Medication Reconciliation
Practical Strategies and Tools for Compliance

Molly Clark, PharmD, MHA
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Molly Clark, PharmD, MHA, is senior executive director of quality and safety at Sanford Health. She has been at Sanford since 2007. She earned her Doctor of Pharmacy degree at Drake University in 2003 and then completed her postgraduate residency at Northwestern Memorial Hospital in Chicago, where she stayed on as a clinical pharmacist and then moved into a role in patient safety, with a focus on medication reconciliation research. Clark completed her Master of Healthcare Administration degree from the University of North Carolina in Chapel Hill in 2010. In her current role, she oversees quality, patient safety, performance and process improvement, patient experience, and clinical standardization.
Engaging Leadership, Physicians, and Staff in Medication Reconciliation

All levels of an organization must be committed to medication reconciliation to make it a successful quality and patient safety strategy. With all the change occurring in healthcare, medication reconciliation is likely one of many competing initiatives. Therefore, it is imperative that everyone—from your senior leadership team to physicians and your clinical team involved in your medication reconciliation process—get engaged. Here are some steps to get that engagement underway:

- First, it is essential that everyone understands the reason why they are doing medication reconciliation. This can be done by presenting a review of the literature, summarizing regulatory requirements, and sharing case studies.

- Second, leadership needs to understand the operational implications of medication reconciliation so they can make informed decisions about policies, procedures, and resources.
• Lastly, among all the changes and initiatives, a strong case needs to be made for putting medication reconciliation on the list of organizational priorities.

This chapter will assist you in your efforts to educate and engage leadership, physicians, and staff on the importance of medication reconciliation and the potential impact it can have on patient safety, regulatory readiness, and in some cases, pay for performance (P4P) programs.

Let’s start with how to get your leaders, physicians, and staff to understand the reason why they are doing medication reconciliation. Remember, it is important to start with the “why” message to make sure everyone agrees on the importance of the process. Once you have engagement from leaders, physicians, and staff, you can move to the “how.” If you start with the “how,” many people will get overwhelmed with the details and miss the important message of why this is so important from a patient safety perspective.

To begin, use current literature as a starting point to make the case for why we need to do medication reconciliation. There is a plethora of articles related to medication reconciliation, so doing a summary of the key points will engage those that need hard facts and evidence to accept the need to do medication reconciliation. Figure 1.1 includes a summary of current literature that can be used as talking points in crafting presentations or communications with leadership, physicians, or frontline staff. This is by no means a comprehensive review of the literature, but it highlights data published to support the process of medication reconciliation and the effects on patient safety.
The following summarizes the case for medication reconciliation based on current literature:

- Research shows that pharmacist-obtained medication histories and reconciliation upon admission can potentially prevent harmful medication discrepancies, prevent medication errors, and therefore positively impact patient care (Lee, Varma, Boro, & Korman, 2014; Provine, Simmons, & Bhagat, 2014).

- One study reports cardiovascular medications account for the most discrepancies and are the most common causes of adverse events (Downes, O’Neal, Miller, Johnson, Gildon, & Weisz, 2015).

- Embracing new patient centered technologies such as a consumer-based kiosk in which patients can enter medication information can help providers retrieve patient medication lists from many locations and allow patients to engage in their care (Lesselroth, et al., 2009).

- One study demonstrated the cost savings to healthcare organizations when medication reconciliation is performed by pharmacists. The cost associated with the amount of time pharmacists spent reconciling medications with patients was minimal compared to net savings attributable to error avoidance (Sebaaly, et al., 2015).

- The number of potentially preventable medication errors during admission is approximately 22%, and increases to 66% during transitions to or from the ICU, and is 12% in the course of discharge. In the inpatient setting, 38.6% of medication errors could cause moderate-to-severe discomfort or clinical deterioration (Conklin, Togami, Burnett, Dodd, & Ray, 2014).

