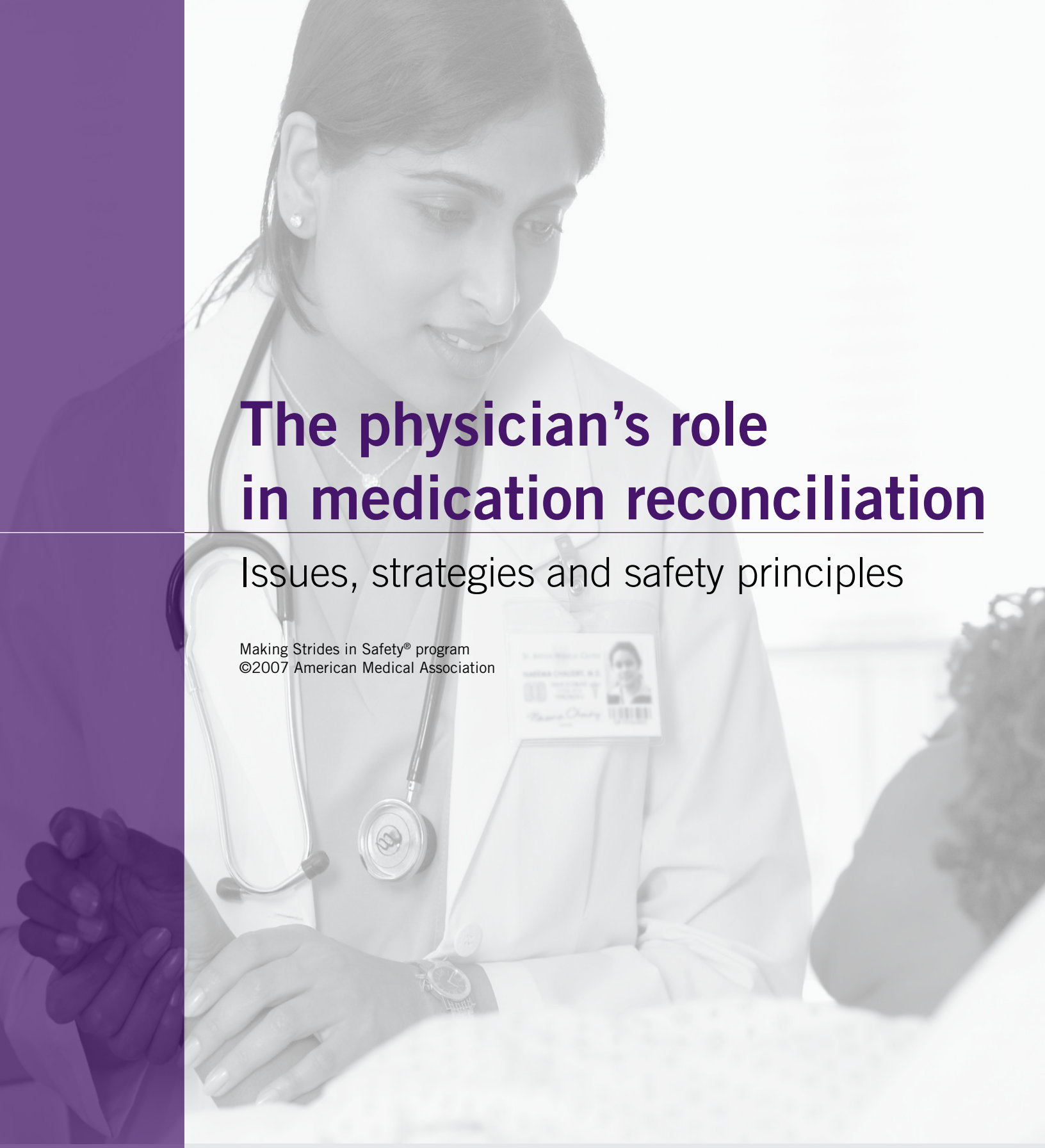

The physician's role in medication reconciliation

Issues, strategies and safety principles

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Preface

Recognizing the importance and complexity of medication reconciliation, the American Medical Association (AMA) convened an expert panel of physicians and pharmacists from across the United States to address medication reconciliation in the context of medication safety and, specifically, the physician's role in medication reconciliation. Panel members represented various areas of expertise, including family medicine, internal medicine, endocrinology, gerontology, radiation oncology, anesthesiology, academic medicine, medical research, hospitalists, and physicians who specialize in vulnerable populations and transitions in care. The panel's vigorous discussions led to one basic conclusion: medication reconciliation is an integral component of physicians' professional activities.

The essence of medication reconciliation is making sense of a patient's medications and resolving conflicts between different sources of information to minimize harm and to maximize therapeutic effects. It is an ongoing, dynamic, episodic and team-based process that should be led by and is the responsibility of the patient's attending or personal physician in collaboration with other health care professionals. Medication reconciliation is essential to optimize the safe and effective use of medications. It is one element in the process of therapeutic use of medications and medication management for which physicians are ultimately held legally accountable, as illustrated in the introductory case report.

The case described below illustrates James Reason's Swiss Cheese model[1] of how a series of failures can "line up" and cause adverse events. The case also demonstrates that focusing on medication reconciliation, including creating reconciled medication lists to comply with accreditation requirements, is a major component of the larger universe of medication management that includes all providers, the pharmacy and all outpatient settings. Medication reconciliation must be emphasized to ensure that medication needs and information do not "fall through the cracks" (as this patient's did) and to avoid potential harmful therapy, patient harm, potential liability and higher costs.

> A 75-year-old woman was admitted to the hospital for evaluation of an infection after developing symptoms two weeks post-operative from a total knee replacement surgery. On evaluation, the patient had a methicillin-resistant *Staphylococcus aureus* infection. After creatinine laboratory studies indicated normal renal function, her attending physician, Dr. B, prescribed vancomycin, rifampin and gentamicin. Dr. B's plan was to discontinue gentamicin once the patient was discharged.
>
> When the patient was discharged to her resident nursing home, contrary to Dr. B's plan, the transfer form listed "gentamicin 120 mg, IV piggyback q12 hours." Nurse C drafted the patient's transfer order. Because Dr. B was on vacation, Dr. P was covering. Nurse C spoke with Dr. P to obtain the discharge order. In her testimony to the court, Nurse C claimed she provided information to Dr. P from the chart and read back the orders with gentamicin listed. Dr. P claimed he would have relied on the nurse to provide accurate information, and said he would not have ordered gentamicin unless he was "misinformed."
>
> The nursing home nurse and attending physician Dr. T accepted the patient. The nursing home nurse transferred the medication working orders to the nursing home records, and Dr. T continued the patient on gentamicin, relying on the transfer order. Dr. T did not order laboratory studies for renal function for two days, did not see the patient for three days and did not contact Dr. B or Dr. P for three days. The nursing home did not routinely order daily laboratory tests for renal function unless a patient had some known prior history of kidney disease.
>
> Three days after the patient arrived at the nursing home, Dr. T was informed that the patient was having trouble urinating. Dr. T examined the patient, but did not terminate the gentamicin—he ordered a serum creatinine test. Results showed "abnormal high" levels. Dr. T did not terminate gentamicin, but ordered another serum creatinine. The next day an even higher value was reported, and Dr. T discontinued the gentamicin, then diagnosed the patient with acute renal failure. Dr. T indicated he relied on the transfer form when making the decision to continue gentamicin. The patient was subsequently diagnosed with permanent renal failure, and requires dialysis for the rest of her life.
>
> The patient sued and was awarded $3.2 million in damages.

Overview

Issues, strategies, failures and safety principles

In "The physician's role in medication reconciliation," the panel aims to heighten physician awareness of the integral role of reconciliation in the safe use of medications and to provide a framework for physicians to understand their personal roles and responsibilities in this often difficult process of care. The principles put forth help define the scope of work and the roles that physicians can and should play in assuring that the benefits of medication reconciliation are available for their patients in all settings of care.

The concepts and strategies presented in this monograph are intended to help physicians recognize gaps or inconsistencies in systems that impede medication reconciliation and to direct their attention to areas needing additional development or support to facilitate adoption of a successful reconciliation process. Furthermore, given that medication reconciliation is one of the more complex components of the care delivery process and patient safety enterprise, a requirement exists for well-designed systems support to meet the objectives of medication reconciliation and to address inefficiencies in resources and design that form barriers to an effective reconciliation process.

This monograph first provides background on medication issues, including: medication errors and adverse drug events, communication problems and medication reconciliation's relationship to patient safety. It then presents an overview, including the steps of medication reconciliation, the underlying principles of medication reconciliation for deeper understanding of the physician's leadership role and obligations, and guidance for effective achievement of medication reconciliation. This is followed by strategies for two particularly important areas of medication reconciliation: taking a medication history and promoting patient understanding of their medication regimen.

Case study examples illustrate medication reconciliation failures and can be the basis for discussions physicians may have with their medical team and with their patients. Recognizing that ultimately all health care safety and factors affecting medication reconciliation must be customized to the particular patient and practicing setting, this monograph does not offer rigid prescriptions, but rather general principles that physicians and their teams may adapt to their specific circumstances and needs.

