INSTITUTE FOR HEALTHCARE IMPROVEMENT
SUMMARY REPORT: 90-DAY PROJECT
Medication Reconciliation
10/31/2007

I. Research and Development Team

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II. Intent

Medication reconciliation consists of three basic steps: verify what medication the patient is actually taking and create a medication list, clarify any medications with the doctor, and reconcile the medication list with what has been ordered. The intent of this project is to focus on medication reconciliation for optimal health from the patient's point of view.

III. Background

The concept of creating an accurate list of medications and using that list when ordering medications has long been a part of health care; however, the formal introduction of medication reconciliation began in 1998.[1] The Joint Commission mandated medication reconciliation for surveyed organizations in 2005.[2] The Institute of Medicine published its comprehensive review, *Preventing Medication Errors*, in 2007.[3] This report clearly validates medication error as a common clinical problem. The evidence in hospital environments is compelling; the evidence in outpatient settings is more sparse but clearly suggestive of unacceptably high error rates. Paradoxically, the lack of documentation in ambulatory environments is a cause for greater concern. If our system for managing medications is fraught with error in an environment where significant controls exist, one could speculate that error rates in the relatively uncontrolled ambulatory environment might be far higher.

The literature supports the finding that specific errors and adverse events are associated with medication reconciliation: 53% of patients had one more discrepancies between the medication history and the physician's admitting orders, 36.8% of which were deemed to be potentially serious;[4] 60% of errors occurred at interfaces of care,[1] with 49% of patients at discharge showing discrepancies between the admission medication list and the discharge orders.[5] A systematic review of medication errors at admission showed 67% medication history errors; 60% to 67% of all patients had a medicine either added or dropped from their regimen that was felt to be in error.[6]

On the surface, medication reconciliation seems simple to do. Simple, however, does not equate to easy. The real challenge comes in implementation. The Joint Commission's data shows that almost 40% of hospitals are failing to reconcile medications at admission, at transitions between levels of care, or at discharge.[7]

During interviews, we identified a number of systemic issues that make this process difficult. No uniformly reliable process for development of a "best available" list exists. Turf battles between providers over responsibility for completion of reconciliation related tasks are common. Providers often perceive technology as the solution rather than as a tool. Major problems exist at the interfaces between levels of care, particularly between inpatient and ambulatory settings. Certain classes of providers are often neglected (e.g., dentists, optometrists).

But there may be an even more deep-seated problem. Clinicians are focused on producing "health care"—i.e., conducting visits, doing procedures, dispensing medication—as opposed to enabling and maintaining optimal health. Anything that interferes with this "health care production" gets marginalized, looked upon as if it is something nice to do but not essential. Providers may view medication management, and medication reconciliation in particular, as interfering with health care production.

IV. Description of Work to Date

Planned Deliverables	Output
Understand the problems with medication reconciliation at various points of care	• We conducted interviews with various clinicians. • We reviewed the literature.
Better understand the problem from the patient's point of view	• We conducted a focus group in Portland, Maine. • We reviewed the results of a focus group in Minneapolis. • The Dallas Fort Worth Survey, conducted by nursing students, was shared with us.
Propose potential improvements that can be tested that will support medication reconciliation for the patient in all sites of care	• Change Package for promoting a personal medication list was developed by Aurora Health Care system along with Consumers Advancing Patient Safety.
Develop driver diagram for medication reconciliation	Completed

Develop segmentation model for what could be expected of various patients	The population can basically be divided into two segments when it comes to personal medication list management: those that are able to manage their medication list either by themselves or with family support and those that not able to manage a list
Plan possible seminar	We have established many contacts throughout the US for the best approaches to reconciliation.
Develop measures	Done

V. Results of the 90-Day Scan

We interviewed a variety of clinicians about reconciliation; here are some of the key comments:

"The list of medications should be what the patient is putting in their mouth. It is not what they were prescribed; it is what they are actually doing." —Ron Stock MD, Peace Health

"It takes a village. Whole communities engage in the work of helping patients and clinicians keep an accurate list." —Doris Hanna, RN, CPNP, ScD, National Initiative for Children's Healthcare Quality

"The approach we took was to get the whole community involved, including patients, community members, clinicians, the retail pharmacists, and the hospital." —Katherine Jones, PhD, PT, The Nebraska Center for Rural Health Research

"The biggest challenge that I had for inpatient medication reconciliation was getting physician and nursing alignment and support." Patient Safety Officer

"The problem needs to be defined and broken into three steps:

1. Verify: Someone sits down and collects the list from the patient and family.
2. Clarify: There will inevitably be holes in the list—a "blue pill" that no one knows what it is, or they know the name but not the dosage. So someone needs to clarify.
3. Reconcile: After obtaining the best available list, there may still be holes and someone will need to decide what needs to be done. You will need to maintain the list for the patient throughout their stay."

