Medication Reconciliation: Much More Than Bringing Together a List of Medications

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Objectives
1) Define medication reconciliation and list the various methods used to reconcile medications.
2) Describe the reasons why medication reconciliation was prioritized on the Joint National Commission’s National Patient Safety Goal list.
3) Discuss research data that documents the need for medication reconciliation.
4) Discuss patient-centered and system-centered barriers that complicate the reconciliation of medications.
5) List considerations for system development and implementation of medication reconciliation into your pharmacy practice.

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Abstract: Medication reconciliation is not a new concept at all. In pharmacy, it has been described, in part, under the rubrics of “pharmaceutical care” and now medication therapy management. Many see medication reconciliation as simply creating a list of medications a patient is taking. Much discussion has surrounded the person or party responsible for this list of medications. The challenge is that medication reconciliation is more than just a list of medications. This article reviews the definition and concepts of medication reconciliation and offers other insights into managing pharmacotherapy in healthcare.

Case Vignette
Mrs. Jones is a 72-year old female brought by ambulance from her home and admitted through the emergency department (ED) for what looks like a broken hip from a fall. The nurse admitting her is now faced with entering her home medications into the computer. The nurse has to rely on her daughter, who is with her in the ED. No one brought in her medication bottles. The nurse asks the patient about her pharmacy. She is told that she uses two pharmacies in town and a mail order connected through her insurance company. The daughter is able to describe a few of her medications. The hospitalist taking care of her calls in an orthopedic surgeon. In preparation for surgery, he asks about any blood thinners she could be taking. He is told that she takes aspirin for her heart. He wonders about other antiplatelet and/or anticoagulant medications she could be taking. The nurse asks the daughter to go and get her medications from home. After a successful surgery, Mrs. Jones is ready for discharge. During her hospitalization it is discovered that her daughter lives out of state and the person thought to be her daughter is the neighbor that found her after the fall. It is considered that she will need rehabilitation before going home. Transfer orders are done and include medications. Upon arrival at the rehabilitation center, the “real” daughter shows up with her bottles of medication. Although the medication lists are different, the rehabilitation nurse uses the medications that were ordered on transfer, as her final medications sent to the pharmacy. The daughter takes the original medications home. After successful rehabilitation, Mrs. Jones goes home. Her first stop is the pharmacy. She gets her new medications filled. She wonders about her old medications at home. She remembers her cardiologist telling her to never stop the pink one. She also has financial stress. She gave the pharmacist six prescriptions, not realizing that she had nine in her bag when she exits the pharmacy.
Introduction
Who could forget September 11, 2001? Where were you when the Twin Towers came down? Sir Isaac Newton would say that when an object with mass obtains a velocity, the linear momentum is a forward vector until a force stops it. In the case of the Twin Towers, it was the ground. Linear momentum does not apply to medication management. The patient never seems to move in a consistent vector and when a force is acted upon the patient, a change of direction occurs that often ends in confusion. The case vignette is typical of how care transcends healthcare. Patients have points of transition, from home to hospital, hospital to home, and home to pharmacy. Each of these points of transition can complicate the health of the patient. Pharmacotherapy is often a large part of the care of the patient and is subject to errors. Medication reconciliation is meant to ensure that medications are not discontinued inadvertently, duplicated or prescribed inappropriately during transitions of care. It is also about reducing patient confusion especially in those taking multiple medications.

Definition of Medication Reconciliation
Often when something of importance occurs in medicine, the words often used to describe the issue are borrowed from the Bible. Salvation is tied to a lifesaving surgery; faith is assigned to confidence in the physician; hope transcends to the family in need and now reconciliation is assigned to medication. To reconcile means to restore friendly relations between two people or cause something to coexist in harmony. Reconciliation is a must when two people are at odds with each other over an issue. To reconcile often benefits both parties by restoring harmony. The result is peace and restoration of relationship. The same is true when medications are reconciled. The patient benefits through proper medication management, and the practitioner gains a comprehensive list of medications from all providers. Hopefully the result is less medication errors.

There are many organizations that have defined medication reconciliation. Table 1 outlines some of these definitions. It is basically a process of identifying the most accurate list of a patient’s current medications and comparing them to the current list in use, acting on any discrepancies and documenting any changes, and making sure that the information is accurately communicated. The focus becomes developing a medication list at all points of care transition. Developing a list can be complicated because patients have many points of care in the healthcare system. At this time, no one really knows who is responsible for the medication reconciliation process. The American Pharmacy Association (APhA) and the American Society of Health-Systems Pharmacists (ASHP) have published a joint statement with recommendations regarding medication reconciliation. It is APhA and ASHP opinion and now policy, that medication reconciliation is the responsibility of the pharmacist.