- According to a study conducted at an academic medical center, after implementing a discharge reconciliation process medication errors were reduced from 90% to 47% on the surgical unit and from 57% to 33% on the medicine unit (Murphy, Oxencix, Klauck, Meyer, & Zimmerman, 2009).

- In an outpatient family medicine clinic medication reconciliation conducted by clinical pharmacists identified and resolved 2,164 medication discrepancies in one year. This resulted in improved and more accurate electronic health record medication lists (Milone, Philbrick, Harris, & Farris, 2014).
Sixty-six percent to 71% of adverse events are associated with medications when patients are discharged from the hospital to home. Furthermore, 77% of patients receive inadequate medication instructions when they are discharged from the hospital. Medication assessment and reconciliation performed by pharmacists three to seven days after patients are discharged decreases readmission rates and provides cost savings (Kilcup, Schultz, Carlson, & Wilson, 2013).

A number of studies reported that pharmacists obtain more complete and accurate medication histories. Teaching medication history taking in medical schools could have a positive impact in students’ knowledge and comfort in interviewing patients regarding medications (Gleason, K., et al., 2010).

The number of people in the United States harmed by medication errors is at an estimated 1.5 million, most of them occurring at the time of transition of care. Pharmacist-led interventions such as medication reconciliation and patient education can reduce such errors, decrease readmission rates, and improve patient outcomes (Zemaitis, 2016).

One study reported pharmacy technicians having fewer discrepancies when collecting medication histories than physicians (Pilegaard-Henriksen, Noerregaard, Croft-Buck, & Aagaard, 2015).

Researchers studying medication discrepancies in an internal medicine setting found that two out of five patients studied had medication errors at discharge (Bishop, Cohen, Billings, & Thomas, 2015).

According to one study conducted at an acute academic hospital, the number of patients experiencing postdischarge medication errors was 36 out of 83. Eighty-six percent of the errors were of moderate harm (Riordan, Delaney, & Grimes, 2016).

In addition to using talking points, include internal data, case studies, and pilot program results your organization has collected. You’ll find that while some people will relate to literature reviews, others are more influenced by data collected at their organization.
When preparing any communication, it is important to know and cater the message to your audience. The presentation you give to your senior leadership will be different from the presentation you give at a staff meeting of frontline caregivers. The same is true if you are presenting to different disciplines such as physicians, nurses, pharmacists, etc.

To make the greatest impact while presenting, make sure to always support your communication efforts and presentations with data. Either external data from the literature or your own can be effective. You may find that in some situations, using a combination of external and internal data is a very effective way to engage leaders, physicians, and staff. Two key messages that will speak to the need to make medication reconciliation a priority in your organization are: the positive impact it will have on patient safety; that successful processes will help achieve compliance with all regulatory requirements.

**Business Case for Medication Reconciliation**

After gaining support for medication reconciliation, there is still a need to build a business case. Especially for your leadership, which is balancing the need to have a successful medication reconciliation process with many other organizational priorities. The reality of healthcare today is leaders are challenged to meet all regulatory requirements and deliver high-quality, safe care, but all at a lower cost. This environment makes it essential that a business case is brought forward that balances the cost of doing medication reconciliation with the positive impact it has on patient outcomes, the reduction of medication errors, and the operational efficiencies it can bring by having a successful, streamlined medication reconciliation process.
To start working on your business case, it is helpful to have internal data. Inserting your own internal data into a business case helps bring home the point of prioritizing medication reconciliation as an organization and helps justify additional resources to effectively implement medication reconciliation and decrease patient harm. This can be captured through your current medication reconciliation processes. If it isn’t feasible to utilize internal data, you can use external data published in the literature.

Previously, business models have been published as part of the Medications at Transitions and Clinical Handoffs (MATCH) toolkit and in the previous edition of this book. Following is a review of that original material.