Because medication reconciliation represents an integral part of the patient safety effort, this monograph offers guidelines and information on developing support for medication reconciliation in the context of core safety principles. It provides useful information for physicians' use in local improvement efforts and in advocacy for medication safety.

Finally, this monograph discusses important special topics critical to effective medication reconciliation: information technology, coordination of care and vulnerable populations. Information technology has tremendous potential, but it also poses significant challenges. This discussion highlights some of those issues. It also reviews a key issue in medication reconciliation—coordination of care—and sketches a directly related effort to address this concern (i.e., medical homes). In addition to enhancing coordination of care, medical homes may provide important benefits to older and minority populations—groups that are disproportionately affected by ineffective medication reconciliation. Lastly and significantly, the monograph discusses vulnerable patient populations, including older adults and minorities, and provides examples and potential strategies to improve medication reconciliation for these patients.

Key definitions

Error: The failure of a planned action to be completed as intended (error of execution) or the use of a wrong plan to achieve an aim (error of planning). An error may be an act of commission or of omission.[2]

Medication error: Any error occurring in the medication-use process.[3]

Adverse drug event: Any injury due to medication.[4]

Medication reconciliation: The essence of medication reconciliation is making sense of a patient's medications and resolving conflicts between different sources of information to minimize harm and maximize therapeutic effects. It is an ongoing, dynamic, episodic and team-based process that should be led by and is the responsibility of the patient's attending/personal physician in collaboration with other health care professionals. Medication reconciliation is essential to optimize the safe and effective use of medications. It is one element in the process of therapeutic use of medications and medication management for which physicians are ultimately held legally accountable, as illustrated in the introductory case report (AMA Medication Reconciliation Panel, 2006).

Medication reconciliation failure: A medication error or adverse drug event resulting from incomplete or inaccurate medication information (AMA Medication Reconciliation Panel, 2006).

Medical home: A health care setting that provides patients with timely, well-organized care and enhanced access to providers.[5]

Background

Medication errors and adverse drug events

Medication errors occur in all environments of care including hospitals, nursing homes, ambulatory settings and in the home as patients self-manage their care. They also occur at critical times or points of care, especially during transitions, handoffs or referrals, and in the period after discharge from the hospital.[6, 7]

The Institute of Medicine defines an adverse drug event (ADE) as any injury due to medication.[8] Medication reconciliation aims to prevent injury by enhancing medication management and providing another layer of safety to the management process. Reconciliation failures, which the panel distinguishes from ADEs, are discussed in a later section of the monograph. Given that some ADEs may be attributed to unreconciled medication, the following section provides an overview of the extensive and costly effects of medication errors and ADEs on patients and the health care system.

In 2005 the rate of medication errors during hospitalization was estimated to be 52 per 100 admissions, or 70 per 1,000 patient days.[9] Emerging research suggests the scope of medication-related errors in ambulatory settings is as extensive as or more extensive than during hospitalization.[10] Ambulatory visits result in a prescription for medication 50 percent to 70 percent of the time.[11] One study estimated the rate of ADEs in the ambulatory setting to be 27 per 100 patients.[12]

It is estimated that between 2004 and 2005, in the United States 701,547 patients were treated for ADEs in emergency departments and 117,318 patients were hospitalized for injuries caused by an ADE.[13] Insulin, warfarin and other drugs that require monitoring to prevent overdose or toxicity were implicated in one in every seven ADEs treated in emergency departments.[14]

Individuals aged 65 years or older are more likely than any other population group to require treatment in the emergency department for ADEs.[15] They are twice as likely to require treatment for ADEs and nearly seven times more likely to require hospitalization than younger individuals.[16] The estimated annual cost for treating medication errors in Medicare enrollees aged 65 years and older is $887 million.[17]

Errors across interfaces of care are frequent and consequential.[18] Interfaces of care occur when a patient is admitted to, transferred within or discharged from a health care setting, and when a patient traverses or navigates from one setting to another to receive care. One study found that 49 percent of previously hospitalized patients who were receiving continuing care from their primary care physician experienced at least one medication error within two months of discharge from the hospital.[19] Another study found that 11 percent (n = 45) of 400 patients discharged from a general medicine service experienced ADEs—harm ranged from significant (n = 32) to life-threatening (n = 7) injuries.[20]

Interactions between prescription medications and over-the-counter (OTC) drugs, herbal preparations or supplements are a growing concern, as concurrent use can lead to serious adverse reactions.[21] OTC drugs, vitamins, minerals, herbal products or supplements are usually not documented in the patient's medical record. In the United States, it is estimated that in any given week, most adults aged 18 years and older take at least one prescription medication, OTC drug, vitamin, mineral, herbal product or supplement, while 10 percent take five or more.[22] Overall, 26 percent of the population takes herbal products and supplements, and 30 percent of prescription drug users take an herbal product or supplement.[23]

In all settings of care, drug-drug interactions are significant, but undetected, causes of ADEs. Drug-drug interactions—including interactions between drugs a patient is known to be taking—are frequently not recognized. Controversy, confusion and uncertainty about the significance of many drug-drug interactions further increase risk and opportunity for ADEs.

The physician must have adequate tools to make clinical judgments about complementary and alternative medications. Without sufficient information about the effects and interactions of these medications, these drugs may be compiled into a list but the information may never be used in a way that benefits the patient. The University of Washington subscribes to an online database that allows its providers to research information on patients' complementary and alternative medications, and their known interactions.

Communication, confusion and medication errors

Communication failures are the most common causes of medication errors that result in ADEs. Incomplete patient information, unavailable drug information, miscommunication of drug orders and insufficient information flow are examples of common communication problems. Causes include technical problems, environmental noise and interruptions, and inadequate policies and procedures that do not support effective system, team and individual communication. Between 1995 and 2003, communication failure was cited as a root cause in more than 60 percent of all sentinel events reported to the Joint Commission (formerly the Joint Commission on Accreditation of Healthcare Organizations).

Medical information and medication regimens are often complex. It is not unusual for patients to lack understanding of their condition or to be unfamiliar with their medications and, therefore, to be unable to communicate their health information to physicians or to all providers participating in their care. Patients may not have the resources or capacity to maintain their own personal health information record; in addition, they may not understand the value of maintaining a record of their medical information or may not consider this their role in the health care relationship. This can result in vital information being unknown to all of the physicians participating in a patient's care.

For example, in the home and other self-care settings, ADEs are attributed to poor self-management, which is most often caused by patient or caregiver lack of understanding, confusion or limited patient resources.[24] Misunderstandings between patients and physicians, patient unfamiliarity with or inability to identify medications, low health literacy and cultural barriers contribute to ADEs in the self-care setting.[25] Patient misuse of medications is often caused by misunderstanding label instructions and misinterpreting text or icons.[26] Multiple medication regimens, formulary substitutions, generic substitutions and use of drug samples can produce complex and often incompatible medication therapies, all of which add to patient confusion, mismanagement and poor outcomes.[27] Restricted access to care, limited self-management support and inability to successfully navigate the health care system add to patient frustration, which contributes to incorrect adherence to medication regimens or patient nonadherence, resulting in poor therapeutic response to planned protocols of care.[28]

Medication reconciliation and patient safety

Critical patient information, including medical and medication histories, current medications the patient is receiving and taking, and sources of medications, is essential to the delivery of safe medical care. However, interruptions in the continuity of care and information gaps in patient health records are common and significantly affect patient outcomes. Information gaps that contribute to medication errors and ADEs may occur when physicians and other health care professionals do not have knowledge of, or access to, a complete, accurate record of the patient's prescription and nonprescription medications. Consequently, clinical judgments may be based on incomplete, inaccurate, poorly documented or unavailable information about the patient and his or her medication regimen.

The process of medication reconciliation aims to promote patient safety by providing a structured process for physicians and other health care providers to acquire and transfer accurate, detailed information about current prescribed medications, nonprescription and OTC drugs, or neutraceuticals patients may be taking or using. Careful medication reconciliation can reduce the rate of medication errors and ADEs. A successful reconciliation process can reduce the work or subsequent duplication of efforts associated with management of medication orders and errors at transitions in care and on discharge.[29]

Medication reconciliation

Steps

The medication reconciliation process can be seen as having seven general steps, which can be applied to all settings and locations of care. The work of medication reconciliation entails substantial effort and time, and all seven steps require team and systems support. The steps are:

1. Assembling the lists of medications
2. Ascertaining accuracy (review and compare prior and new lists)
3. Reconciling medications and resolving discrepancies
4. Formulating a decision, i.e., making a medical judgment with respect to the patient's condition and medications
5. Optimizing care to best meet the patient's needs with this information
6. Checking the patient's (and/or caretaker's) understanding of their medications
7. Documenting changes and providing the patient with a copy of his or her current medication list

Principles

The following principles underlie the medication reconciliation process described above to allow the physicians and his or her team to fulfill each step effectively. Specific medication reconciliation processes will depend on the care setting and systems resources, but should be appropriate to the particular episode and setting of care.