Why do we need Medication Reconciliation?
If the film industry were to remake the film Mary Poppins, they would have to change the words to the famous song; “a spoonful of sugar makes the medicine go down”, to “a spoonful of sugar moves the medicine safely”. Safety is the main tenet of medication reconciliation. The presuppositions of this are based on several reports. The main one is the Institute of Medicine (IOM) report; “To Err is Human: Building a Safer Health System”.5 In that report, the IOM responded to the avalanche of medical news on medical errors like chemotherapy overdose and amputation of the wrong foot. The report outlined statistics that got the attention of policymakers and the public. Their data implied that in U.S. hospitals

<table>
<thead>
<tr>
<th>Organization</th>
<th>Medication Reconciliation Definition</th>
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<tr>
<td>Academic article</td>
<td>The verification and communication of a patient’s medication regimen at points of transition during patient care.</td>
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<tr>
<td>Joint Commission (JACHO)</td>
<td>Medication reconciliation is the process of comparing a patient’s medication orders to all of the medications that the patient has been taking. This reconciliation is done to avoid medication errors such as omissions, duplications, dosing errors, or drug interactions. It should be done at every transition of care in which new medications are ordered or existing orders are rewritten.</td>
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<tr>
<td>APhA and ASHP Joint Statement</td>
<td>Medication reconciliation is the comprehensive evaluation of patient’s medication regimen any time there is a change in therapy in an effort to avoid medication errors such as omissions, duplications, dosing errors, or drug interactions, as well as to observe compliance and adherence patterns. Comparison of existing and previous medication regimens should occur at all transition points where medications are ordered. Medication reconciliation needs to occur as a process of self-care in the community pharmacy.</td>
</tr>
<tr>
<td>Research article</td>
<td>A process of identifying the most accurate list of a patient’s current medicines including the name, dosage, frequency and route – and comparing them to the current list in use – recognizing any discrepancies and documenting any changes, resulting in a complete list, accurately communicated.</td>
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in 1977, 44,000 to 98,000 Americans die each year from medical errors. Another report that affected medication reconciliation was the incidence of adverse drug reactions in hospitalized patients. In that 1994 meta-analysis of prospective studies, the authors estimated the incidence of serious adverse drug reactions in hospitals to be 6.7%, with 0.32% being fatal. Both reports set the stage for reducing medication errors in patients. Institutions of quality set goals to challenge the healthcare system to reduce medication errors. The Joint Commission on Accreditation of Healthcare Organizations (JCAHO) made medication reconciliation the eighth National Patient Safety Goal. The push is to get hospitals to accurately and completely reconcile medications across the continuum of care, with the aim at reducing the number of adverse events that occur when transition of care occurs. The Institute for Healthcare Improvement has medication reconciliation as a part of its 100,000 Lives Campaign. They report that 40% of medication errors are believed to result from inadequate reconciliation in handoffs between healthcare providers and that 20% of these errors are believed to result in harm to the patient. One of the six goals they list is preventing adverse drug events through medication reconciliation.

The Evidence for Medication Reconciliation
Much of the evidence documenting the problem of medication accuracy defines the need for medication reconciliation. The research documents the medication disparities that occur when medication list are compared. There are so many different types of disparities that the research actually documents the risk of not doing medication reconciliation. Table 2 outlines selected studies in various clinical settings that document the problem of medication accuracy and the need for medication reconciliation. There is no safe boundary from the problem. It can occur in hospitals, geriatric settings, family medicine clinics and with specialists like cardiologists. There are many more studies like those listed that document the need for medication reconciliation. Because the issue is so widespread across all points of care, medication reconciliation needs to occur at all points of transition. So far, evidence documenting the patient benefit from reconciling medications is scant. The optimal method for reconciling medications has yet to be determined.

