



Commonwealth of Massachusetts
Board of Registration in Medicine
Quality and Patient Safety Division

Advisory
Medication Reconciliation
January 2015

Background

The Quality and Patient Safety Division (QPSD) has received a number of Safety and Quality Review (SQR) reports of patient events associated with inadequate medication reconciliation during hospital stays and transitions of care. This Advisory is issued to support health care facilities, as they continue to evaluate and refine their protocols for medication reconciliation, particularly during admissions and discharges. While some references are provided, this Advisory does not include a comprehensive review of the literature; nor is it intended to provide specific recommendations for evidence-based practice.

Publication of this Advisory does not constitute an endorsement by the Board of any studies or practices described in the Advisory and none should be inferred.

Overview

Medication errors occur frequently during patient transitions of care, resulting in omissions, duplications, inappropriate prescribing and other errors. Studies have found discrepancies between pre-admission medications and admission orders to be as high as 30-70%.¹ The Institute of Medicine (IOM) estimated that more than 450,000 preventable adverse drug events occur annually in hospitals.² There are a variety of reasons that care transitions are vulnerable to mistakes in medications, including the discontinuity of providers and patient information, incomplete discharge processes, changes in medication regimens, and inadequate patient and family counseling.³ The challenges of multiple providers and care settings are further complicated by the complex, and frequently incompatible, array of paper and electronic health records that may exist within, and between, healthcare organizations.

According to The Joint Commission, medication reconciliation (MR) is “a process of comparing the medications a patient is taking (and should be taking) with newly ordered medications.”⁴ A comprehensive MR process can reduce the likelihood of medication errors and improve communication

¹ Greenwald, JL et al. Making Inpatient Medication Reconciliation Patient Centered, Clinically Relevant and Implementable: A consensus statement on key principles and necessary first steps. *J Hosp Med*, 2010; 5(8):477-485.

² Philip Aspden et al, editors. Preventing Medication Errors: Quality Chasm Series. Institute of Medicine 2006. Accessed 10/6/14 at http://nap.edu/catalog.php?record_id=11623

³ Mueller, SK et al. A Toolkit to Disseminate Best Practices in Inpatient Medication Reconciliation: Multi-center medication reconciliation quality improvement study (MARQUIS). *The Joint Comm J Qual and Patient Safety*, 2013. 39; 8:371-82.

⁴ National Patient Safety Goals Effective January 1, 2014, Hospital Accreditation Program. The Joint Commission. Accessed 10/6/14 at http://www.jointcommission.org/assets/1/6/HAP_NPSG_Chapter_2014.pdf

throughout the continuum of care. However, MR faces all of the barriers noted above, and many of the challenges with implementing a MR process are reflections of the complex and siloed nature of the healthcare system. In 2005 The Joint Commission (TJC) adopted National Patient Safety Goal (NPSG) No. 8 that required hospitals to “accurately and completely reconcile medications across the continuum of care.”⁵ In recognition of the difficulties many hospitals were having defining medication reconciliation and implementing systematic processes, the TJC announced effective January 1, 2009 that hospital survey findings would no longer be factored into the organization’s accreditation decision or appear on the accreditation report.⁶ Since then, TJC has revised and reinforced its criteria in an attempt to reduce the burden on organizations while promoting changes that lead to true improvements in patient care.⁷

Developing an effective MR process requires an inclusive and iterative planning system, leadership and physician champions, strong interdisciplinary communication and collaboration, and innovative patient education and empowerment programs.

Cases Examples and Lessons Learned

Discharge orders to “continue with home medications,” made without consideration of whether any of these medications were contraindicated, given the patient’s hospitalization. (For example, a patient discharged after admission for gastrointestinal bleed, continues aspirin at home.) A standardized discharge MR process and pharmacy teaching about medications can help to improve outcomes. To prevent “short cuts,” the Computerized Provider Order Entry (CPOE) discharge process needs to be streamlined.