1. **Medication reconciliation is a necessary component of safe medication management. The process is ongoing and dynamic.**

- This process begins with prescribing the right medication for the right indication and continues with regular review of medications for their effectiveness and adverse effects, i.e., standard medication management.
- The process includes continuous assessment within and across sites of care. Without proper physician attention to medication reconciliation as a component of medication management, managing patients' medication regimens cannot be optimal.

2. **The medication reconciliation process should be patient-centered.**[30]

- Dimensions of patient-centered care include respect for patient values, preferences and expressed needs; coordination and integration of care; communication, including consideration of literacy, numeracy, understanding and education; physical comfort; emotional support and relief of fear and anxiety; and involvement of family and friends, while respecting legal limitations.[31]
- Through a focus on patient-centered care, health care professionals can strive to secure patient trust, to develop environments where effective and efficient communication with patients results in obtaining maximum information on their medications and to enhance medication adherence.

3. **Shared accountability between health care professionals and patients is essential to successful medication reconciliation outcomes.**

- Managing medications, including medication reconciliation efforts, necessitates developing a partnership between the patient and the physician and/or other prescribing health care professionals within and across sites of care.
- Physicians should encourage patients to keep an accurate medication list and, as part of that effort, provide the patient with an accurate, reconciled list routinely. A newly reconciled list should include the date and time of the reconciliation, identify the person making the reconciliation and, when possible, that person's contact information.
- Once the patient has an accurate list, he or she may use the list as a personal reference, review or update the list with physicians who prescribe his or her medications, and present the list to other physicians and providers for inclusion in his or her medical record(s).

4. **All patients should have an accurate medication list for use across sites of care and over time.**

- For each medication, the medication list should include the dosage, frequency and route of administration, known allergies and reactions to medications.

- The list should be reviewed in the context of the patient's total health history. In addition to the medication list, documentation in the patient's record would optimally include whether the patient is taking the medications as prescribed, the time and date of the last dose, and the names of prescribing physicians and other health care professionals involved in the patient's care, as well as the sources of medications (e.g., local or mail-order pharmacies, Internet or foreign countries).

5. The medication list should not be limited to prescription drugs.

- It is important that the list include names of OTC drugs, vitamins and other supplements, cultural or home remedies, and neutraceuticals, as well as the dosages and frequency of use.
- Patients' reactions and allergies should also be documented for nonprescription products because of their potential for interaction with prescription drugs or interference with clinical diagnosis and treatment efforts.

6. Within all settings, the medication reconciliation process should happen at every medication encounter, regardless of the care location.

- A medication encounter is any occasion in which medications are reviewed, added, altered, changed, directed to be taken differently or deleted, and any occasion when the possibility of drug interactions exists (e.g., parenteral contrast used, or patients receive sedation or other medications as part of a diagnostic or treatment protocol).
- At the conclusion of a clinical visit, the physician or designated member of the health care team should provide the patient with a reconciled list and instructions on managing medications on the list, which medications or OTC drugs to discontinue and when to resume previously prescribed medications or OTC drugs.
- The physician or a designated member of the health care team should transfer the reconciled information to the next point of care as needed. The process should be considered a standard part of the clinical visit.

7. Across all settings, the medication reconciliation process must happen at every transition in the patient's care, regardless of the care transition.

- Because the process of medications being prescribed and taken by a patient is dynamic rather than static across sites of care, frequent, careful medication reconciliation is essential for safe medication use. Like each clinical encounter, each transition of patient care should engage the medication reconciliation process.
- For any transition, notes in the patient's medical record should state that medications were verified to the extent possible and should describe how medications were reconciled or updated. This is essential for any transition that involves a medication encounter and any occasion when medications are withheld pending consultation with the prescribing physician.
- When transitions do involve medication encounters, a high level of vigilance in ensuring appropriate medication reconciliation is essential to promote patient safety.

8. The process of medication reconciliation is interdisciplinary and interdependent—and reliant on a team approach.

- The patient's personal or attending physician must lead the medication reconciliation process and engage the patient in ensuring an accurate list is created for appropriate clinical use within and across sites of care. However, many team members also utilize that information—nurses, pharmacists, other physicians, hospitals, staff of skilled nursing facilities and nursing homes, and other providers.
- It is critical that physicians engage these other team members to help ensure that accurate, appropriate and timely medication information is transferred and used to promote effective and efficient pharmaceutical regimens and treatment.
- The physician's clinical knowledge is key to successful medication reconciliation. He or she must make sense of the medication list, and correlate it with a patient's known medical problems and current treatment plan.
- The medication list should be available to all health care professionals who are participating in the patient's care.

9. Physicians are ultimately responsible both ethically and legally for the medication reconciliation process.

- Although the patient is the owner of the medication list, the physician is the steward of the patient's medication information (i.e., medication history, current medications, allergies and patient preferences).
- Because of their role as leader and advocate for patient care and well-being, medication reconciliation is the responsibility of all physicians, regardless of their specialty.
- The physician's unique position creates a logistical accountability as well as a legal responsibility to have and communicate accurate information on his or her patients' medications to members of his or her own team, and to others involved temporarily or permanently in the patient's care.
- In all instances, physicians should comply with their institution's rules and regulatory requirements when accomplishing this principle.

10. Some medication information may be emotionally or legally charged, but nevertheless significant. It may be added at the discretion of the patient or prescribing health care professional by mutual decision.

- It is implied and inherent to the medication reconciliation process that patients will be forthcoming with information about medications they are taking in order to develop the most accurate and safest list. Physicians may want to ask their patients the following question: "Are there medications that you take that you do not want to talk to me about?"
- Ethical duties, legal constraints and the patient's personal preferences may preclude the inclusion of certain medications or drugs on the medication list. For example, patients may stipulate that they are providing the physician information that they do not want disclosed to third parties or others outside of the patient-physician relationship.
- In instances where precluded medications, including controlled substances, have the potential to interact with the patient's other medications and cause foreseeable harm, that potential for harm should be communicated to the patient.

  The following is a suggested script that may assist physicians in this difficult situation:

  I know there are some medications and other drugs you might be taking that you don't want in the record. But to provide the best health care possible, please let me know what drugs you are taking so we can ensure no drugs we prescribe might cause side effects or harm you. We will only share this information with other health care providers. You should also tell all your other physicians this information, and ask them to not put this information into your formal medical records if you do not wish it there.

  The information the patient does not want disclosed should not be included in the patient's list but should be included in the physician's private notes with adequate documentation of the conversation and whether the physician determined that the sensitive information should be shared with other health care professionals.
- The health care professional's knowledge of the medication or substance and its potential for harm should not be withheld from other professionals participating in the patient's care.

Physicians will benefit from discussing with legal counsel or risk managers the proper documentation of a patient's preference to withhold medical information from the medical record. It may be necessary to document the physician's discussion with the patient of the risks of withholding information, and the physician's responsibility to share information with other health care professionals.

- Physicians and prescribing health care professionals should also be aware of statutory requirements, such as reporting HIV/AIDS status, and psychiatric protection or other laws that limit or control how information may be transmitted among professionals.
- Ultimately, there are considerations that may make a formal list incomplete. This illustrates the importance of a good patient-physician relationship based on trust that allows for maximum communication about patient medications, the ability to provide appropriate information within and across sites of care and the ethical duty of medical professionals to promote optimal care while respecting the patient's wishes and privacy.

Strategies

Taking a medication history

Obtaining information about a patient's medications can be challenging. The patient's ability to give a complete and accurate medication history may be complicated by a host of factors, including nomenclature, unfamiliarity with a drug's brand or generic name, loss of visual clues (e.g., patient reliance on drug appearance, size and color to identify a medication rather than the drug's name) when medications are changed or substituted, self-treatment and unnecessary medication or OTC drug use based on perceived need, or taking unknown medications borrowed from or offered by family and friends.

Nevertheless, physicians should be cognizant of factors that may result in inaccurate medication information. Physicians should not assume that the medication lists provided by patients are current or instructions on prescription labels are being followed. Furthermore, long-term relationships with patients do not diminish the likelihood of medication discrepancies or missing information, even if some of the medications were prescribed by the interviewing physician. In instances when patients are taking multiple medications, there are increased opportunities for patient confusion. Patients may be taking some medications correctly and others incorrectly. Patients may have a high familiarity with some medications and be less familiar with others. Inquiry should be appropriate to the patient's circumstances.

A key to effective communication when eliciting medication information is to promote an open, transparent discussion. The following questions provide a framework for organizing the medication history and beginning a fruitful discussion (with adjustment of language to patient background and culture as appropriate).