—Roger Resar, MD, IHI

Observations from inpatient providers include:

1. Smaller, less complex organizations have been more successful implementing and sustaining medication reconciliation.
2. Employed medical staffs make life easier.
3. Physicians managing patients across levels of care make life easier.
4. Electronic Medical Records are not a panacea; technology is a tool, not a solution.
5. Who has responsibility between/among physicians caring for a patient for reconciling meds?
6. Who is the attending physician and is identification of this individual the answer to #5?
7. Too much focus and time are spent on "the form" rather than on accountability and process.

Observations from outpatient providers include:

1. Medication reconciliation is very time consuming.
2. It is important for clinicians involved in the process to clarify roles and responsibilities.
3. Developing a standardized process is essential.

Interviews with patients revealed both interest and concern surrounding medications. A summary of findings suggests:

1. Patients get most of their information about medications from a source other than their physician.
2. Some of the patients maintain an active list of their medications.
   We surveyed 248 adults from a variety of health care settings in August-September 2006.
   - 160 (65%) indicated they are taking medications on a regular basis.
   - 48 (30%) of those taking medications stated they were carrying some form of a medication list containing their medication information.[8]
3. Patients want to be talked to in plain English.
4. Patients want an easy-to-understand medication list that they can carry with them.

A number of organizations are promoting the use of a personal medication list in a geographic region. For example, OSF Healthcare has been working on medication reconciliation since 2001.[9, 10] During the initial years, they focused on improving reconciliation within the hospital. In 2005, Kathy Haig, RN, Patient Safety Officer for OSF SJMC, and the safety officer at BroMenn Regional Medical Center began working together on a community-wide campaign to promote medication list management. Meeting with various stakeholders over the course of a year, they developed a standardized medication list form that includes, for each medication, the name, strength, dose, frequency, reason for taking it, date that it was added or changed, and prescriber. In addition, the form includes information such as past surgeries, allergies, immunization dates, and health conditions. The form comes with a plastic jacket. The group promoted the use of the medication list throughout the local community of Bloomington-Normal. They used physician

offices, pharmacies, churches, and hospitals as a vehicle for distribution of the tool. They held a press conference to let the community know of its use.

This story illustrates a growing trend within geographic regions to encourage medication list management. Dallas Fort Worth has launched a significant campaign to promote medication list management.[11] They have worked with all the major stakeholders: hospitals, retail pharmacies, physician groups, business and civic organizations, insurance companies, and home care. Some examples of other groups in the US that are working on promoting medication list management in geographic regions include North Carolina Hospital Association, South Carolina Hospital Association,[12] Tennessee Pharmacist Association,[13] Minnesota Alliance for Patient Safety, and Aurora Health Care. Aurora Health Care System and Consumers Advancing Patient Safety worked together, sponsored by a grant from Agency for Healthcare Research, to improve the safety of patients in the outpatient setting. One aspect of this work was to create a process and form for the maintenance of an accurate medication list in the outpatient setting. They developed one toolkit on how to develop a community based partnership council[14] and another on how to create an accurate medication list.[15]

The American Society of Health-System Pharmacists (ASHP) held a summit in June 2007 on continuity of care in medication use. During the summit, they worked on the key data that an individual should carry with them about their personal medication list. ASHP will soon publish their work in the *American Journal of Health-System Pharmacy*. They also plan to launch a campaign to promote the use of a personal medication list.[16] My Medicine List" is available on http://www.ashpfoundation.org.

Finally, the Joint Commission International, along with the World Health Organization, has recommended "patient, families and caregivers keep and maintain an accurate medication list."[17]

Although the literature to support medication list management is limited to a few articles,[18, 19] this is a practical strategy to support better medication management. A reasonably comprehensive medication list will support medication reconciliation in all settings of care, including the hospital. If all patients, or at least high-risk patients, present to our hospitals with a reasonably accurate medication list, it will save time and improve the work flow as well as the care.