The Institute of Medicine and others in the literature have published data that a certain percentage of people admitted to a healthcare organization will experience a discrepancy in their medication regimen, and a certain percentage of those discrepancies will lead to an adverse drug event (ADE) that could seriously harm a patient. The literature sets the cost of a preventable ADE at $4,800 per event based on a 1997 study (Bates, et al., 1997). Some organizations have calculated an ADE to cost as much as $10,375 (Jha, et al., 2001).

See Figure 1.2 for a financial model for medication reconciliation developed by Steven B. Meisel, PharmD, the director of medication safety at Fairview Health Services in Minneapolis.
**FIGURE 1.2** How to calculate gross cost savings from medication reconciliation

<table>
<thead>
<tr>
<th>Calculation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of discrepancies per patient</td>
<td>Number of patients per year that one person can reconcile</td>
</tr>
<tr>
<td>x</td>
<td>Percent of patients with discrepancies that would result in an adverse drug event (ADE)</td>
</tr>
<tr>
<td>x</td>
<td>Percent effectiveness of process</td>
</tr>
<tr>
<td>x</td>
<td>Cost of an average ADE</td>
</tr>
<tr>
<td>=</td>
<td>Annual gross cost savings</td>
</tr>
<tr>
<td>- Salary of employee</td>
<td>Annual net savings</td>
</tr>
</tbody>
</table>

Source: Steven B. Meisel, PharmD

Fairview’s internal data shows that an effective medication reconciliation process can detect and avert up to 85% of these discrepancies. It takes an estimated 15 to 30 minutes to do effective medication reconciliation on admission. With these assumptions in mind, Meisel outlined the calculations in Figure 1.2.

To calculate the net cost savings, subtract the cost of the anticipated resource investment (e.g., staff, equipment, IT) from the gross cost savings. In Figure 1.3, Meisel gave the conservative model for savings from a medication reconciliation process that uses pharmacy technician resources to reconcile medications on admission to Fairview. Net savings will vary depending on the type of staff you decide to perform medication reconciliation (e.g., nurse, pharmacist, pharmacy technician, or physician).
FIGURE 1.3 How to calculate net cost savings from medication reconciliation

1.5 (discrepancies per patient admitted to Fairview) 
\times 6,000 patients (average of 20 minutes/patient to complete med rec) 
\times 0.01 (1% of Fairview admissions experience discrepancies that would result in an ADE) 
\times 0.85 (85% of discrepancies avoided through med rec process) 
\times $2500 (conservative cost of an ADE) 

= $191,250 annual gross savings 
- $45,000 (salary and benefits of an incremental pharmacy technician) 
= $146,250 annual net savings (325% return on investment in a new staff member)

Source: This model was presented by Steven B. Meisel, PharmD at the Joint Commission/Institute for Safe Medication Practices Medication Reconciliation Conference, 11/14/05.

Steve Rough, MS, RPH, director of pharmacy at the University of Wisconsin Hospital and Clinics, developed a template to use for pharmacist justification for medication history collection and reconciliation on admission to an organization. See Figure 1.4 for an adaptation of the template based on data collected during the MATCH study.
Making Medication Reconciliation an Organizational Priority

**FIGURE 1.4** Pharmacist justification for medication history collection and reconciliation on admission

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Average # of discrepancies/med errors per patient</strong></td>
<td>2.5</td>
</tr>
<tr>
<td><strong>Number of inpatient admissions per year</strong></td>
<td>43,312 (2006)</td>
</tr>
<tr>
<td><strong>Potential med errors per year that can be avoided</strong></td>
<td>95,286 (2.2 x 43,312)</td>
</tr>
<tr>
<td><strong>Percent of medications that were potentially harmful to patient during hospitalization</strong></td>
<td>2.5%</td>
</tr>
<tr>
<td><strong>Number of harmful medication errors avoided per year</strong></td>
<td>2,382</td>
</tr>
<tr>
<td><strong>Annual gross savings to hospital ($4,800 per harmful error)</strong>**</td>
<td>$11,434,320</td>
</tr>
<tr>
<td><strong>Average pharmacist time requirement per admission</strong></td>
<td>21 minutes</td>
</tr>
<tr>
<td><strong>Additional pharmacist FTE needed to provide service (based on 115 admissions daily)</strong></td>
<td>~ 5 FTE</td>
</tr>
<tr>
<td><strong>Cost of additional pharmacist FTE (salary + benefits)</strong></td>
<td>$625,000</td>
</tr>
<tr>
<td><strong>Annual Net Savings</strong></td>
<td>$11.4M</td>
</tr>
</tbody>
</table>