1. What medications do you take? Can you tell me the names of all your medications, including vitamins, OTC drugs, supplements and neutraceuticals?
2. Why is it important to take your medications?
3. Why do you take this medication? How long have you been taking this medication? Do you have a medical condition? What medical condition(s) do you have? What did your doctor say to you about this medication?
4. How do you take your medications (e.g., time of day, with food)?
5. Are you taking your medication the way the doctor told you to? When was the last time you took it? When was the time before that?
6. What do you do when you make a mistake? Do you ever skip medications or take two when you miss a dose?
7. Is your medication making you feel better, worse or no change?
8. What other medicines, herbals, supplements, neutraceuticals, drops or sprays are you taking? Do you take other drugs that a physician has not prescribed?
9. From where do you get your medications? A local pharmacy? Mail order? The Internet? From another country? Other?
10. Who buys the medicines in your family? Should we talk to him or her to make sure we have a complete list of all the medicines you take?

Strategies to assist patient understanding

Medications are highly useful as tools for treatment, but they are only effective if the patient understands the instructions for use and can safely manage and adhere to his or her medication regimen. Of course, the most important transfer of care or handoff is to the patient. However, health information is often difficult to understand, navigating the health care system can be challenging and patients do not always have the tools, resources or skills to safely take the handoff, particularly when it involves medications. Confusion, frustration, fear and unfamiliarity with medical terminology contribute to patient misunderstanding—and misunderstanding increases the risk of patient harm and limited adherence to drug regimens. Ensuring that patients understand their treatment is a component of care. Furthermore, it is the patient's legal right to receive consistent and accurate information that is expressed in a manner he or she can understand.

To assist patient understanding and prevent communication-related errors, the AMA encourages physicians, other health care professionals and staff, to utilize the following Safe Communication Universal Precautions in all patient encounters.[32] These are directly applicable to medication instructions.

- Use plain, nonmedical language.
- Slow down.
- Break information down, use short statements.

- "Chunk and check," or organize information into two or three key concepts, then check for understanding.
- Aim for a fifth- to sixth-grade reading level on all written information.
- Use communication aids to assist in conversations, discussions or education sessions with patients, families and caregivers:
  - > Offer to read materials aloud and explain.
  - > Underline, highlight or circle key points.
  - > Provide a trained interpreter, when appropriate.
  - > Use visual aids to help patients navigate the health care system and understand health information.
- Ask patients to teach-back what they were told.

Teach-back is a very effective method to determine whether physicians (as well as other providers) have communicated effectively. It means asking patients to put information they receive into their own words. Patients do not mind being "quizzed" about their understanding and do not feel the physician is testing them.[33] In addition, research has shown that asking patients to recall and restate what they have been told is a top patient safety practice.[34] Teach-back is always important, but especially when changes in care, medications or diagnosis occur, and when explaining self-care or discharge instructions.

To use teach-back, one might ask questions to start the discussion of patient understanding. Examples of teach-back lead-ins to assess patient or caregiver understanding include:

- We have gone over a lot of information. In your own words, can you review for me what we have discussed? How will you make it work at home?
- Sometimes I give a lot of information. Can you let me know what you heard me say? This helps me make sure I gave you the information you want and need.

As in the medication history, these questions should be adjusted to take into account the specific patient population and culture, as well as literacy levels.

Reconciliation failures

A medication error or ADE resulting from incomplete or inaccurate medication information is sometimes called a "reconciliation failure." Emerging research shows that reconciliation failures occur most often at points of transition in both hospital and ambulatory settings as patients move through the maze of care settings and referrals.[35] Reconciliation failures are also high during handoffs within all settings of care.

The potential for unintended consequences or harm increases as deficient information follows patients through episodes of care and to various settings of care, including the home. Harm can result from patients taking wrong, incompatible or duplicate medications, and this can sometimes lead to toxicity or failure to take the right drug at the right dose at the right time, failure to resume needed medications or incorrect resumption of discontinued medications—all of which can result in failure to respond to treatment or declining health.

On Sept. 25, 2007, the United States Pharmacopoeia provided its "Statement on Medication Reconciliation Errors as Reported to MEDMARX®" to the Joint Commission.[36] The portion of the statement presented in the appendix shows reconciliation failures in various settings of care (see page 25).

The case study examples provided below illustrate some of the system weaknesses that can create reconciliation failures. Questions are provided after the cases. The questions are proactive checklists to assist the process of analysis and discussion by physicians and health care teams to avoid such mishaps in their own practices and for their own patients. The framework for analysis suggested by the questions may be applied in multiple situations and prompts the physician to consider the following variables that can influence the reconciliation process: the patient's age, diagnosis and comorbidities; what can be done to determine correct drugs or intercept wrong drugs; identification of information or communication gaps and barriers to reconciliation; and the team and systems support needed to complete the process.

Case studies: Reported reconciliation failures

Reconciliation failures on admission to the hospital

1. **A patient who was admitted for pleural effusion kept her potassium chloride tablets in a prescription vial labeled with her husband's name and directions for the use of diclofenac sodium-misoprostol (Arthrotec). During the admission interview, the patient reported the following preadmission medication regimen: atorvastatin calcium, captopril and enteric-coated aspirin. On admission, the patient was ordered Arthrotec 50 mg, three times daily, instead of potassium chloride.**[37]

2. **A patient reported use of prednisone, 7.5 mg/d as a preadmission prescribed medication. The medication was not ordered on admission to the hospital.**[38]

Questions

1. Is there a standard process for determining the medications for particular patients and whether they will be continued in another setting of care?
2. During the admission processes, when are the medications patients bring to the hospital from the home checked by the physician or staff?
3. When are identities on the prescription bottle verified? Can a pharmacist used by the patient be contacted to obtain a medication list?
4. Did the patient have a medication list or was one ever compiled?
5. How can a medication reconciliation approach correlating a patient's medications with his or her medical problem list help to prevent errors?
6. How can an effective medication reconciliation process—resulting in an accurate medication list—be created within and across sites of care?

Reconciliation failures at discharge

1. **A 68-year-old man with a history of diabetes and atrial fibrillation maintained on warfarin presented to the emergency department. At the time of admission, the patient was unable to recite his medication history, and his wife was unclear about the doses. However, the emergency medical services (EMS) run-sheet had a list of the patient's medications and doses. The patient was started on the medication regimen per the EMS report. While in the hospital, the patient received 5 mg of warfarin at bedtime, which according to the EMS intake sheet was his usual outpatient dose. The team did not confirm this dose with the patient's family, primary physician or pharmacy. At the time of discharge, the patient's international normalized ratio (INR) was noted to be four. Realizing the warfarin dose was too high, the team instructed the patient to decrease his dose to 3 mg at bedtime and to have his INR rechecked in three days. After three days, his INR was 10. He was treated with vitamin K. Two days later, the patient returned to the emergency department with back pain, lower extremity weakness and incontinence. He was found to have an epidural hematoma, which was emergently evacuated.**[39]

2. **A 59-year-old man with severe but well-controlled congestive heart failure, on spironolactone and other appropriate medications, was discharged following a brief hospitalization for cellulitis of the leg. His preadmission medication regimen was included on his discharge orders. Within days of discharge, the patient began to feel lethargic and nauseated. He presented to the emergency department with these complaints and was found to be in acute renal failure, with a serum potassium level of 7.1 and a sodium level of 122. Upon review of his discharge orders from his prior admission, it was discovered that the spironolactone was mistakenly prescribed at a dose eight times higher than his admission dose.**[40]

Questions

1. What records are relied upon for patient medications when patients cannot provide information, respond to questions or show documentation?
2. Is there redundancy in verifying patient medications? Is there a process that checks medications when there is no direct evidence of specific drugs and/or doses?
3. Is there a process to review medication regimens for high-risk drugs before discharge?
4. Can a process be developed to educate patients about side effects associated with particular medications or physiological/psychological effects associated with dosage changes? What elements should constitute the patient education process?
5. How can an effective medication reconciliation process—resulting in an accurate medication list—be created within and across sites of care?

Reconciliation failures at transitions

1. **A patient's primidone (a barbiturate used for epilepsy) was discontinued during the patient's hospitalization and not renewed upon discharge to a skilled nursing facility (SNF). The patient later experienced three grand mal seizures while at the SNF.**[41]

2. **An 80-year-old man was transferred to an SNF for rehabilitation following surgery for a fractured hip. The patient's transfer orders did not convey his intolerance to narcotics and the on-call physician prescribed oxycodone. The patient became confused. Because the SNF staff had no information on the patient's base line physical and cognitive function, staff assumed the patient had advanced dementia. His rehabilitation sessions were delayed. He remained in bed for several days and developed a decubitus ulcer on his sacrum. When his wife learned of his pain regimen, she advised staff of the patient's narcotic intolerance and the medication was discontinued.**[42]

Questions

1. How does a patient's age contribute to the reconciliation failure? How do the above case studies suggest patient age as a factor?
2. Was a medication list used by the hospital? Was the list a component of the transfer orders?
3. Is there a process to verify medications for admissions from nursing homes generally, and SNFs specifically to the emergency department or inpatient care?
4. Is there family support for patients who are going to and from SNFs, and can they be contacted for information on the patient's medications?
5. Is there a process to involve caregivers or family of SNF patients, including base line information on cognition, activities of daily living and function?
6. Is a social history and relationship to medication regimens listed in the patient's chart?
7. How can an effective medication reconciliation process—resulting in an accurate medication list—be created within and across sites of care?