Incorrect medication or dose, or inaccurate medication allergy history are documented in the narrative section of the medical record (e.g., history and physical, ED physician notes). Narrative sections of the medical record are more vulnerable to dictation and transcription errors. A transfer reconciliation order form and CPOE can improve order accuracy, and provide alerts and improved systems for MR. Nursing and pharmacy verification of orders are important safety checks.

A patient receives another patient’s medications because the wrong medication reconciliation sheet is provided by the skilled nursing facility (SNF) to the hospital’s outpatient treatment unit. System redesign is required to assure standardized practice for hand-off between outside facility and receiving facility. Process must include verification of patient identification and medications.

Anticoagulation medications not restarted post-procedure due to confusion over whether medications entered in CPOE as a “hold” would need to be reordered. Information Technology (IT) enhancements to CPOE system are needed to assure a process for restarting “hold” medications, as ordered.

⁵ The Joint Commission. Improving America’s Hospitals: A report on quality and safety. March 2007. Accessed 10/6/14 at http://www.jointcommission.org/assets/1/6/2006_Annual_Report.pdf

⁶ “Medication Reconciliation: A team approach” Conference Summary. March 6, 2009. Society of Hospital Medicine, Philadelphia, PA. Accessed on 10/6/14 at http://www.hospitalmedicine.org/Web/Quality_Innovation/Implementation_Toolkit/MARQUIS/White_Paper_Medication_Reconciliation.aspx

⁷ The Joint Commission. National Patient Safety Goals Effective January 1, 2014: Hospital Accreditation Program. Accessed 10/6/14 at http://www.jointcommission.org/assets/1/6/HAP_NPSG_Chapter_2014.pdf

A patient has a medication reaction after provider overrides CPOE alerts about the patient's medication allergy. Removal of unnecessary alerts (decrease "alert-fatigue") and enhancements to the "hard stop" features can decrease "work-arounds" and protect against medication errors.

Incorrect medication order not identified and continued through two transitions-ED to ICU to inpatient unit. Provider accountability for MR at each transition must be unambiguous. Validation of physician orders with electronic medical record should occur during daily huddles.

Areas for Health Care Facility Systems Review

The areas described below provide topics and references as support for internal discussion and review of health care facility medication reconciliation protocols.

1. **Barriers to comprehensive preadmission medication history-taking.** Complete and accurate medication histories are essential to MR and patient safety. Studies have shown that 85% of errors in patient admission orders are due to medication history errors,⁸ and that up to 50% of medication errors are due to poor communications.⁹ Contributing factors include:
 - Patients/families: medication recall and health literacy.
 - Physicians/providers: available time for MR and interviewing skills.
 - Information: access to outpatient records, Electronic Health Record (EHR) compatibility across transitions of care, and accuracy of data (paper or electronic).
2. **Development of a comprehensive MR process.** The complex multi-faceted process of medication reconciliation requires strong hospital and clinical leadership, multi-disciplinary development and implementation teams, and adequate resources to be effective.¹⁰ The Joint Commission, Agency for Healthcare Research and Quality (AHRQ) and other organizations have facilitated the development of a number of MR toolkits. Each toolkit outlines the critical steps and concepts to be followed by a hospital that is developing or modifying a MR process. (See list at end of this Advisory.)
3. **Issues to consider when developing a MR process.** One of the critical components of effective MR processes is the clear delineation of roles and responsibilities for MR from admission through hospitalization through discharge, as well as for communication with community providers and outpatient pharmacies. Key issues to consider, include:
 - An inaccurate or incomplete MR can be harmful by creating the impression that the current list is up to date, so it is important that those providers tasked with MR have the time and skills to do it correctly.
 - When a comprehensive MR cannot be done then the medication list should be marked as incompletely reconciled for future providers to complete.
 - Having the highest trained people working with the highest risk patients is preferable.

⁸ Gleason, KM et al. Results of the Medications At Transitions and Clinical Handoffs (MATCH) Study: An analysis of medication reconciliation errors and risk factors at hospital admission. J Gen Intern Med 2010; 25(5):441-7.

