SAFE PRACTICE 17: MEDICATION RECONCILIATION

The Objective
The healthcare organization must develop, reconcile, and communicate an accurate medication list throughout the continuum of care.

The Problem
Medication reconciliation is a process of identifying the most accurate list of all medications a patient is currently taking, and using this list to provide correct medications for the patient in all care settings within the healthcare system. [IHI, 2008] The goal of medication reconciliation is to reduce adverse drug events (ADEs) during transitions of care. [TJC, 2006] A meta-analysis of 22 studies focusing on medication history discrepancies found that 10 to 67 percent of patients had at least one prescription medication history error at hospital admission. When nonprescription drugs were included, the frequency was 27 to 83 percent; and when information on drug allergies and prior adverse events was included, the frequency was 34 to 95 percent. [Tam, 2005; Gleason 2004] Many of these medication history errors occur upon admission to or discharge from a clinical unit of the hospital. A study of 4,108 patients found that 46 percent of errors occur at these junctions. [Bates, 1997] A similar study of 250 medication history errors found that approximately 60 percent of errors occurred at these times. [Rodehaver, 2005]

The frequency of medication reconciliation errors is estimated to be 20 percent of adverse drug events (ADEs) within hospitals. [Rozich, 2001] A large study of 2,022 medication errors involving reconciliation, conducted by the United States Pharmacopeia, found that 22 percent occurred at admission, 66 percent occurred during transitions in care, and 12 percent occurred at the time of discharge. [Santell, 2006] A study following patients two weeks after hospital discharge found that ADEs occur in approximately 12 percent of patients. [Forster, 2003]

The severity of these events has been measured in several studies. Cornish et al. found that 61.4 percent of errors had no potential to cause serious harm, and the remaining 38.6 percent had potential to cause moderate to severe discomfort or clinical deterioration. [Cornish, 2005; Levinson, 2008a; Levinson, 2008b] A study in 1990 reported that about 6 percent of patients may experience a drug discrepancy of a serious nature at hospital admission. [Van Hessen, 1990; Etchells, 2006] Gleason et al. reported that 55 percent of medication discrepancies would have been unlikely to cause harm, 23 percent would have necessitated monitoring or precluded harm, and 22 percent would have resulted in serious harm had the pharmacist not intervened. [Gleason, 2004] Patients with a higher severity of illness, or who were taking numerous medications, were more likely to have a higher risk for ADEs. [Gleason, 2004] Another study of 1,459 emergency department admissions showed that 41 percent of medication reconciliation errors were clinically important. [Akwagyriam, 1996] Another found that 3 percent of patients had missing medications in their history that were “life-saving,” and that 24 percent of patients would have gained significant benefit if their missing medications had been included. [Cohen, 1998] In a study of 180 patients on a general medicine service, 939 unintentional medication discrepancies were found, of which 257 had potential for patient harm (1.4 potential adverse drug events [PADEs] per patient); 54 percent had at
least one PADE. Seventy-two percent of these PADEs related to the reconciliation process were due to errors in taking the medication history rather than in reconciling the medications with admission or discharge orders. The majority of PADEs occurred at discharge (75 percent) as opposed to at admission, and 60 percent were due to omissions of medications. [Pippins, 2008]

Preventable adverse events from medication errors affect approximately 2 out of every 100 patients admitted to the hospital, and adverse events outside the hospital are estimated to account for 4.7 percent of hospital admissions. [Leape, 1994; Kanjanarat, 2003; Lazarou, 1998] Effective preventability strategies for the reduction of medication errors and subsequent ADEs have been found through successful medication reconciliation processes. [Nickerson, 2005; Bartick, 2006; Boockvar, 2006; Vira, 2006] A multicenter study of 50 hospitals found that reduction of errors and ADEs is most strongly correlated with active physician, pharmacist and nurse engagement; having an effective improvement team; using small tests of change; having an actively engaged senior administrator; and sending teams to multiple collaborative sessions. [Rogers, 2006] A study of one critical care unit found that the use of a discharge survey resulted in a reduction from 94 percent of patients having orders changed to 0 percent. [Pronovost, 2003] Another study performed in an outpatient setting found that: 1) mailing letters prior to appointments to remind patients to bring medication bottles and updated medication lists; 2) verifying updated lists; and 3) correcting medication lists in the electronic medical record decreased medication discrepancies by 50 percent from 5.24 discrepancies per patient to 2.46. [Varkey, 2007] Involving a pharmacist in medication history taking has also been reported to reduce medication errors by 51 percent. [Bond, 2002]

