

# Understanding and Improving Medication Reconciliation Between Hospitals and Nursing Homes

## Patient Safety Risk and Cost in Care Transitions

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*Stratis Health, based in Bloomington, Minnesota, is a nonprofit organization that leads collaboration and innovation in health care quality and safety, and serves as a trusted expert in facilitating improvement for people and communities.*

## Understanding and Improving Medication Reconciliation Between Hospitals and Nursing Homes

### Executive summary

A lack of consistent protocols across care settings in medication reconciliation results in challenges and problems in care transitions between hospitals and nursing homes.

In the absence of quantifiable research, this paper estimates the time spent to address medication reconciliation issues in care transitions between hospitals and nursing homes, using three common transition examples: 1) incomplete indication and diagnosis information, 2) inappropriate dosing, and 3) psychotropic medications prescribed for a hospital event that continue to be administered in the nursing home.

The paper makes three recommendations, based on research and on the quality improvement experience of the authors, intended to lead to action by hospitals, nursing homes, and pharmacists to improve the medication reconciliation process. These recommendations also can inform policy and regulatory considerations and action:

1. Implement interventions that assure indications and diagnoses are documented for all prescribed medications
2. Increase pharmacy's role in medication reconciliation during transitions of care
3. Implement an interdisciplinary approach to medication reconciliation that occurs before or during the care transition and that includes hospital, nursing home, and pharmacy staff.

### The problem

Medication management is one of the most significant factors contributing to unnecessary hospital readmissions. The majority of medication errors occur during times of transitions, approximately half of hospital related medication errors and 20 percent of adverse drug events are due to poor communication at transitions.<sup>1</sup> Approximately half of adults experience a medical error after hospital discharge, and 19 percent to 23 percent experience an adverse event, which is most commonly related to medications.<sup>2</sup> An estimated 60 percent of post-discharge adverse drug events can be prevented or improved with intervention.<sup>3</sup> The Institute of Medicine (IOM) estimates that the total national cost (lost income, lost household production, disability and health care costs) of preventable adverse events—medical errors resulting in injury—are estimated to be between \$17 billion and \$29 billion, of which health care costs represent over one half.<sup>4</sup> Improved discharge procedures can have a major impact on preventing these events.<sup>5</sup>

Today's medication reconciliation processes in care transitions from hospitals to nursing homes have numerous issues that impact patient safety and result in significant time diverted away from patient care. In the absence

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of available research to quantify the issue, this paper provides examples of common workflows to illustrate the problem.

Medication reconciliation, which includes an evaluation of the patient's current health status, affects all patients as they move between health care settings. The medication reconciliation process reduces medication errors and patient harm by comparing a patient's current medication regimen against the physician's admission, transfer, and or discharge orders to identify discrepancies.<sup>6</sup> The medication reconciliation process includes:

1. Obtaining and verifying a patient's medication list, including both prescription and over-the-counter medications, prior to an admission or a transition,
2. Considering a patient's home medication list when ordering medications upon institution admission
3. Noting and clarifying all unexplained discrepancies (e.g., those not resulting from and documented about the patient's clinical condition, formulary changes) between the pre-admission medication list and admission medication list with the prescriber

Although patients frequently have multiple sources of medications, the health care system has no protocol for documenting medications consistently across care settings. Currently, these processes are completed by various disciplines throughout the health care continuum in transitions of care.

Accurate and complete medication reconciliation can prevent numerous prescribing and administration errors. The Joint Commission's sentinel event database includes more than 350 medication errors resulting in death or major injury for 2013. Of those, 63 percent are related, at least in part, to breakdowns in communication; and approximately half of those would have been avoided through effective medication reconciliation.<sup>7</sup>

## Examples of issues during medication reconciliation

The following are three real-life examples of common medication issues that occur in transitions of care from hospital to nursing home which illustrate the problem and the importance of improving the process. These common situations have potential for causing harm to the patient/resident and costing the health care system significant dollars and resources in correcting these issues post-admission.

### Example 1: Missing Indication and/or Diagnosis

An elderly male is admitted to a long term care facility from a hospital with orders for Norvasc, Simvastatin, Zolof, and the ACE-inhibitor: Ramipril 5 mg daily. No indications or diagnoses are listed for these medications on the discharge orders from the hospital.

None of the patient's/resident's orders for the prescribed medications include an indication or diagnosis. However, the discharge orders have a diagnosis list. This list includes hypertension, osteoporosis, depression, heart failure, and history of myocardial infarction (six months prior to this hospitalization), diabetes, hyperlipidemia, and mild renal impairment.