Developing support for medication reconciliation: Applying patient safety principles

The process of medication reconciliation is performing a component of medication management in a new way that distinguishes its role in the overall patient safety effort.[43] Importantly, successful medication reconciliation is only attainable in a safety culture: a culture that recognizes its potential to reduce ADEs, commits to change, establishes goals and builds a safety culture to support those goals. A safety culture exists in any setting of care (inpatient, ambulatory or office setting) where safety is the highest priority and a relentless commitment to safety is visible to patients, staff and colleagues. Medication reconciliation is a safety activity and its success depends on human cognition, knowledge, competency, management skills, and recognition that problems and barriers associated with medication reconciliation are symptomatic of the underlying problems of a fragmented, complex health care system.

Generally, four major elements define a safety culture:[44]

1. Acknowledgment of the high-risk, error-prone nature of an organization's activities
2. A just culture[45] in which individuals are able to report errors or close calls without punishment
3. An expectation of interdisciplinary collaboration to seek solutions to vulnerabilities
4. Willingness on the part of the organization to dedicate resources to address safety concerns

Consider employing the following universal strategies to build a safety culture to promote medication reconciliation and patient safety within and across sites of care. These strategies can be used as points to elicit discussion on patient safety and on solutions for medication reconciliation, as well as a model to further other safety interventions.

Initiate systems-level interventions[46]

- Define goals and communicate expectations regarding medication reconciliation.
- Organize your team or staff—determine roles according to skill, patient needs and available resources.
- Design the medication reconciliation process and necessary tools to support the safe delivery of care.
- Establish a just culture:
  - > Educate and train your team or staff, and encourage lifelong learning.
  - > Incorporate a formal process for improvement—analyze results, recognize successes and failures, make changes as needed, look for new tools to enhance the process, and share knowledge and outcomes with peers.
  - > Encourage respect for the knowledge and contributions of team members.
- Engage patients and their family or caregivers in the medication reconciliation process:
  - > Acknowledge that the patient ultimately owns his or her medication list.
  - > Provide patients with tools—knowledge, skills and confidence—to facilitate active engagement.
- Adequately document changes to the patient's medication regimen and inform those who need to know.
- Enforce the following rules:
  - > Medication list information must be easily accessible to those who need to know.
  - > Medication list(s) from various data sources (other practices, pharmacies, etc.) will be available to patients and providers.
- Create the ability to link medications to the medical complaint and/or diagnosis.
- To prevent ADEs, comply with regulatory requirements, such as those of the Joint Commission, the Centers for Medicare & Medicaid Services and the National Committee for Quality Assurance.
- Insist on synergy and compatibility between inpatient and outpatient medication reconciliation processes and the tools to support those processes.
- Ensure that the medication reconciliation process and support tools are easily transferable to other settings of care.

Involve patients[47]

Establish that every patient will experience the following:

- Patients will be asked to provide a list or brown bag of their current medications (including prescriptions, OTC drugs, herbal supplements and neutraceuticals).
- Clinic personnel will review the medication list with the patient or his or her representative.
- The patient's medication list and medical record will be *reconciled* and the process documented.
- Any new medication orders will be checked for interactions and/or conflicts with an updated, reconciled medication list.
- Patient education and instruction will be provided on all changes, and teach-back will be used to determine if the patient or caregiver understands the medications and information.
- The patient will leave the encounter with a paper copy of the updated, reconciled medication list.

Standardize the reconciliation process

To improve all components of medication management and enhance safety, attempts should be made to standardize the process of medication reconciliation. Standardization of processes leads to greater safety by reducing variation among providers.

In all institutions and physician practices:

- Create policies and procedures to facilitate standardization
- Clarify responsibilities
- Adopt the medication reconciliation principles
- Ensure that standardized processes include disseminating appropriately reconciled medication lists to other relevant providers

Simplify medication regimens

Polypharmacy occurs when the medication regimen includes at least one unnecessary medication.[48] When possible, minimize medications and simplify medication regimens.

Consider the following strategies to prevent or control polypharmacy:

- Determine if every medication is clinically necessary
- Eliminate therapeutic duplication—consider monotherapy to manage multiple diseases when possible
- Choose for the patient the best medication with the least frequent dosing interval
- Prioritize the medication regimen for patients, recommend that patients dispose of old medications
- Discuss effects and outcomes the patient should expect from his or her medications

Physicians are particularly important in promoting effective medication reconciliation and making sure is integrated into care processes. Considerations specific to the role of physicians within the medication reconciliation safety enterprise include lifelong learning, the physician's team leadership role and promoting or participating in research.

Participate in lifelong learning

The AMA encourages physicians to maintain and advance their clinical competence and keep up with changes in health care delivery.[49] The process of medication reconciliation is influenced by patient needs, the care setting, formulary requirements and systems resources—factors that are constantly changing. Ongoing education or lifelong learning that spans the physician's career is necessary to better understand and influence this complex, dynamic process.

Physician's team leadership role

The best medication reconciliation team will be multidisciplinary and—in all settings of care—will include physicians, pharmacists, nurses, ancillary health care professionals and clerical staff. The team's variable requisite knowledge, skills, experiences and perspectives are needed to make medication reconciliation work as safely and smoothly as possible. Team members may have access to vital information or data needed to optimize medication safety. Because physicians are ultimately responsible for the medication reconciliation process and subsequently accountable for medication management, physician leadership and involvement in all phases of developing and initiating a medication reconciliation process or model is important to its success.

The physician's role might include the following tasks:

- Identifying information gaps
- Defining the work and formulating the reconciliation process
- Utilizing clinical knowledge to verify completeness of a patient's medication profile
- Directing management of the patient's medications
- Developing communication protocols for staff and colleagues, and referrals between settings of care and during transitions in care
- Setting performance expectations and delegating responsibilities, including nonclinical tasks (e.g., identifying, sorting and compiling the patient's medications; collecting past medication orders or lists and other relevant information from the patient's medical record and other sources; communicating with the patient's family, other physicians or pharmacists as necessary to obtain current information)
- Team building, i.e., creating a climate that encourages and values the contributions of team members
- Participating in all phases of the process:
  - > Facilitating the work of the team
  - > Managing resources and skills
  - > Analyzing data and outcomes
- Advocating for national and institutional policy that support the complex and extensive work of medication reconciliation

Research considerations

Currently, research results indicate that medication reconciliation in hospital settings can significantly reduce errors occurring at transitions in care.[50, 51] The role of the physician in medication reconciliation has yet to be studied. Research is needed to understand how clinicians of various specialties and levels of expertise accomplish medication reconciliation in order to devise systems to support their work and to provide evidence on the most appropriate medical team member to accomplish the steps involved in medication reconciliation. Hospital-based research reveals that the "right" combination of personnel to achieve error reduction will likely depend on the context and practice setting, and that the best protocol and team structure will likely differ for an academic center, a rural hospital, a nursing home,[52] a solo practitioner or a large practice group.[53]

Additional research is required in all settings of care, but is especially needed to understand the complexity of ambulatory medication management and the dynamics of medication management by patients in the home. Additional research is also needed on OTC drug and prescription drug interactions, drug-disease interaction and rates of error, as well as adverse reactions associated with complementary and alternative medications and their interactions with conventional medications.

In all settings of care, physicians should encourage and consider participating in research to promote effective patient safety improvement in medication reconciliation.

The patient's role

The patient is the one constant in the continuum of care. Patient engagement is essential to achieve optimal outcomes, however, the patient's personal goals, preferences, resources and capacity should factor into determining the scope of his or her role in medication reconciliation.

The physician can encourage patient or family/caregiver engagement in medication management by inviting patients to partner with the physician on health goals, explaining the value of a current, complete medication list and educating patients on the list's content. Optimally, patients and physicians, in the context of the patient-physician partnership and shared decision-making, will discuss care options and agree to mutual goals. At the very least, patients should be encouraged to carry a current medication list to all their medical encounters and visits to pharmacies.

When multiple physicians are involved in a patient's care, patients or their family/caregivers are often viewed as primary conduits of information between physicians participating in their care. Physicians may rely on patient summaries of evaluations or treatment plans for ongoing management decisions. This may unfairly burden patients with the responsibility of conveying complex medical information—which they may not fully understand—to other physicians and members of the health care team. When patients do not understand medical or health information, the potential for confusion, frustration, poorer health outcomes and patient harm increases.[54]

Regardless of the level of the patient's capacity and interest, it is not the patient's responsibility to convey complex medical information from one physician to another, or from one point of care to the next. It is the physician's responsibility to ensure that complete and accurate patient information is exchanged with other physicians or members of the health care team in a timely and professional manner.[55]

Notwithstanding the best efforts to communicate with all physicians participating in the patient's care and to prevent knowledge or information gaps, the current system is not designed to support effective communication and well-coordinated care. No one knows this better than patients when they struggle to navigate the system and understand the information needed to safely manage their care.