Computerized prescriber order entry (CPOE) systems can effectively reconcile medications, but these systems are only as good as the data entered into them. CPOE systems alone, without effective reconciliation strategies, are likely to be ineffective. [Anderson, 2007; Groeschen, 2007; Lawrence, 2007; TJC, 2007; Yu, 2007; Bails, 2008] A recent two-site randomized controlled trial of an information technology-assisted medication reconciliation intervention found a 38 percent relative risk reduction in potential ADEs. Patients at highest risk for PADEs were more likely to benefit from the intervention. Errors still remained even in the intervention group, most often due to incomplete and inaccurate electronic sources of ambulatory medication information, lack of patient and caregiver knowledge of preadmission medication regimens, lack of clinician adherence with the reconciliation process, and software usability issues. [Turchin, 2008; Schnipper, 2009]

The costs associated with all ADEs are estimated to be about $3.8 million per year per hospital, of which approximately $1 million is preventable. [Classen, 1997] Another study found that ADEs increased patients’ length of stay by 2.2 days and increased costs by $3,244 and that preventable events caused an increased length of stay of 4.6 days and an increased cost of $5,857 per patient. For the 700-bed teaching hospital studied, annual costs for ADEs and preventable ADEs were $5.6 million and $2.8 million, respectively. [Bates, 1997]

Although reducing medication errors related to medication reconciliation has been a Joint Commission safety goal since 2005, hospital implementation is still in the early stages, and these changes are yet to be fully tested. In 2007, The Joint Commission hosted a one-day Summit on Medication Reconciliation, with the goal of discussing the challenges associated
with reconciling medications in various healthcare settings, identifying best practices, and bringing forth potential refinements to medication reconciliation practices. The consensus was that the process of medication reconciliation, obtaining an accurate medication list from the patient, and ensuring its accuracy throughout the care continuum improves patient safety; however, more guidance on implementation is required. [TJC, 2009]

Preliminary data suggest that an accurate medication history, coupled with an electronic medication reconciliation process, may reduce adverse drug events due to medication discrepancies. [Schnipper, 2009] Processes using both electronically available medication records as well as data from patient/family interviews have been proposed as potential solutions. [Agrawal, 2009; Cutler, 2009]

NQF recognizes that medication reconciliation is critically important for patient safety but that it also represents a set of processes that are difficult for organizations to implement. NQF continues to monitor the scientific evidence and the availability of best practices for medication reconciliation. As further evidence clarifies the issues of medication reconciliation, NQF will adjust this safe practice.

**Safe Practice Statement**

The healthcare organization must develop, reconcile, and communicate an accurate patient medication list throughout the continuum of care. [LMMHS, 2004; SHM, 2008; ASHP, 2009; IHI, 2009; JCR, 2010]

**Additional Specifications** [JCR, 2010]

- Educate clinicians upon hire on the importance of medication reconciliation; frequency of ongoing education is based on the risk of noncompliance and adverse drug events as determined by the organization. [AHRQ, N.D.b]
- Providers receiving the patient in a transition of care should check the medication reconciliation list to make sure it is accurate and in concert with any new medications that are ordered/prescribed.
- The list should include the full range of medications as defined by accrediting organizations such as The Joint Commission. At a minimum, the list should include the following:
  - prescription medications;
  - sample medications;
  - vitamins;
  - nutriceuticals;
  - over-the-counter drugs;
  - complementary and alternative medications;
  - radioactive medications;
  - respiratory therapy-related medications;
  - parenteral nutrition;
  - blood derivatives;
  - intravenous solutions (plain or with additives);
  - investigational agents; and
  - any product designated by the Food and Drug Administration (FDA) as a drug.
- At the time the patient enters the organization or is admitted, a complete list of medications the patient is taking at home (including dose, route, and frequency) is created and documented. The patient, and family, as needed, are involved in creating this list.
- The medications ordered for the patient while under the care of the organization are compared to those on the list created...
at the time of entry to the organization or admission. According to The Joint Commission’s FAQ, organizations should keep two lists during the hospitalization. The “home medications” list should be maintained unchanged and available for subsequent use in the reconciliation process. The list of the patient’s current medications while in the hospital is a dynamic document that will require updating whenever changes are made to the patient’s medication regimen. Both lists should be considered whenever reconciliation is carried out. The reason for referring to the “home” medication list is that some “home” medications may be held when a patient is admitted or goes to surgery. They may need to be resumed upon transfer to a different level of care, return from the operating room, or at discharge. [JCR, 2010]

Any discrepancies (i.e., omissions, duplications, adjustments, deletions, additions) are reconciled and documented while the patient is under the care of the organization.