⁹ Greenwald, JL et al. Making Inpatient Medication Reconciliation Patient Centered, Clinically Relevant and Implementable: A Consensus Statement on Key Principles and Necessary First Steps. J Hosp Med 2010; 5(8):479.

¹⁰ Mueller, SK et al. A Toolkit to Disseminate Best Practices in Inpatient Medication Reconciliation: Multi-Center Medication Reconciliation Quality Improvement Study (MARQUIS). Jt Comm J Qual and Pt Safety 2013; 39(8):371-82.

- Taking and documenting an accurate preadmission medication history as early in the hospitalization as possible improves patient safety for the complete hospital stay and greatly improves efficiency by reducing re-work by providers subsequently caring for the patient.
4. **High risk patients.** Intensive MR efforts should be focused on patients with higher risk for medication errors,¹¹ including:
- Low health literacy (a brief health literacy questionnaire can be used to assess each patient).
 - Elderly.
 - Multiple co-morbidities.
 - Cognitive impairment due to delirium, medication, and acute illness.
 - Transfer from facility outside of the hospital system.
 - Multiple medications and high-risk medications.
 - Lack of access to preadmission medication sources.
 - Provider concern regarding medication safety.
5. **Roles of specialists and hospitalists.** Questions to consider with regard to specialists and hospitalists include:
- a. What is the role of specialists? Do they only perform MR with the medications within their purview, or with all medications?
 - b. In the outpatient setting how do specialists verify the medications they are prescribing, and communicate any questions or discrepancies to the appropriate provider, (e.g. the patient's primary care provider)?
 - c. Setting the requirement that all providers update the medication list may create opportunities for error if there is inadequate time, training or information for the provider to accomplish this task. Should all providers be required to do MR, or specific providers along the continuum e.g. ED provider, admitting physician, hospitalist, etc.?
 - d. What are the roles and responsibilities of hospitalists for MR? Given the central role played by hospitalists, should they have ultimate responsibility/oversight for thorough medication histories, periodic MR throughout stay, and revisiting MR prior to discharge? If not, then hospitals need to identify who will bear overall responsibility for the medication list throughout transitions of care.
6. **Role of pharmacists and pharmacy staff:** Literature reviews of pharmacist-provided direct patient care and MR best practices have found significant improvements in medication adherence, patient knowledge, and healthcare utilization with greater involvement of pharmacy staff in MR.^{12,13} Particularly effective uses of pharmacy staff in MR include:
- Performing a comprehensive medication history on admission. Pharmacy technicians taking medication histories in the ED has been shown to be effective.
 - MR at admission and discharge.

¹¹ Chapter 7: High-Risk Situations for Medication Reconciliation: Medications at Transitions and Clinical Handoffs (MATCH) Toolkit for Medication Reconciliation. August 2012. Agency for Healthcare Research and Quality, Rockville, MD. Accessed 10/6/14 at <http://www.ahrq.gov/professionals/quality-patient-safety/patient-safety-resources/resources/match/match7.html>

¹² Chisolm-Burns, MA et al. US Pharmacists' Effect as Team Members in Patient Care: Systematic review and meta-analyses. Med Care 2010;48:923-933.

¹³ Mueller, SK et al. Hospital-Based Medication Reconciliation Practices: A systematic review. Arch Intern Med, 2012; 172(14):1057-69.

- Patient counseling on medications.
- Discharge communication with outpatient providers.
- Post-discharge communication with patients, (e.g. follow up phone calls).

7. **Discharge protocols.** Studies have shown that 40% or more of patients have unintended medication discrepancies at discharge.¹⁴ Discharge medications should be reconciled with preadmission medications and current inpatient medications. Rather than simply instructing patients to pass on medication information to their post-discharge providers, discharge medications should be actively communicated to outpatient healthcare providers, including:

- Primary care providers.
- Specialists.
- Community health and social service providers.
- Outpatient pharmacies.

The information should include exactly how the discharge medication regimen differs from the preadmission regimen (medications that are new, stopped, changed, and continued without changes), why those changes were made, and any monitoring that is required.