Medication reconciliation and information technology

Working from incomplete clinical information is as frustrating to physicians as it is to patients. Patients often receive medications from multiple providers and sources. Maintaining a timely information flow between physicians is difficult as patients increasingly traverse multiple care settings for subspecialty treatment. Systems for communication among providers may be ineffective or nonexistent, and if electronic information systems exist in two locations, they are often incompatible or do not interface with systems in other locations where patients receive their care or medications.

Indeed, information technology (IT) requirements for medication management are appropriately described as daunting and expensive. The ultimate medication-use system that ensures a uniform and standard process for managing medications requires developing a nationwide IT system that has the capacity to coordinate information within settings of care and, additionally, to transfer, accept and coordinate information across multiple systems of care.[56]

The consequences of underdeveloped IT or limited interfaces between systems are not only evident in times of crisis (e.g., the arrival of an unconscious, unaccompanied patient to the emergency department) or natural disasters, but also in the day-to-day management of medication use. Effective medication management and reconciliation may depend on other essential information, such as past and present laboratory values. Currently in many systems, prescribing, preparation and infusion systems are not fully integrated. Rather, they are separate, stand-alone systems, with each component of the medication-use system compartmentalized, which can result in health care team members relying solely on the particular component or technology that assists their assigned tasks.[57] Decision support in each of these areas may be absent or variable.

Decision-support systems and technologies to enhance the medication reconciliation process need to consider data standardization, simplification, information display and interoperability as is expected of any IT system. Specifically, IT systems incorporating the medication reconciliation process should have the ability to transfer critical information quickly across systems.[58] Key physician IT needs may include access to a clinical knowledge base, and information interpretation and analysis (i.e., critically analyzed information that is the combined result of a number of studies presented in clinically relevant form), the capability to search for information and deliver knowledge quickly when and where needed, and "intelligent prompting" (i.e., mechanisms that generate alerts specific to a patient's unique characteristics and needs).[59] Ideally, an electronic health record system would display a patient's medication history, other essential information—such as allergies and laboratory values—and all medications prescribed by any provider, anywhere, at any time.

The AMA encourages the development of standards for health care IT whereby the different products will be interoperable, and able to retrieve and share data for the identified important functions. To meet this objective, current AMA policy states that the AMA will:

> Work with Congress and insurance companies to appropriately align incentives as part of the development of a National Health Information Infrastructure (NHII), so that the financial burden on physicians is not disproportionate when they implement these technologies in their offices;
>
> Review the following issues when participating in or commenting on initiatives to create an NHII: (a) cost to physicians at the office-based level; (b) security of electronic records; and (c) the standardization of electronic systems;
>
> Continue to advocate for and support initiatives that minimize the financial burden to physician practices of adopting and maintaining electronic medical records; and
>
> Continue its active involvement in efforts to define and promote standards that will facilitate the interoperability of health information technology systems.[60]

Even when sophisticated integrated IT systems exist, IT will neither replace the human cognitive work of medication reconciliation nor prevent misreporting by patients nor failure to capture changes in medications by prescribers. Efficient, effective workflow necessary to implement and sustain the medication reconciliation process needs to be supported by IT systems, but it should not be driven by technology. IT systems and applications do have the

potential to streamline the medication reconciliation process—especially assembling and storing patient information—and to provide the means to effectively transfer patient medication information across the continuum of care. However, health care technology is fragmented and requires close attention by potential users to ensure that implementation does not create additional pressures and problems with accuracy of medications.

Coordinating care: Transitional care and the medical home

Transitional care is defined by actions designed to ensure coordination and continuity of health care as patients transfer between different locations, such as from the hospital to an SNF or between different levels of care in the same setting (e.g., in and out of the intensive care unit).[61] Transitional care aims to prepare, assist or support patients and their caregivers in managing the patient's care. Desired outcomes of transitional care include reduction in hospital readmissions, reduction of ADEs after hospital discharge and improved patient self-care skills.

The American Geriatrics Society states:[62]

> Transitional care is defined as a set of actions designed to ensure the coordination and continuity of health care as patients transfer between different locations or different levels of care within the same location. Representative locations include (but are not limited to) hospitals, sub-acute and post-acute nursing facilities, the patient's home, primary and specialty care offices, and long-term care facilities. Transitional care is based on a comprehensive plan of care and the availability of healthcare practitioners who are well-trained in chronic care and have current information about the patient's goals, preferences, and clinical status. It includes logistical arrangements, education of the patient and family, and coordination among the health professionals involved in the transition. Transitional care, which encompasses both the sending and the receiving aspects of the transfer, is essential for persons with complex care needs.

Coordinating the patient's medical and medication records to enhance care and promote safer outcomes is the hallmark of medication reconciliation. A concept called the medical home suggests a model for achieving optimal coordination of care and information flow across the continuum of care settings. A medical home is a partnership between the physician and the patient (and his or her family where appropriate) based on mutual trust and respect.[63]

In July 2006 the American Academy of Family Physicians and the American College of Physicians developed the proposal "Joint Principles of the Patient-Centered Medical Home," which describes the elements of the physician-guided medical home.[64, 65] The principles expressed in the proposal stress physician leadership and coordinated, integrated care across all domains of the health care system at all stages of life.

AMA policy supports the concept of partnerships between primary care physicians and patients to coordinate access to all needed medical services and consultations (a medical home) for all patients.[66] In some cases, patients may want to identify the central physician they wish to have coordinate their care. Importantly, this concept has been reported to positively affect highly vulnerable patient care groups. According to a Commonwealth Fund study,[67] minorities with a medical home had significantly improved coordination of care, e.g., increased access to needed care, routine preventive screenings and better management of chronic conditions.[68] Appropriate transitional care and medical homes may provide physicians and other medical professionals the ability to effectively implement medication reconciliation processes and create accurate medication lists within and across settings of care.

Vulnerable populations

The U.S. population is growing older and becoming more diverse. The number of people over age 65 is greater than 40 million, and that number is expected to grow to approximately 75 million over the next two decades.[69] With increasing age and longer life spans, this population is likely to experience chronic conditions that require multiple medications and more frequent physician visits across various settings of care. The U.S. Census Bureau reports that 311 languages are spoken in the United States—in 14 million U.S. households people speak a language other than English.[70]

As a result, physicians will need to identify and plan for the special needs of patients who are vulnerable due to language barriers, cultural issues, socioeconomic stressors or frailty, all of which increase risk and the likelihood of harm.[71] The need for physicians to minimize their patients' exposure to risk and harm will grow in importance as the population ages and diversifies.

Case study: Low English proficiency

Mr. G, a 45-year-old Hispanic immigrant, undergoes a job health screening and is told that his blood pressure is very high. He goes to the local public hospital and is given a prescription for a beta-blocker and diuretic, known to be effective and simple for adherence because each is supposed to be taken once a day.

Mr. G presents to the emergency department one week later with dizziness. His blood pressure is very low, and he says he has been taking the medicine just like it says on the bottle, i.e., "once a day." The case is discussed by multiple practitioners until one who speaks Spanish asks Mr. G how many pills he took each day. "Twenty-two," Mr. G replies. The provider explains to his colleagues that in Spanish the number 11 is spelled "o-n-c-e" or once. In fact, Mr. G took 11 pills daily, rather than one pill once a day.[72]

Racial and ethnic minorities and patients with low English proficiency (LEP) are at particular risk for medication errors due to miscommunication. When LEP is not addressed or, as in the case study above, its consequences are not considered, the opportunity for patient harm increases.

The Federal Civil Rights Act of 1964, as amended by Executive Order 13166, Aug. 11, 2000, and U.S. Department of Health and Human Services regulations, requires recipients of federal financial assistance to take reasonable steps to ensure that persons with LEP have meaningful access to federally funded programs and services, and language assistance or translation services.

Hospitals, some ambulatory settings and large practice groups may have protocols for addressing LEP that correspond to the requirements of the federal statute; however, strategies exist to prevent miscommunications that are applicable in all settings of care.

Strategies to prevent miscommunication

The following recommendations can assist physicians who treat populations with cultural, linguistic or socioeconomic barriers on medication issues, as well as general information. The underlying goal should be to establish rapport with the patient. Sensitivity with respect to language, race, age and other relevant factors should be considered when using the following strategies. Like patient safety principles, these points can be employed to start discussions on how they can be applied to the specific provider, patient and setting involved.