When the patient’s care is transferred within the organization (e.g., from the ICU to a floor), the current provider(s) inform(s) the receiving provider(s) about the up-to-date reconciled medication list and documents the communication.

The patient’s most current reconciled medication list is communicated to the next provider of service, either within or outside the organization. The communication between providers is documented.

At the time of transfer, the transferring organization informs the next provider of service of how to obtain clarification on the list of reconciled medications.

When the patient leaves the organization’s care, the current list of reconciled medications is provided to the patient, and family, as needed, and is explained to the patient and/or family, and the interaction is documented. [Jack, 2009; AHRQ, N.D.a]

In settings where medications are used minimally, or are prescribed for a short duration, modified medication reconciliation processes are performed:

- The organization obtains and documents an accurate list of the patient’s current medications and known allergies in order to safely prescribe any setting-specific medications (e.g., IV contrast, local anesthesia, antibiotics) and to assess for potential allergic or adverse drug reactions.

- If no changes are made to the patient’s current medication list, or when only short-term medications (e.g., a preprocedure medication or a short-term course of an antibiotic) will be prescribed, the patient, and family, as needed, are provided with a list containing the short-term medication additions that the patient will continue after leaving the organization.

- In these settings, there is a complete, documented medication reconciliation process when:
  - Any new long-term (chronic) medications are prescribed.
  - There is a prescription change for any of the patient’s current known long-term medications.
  - The patient is required to be subsequently admitted to an organization from these settings for ongoing care.
• When a complete, documented, medication reconciliation is required in any of these settings, the complete list of reconciled medications is provided to the patient and the patient’s family, as needed, and to the patient’s known primary care provider or original referring provider, or a known next provider of service.

Applicable Clinical Care Settings
This practice is applicable to Centers for Medicare & Medicaid Services care settings, to include ambulatory, ambulatory surgical center, emergency room, dialysis facility, home care, home health services/agency, hospice, inpatient service/hospital, outpatient hospital, and skilled nursing facility.

Example Implementation Approaches
- Develop and use a template medication reconciliation form to gather information about current medications and medication allergies, to standardize care, and to prevent errors.
- The Medical Executive Committee should aid in the creation and reinforcement of medication reconciliation.
- Identify internal champions to lead implementation of the practice within the organization.
- Educate providers about reviewing the necessity of medications upon admission and discharge, to further streamline medication lists and reduce ADEs.
- Any changes from the “home” medication list should be clearly noted and explained to the patient. [Jack, 2009; AHRQ, N.D.a]
- Include patient health literacy, feasible dosing schedules, and affordability, as well as cultural, physical, or environmental barriers, when creating individual patient medication regimens.
- Review and draw upon sources of fully developed implementation solutions, such as those of the Massachusetts Coalition for Prevention of Medical Errors (http://www.macoalition.org/) and the Institute for Healthcare Improvement. [MCPME, N.D.; IHI, 2008]
- Use of over-the-counter or complementary and alternative medication (CAM) should be included in provider education about medications, and providers should then educate patients about the state of scientific knowledge with respect to CAM therapies that the patient may be using or thinking about using.
- Encourage patients to carry an accurate medication list with them and share with their healthcare providers, including the community pharmacist. [ISMP, 2007; ASHP, 2008]
- Some organizations have referred to patient home medication bottles and contacting the patient’s home pharmacy to assist in the creation of an accurate home medication list to help clinicians when making medication decisions.
- Use consumer-based kiosk technology to improve medication reconciliation and decrease facility costs. [Lesselroth, 2009]
- Safe medication ordering practices, such as use of order sets or preprinted orders, drug interaction software, and implementation of other performance improvement methods, may be led by pharmacy leaders across the organization.
Strategies of Progressive Organizations

- According to recently published research, implementation strategies most strongly correlated with success include an active interdisciplinary focus (physician, pharmacist, and nurse engagement); having an effective improvement team; using small tests of change; having an actively engaged senior administrator; and having teams participate in collaborative initiatives.

- High-performing organizations have required second check systems by a separate care provider to validate patient medication home lists.

- Consider including budgetary resources to financially support the medication reconciliation process through additional dedicated staff or technology support systems.