Medication discrepancies have even been documented in an inpatient behavioral health unit. A pharmacy technician took a medication history within 18 hours of a patient’s admission to the behavioral health unit. Once the information was collected, the pharmacist reviewed the information, reviewed the chart and interviewed the patient. Pharmacists found 158 medication discrepancies in the 54 patients that met the study’s inclusion criteria. Of these discrepancies, 48% were errors of omission or incorrect medication, 31% were an omitted or incorrect dose, 13% were an omitted or incorrect frequency and 8% were miscellaneous errors. There was no comment on the clinical importance of these errors. The actual harm of these discrepancies is important to consider. One trial listed the unintended medication discrepancies on hospital admission as 35% with 61% having no harm potential, 33% moderate harm, and 6% severe harm potential. The rate of unintended medication discrepancies at discharge was 14%. The discrepancies were omission of medications, unnecessary duplicates, incorrect doses and incorrect timing.

After reviewing these data, one wonders about issues in the local hospital that one works. An unpublished analysis of 492 family medicine inpatients for 4 months showed that 53% of the records had issues that needed to be reconciled. Approximately 32%

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<th>Study Year</th>
<th>Design/Site</th>
<th>Outcome</th>
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<tr>
<td>1992</td>
<td>Family Medicine practice</td>
<td>87% had prescribed meds with incomplete documentation.</td>
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<tr>
<td>1996</td>
<td>Outpatient geriatric center</td>
<td>6 meds per patient; 5 meds documented in EMR; 26% had misreported meds.</td>
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<tr>
<td>2000</td>
<td>Outpatient cardiology offices, n = 8</td>
<td>239 patients, 545 discrepancies, 51% taking a med not in record, 25% not taking meds recorded, 20% taking different meds. Problems correlate with age, number of meds and physicians.</td>
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<tr>
<td>2001</td>
<td>Family Medicine outpatient clinic</td>
<td>26% with medication discrepancies; 58% were for prescriptions patient was taking but were not documented in the electronic medical record.</td>
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<tr>
<td>2004</td>
<td>Nursing homes</td>
<td>In 4 nursing homes, 122 nursing home admissions, 3 discrepancies on average between nursing home to hospital; 1% from hospital to nursing home; 20% had adverse drug event and needed a med change.</td>
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needed clarification with the patient and this was done through nursing personnel. The types of issues found included the discharge medication reconciliation form completed by the physician did not reconcile with the form completed by the nurses (18%), medications needed to be added to the discharge summary (11%), medications on discharge summary needed clarification (10%) and some consisted of more than one issue type (5%). It is important to realize that medication reconciliation is important and relevant in the local community served.

Recently, a population-based cohort study from Canada was published documenting the potential risk for unintentionally discontinuing chronic disease medications after hospital admission. For the five medication classes studied, hospitalization was associated with high rates of medication discontinuation, ranging 4.5% to 19.4% after discharge. Unintentional medication discontinuation was worse in those who had to be admitted into the intensive care unit. The authors also noted that there was an associated risk of negative outcomes like death, emergency room visits, and hospitalizations in patients whose statins or blood thinners were unintentionally discontinued. The limitations for this trial were addressed and minimized as much as possible. The editorial accompanying the article offers a brief review of the study and results. The authors of this editorial (Kahn and Angus) make a major point that must be addressed regarding the medication reconciliation process. “If hospitals are incentivized only to make sure patients’ medications at discharge are the same as admission, there is no incentive to improve the medication plan during the hospitalization.” A list is only a list. Medication reconciliation involves the need for medication assessment to address the pharmaceutical care of the patient. It is more than disease-state-management, but a comprehensive benefit-risk assessment that questions even the need for the medication in the patient. This assessment takes on many forms. It involves knowing the outcomes research of medications and considering patient-specific values such as finances, adherence patterns, and family support structures, so that a patient-centered medical decision can be made. So whose job is it to make this medication assessment? Research shows that interventions led by pharmacists are the most promising.

Pharmacists are being trained in medication therapy management (MTM) programs where medication reconciliation can be addressed. This assessment can be done at all points of transition in care and should be the responsibility of all pharmacists, no matter the practice setting. The community pharmacist is as responsible as the hospital pharmacist as the pharmacist in clinical care environments. Ultimately it is the patient’s responsibility to know their medications, but the opportunity afforded the pharmacist for proper pharmaceutical care must not go unaware.

Overall it is believed that medication reconciliation ensures patient safety, prevents unwanted hospitalizations and reduces risk for medication misadventures. However these beliefs have been poorly studied and further study is warranted.

What’s Wrong With the Process?
There are many barriers that impede the success of obtaining an accurate medication list from a patient. Some of these barriers are patient-centered and some of these are system-centered. The main patient-centered barriers are patient acuity and family support. Many patients remain oblivious to the medications they are taking or they have no real desire to understand them. They often do not have the family support system in place to help in times of need when medications are unaffordable or when they need help in understanding the benefit and risk of medications.