8. **Engaging patients.** To develop a patient centered, patient safety-focused medication reconciliation process, patients and their families must receive appropriate and sufficient counseling and education about their medications throughout the hospitalization and at discharge. Patients should be empowered to ask questions, maintain an up to date medication list, and to inform healthcare providers about current medications and any recent changes. Ideally multi-disciplinary teams, including pharmacists, will be involved in counseling, education and empowerment activities.
9. **Maximize use of Electronic Health Records.** Identification of strengths and weaknesses of EHRs and paper systems with regard to MR is essential. Elements that inhibit or confuse the MR process (e.g. a change to the preadmission medication list appears as an order) need to be corrected. Simple and timely access to outpatient and other records within EHRs and through the Health Information Exchanges (HIE) greatly enhances the MR process. Computerized medication reconciliation systems should facilitate (and not impede): access to preadmission medication sources; comparison of medication regimens across care settings; ordering and reconciling medications at admission, transfer, and discharge; the generation of clear documentation for patients and providers; division of labor; and interdisciplinary communication.
10. **Measurement of success.** Audits of the MR process can facilitate the identification of issues and opportunities for improvement. Was the medication history accurate, were medications reconciled correctly at the time orders were written, were discharge medications correct and is there evidence of patient education and engagement? Only through such measurement can health care facilities know where they need to focus efforts and whether their quality improvement interventions are indeed improving medication safety.

Conclusion

Medication reconciliation is an important patient safety process that continues to present significant challenges for health care facilities and providers. Multi-disciplinary teams are needed to carry out the

¹⁴ Wong, JD et al. Medication Reconciliation at Hospital Discharge: Evaluating Discrepancies. *Annals of Pharm* 2008; 42:1373-79.

complex task of medication reconciliation across multiple care settings and throughout the continuum of care. The silos of care (e.g. specialists, pharmacists) and the fragmented nature of healthcare must be recognized and addressed in order to develop and maintain an effective MR system. Clear roles and responsibilities for various providers should be established in order to provide a sense of ownership of the MR process at critical junctures throughout the hospitalization. Improvements in communication and increased use of pharmacists and pharmacy staff throughout the process are important first steps. Empowerment of patients has many benefits, including reduced risk for errors in the admitting medication history and improved post-discharge medication adherence. Strong administrative and clinical leadership, combined with an inclusive and iterative planning process, using best practices in quality improvement methods, is critical to the implementation of an effective and sustainable MR system.

Toolkits for Medication Reconciliation

- IHI How-to Guide: Prevent Adverse Drug Events (Medication Reconciliation).
<http://www.ihl.org/resources/Pages/Tools/HowtoGuidePreventAdverseDrugEvents.aspx>
- MARQUIS Medication Reconciliation Implementation Toolkit:
http://www.hospitalmedicine.org/Web/Quality_Innovation/Implementation_Toolkit/MARQUIS/Overview_Medication_Reconciliation.aspx
- Medications at Transitions and Clinical Handoffs (MATCH) Toolkit for Medication Reconciliation:
<http://www.ahrq.gov/professionals/quality-patient-safety/patient-safety-resources/resources/match/index.html>

Additional references:

Gao, T et al. Breakdowns in the Medication Reconciliation Process. PA Patient Safety Advisory 2013; 10(4):125-36. Accessed 10/6/14 at

[http://patientsafetyauthority.org/ADVISORIES/AdvisoryLibrary/2013/Dec;10\(4\)/Pages/125.aspx](http://patientsafetyauthority.org/ADVISORIES/AdvisoryLibrary/2013/Dec;10(4)/Pages/125.aspx)

The Joint Commission NPSG Effective January 1, 2014

http://www.jointcommission.org/assets/1/6/HAP_NPSG_Chapter_2014.pdf

Zhu, J et al. Prevention of adverse drug events in hospitals. UpToDate 2014. Accessed 10/6/14 at

<http://www.uptodate.com/contents/prevention-of-adverse-drug-events-in-hospitals>