- Institutions with Computerized Practitioner Order Entry should consider IT-supported medication reconciliation systems. [Schnipper, 2009]

- Conduct pharmacist review of admission, transfer, and discharge medication lists.

- Have pharmacists collect accurate medication histories on patients identified as high risk for medication errors. [Kaboli, 2006; Schnipper, 2006]

Opportunities for Patient and Family Involvement

- Encourage patient and family members to ask questions about the appropriate usage of their medications.

- Engage patient and family members to carry accurate medication lists, and to share those lists with healthcare professionals during office visits, hospitalizations, and community pharmacy encounters. The list should be updated with each medication change, and patients should encourage their healthcare provider to assist them in verifying accuracy of the list every six months.

- Use the teach-back method to ensure patient/family understanding of appropriate medication use. Example: Have patients or family members, as appropriate, demonstrate the administration of medications that involve injections or inhalation devices.

- Patient and family members should be instructed how to identify and manage routine side effects and to know when and whom to contact if they believe the patient is experiencing any serious adverse effects of drug therapy. Pharmacists involved in this education during discharge can offer accurate information about changes in the patient's previous medication list and the discharge medication list and can assist with managing barriers to medication adherence. [Dudas, 2001; Coleman, 2006; Karapinar-Çarkit, 2009]

- Consider including patients or families of patients who have experienced medication-related adverse events to serve on appropriate patient safety or performance improvement committees.

Outcome, Process, Structure, and Patient-Centered Measures

These performance measures are suggested for consideration to support internal healthcare organization quality improvement efforts and may not necessarily address all external reporting needs.
**Outcome Measures** include ADEs causing harm to patients, including death, disability (permanent or temporary), or preventable harm requiring further treatment, and operational and financial outcomes, including break-even analysis.

**Process Measures** include evidence of reconciliation having occurred; number of unreconciled medications per a specified number (e.g., per 100) of patient admissions; unreconciled medications per patient; and/or total number of patients with unreconciled medications in the area of focus. A reasonable goal for an organization is to reduce the percentage of unreconciled medications in an area of focus (admission, transfer, or discharge) by 75 percent or more. Furthermore, if the medication history has been taken, the medication list drawn up, and the reconciliation process has occurred, their accuracy, can be measured. [NQF, 2009; Stock, 2009]

- National Quality Forum (NQF)-endorsed® process measures:
  1. #0019: Documentation of medication list in the outpatient record (Ambulatory): Percentage of patients having a medication list in the medical record.
  2. #0020: Documentation of allergies and adverse reactions in the outpatient record (Ambulatory): Percentage of patients having documentation of allergies and adverse reactions in the medical record.
  3. #0097: Medication Reconciliation [Ambulatory Care (office/clinic)]: Percentage of patients aged 65 years and older discharged from any inpatient facility (e.g., hospital, skilled nursing facility, or rehabilitation facility) and seen within 60 days following discharge in the office by the physician providing ongoing care who had a reconciliation of the discharge medications with the current medication list in the medical record documented.
  4. #0293: Medication Information [Emergency Department]: Percentage of patients transferred to another acute hospital whose medical record documentation indicated that medication information was communicated to the receiving hospital within 60 minutes of departure.
  5. #0419: Universal Documentation and Verification of Current Medications in the Medical Record [Hospital, Nursing home/Skilled Nursing Facility (SNF), Ambulatory Care (office/clinic)]: Percentage of patients aged 18 years and older with a list of current medications with dosages (includes prescription, over-the-counter, herbs, vitamin/mineral/dietary [nutritional] supplements) and verified with the patient or authorized representative documented by the provider.
  6. #0553: Care for Older Adults – Medication Review (COA) [Ambulatory Care (office/clinic), Health Plan]: Percentage of adults 65 years and older who had a medication review.
  7. #0554: Medication Reconciliation Post-Discharge (MRP) [Ambulatory Care (office/clinic), Health Plan]: Percentage of discharges from January 1 to December 1 of the measurement year for patients 65 years of age and older for whom medications were reconciled on or within 30 days of discharge.
8. #0560: HBIPS-5 Patients discharged on multiple antipsychotic medications with appropriate justification [Hospital]:

Patients discharged from a hospital-based inpatient psychiatric setting on two or more antipsychotic medications with appropriate justification.

Structure Measures include verification of the implementation of medication reconciliation and the formal reporting to governance and senior management of performance improvement toward established target aims and goals.