### Risk and Cost

Medications are prescribed for multiple disease states. How medications are monitored and doses are adjusted requires a clear understanding of the indication or diagnosis for which it was prescribed. The admitting nursing home is required to have an indication or diagnosis for all prescribed medications. For every missing indication or diagnosis, nursing home staff must backtrack through the health care system to obtain one.<sup>8</sup> Nursing home staff report that this process often takes hours, and sometimes even days, after an admission.

The following describes a common post-admission workflow for a nursing home that seeks clarification on missing indications/diagnosis for prescribed medications:

1. Nursing home medical director or nurse practitioner reviews the incomplete orders and decides which medications must be held, discontinued, or given while waiting for clarification based on the information available and the condition of the resident.
2. Nursing home nurses and unit coordinators identify which items need clarification and complete the electronic health record (EHR) form and/or fax or call the discharging hospital with a request for review to receive clarification.
3. At the discharging hospital, nurses, physicians, and medical records personnel try to find missing indications and/or diagnoses and call or fax the nursing home.
4. Nursing home nurses or unit coordinators transcribe the information into their EHR.

The effort to track down a missing indication or diagnosis is estimated to take an average of 9.75 hours (see Table 1) per discharge.

This workflow is a common occurrence in care transitions and causes significant unnecessary health care expenditures and the potential for adverse patient outcomes, as residents may have a delay in receiving the right medications at the right time for the most therapeutic and safest benefit while waiting for these clarifications.

If the reconciliation does not occur and providers make assumptions about indications or diagnosis, the medical history can become distorted and potential inaccuracies can persist in a patient’s record.

No studies are available which describe the time required for rework due to poor reconciliation. This paper estimates the time per task in addressing medication issues. While not a research project, these estimates reflect the experiences of nursing homes and hospitals. Table 1 outlines the excess cost associated with missing indications and/or diagnosis.

**Table 1: Cost of Health Care Professionals Time for Medication Reconciliation for Medication Lists with Missing Indications and/or Diagnosis**

Task	Time (hrs)	Profession	Cost/hr*
Nursing home notices orders are incomplete when it processes the hospital discharge orders	0.25	Registered Nurse	\$33.13
	0.25	Health Unit Coordinator	\$16.80
Nursing home staff contact hospital staff to track down medications prescribed without indications/diagnoses	1.5	Health Unit Coordinator	\$16.80
	2	Registered Nurse	\$33.13
Hospital staff work to track down indications and diagnosis	0.5	Health Unit Coordinator	\$16.80
	1	Registered Nurse	\$33.13
	0.25	Physician	\$92.95
Nurse practitioner reviews medication lists with revised orders	1	Nurse Practitioner	\$45.71
Nursing home continues to process orders as clarification is received	1.5	Health Unit Coordinator	\$16.80
	1.5	Registered Nurse	\$33.13
<b>Total</b>	<b>9.75 hrs</b>		<b>\$289.32</b>

\*Average hourly wage, not fully loaded (Bureau of Labor Statistics 2014) (based on average of 14 medications/resident). Time was estimated based on field experience.

### Example 2: Inappropriate Dosing

A 76-year-old female patient is discharged from hospital to nursing home with an order for Ambien 10 mg at bedtime, which is acceptable in the hospital setting. The patient tolerated this dose in the hospital.

### Risk and Cost

The recommended maximum Ambien dose for an elderly female patient is 5 mg at bedtime in the nursing home.

**The time required to correct a prescription could be saved if medication reconciliation is done using an interdisciplinary approach.**

The following describes a common post-admission workflow for a nursing home that identifies a medication discrepancy between acceptable practicing standards for hospitals and nursing homes:

1. Nursing home enters the order into the patient's medication administration record (MAR).
2. In the absence of knowledge of the medication's prescribing history, the dispensing pharmacy fills the order and delivers it to the nursing home.
3. Nursing home receives and processes the order by logging it into their controlled medication accountability tracking system and locking the pills in the drug storage area.
4. Nursing home pharmacy consultant reviews the post-admission medication list, typically two to 30 days post admission.
5. Consultant identifies Ambien dose may be too high for this patient based on individual patient assessment and recommends to the interdisciplinary team to reduce the Ambien dose to 5 mg.
6. The interdisciplinary team reviews the recommendations made by the pharmacy consultant and initiates changes to medications based on the findings.
7. The nurse generates the paperwork or EHR request, which is submitted to the director of nursing who reviews the changes and gives final approval.
8. The nurse manager addresses the issue with the patient's primary care physician through fax or face-to-face communication.
9. Physician writes a new order for the 5 mg Ambien dose and faxes the order to the nursing home. The physician also faxes the new order to the pharmacy because of controlled medication laws.
10. Nursing home removes the previous order from the resident's MAR. They log it out of their accountability tracking system, document the medication for drug disposal, and then properly dispose of the medication.
11. Nursing home receives and processes the new order by logging into their controlled medication accountability tracking system and locking it in the drug storage area.
12. Pharmacy processes the order to fill the medications. They remove the old order from their prescribing record and add the new order. The pharmacy fills the order and delivers it to the nursing home.