Even if every person presented to our hospitals with a perfect medication list, hospitals must follow certain key processes to carry out medication reconciliation. The following comes from the IHI How-to Guide, "Prevent Adverse Drug Events (Medication Reconciliation)."[20]

Tips and Tricks: Preventing Adverse Drug Events by Implementing Medication Reconciliation

More than 3,000 hospitals across the US have been working hard to implement the Campaign interventions. Here are some of the "tips and tricks" for successful testing and implementing of

each intervention that we have gathered from our site visits to Campaign hospitals, our Campaign calls, and our Discussion Groups on IHI.org.

General tips for implementing medication reconciliation:

- Put the patient first.
- Take the time to understand the existing medication process in your organization to determine how medication reconciliation fits in.
- Implementing medication reconciliation surfaces defects in the medication system. Determine how many existing safe practices should be in place before implementing a successful medication reconciliation process.
- Senior leadership and clinical leadership must support the hospital's efforts to implement medication reconciliation.
- Test different processes; one process may not work for all patients and situations.
- Do not let "waiting to develop the perfect system" slow you down.
- Be aware that there may be additional work for staff.
- Reducing rework may offset some of the time invested in medication reconciliation at admission.
- Use clinical judgment to determine when medication reconciliation applies.
- Use stories of errors and rework to engage staff.
- Develop reliable processes that do NOT rely on vigilance and hard work to ensure their success.
- Take advantage of habits and patterns.
- Contact other hospitals for ideas that you can test in your own hospital.

Tips for collecting an accurate medication list:

- Collect the best list you can. Learn why the list is not complete and work on how to address these gaps.
- List the source of information: this may be useful in determining the reliability of the medication list.
- Defer to the person who is in the best position to collect this information—nurses, pharmacists, pharmacy technicians, residents or physicians.
- Involve pharmacists with high-risk patients or those with complex medication regimens.
- Develop a standard interview sheet to improve the information collected.
- Segment patients: collect medication histories from pre-op patients during pre-op screening. One process may not work for all patients.
- In all cases, interview the patient to confirm the dose and the frequency for each medication the patient is taking.
- If a patient has a caregiver, interview that individual to obtain a medication history.
- Clarify responsibilities for completing this process.
- Collaborate with other health care facilities to develop a common format for a patient's own medication list.

- Engage patients: Inform them of the importance of carrying this information with them as they visit different care providers.

Tips for streamlining the medication reconciliation process on admission:

- Incorporate the medication history into existing forms.
- Determine if the medication history form can be used as an order form.
- Use technology to download information from an electronic health record.

Tips for completing medication reconciliation on transfer:

- Identify when medication reconciliation applies:
  - Any time the organization requires that orders be rewritten
  - Any time the patient changes service, setting, provider or level of care and new medication orders are written
  - For transitions not involving new medications or rewriting of orders, the organization determines whether reconciliation must occur.
- Develop policies and procedures to guide staff.
- Ensure that the original medication list is available at the time of transfer.
- Identify who is responsible for completing medication reconciliation.
- Develop a process to assist specialists ordering medications with which they have little familiarity.

Tips for completing medication reconciliation on discharge:

- Print medications from the pharmacy profile onto a form that can be used as a discharge order.
- Involve pharmacists in discharge reconciliation.
- Develop a process to assist specialists ordering medications with which they have little familiarity.

Tips for completing medication reconciliation for patients undergoing ambulatory procedures and emergency department:

- Determine if medication reconciliation applies.
- Differentiate the need for a medication history and the need for medication reconciliation.
- Segment the patient population; one process may not work for all patients.
- Review JCAHO's description of "minimal medication use".
- Adopt one form to begin medication reconciliation in the ED that can be used whether or not the patient is admitted.

Tips for working with others:

- Engage physician offices, asking that they keep the patient's medication list current.
- Develop a standardized medication list for your region or state.
- Involve patients in developing the form.