- NQF-endorsed structure measures:
  1. #0486: Adoption of Medication e-Prescribing [Ambulatory Care (office/clinic), Community Healthcare, Other]: Documents whether provider has adopted a qualified e-Prescribing system and the extent of use in the ambulatory setting.
  2. #0487: EHR (electronic health record) with EDI (electronic data interchange) prescribing used in encounters where a prescribing event occurred [Can be used in all healthcare settings]: Of all patient encounters within the past month that used an EHR with EDI where a prescribing event occurred, how many used EDI for the prescribing event.

Patient-Centered Measures include medication management metrics, synthesized from surveys of patients about their satisfaction related to medication management and communication by caregivers. The NQF-endorsed HCAHPS survey [NQF, 2005] addresses this through the following questions: “During this hospital stay, were you given any medicine you had not taken before?” (Q.15); “Before giving you any new medicine, how often did hospital staff tell you what the medicine was for?” (Q.16); and “Before giving you any new medicine, how often did hospital staff describe possible side effects in a way you could understand?” (Q.17). Measures of patient participation in maintaining their medication lists may also be undertaken.

Settings of Care Considerations

- Rural Healthcare Settings: All requirements of the practice are applicable to small and rural healthcare settings as specified.
- Children’s Healthcare Settings: All requirements of the practice are applicable to children’s healthcare settings as specified.
- Specialty Healthcare Settings: All requirements of the practice are applicable to specialty healthcare settings as specified.

New Horizons and Areas for Research

It is critical that medication management systems be better understood in order to leverage products, services, and technologies that can enable best practices to reduce preventable harm to patients across the healthcare organization. Research in the areas of enabling technologies may hold promise. [Lesselroth, 2009] Evaluation of the improvement in medication accuracy by actively communicating with the patient’s community pharmacy for medication verification and communication of medication discharge lists should also be included for further research. Evaluation of a secure electronic medicine list to which the patient may designate access by caregivers, such as Google Health or HealthVault, could be considered for future medication list access.
Other Relevant Safe Practices

Relevant practices include Safe Practice 1: Leadership Structures and Systems; Safe Practice 4: Identification and Mitigation of Risks and Hazards; Safe Practice 12: Patient Care Information; and Safe Practice 15: Discharge Systems. Safe Practice 18: Pharmacist Leadership Structures and Systems is vitally important to a successful medication reconciliation program.

Notes


June 1, 2010

Dear Healthcare Leader:

We are delighted to announce that the National Quality Forum has graciously given us permission to distribute copies of the *NQF Safe Practices for Better Healthcare – 2010 Update*. This section has been provided to you in the interest of helping you implement, and/or educate others to adopt the suggestions and implementation examples into your safe practices.

The National Quality Forum is dedicated to providing evidence-based practices as ready-to-use tools to improve safety. The practices in the *NQF Safe Practices for Better Healthcare – 2010 Update* have been evaluated, assessed and endorsed to guide large and small healthcare systems in providing the safest care in every area of patient safety. We give our highest recommendation for them as a valuable resource toward patient safety from hospital bedside to boardroom. It is in the fulfillment of this mission that NQF makes the gift of this to you in your pursuit of your quality journey.

We hope that you will recommend that others purchase the report from NQF. The home page of the National Quality Forum can be accessed at the following link: [http://www.qualityforum.org/](http://www.qualityforum.org/) and an abridged report of the *NQF Safe Practices for Better Healthcare—2010 Update* can be downloaded free online at: [http://www.qualityforum.org/Publications/2010/04/Safe_Practices_for_Better_Healthcare_-_2010_Update.aspx](http://www.qualityforum.org/Publications/2010/04/Safe_Practices_for_Better_Healthcare_-_2010_Update.aspx). To obtain the full report for a cost of $29.99, please contact NQF by phone during business hours at 202-783-1300 or via e-mail at info@qualityforum.org and their staff will contact you for payment details.

If you want to have a free copy of the entire set of practices, you may receive one if you fill out a web-based survey that may be filled out at [http://www.safetyleaders.org/2010nqfResearchStudy/index.jsp](http://www.safetyleaders.org/2010nqfResearchStudy/index.jsp).

We want to acknowledge you and your institution for your current efforts in patient safety. We hope you enjoy this important information and find it useful in your future work.

Sincerely,

Charles R. Denham, M.D.
Chairman

The Texas Medical Institute of Technology is a 501c3 not for profit medical research organization dedicated to save lives, save money, and build value in the communities its 3100 Research Test Bed hospitals serve.

[www.SafetyLeaders.org](http://www.SafetyLeaders.org)