The potentially inappropriate dosing of Ambien could have resulted in a fall due to excessive sedation, a potential side effect of this medication. A medication-related adverse drug event fall could have resulted in a re-hospitalization. In 2010, falls among older adults cost the U.S. health care system \$30 billion in direct medical costs, when adjusted for inflation.<sup>9</sup>

The effort to correct this medication therapy problem is estimated to take an average of 4.3 hours (see Table 2) over two to 30 days after a resident is admitted to the nursing home.

**Table 2: Cost of Health Care Professionals Time in Medication Reconciliation for Medication Lists with Inappropriate Dose**

Task	Time (hours)	Profession	Cost/hour*
Pharmacy consultant reviews order post admission and identifies inappropriate dose	0.25	Pharmacist	\$56.01
Nursing home interdisciplinary team review	0.5	Pharmacist	\$56.01
	0.25	Registered Nurse	\$33.13
	0.25	Director of Nursing	\$52.11
Nursing home generates request to change order	0.25	Registered Nurse	\$33.13
	0.25	Director of Nursing	\$52.11
	0.25	Physician	\$92.95
Physician writes new order for new medication	0.25	Physician	\$92.95
Physician office faxes new order to nursing home	0.25	Health Unit Coordinator	\$16.80
Pharmacy processes and fills the new order	0.25	Pharmacist	\$56.01
	0.5	Pharmacy Technician	\$14.83
Nursing home processes the new order	0.25	Health Unit Coordinator	\$16.80
	0.25	Registered Nurse	\$33.13
Nursing home destroys old medication	0.5	Registered Nurse	\$33.13
	0.025	Registered Nurse (witness)	\$33.13
<b>Total</b>	<b>4.275 hrs</b>		<b>\$186.60</b>

\*Average hourly wage, not fully loaded (Bureau of Labor Statistics 2014) (based on average of 14 medications/resident). Time was estimated based on field experience.

### Example 3: Medication Evaluation and Follow-Up

A patient suffering from dementia associated with Alzheimer's is admitted to the hospital after a fall and hip fracture. As is common for patients suffering from dementia, the patient had significant delirium in the hospital post-surgery for which Zyprexa 5 mg two times per day was prescribed.

### Risk and Cost

Upon discharge from the hospital to the nursing home, the patient is continued on the Zyprexa without evaluation for continued delirium and subsequent need for Zyprexa. Further complicating this problem, the recommended maximum dose of Zyprexa to manage an elderly patient is only 5 mg daily, the patient is taking twice this dose.

Nursing homes are working to reduce and eliminate the use of psychotropic medications across the nation as a part of their Quality Assessment and Performance Improvement (QAPI) work.

The following describes a common post-admission workflow for a nursing home while they work to eliminate this medication:

1. Nursing home documents behavior(s) into treatment administration record (TAR) that are to be treated by medication.
2. Nursing home documents interventions in the TAR to use for identified behaviors to be treated.

3. Nursing home obtains psychotropic medication consent form from family identified the risks and benefits of the prescribed medication.
4. Nurse initiates the psychotropic monitoring assessment.
5. Within 30 days, the pharmacy consultant reviews the medication and evaluates therapeutic benefit and effectiveness.
6. Nursing home interdisciplinary review occurs.
7. Physician writes order to have medication discontinued.
8. Nursing processes order to have medication discontinued.
9. Nurse updates the care plan.
10. Nurse communicates change in medication order to family.

The effort to correct this medication therapy problem is estimated to take an average of 4.75 hours (see Table 3) over two to 30 days after a resident is admitted to the nursing home.