- Publicize the importance of medication reconciliation on local cable TV outlets, church bulletins, senior center newsletters, and local press.
- Use "brown bag" events to review medications. Provide each patient with an up-to-date medication list.
- Work with community pharmacies to improve communication about medication histories

The above recommendations from the IHI How-to Guide establish a great beginning. In addition, a number of references discuss how organizations have successfully implemented medication reconciliation.[1, 9, 21-24] The following recommendations represent potential solutions to some of the problems that organizations have encountered:

1. Consider discussion of a community-wide formulary; include all community providers and payers.

2. Consider establishing the inpatient equivalent of a "medical home" to minimize the consequences of transitions among multiple physicians.

3. Consider implementation of team-based care and an integrated admission assessment. ThedaCare accomplishes admission assessments using a team approach in which the attending physician, the primary care nurse, and the unit pharmacist conduct their evaluation simultaneously with the patient and the patient's significant others present. Medication reconciliation is embedded in this process.

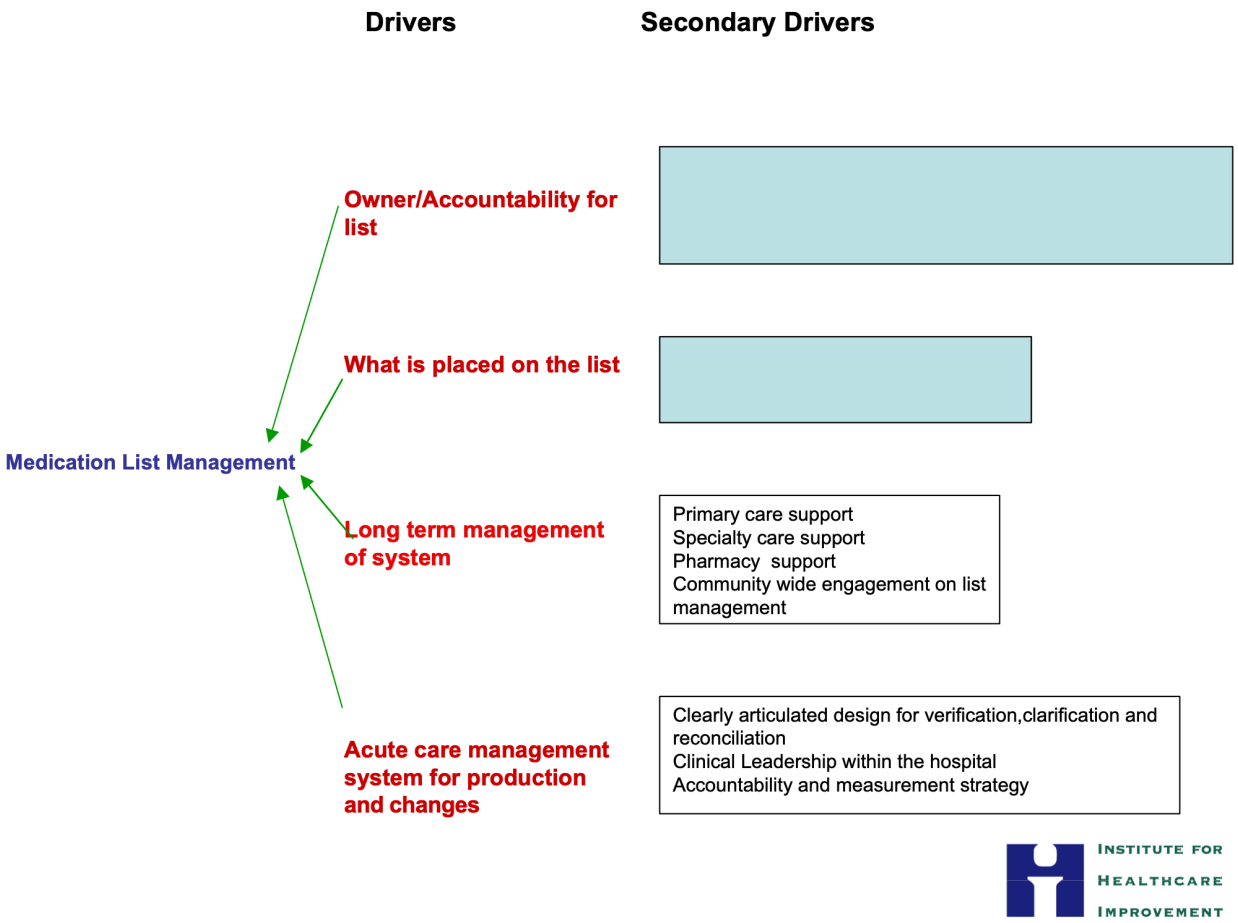
4. Resolve issues about physician responsibility for patients admitted for surgical procedures.