System-centered barriers are more involved than those of the patient. There is variation in the process of gathering a medication history and there is little agreement across professions (nursing, pharmacy, medicine) on who is responsible for gathering this information. There are issues of duplicating the medication histories gathered by the nurse or physician and documenting the data in different places in the patient record. Many times this data does not agree. Other system-centered barriers include physicians and nurses being less and less familiar with medications, and not knowing both the brand and generic names, nor their formulations or side effects.

The loss of continuity of care is another system-centered barrier. There is very little discussed in the literature about this concept. Primary care medicine has traditionally relied on continuity of care as the model of patient care. It has always been important for the physician to see the patient over the course of years, to establish a relationship with the patient and build a database of disease within a family to address care. But gone are the days of family physicians and internists having a thriving ambulatory practice, hos-
Hospital practice and long-term care practice. When a patient is admitted to the hospital, their primary care physician is often not their primary physician in the hospital. The admission is transitioned to the hospitalist. As a result, there is a loss of the continuity of care at this transition point and medications that the patient is taking are at risk for errors. In the past, the patient’s primary care physician, who was familiar with their medications and medical history, admitted the patient to the hospital. The result was a medication list less suspect. Today, most patients are admitted through the emergency department and cared for by a hospitalist team. The resulting medication list is mainly generated from the word of the patient and family. This method can be accurate, but many times it is not and often relies on the game of chance and coincidence.

Hyperpharmacotherapy, better known by most as polypharmacy also plays an important role. In the population-based cohort study by Bell and Brener mentioned earlier, substantial hyperpharmacotherapy was found. Of the patients admitted to the hospital, 75% were prescribed a median of nine different medications in the year prior to hospitalization. This brings up a litany of issues for the hospitalist who must attend to the patient’s acute medical problems and medications while potentially being unfamiliar with some of the chronic disease medications. It would be nice if the hospital could call upon the community pharmacy for a list of current medications for a patient, but gone are the days of single-source pharmacy providers. Many patients have multiple pharmacy providers. Patients having multiple practitioners prescribing multiple medications being filled by multiple pharmacies compound the issues and create the need for medication reconciliation.

Another system-centered barrier that should be mentioned is medication formularies. Whether in the hospital or community setting, medication regimens are often complicated by formularies, which ultimately are nothing more than money saving tactics. Do formularies really save money or do they increase risk? Patients are often admitted to the hospital on a nonformulary medication. These medications are substituted for the formulary medication of choice. Upon discharge, the physician prescribes the list of medications that were used in the hospital, ignoring the nonformulary medication that was substituted in place of the patient’s original medication. The patient goes home and runs the risk of duplicating therapy with two medications from the same class. In an effort to try and save money, potential harm can come to the patient. Medication formularies have a downside.

Solutions
Solutions to the medication reconciliation issue vary in scope. Many organizations have alluded to a model concept. Most of these models have been described in the geriatric literature. Some examples include the Transitional Care Nurse, Project-RED (Re-Engineered Discharge) and the BOOST models. The essence of all of these models is for the nurse or pharmacist to collaborate with the prescriber and visit the home after discharge to eliminate unnecessary medications and provide a plan for safe administration. Project-RED assigns the patient a Discharge Advocate (DA) who coordinates all medications and education. The BOOST Model specifically uses a screening tool to identify risk factors for adverse events, polypharmacy (hyperpharmacotherapy), poor health literacy, weak support systems, use of high-risk medications, and psychiatric issues. This model includes calling the patient within 72 hours of discharge.

Other solutions being discussed are physician computer order entry, allowing the prescriber to reconcile issues at the bedside, electronic prescribing through direct orders to the community pharmacy, and a universal electronic health record. Access to health information may be easier with a universal electronic health record, but is it accurate when many stakeholders have access to the information? Encouraging one pharmacy would be helpful, but money drives the system and patients need the freedom to shop for the best price.

Could hospital or community pharmacists have their own transitional care pharmacist? Could this type of model provide a collaboration opportunity for community and hospital pharmacists? Could this collaboration open up information sharing opportunities between pharmacists after the patient is discharged from the hospital? Could this be an entrepreneurial adventure?