Linguistic barriers

- Plan ahead:
  - > Consider the demographics of your patient population and what type of language access service is most suitable for your practice, e.g., an on-site interpreter, appropriately trained bilingual staff, remote telephonic interpretation.
  - > Make sure that your office staff collects information on language before or at the time of the initial visit. This is best asked as: "What is the language spoken in your home?"
  - > Ensure that either a trained on-site or remote telephonic interpreter or trained bilingual staff member translates the medication instructions to the patient.
- Ask the patient to bring his or her medications to the office for the initial visit. Physicians should attempt to identify the generic form of any unfamiliar medications that may be unique to a patient's home country.
- Like other patient communication, prescriptions and patient discharge instructions should be written in fifth- to sixth-grade-level English and, if possible, translated into the patient's native language. If this is not possible, the instructions should be communicated orally using some form of interpreter services in simple, clear language.
- Use the teach-back method to ensure patient comprehension.
- Consider developing a modifiable patient handout for universal use by low-literate and LEP patients or pictorial medication instructions to accompany verbal patient education.

Cultural barriers

- Ask patients who generally buys and administers drugs in the family.
- Ask patients about medications used other than those prescribed by a health care provider, including those recommended by a friend or a community healer.

- Ask patients about fears or concerns they have regarding the use of any medication. If cultural beliefs inhibit appropriate use of medications, attempt to work within that belief framework to promote appropriate medical care.

Low socioeconomic status

- Ask if patients are using more than one site of care to receive treatment and, if so, request that patients bring all medicine bottles/containers to appointments on a regular basis.
- Ask where patients receive their medications and what they do when they run out.
- Simplify the medication regimen as much as possible.
- Consider referring patients to community or social services for assistance as appropriate.

Case studies: Frail elder patients and patients with multiple, chronic illnesses

1. **Believing that he had been prescribed two different medications, a patient inadvertently took two beta blockers after discharge from the hospital because he was sent home with one that had a generic name and another that had a trade name.**[73]

2. **A patient with congestive heart failure started receiving spironolactone in the hospital. The patient was sent home with a prescription for this medication in addition to ramipril, furosemide and potassium supplements, which the patient was taking prior to hospitalization. Electrolytes were not monitored after discharge. Two weeks later the patient developed extreme weakness and anorexia. Blood work at that time demonstrated a serum potassium level over 7.5 mmol/L and required the patient's readmission to the hospital.**[74, 75]

Managing medications and the reconciliation process is problematic in frail elders and patients with multiple chronic illnesses who are likely to be seeing multiple physicians, taking multiple drugs and managing complex or high-alert medications (i.e., drugs associated with a heightened risk of causing significant harm).[76] Increased incidents of patient-generated ADEs are associated with inaccurate use of prescription drugs or inability to comprehend instructions. Information gaps and poorly coordinated care increase risks to patients when multiple physicians are prescribing multiple medications, but are unaware of what other physicians are prescribing.[77] The need to coordinate care is critical.

Strategies to coordinate care and simplify medication regimens

Consider the following strategies to coordinate care and simplify medication regimens:

- Determine the extent and type of case management needed to identify all physicians caring for patients and to coordinate care across the continuum.[78]
- Organize the patient's medical history, medication history and current medications into one record (e.g., the patient's medical record), and identify who else needs to know this information.
- Determine whether a medication, poor adherence or socioeconomic factors contributed to a poor therapeutic outcome before changing medications or doses or adding another drug to the patient's regimen.
- Optimize drug therapy.
- Ascertain patient and caregiver understanding.

Conclusion

The burden of medication errors and reconciliation failures is exceedingly high in the current health care system. Medicine reconciliation is a fundamental process of high-quality, safe medical care. An accurate, current medication list is essential in all patient care settings. The value that medication reconciliation adds to medication management is intuitive. It is an accepted quality improvement process that has been formalized as a requirement by regulatory entities. As identified in this monograph, the barriers and challenges to constructing an accurate medication list and developing a reliable, enduring method of communicating current medication information across the continuum of care are formidable. However, the importance is so great that considerable effort should be expended to discover, document and manage this information.

The AMA's medication reconciliation panel strongly believes that improving medication reconciliation is the responsibility of physicians, requires effective partnership and collaboration with all members of the health care team, and is best accomplished through effective partnerships with patients. Awareness of the steps involved in medication reconciliation, the principles underlying them, strategies that may be useful in creating and addressing medication reconciliation processes and limitations, and their relationship to patient safety can improve this aspect of medication management. Physicians should lead in this effort—it is their ethical and legal obligation in advocating for the patient.

In addition, comprehensive research, sharing of best practices, information system design and redesign, enhancing patient engagement and continuing, lifelong professional education are necessary to achieve this fundamental safety and quality improvement goal in our health care system. As physicians in partnership with our patients, we are obligated to participate in the medication reconciliation process to ensure its success.

Appendix

Statement of the United States Pharmacopoeia (USP) on medication reconciliation errors as reported to MEDMARX®, submitted by Rodney W. Hicks, PhD, ARNP, and Diane D. Cousins, RPh, to the Joint Commission, Sept. 25, 2007

In December 2004, in response to then new Joint Commission safety goals and standards, USP added three selections to the MEDMARX cause of error field: *Reconciliation-admission*, *Reconciliation transition*, and *Reconciliation discharge*. As of Dec. 31, 2006, which represents a 24-month period, 294 reporting facilities (out of 630 or 46.7%) submitted 6,385 records (out of 417,354 or 1.5%) medication error reports involving reconciliation, of which 94.4% involved inpatients, 5.4% involved outpatients, and 0.2% involved patients in their residential setting. Of all errors, 97% of the errors were not harmful* and 44 errors resulted in either initial hospitalization or prolonged hospitalization. Many organizations report they are working on standardizing the reconciliation process.

Errors were associated with each of the MEDMARX location values, indicating that this process is not isolated to one type of clinical setting. The leading locations for inpatient errors were Nursing Units (n = ~3,500) and the pharmacy department (n = ~1,400); approximately 425 errors were intensive care settings. A detailed review of pharmacy errors indicate that pharmacists are working among manual systems (e.g., chart orders), CPOE systems, and other pharmacy information systems. Competing information technology systems accounted for many errors (i.e., orders may be active in one system but not the other). Other examples include pharmacy personnel inadvertently entering the wrong route of administration or the wrong dosage form when patients transition between units. MEDMARX captures a broader application of "Reconciliation" to include the sub-processes within the pharmacy department.

For outpatient locations, the leading location was emergency department, accounting for nearly 50% of the outpatient errors. Other locations included outpatient surgery, cardiac cath lab and radiology.

Errors during transition were most prevalent (48.2%) followed by admission (40.5%) then discharge (11.3%). USP would view seven of the records as sentinel events, meaning the error resulted in either permanent harm (Category G), required interventions to preclude harm (Category H*) or may have caused or contributed to a patient's death (Category I*). Of these events, five occurred during transition and one each during admission or discharge.

The phase of transition is where USP believes organizations have the most control of the medication list and where technology offers a potential solution. Blanket orders (resume all previous orders, continue home medications) did result in some errors. However, USP also notes that some of the transition errors were the result of failed technology, such as insufficient allergy information being readily available, outdated record identification processes (e.g., imprints versus machine-readable labels), confusing directions on medication administration records, and failure between pharmacy information systems to authorize drug withdrawal from automated dispensing devices.

Examples of admission errors include:

- Patient's home medications were not available on formulary, thus forcing substitution
- Failure to transcribe orders or send chart copies of the order led to pharmacists' inability to process orders in a timely manner
- Errors involving products that look alike or sound alike (e.g., Tenex and Urex)
- Patients not having an accurate list of their medications
- Patients not knowing the dose of their medication