5. Engage the patient and/or the patient's caretakers in active discussion of medications, particularly at admission and discharge.

6. Ensure that the patient leaves the hospital at discharge with an accurate list of medications in understandable language, and use "teach-back" and "show back" to assess the patient's comprehension.

7. Specifically review medication changes that occur in association with transfers between levels of care.

8. Develop a clearly articulated process for each step of medication reconciliation: verification, clarification, and reconciliation. Be sure that the process takes into account human factors design. Be very specific about the *who*, *what*, *where*, and *when* for this process.



The driver diagram above illustrates the requirements for managing a medication list across the continuum from the patient's point of view.

Measures
One measure of medication list management across the continuum would be the percent of patients from a community who present to either the ER or hospital with a written medication list. A similar measure would be the percent of patients presenting to a clinician's office with a medication list. You could also determine the accuracy of the medication list by interviewing the patient and comparing the interview to what the patient actually has written down. At Peace Health they have measured the reliability of the medication list management in the ambulatory setting by having the patient answer two questions when they leave the office : 1) did the MD review your meds with you? 2) did they offer or give you a copy of your updated med list?

IHI has also developed measures for the effectiveness of hospital medication reconciliation (please see IHI How-to Guide).[20]

VI. Technology Implications

Technology is an important consideration when it comes to medication list management and reconciliation. Many hospitals and some physician offices have some form of an electronic medical record that they use for medication management including medication reconciliation. Many insurance companies through their pharmacy benefits management companies keep fairly extensive records on medication. Pharmacy benefits databases are updated through pharmacy adjudication of claims for medications purchased by patients. If a prescription is ordered, but not filled, the prescription will not appear in the database. The challenge is getting these systems interfaced, keeping information up to date, and having all clinicians support data entry and update into these systems.

One analysis of an electronic medication list showed that only 5% of the patients had a completely accurate list.[25] However, if the list is kept up to date, then an electronic medical record can be a great tool to assist the medication list management process. The electronic medication list can be used as a starting point to have a conversation with the patient; the list can never be a replacement for the conversation with the patient. Brigham and Women's Hospital uses this method; they have an electronic tool that generates a medication list based on prior hospitalizations and outpatient visits. They review this list with the patient, making any necessary changes to the list and ordering based upon what the patient is actually taking. Because the list is managed by and coupled to orders from the physician, the system is more complete and hence more effective than other electronic approaches to reconciliation for hospitals. Other approaches that have separated list management from order management do not appear to be as effective.

VII. Conclusions and Recommendations

Medication reconciliation has become too complex. Two experts in the field that we interviewed both said essentially the same thing: "Reconciliation is pasting a solution on top of a broken medication management system that fundamentally doesn't work." It appears that too much has been added to the process of medication reconciliation. Medication reconciliation is only one part of the process of medication management. The focus should be on getting, using, and maintaining the best possible personal medication list throughout the continuum of care. The list is what the patient is actually taking; it is not what has been prescribed or what has been dispensed. Based on the above items, technology is a tool to help support the work; it is not the answer by itself.

There are now examples of entire geographic regions working on producing the best available medication list. Overall, we have failed to involve the patient in the development of the solution. One noticeable exception to this has been Aurora Health Care, along with CAPS, which has developed community-based advisory panels that help create the solution for a personal medication list for citizens of that region.

We suggest the following recommendations to improve medication reconciliation:

1. *Promote the use of a personal medication list in a geographic region.* ASHP will be promoting this. Aurora Health Care, along with CAPS, has developed a Change Package for this work.[14, 15]

2. *Improve medication reconciliation in the inpatient setting using the present How-to Guide,[20] along with the recommendations in this paper.* In particular, focus on creating a clearly articulated process for verification, clarification, and reconciliation. Apply the IHI reliability framework to medication reconciliation.[26]

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Appendix

A Wiki was created to support the creation of this technical brief. You will find supporting information at this Wiki that is not included in this technical brief. http://medicationreconciliation.pbwiki.com/?l=S