner interviews conducted by NEHI suggest several barriers and constraints that are especially relevant to medication management and adherence, including:

Incomplete and inaccurate patient medication lists: Hospital staff report many of the same difficulties faced by office-based physicians in assembling an accurate list of each patient's prescription medications on a timely and cost-effective basis. A case in point: the Joint Commission, the organization responsible for accrediting hospitals, required hospitals to adopt formal medication reconciliation practices in 2006. Since then, the Commission has been forced to suspend the requirement twice, a direct result of implementation difficulties.

Ultimately, electronic prescribing networks may provide a cost-efficient means for hospital staff and transitional care coordinators to assemble comprehensive medication lists. Surescripts, the U.S.'s largest e-prescribing network, reports that it delivered 395 million medication histories to clinicians in 2011, including 15 million specifically requested by acute care providers to support transitions in care.[24] Yet for now, access to electronic medication histories remains more the exception than the rule.

Limitations of family caregiver or other sources of patient support: For patients experiencing a decline in cognitive function, a family caregiver can be the *de facto* medication manager. However, not all patients have family caregivers who are both close at hand and committed to care-giving. Even for patients with family support, transitional care team members may have to continue to provide education and motivation well after the patient leaves the hospital. In the words of National Family Caregiver Association CEO John Schall, "the hospital is often the worst place" to teach patients and caregivers about medication management, since patients and caregivers may be overwhelmed by the hospitalization experience.

Difficulty scheduling timely follow-up visits with primary care physicians or community-based specialists: Advanced discharge planning and transitional care programs generally make a priority of scheduling, while the patient is hospitalized, an appointment with the patient's primary care provider that occurs soon after discharge. There are no firm guidelines on just how soon the visit should occur, but pressure to avoid 30-day readmissions creates an impetus for scheduling visits much more quickly than has previously been the norm.

Practitioners report that scheduling initial follow-up visits can be difficult, given a nationwide shortage of primary care physicians and the heavy workloads of community-based practitioners. This creates pressure to find other ways to review medication use quickly, such as through more easily accessible clinicians like nurses and community pharmacists. A recent innovative example is the PILOT-EBM trial at Duke University Medical Center, whereby a virtual team comprised of a hospital-based clinical pharmacist and a community pharmacist performed transitional medication management for discharged patients. Some 80 community pharmacies participated as part of the virtual team network, with promising early results.[25,26]

Funding challenges: The new discharge planning and transitional care models represent intensive, "high-touch" patient care approaches that can be difficult to fund long term. Initial funding for these models is often provided through grants or special contracts with insurers. Hospitals now face the challenge of converting these programs to sustainable business models. The threat of Medicare reimbursement penalties linked to readmissions may give some hospitals justification to absorb the costs of advanced discharge planning and transitional care, at least for certain high-risk and high-cost patients.

Conclusion

A systematic review of successful models of advanced discharged planning and transitional care published by Mary Naylor and colleagues at the University of Pennsylvania School of Nursing in 2011 found that comprehensive medication reconciliation and medication management, along with services for patient self-management, were key components of nearly all models.[27] A 2011 Commonwealth Fund review of similar evidence found that "…medication compliance is critical for discharged patients to remain stable at home, and hospitals have been working hard to improve their medication education and reconciliation approaches."[28] These reviews underscore just how central medication

management and adherence interventions are to achieving reductions in avoidable hospital readmissions in the U.S.

With that being said, there is much room for improvement and growth. Most hospitals have only just begun to confront the need to upgrade medication practices as part of their effort to reduce readmissions or face new government financial penalties. The hospital sector will need to scale up essential medication and adherence-related practices and achieve new efficiencies, including:

- Improved efficiency in the compilation of accurate medication histories through greater and more effective utilization of electronic prescribing systems.
- Enhanced capability to provide post-discharge follow-up on medication use through increased utilization of non-physician clinicians, including community-based nurses and pharmacists, and effective two-way communication between prescribers and other providers.
- Advancements in efficient techniques of patient engagement and counseling that improve patient self-management.
- Improved deployment of technologies that support medication monitoring and reminders for patients who need assistance and may have limited support from nearby family and friends.

None of these challenges are unique to the hospital sector; all of them represent serious challenges for improved medication management and patient adherence in community settings, such as in primary care and community pharmacy practices. Some of these challenges are the object of ongoing innovation in the community, and the hospital sector could well benefit by adapting and adopting community-based innovations. For example, hospitals might assemble patient medication histories more quickly and inexpensively through greater utilization of electronic medication histories (now available from e-prescribing networks developed primarily by the community pharmacy industry). Hospitals may also be able to tailor counseling to patients most apt to non-adhere by screening patients through assessment techniques (such as patient adherence estimators) developed by pharmacy educators or pharmaceutical companies and applied in the community.