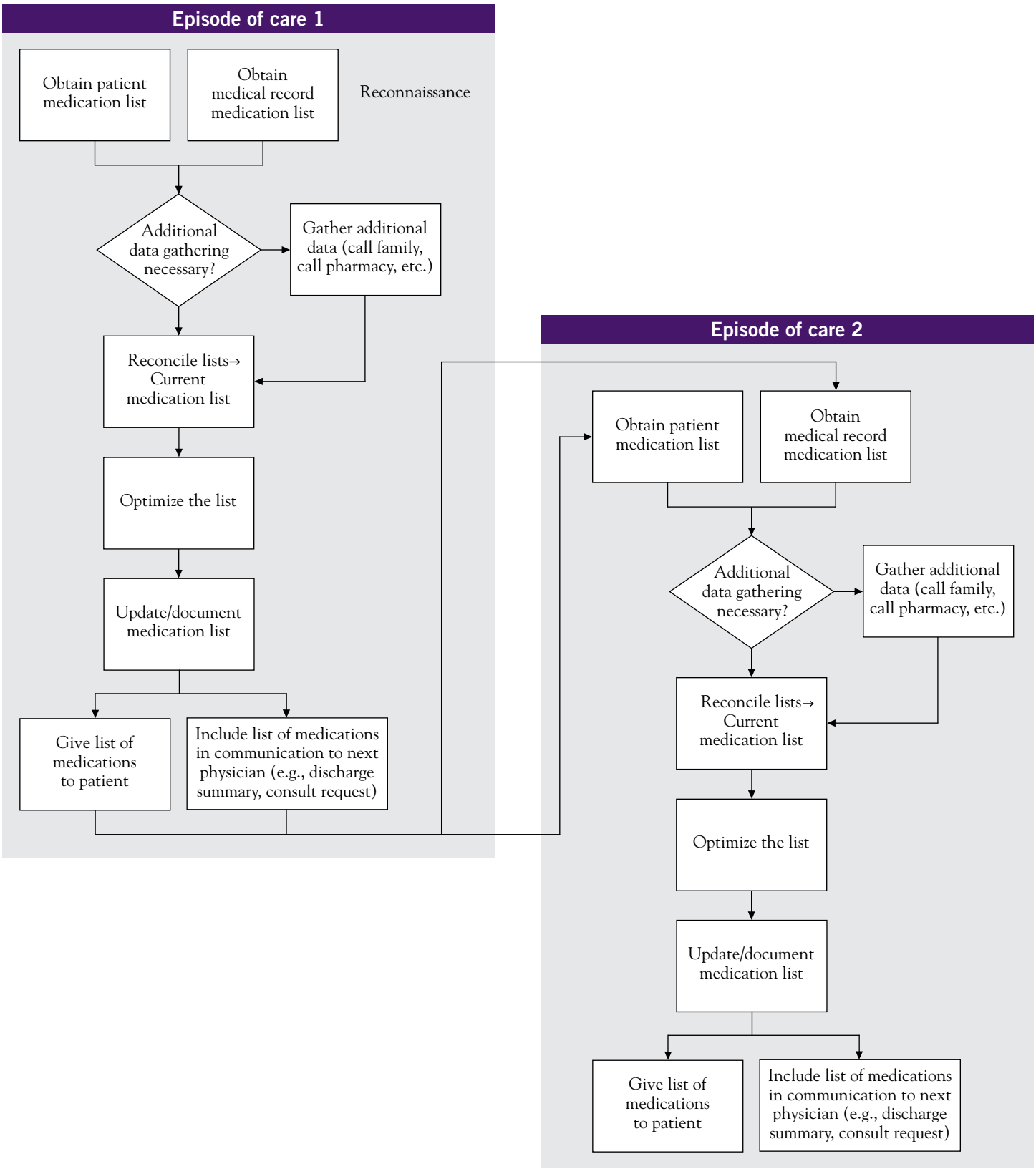
Errors at discharge most often involved patients not receiving medications as ordered (omission errors) and discovered after the patient had left the hospital.

*Based on the National Coordinating Council for Medication Error Reporting and Prevention's *Index for Categorizing Medication Errors*.

Medication reconciliation implementation table, Gordon Schiff, MD

Steps (A, B, C, D)	Potential supports/facilitators for the physician
Assemble ■ Assemble an accurate and current list of the patient's medications	■ The patient's knowledge and tracking of his or her medications ■ The patient's family or caregiver ■ Other physicians who are involved in the patient's care ■ The patient's health care team ■ Consider information from pharmacists, payors and others who have claims data
Be certain and complete ■ Identify discrepancies ■ Identify information gaps ■ Identify (medication safety) risks to patient	■ Pharmacists checking patient profiles for changes, duplications or conflicts in their electronic records, and comparing with medications patient states he or she is taking ■ Nurses cross-checking medications being administered with previous regimens ■ Other physicians insisting on knowing patient regimens before making any changes
Compare ■ Compare and match lists ■ Compare the medication the patient is taking to laboratory or test results	■ Nurses ■ Pharmacists ■ Information technology
Decision-making ■ Decision-making pertaining to prescriptions, e.g., what to continue, discontinue or add ■ Ensure that decisions are communicated (ideally, both verbally and in writing) to patient	■ Physicians grappling with where duplications exist, and where regimens can be simplified and unnecessary medications discontinued ■ Patient self-reported experience with medications ■ Pharmacists questioning changes that raise red flags in patient regimes ■ Clinical practice guidelines that create more standardized regimens for particular diseases ■ Information technology decision support ■ Consultation with other physicians to clarify and question switches and additions to regimens that may confuse patients or caregivers

Optimal medication reconciliation in ambulatory settings of care, Eric Alper, MD, FACP



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Protect your patients with a current, accurate medication list for use in all care settings.

Medication reconciliation efforts enhance a working partnership between you and your patient, and assist in developing reliable channels of communication with other prescribing health care professionals within and across sites of care. Creating a medication reconciliation list with your patients provides an opportunity to elicit information that improves medication management and assists patient self-management of his or her care. Keep in mind that the medication reconciliation process is dynamic and fluid, but a current, updated medication list—when utilized to its fullest potential by the patient and the health care team—is one means to make available information or communicate across the patient's continuum of care. Additionally, a list developed by you and your patient may be used as a "trigger tool," i.e., a starting point for generating a process for discovering medication problems (potential or current) and determining whether there is a need to reconcile your patient's medications with those prescribed by other physicians or health care professionals involved in your patient's care.

In summary, medication reconciliation goals are to:

- Gather the most information about the patient's medications from all sources and self-management of care as you reasonably can
- Assist the patient in understanding and safely managing his or her care
- Encourage you to communicate with your patient's other physicians or health care professionals if there appear to be differences in prescribing philosophies
- Provide a means to communicate the patient's medication information to others as appropriate

Time and support

Generating a medication list takes time. You will most likely need staff support for the nonclinical components of this activity. Staff can assist in identifying and compiling the patient's medications, sorting through "brown bags," collecting past medication orders or lists and other relevant information from the patient's medical record and other sources, and communicating with the patient's family, other physicians or pharmacists as is necessary to obtain current information.

Content

The content of the medication list should be specific to the patient's needs and adapted to the patient's level of literacy, numeracy and understanding. To confirm patient understanding, consider asking your patient to teach-back, i.e., to recall and restate in his or her own words what you have told them.

Goals for developing the content are to:

- Elicit as much information from the patient about his or her medications as reasonable, i.e., possible and practical
- Confirm with your patient how he or she is actually taking each medication
- Ensure that your patient understands what he or she needs to do
- Generate an accurate and most current list of medications
- Provide a list that is useful to the patient and his or her physicians and other health care providers

The patient's medication list should optimally include:

- The patient's name
- Time and date when you created the list
- Patient's known allergies
- Medication names, dosage, frequency and routes of administration
- Reactions to or side effects of medications
- Medication start and stop dates, when known
- Names of prescribing physicians, when known

(Continued on inside back cover)

Card holder

(Continued from back cover flap)

Documentation in the medical record that accompanies the patient list may include additional details such as the patient's sources of his or her medications (e.g., local or mail-order pharmacies, Internet, foreign countries or other sources), patient preferences and patient understanding. Upon completion of the reconciliation process, review the list for accuracy with the patient or the patient's family. A goal for the staff could be to ensure that every patient leaves your office or the care setting with a current and accurate list that the patient understands.

Patient participation

Patient engagement is a critical component of medication management and the medication reconciliation process. Your patient's medication card has been designed to assist patient participation, and to encourage your patient to talk with you and ask you questions about his or her medications. The language in the card is simple, with "medicalese" having been kept to a minimum. The overall reading level of the instructions is at the fifth-grade level and, with a little assistance from you

Example of a completed card

5 My medications (Please print.)

My name:

Known allergies:

What am I taking? Names of medications and dose	Brand name:	Generic name:	Medication ordered by:	Date sta
1 Lasix 40 mg	Lasix	Furosemide		April 1,
2 Capoten 25 mg	Capoten	Captopril		June 1,
3 Tylenol 325 mg	Tylenol	Acetaminophen		June 1,
4 Claritin non-drowsy 10 mg	Claritin non-drowsy	Loratadine		April 1,
5 Centrum	Centrum	Multivitamin		200
6				
7				
8				
9				
10				

Notes: Stay on your low-salt (sodium) diet. Call me if you gain 3 pounds.

Making Strides in Safety® program
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US patent 5945195 Z-CARD® North America, NYC.
212-797-3450 www.zcardna.com Job no.

or your staff, the information should be easy for most patients to understand. The suggested questions and dialogue on the card won't take the place of the conversation you will have with your patient, but can be used by you as a prompt to begin or continue a discussion with your patient. In addition, if you suspect or are concerned that your patient is struggling with information, you can encourage your patient to use the list as his or her prompt when teaching-back information.

Other information

Space has been provided on the card to record immunizations, important health care information and emergency contacts. You may want to encourage your patients to consider the difficult decisions associated with organ donation, living wills and health care power of attorney.

			Date reviewed: Date 1	Date 2	Date 3	Date 4	Date 5
rted:	**Why am I taking it?** Diagnosis	**How do I take my medicine?**	**What else do I need to know?** Side effects		**Follow-up required:**	**Date stopped and why:**	
2007	CHF "Heart problems"	Every day, take one pill in the morning after breakfast	This pill might make you dizzy when you stand up		E.g., lab test every 12 weeks	Side effects, reaction to meds, etc.	
2006	CHF "Heart problems"	Every day, take one pill at 9 in the morning and take one pill at 6 in the evening					
2006	Headaches	Take two Tylenol pills if you have a headache					
2007	Allergies	Take one Claritin pill in the morning with water					
00	Vitamin supplement	Take one with lunch					

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