*Based on an evaluation of 651 general medicine patients interviewed by a research pharmacist who obtained a complete medication history and reconciled medications with other documented medication histories and current orders.


The same template can be applied to other disciplines as well as other transitions in care. By using published error data or by looking at error data at your own institution, you will be able to calculate the number of harmful medication errors per year that can be avoided by doing medication reconciliation. Then by applying a dollar amount to each ADE, you can calculate gross annual savings for the amount of ADEs that can be avoided by doing medication reconciliation. Next, by plugging in numbers on the count of inpatient discharges per year and the time of medication reconciliation on discharge, you can estimate additional FTEs needed on discharge. By applying the cost of an
FTE for additional staff, you can subtract the cost of the added staff from the annual gross savings of preventing a harmful medication reconciliation error to get the annual net savings of increasing staffing resources to do medication reconciliation on every patient.

See Figure 1.5 for examples of time requirements a pharmacist would need to obtain medication histories and perform medication reconciliation. This information will be helpful if used to calculate the number of pharmacist FTEs needed if your organization decides to implement a pharmacist medication reconciliation program that involves obtaining medication histories and performing medication reconciliation.

![FIGURE 1.5](time_requirements.png)

**FIGURE 1.5 Time requirements for pharmacist-obtained medication histories and reconciliation**

<table>
<thead>
<tr>
<th>Description</th>
<th>Time Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average time to obtain medication history</td>
<td>9 minutes/patient</td>
</tr>
<tr>
<td>Average time to obtain medication history and provide necessary interventions/documentation</td>
<td>12 minutes/patient</td>
</tr>
<tr>
<td>Average time for chart review prior to medication history, medication history interview, and necessary interventions/documentation</td>
<td>21 minutes/patient</td>
</tr>
</tbody>
</table>

*Based on an evaluation of 651 general medicine patients interviewed by a research pharmacist who obtained a comprehensive medication history and reconciled medications with other documented medication histories and current orders.*

These business case models can be strengthened by using internal data from pilot programs in your own organization. For example, average times to do medication reconciliation may vary based on your patient population. Internal
Making Medication Reconciliation an Organizational Priority

Pilots done at Sanford Health show that pediatric medication reconciliation averages 13 minutes per patient, preoperative patients average 18 minutes per patient, while emergency department patients average 16 minutes. Also, the number of discrepancies will vary based on those patient populations, which will impact the total savings. By calculating the potential savings, it may help you and your leadership prioritize your medication reconciliation resources to the areas of greatest impact.

In summary, don’t underestimate the need to get everyone on board with medication reconciliation. Take the time to make your case for why this is such an important strategic initiative for your organization. Gather impactful data that will speak to your clinical team and build a business case that engages your senior leadership. Your program will be much more successful when the entire team is engaged and supportive of your program.

References


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Medication reconciliation is a crucial step in preventing medical errors, and it has become an increased focus of regulators across the healthcare continuum as organizations concentrate on improving patient safety and quality of care.

Medication Reconciliation: Practical Strategies and Tools for Compliance focuses on establishing a reliable medication reconciliation process for patients as they move from setting to setting. Maintaining the accuracy of a patient’s medication list is at the heart of medication reconciliation. This book will provide a framework to ensure the prevention of medication-related errors and bring a fresh perspective to an issue that has plagued healthcare facilities for decades.