Furthermore, the hospital sector could make common cause with community providers on medication management and patient adherence for another reason: transitional care services are, by definition, time-limited. They aim to stabilize patients for 30 days or some other finite period of time. Whether patients remain stable and out of the hospital for a longer period depends in part on whether they are actually “handed off” to community providers who can provide the same kind of comprehensive management and adherence services that are the hallmark of the best discharge planning and transitional care services. This could prove especially important as many hospital systems reorganize into integrated systems that encompass primary care or transform themselves into Accountable Care Organizations with new population health goals linked to payment.

In return, these new models of hospital-based transitional care have important lessons to teach community providers and other stakeholders in the health care system. The core attributes of medication practices in successful models of transitional care represent the building blocks of fundamental change in medication practices that currently allow an unacceptably high rate of poor patient adherence as well as unacceptably high rates of adverse drug events and patient safety risks. As noted earlier, these building blocks include (1) accountability, (2) teamwork, (3) medication reconciliation (or what community-based providers might describe as a comprehensive medication review), (4) direct engagement with patients and caregivers, and (5) follow-up services. Taken together, these building blocks could form a self-reinforcing system, or what University of Connecticut pharmacy educator and researcher, Marie Smith, PharmD, has called an improved “medication ecosystem”.[29]

We are far from that vision today, as medication management is still largely fragmented and inconsistent, accountability for outcomes is still limited and half or more of patients with prescriptions fail to take them as prescribed. However, the nation's coming experience with hospital readmissions initiatives may be the impetus needed to spur broader action throughout the health care system to achieve a fully functioning medication ecosystem.

Appendix I: Summary of Medication-related Features of Five Models of Discharge Planning and Transitional Care

	Care Transitions Intervention (Coleman et al)	Transitional Care Model (Naylor et al)	Project RED (Jack et al)	PILOT-EBM (Calvert et al)
Lead Coordinator	• Transition Coach (TC)	• Transitional Care Nurse (TCN)	• Nurse Discharge Educator (NDE)	• Pharmacist (hospital-based) for med mgt
Teamwork	• TC is an advanced practice nurse that coaches patients and/or caregivers to take charge of the patient's own care, including effective communication with all relevant providers	• TCN is an advanced practice nurse who initiates and maintains collaboration with hospital care team, primary care provider and other community-based providers	• Roles of hospital staff defined and communicated; primary care provider identified, contacted, and directly involved	• Usual discharge care supplemented with a virtual med mgt team; collaboration between hospital pharmacist and community pharmacist identified by patient
Med Rec and Clinical Mgt of Meds	• TC qualified in med rec: supervises/ conducts med rec before discharge and during follow-up home visit • Med list contained in personal health record given to patient	• TCN qualified in med rec: supervises/ conducts med rec before discharge and during follow-up home visits	• NDE supervises/ conducts med rec before discharge • Ensures hospital pharmacist contacts patient post-discharge to monitor patient's success with med regimen	• Med rec conducted pre-discharge • Community pharmacists allowed to conduct and document interventions post-discharge
Patient Education, Counseling and Engagement	• TC makes extensive use of teach back techniques with patient and/or caregiver • TC develops and teaches use of Personal Health Record, including use of PHR to track and communicate med use	• TCN educates regarding med use, schedule, etc; assesses patient's self-management ability and patient's personal "system" for storing/accessing/administering meds; advocates or secures improvements (e.g. reminder tools, custom packaging)	• Patient education throughout hospital stay • Patient receives contact information for staff members who can assist, post-discharge • Patient discharged with easy-to-read "After Hospital Care Plan" including med list and instructions	• Hospital-based pharmacist addresses patient and caregiver barriers to adherence identified by care team • Adherence barriers discussed directly by hospital pharmacist with community pharmacist • Barriers to adherence documented and sent to primary care physician

Follow-Up	Home Visits: • TC makes home visit within 48-72 hours; at-home med rec a key task Phone Calls: • Three follow-up telephone calls with patient within 28-day post-discharge period	Home Visits: • TCN makes home visit within 48 hours; at-home med rec a key task; one home visit per week during first month, followed by semi-monthly visits until end of service Patient Advocate: • TCN accompanies patient to their first PCP visit post-discharge and helps patient develop a list of questions prior to the visit	With PCP: • NDE arranges and ensures initial appointment with PCP for 2 to 4 weeks post-discharge Phone Call: • Hospital pharmacist places call 2-4 days after discharge to check on med use	PCP and Pharmacist: • Med list and assessment of patient's barriers to adherence faxed directly to PCP and to community pharmacist; adherence monitored through evaluation of refill records at community pharmacy, every 6 weeks for 6 months; discrepancies communicated to patient's care team

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