Some pharmacies are creating models to integrate medication reconciliation into daily practice through care partnerships, bridging pharmaceutical care into the physician’s office by generating web-based reports for the practitioner and providing medica-
tion synchronization for the patient. This benefits the practitioner because there is pressure from the patient-centered medical home (PCMH) healthcare concept for the practitioner to be responsible for patients being adherent to medications.

Medication reconciliation is more than just making a list. It should be a major goal of MTM services. In fact, researchers at Yale studied medication reconciliation accuracy in 377 patients. Accuracy was determined by comparing admission orders with discharge medication orders. Of 565 medications that were stopped or doses changed, 24% were suspected errors in the medication reconciliation reporting. Most patients lacked full awareness of dose changes, discontinued medications or new medications. Just because medication reconciliation is done, does not mean it is done right.

Back to the Case Vignette
This realistic case identifies most of the common medication reconciliation issues that have been defined in this article. She has four points of transition; home to hospital, hospital to rehabilitation, rehabilitation to home, and home to pharmacy. Each of these points of transition offers opportunity for medication errors. What about other more subtle issues? She has poor family support, financial barriers, and a lack of continuity of care (hospitalist). She is a product of two facilities that most likely have different formularies, which increases her risk of duplication upon discharge. The instructions she received from the hospital are different from the ones she received from her cardiologist. Does she restart the medication? She just might be a product of automatic refills as she picks up nine medications instead of the six given to the pharmacist. Three were waiting on her to be picked up prior to her hospitalization. Medication reconciliation is a real problem and pharmacists are needed to seize the opportunity to make a difference for both the patient and the healthcare system.

Conclusion
Managing medications in a patient is like cueing a rack of pool balls. The vector is not linear, but random and the direction depends on many factors. Patients are bombarded with vectors like multiple doctors, multiple hospitalizations, multiple hospitalist, multiple diseases, multiple pharmacies, ignorance, family stress, opinion, financial barriers, medication formularies, and the list goes on and on. Because of these assorted vectors, medication management is very complex and confusing. At this point, medication reconciliation is the method being used to reduce the resulting complications at points of transition in care. The best method has yet to be determined and frustration will continue until one is found. There will also be continued discussion on who is responsible for medication reconciliation. Pharmacists are in best position to help prescribers help their patients by ensuring that the right patient is taking the right medication at the right dose, route and time. These five rights to medication safety are important, but will need to be amended to include “across all points of transition of care”.

References
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Learning Assessment Questions:

Mark each statement as true or false.

True  False  1. The Institute of Medicine Report in 1999 is responsible for the current fascination with medication reconciliation.

True  False  2. The most common type of errors associated with medication reconciliation are medication duplication.

True  False  3. One of the main issues plaguing community pharmacy medication reconciliation is the number of herbal medications a patient is taking.

True  False  4. One of the main benefits of reconciling medications is preventing unwanted hospitalizations and medication misadventures.

Multiple Choice Questions

5. Which of the following adds to medication confusion and the need for reconciliation?
   a. Lack of doctor-patient continuity
   b. Polypharmacy
   c. Discount drug formularies
   d. More than one outpatient provider
   e. All add to the confusion

6. If medication reconciliation could be described in a few words, which is the BEST description?
   a. Transition of care
   b. Medication discontinuation
   c. Reduction of hospital admissions
   d. Meta-analysis of studies

7. Which patient care service could result in a medication error in a patient transitioning from the rehabilitation hospital to home?
   a. Transitional care nurse
   b. A phone call to the patient within 72 hours of discharge from rehabilitation hospital.
   c. Automatic refill service at the pharmacy.
   d. A and C only

8. Various solutions have been described to aid in creating an accurate list of medications that reconcile. Which one is NOT a reasonable solution?
   a. Transitional nurse or pharmacist to visit home after hospital discharge.
   b. Universal electronic health record
   c. Medication therapy management
   d. Pharmacy Quality Alliance
   e. Medication Formularies

9. APhA and ASHP have developed a joint definition of medication reconciliation. Their definition adds one key point that other definitions do not include.
   a. Medication reconciliation is a process of self-care.
   b. Medication reconciliation occurs at all points of transition of care.
   c. Medication reconciliation is a process of documentation.
   d. Medication reconciliation compares medications between members of a household.

10. Research has shown that unintentional medication discontinuation occurs in 5 to 19% of patients being discharged from the hospital. Which patients are the most at risk?
    a. Surgery patients
    b. Patients that have been in the intensive care unit (ICU)
    c. Burn patients
    d. Patients that have developed an infection while in the hospital