**Table 3: Cost of Health Care Professionals Time in Rectifying Psychotropic Medication Prescribed in the Hospital**

<b>Task</b>	<b>Time (hours)</b>	<b>Profession</b>	<b>Cost/hour*</b>
Nursing home documents behavior(s) into (TAR)	0.25	Registered Nurse	\$33.13
Nursing home documents interventions in the TAR	0.25	Registered Nurse	\$33.13
Nursing home obtains psychotropic medication consent form from family	0.5	Registered Nurse	\$33.13
Nurse initiates the psychotropic monitoring assessment	0.25	Registered Nurse	\$33.13
Pharmacy consultant reviews the medication and evaluates therapeutic benefit and effectiveness	0.5	Pharmacist	\$56.01
Nursing home interdisciplinary Review	0.5 0.25 0.25	Pharmacist Registered Nurse Director of Nursing	\$56.01 \$33.13 \$52.11
Physician writes order to have medication discontinued	0.25	Physician	\$95.95
Health unit coordinator begins the documentation to discontinue the medication	.25	Health Unit Coordinator	\$16.80
Nurse verifies and completes the order to be discontinued	.25	Registered Nurse	\$33.13
Nurse disposes of medication	.25	Registered Nurse	\$33.13
Health unit coordinator documents the discontinuation of the behavior intervention	.25	Health Unit Coordinator	\$16.80
Nurse confirms the discontinuation of documentation of the behavior intervention in the Treatment Administration Record	.25	Registered Nurse	\$33.13
Nurse updates the care plan	.25	Registered Nurse	\$33.13
Nurse notifies family in change of medication order	.25	Registered Nurse	\$33.13
<b>Total</b>	<b>4.75 hrs</b>		<b>\$192.53</b>



\*Average hourly wage, not fully loaded (Bureau of Labor Statistics 2014) (based on average tasks time for correcting one anti-psychotic medication). Time was estimated based on field experience.

## Recommended solutions

The IOM reports that careful alignment of regulatory, economic, professional, and other incentives in the external environment is critical if significant improvement in safety is to occur. Regulation and legislative action can influence quality in health care by empowering the CEO and governance of health care organizations to take action to improve quality.<sup>10</sup>

The following is a list of recommendations for improving medication management in transitions of care by improving workflow in health care settings, based on field experience and supported by research. The recommendations are made from a quality improvement perspective, with the intent to give guidance to and support action by hospitals, nursing homes, and pharmacists. These recommendations also can inform policy and regulatory considerations and action.

### 1. Implement interventions to assure indications and diagnoses are documented for all prescribed medications.

Interventions are needed in all health care settings during care transitions to ensure accurate documented indication/diagnosis for medications ordered. Any medication or combination of medications—or the use of a medication without adequate indications, in excessive dose, for an excessive duration, or without adequate monitoring—may increase the risk of a broad range of adverse consequences such as medication interactions, depression, confusion, delirium, immobility, falls, and related hip fractures.<sup>11</sup> A health care professional cannot monitor and care for a patient appropriately without fully understanding why the patient is taking a medication. These interventions may be in the form of a clinical decision support alert in an EHR or implemented as a practice directive from health care leadership requiring the provider to either choose an indication or include a reason an indication was not given.

### 2. Increase pharmacy's role in medication reconciliation during transitions of care.

The pharmacist is a largely untapped resource that should be utilized during all transitions of care. Studies have shown that increasing/including the use of a pharmacist improves the effectiveness of these efforts:

1. The pharmacist's role in managing patient transitions of care from one site to another reduces unnecessary health care utilization and cost as well as benefiting the patient, who remains healthy at home following a hospitalization.<sup>12</sup>

2. Interdisciplinary interventions have a positive impact on outcomes in the nursing home setting. Participation of a resident's primary physician and/or pharmacist are consistent features of successful nursing home interventions.<sup>13</sup>
3. Involving a pharmacist in medication reconciliation during care transitions can have significant cost savings.

### 3. Implement an interdisciplinary approach to medication reconciliation—which includes hospital, nursing home, and pharmacy—that occurs before or during the care transition

An interdisciplinary approach to medication reconciliation is the most effective way to ensure patient safety and decrease costs. Interdisciplinary team-based care represents the most clinically effective way to address chronic disease management.<sup>14</sup>

Studies have shown that an interdisciplinary approach to medication reconciliation improves the effectiveness of these efforts:

- Changes made to integrate patient safety and clinical pharmacy services into the care of a high-risk, ambulatory population can improve all targeted outcomes.<sup>15</sup>
- Potentially harmful medication discrepancies can be significantly reduced through nurse-pharmacist collaboration. These collaborations can be efficient, cost-effective, and improve patient safety.<sup>16</sup>

#### New vision for medication reconciliation in transitions between hospital and nursing home

The future state of successful medication reconciliation in care transitions would include the hospital, nursing home, and nursing home's contracted pharmacy (**interdisciplinary approach**) each proactively reviewing the patient/resident's medications prior to discharge whenever possible. The process would look like this:

1. Patient arrives at the hospital, which has access to a complete medication list that includes all prescription and over the counter medications he/she is taking. This list has current indications/diagnoses for all medications. Hospital staff reviews this list with the patient and/or family for accuracy.
2. Prior to the patient leaving the hospital, the hospital pharmacist coordinates the reconciliation process comparing the discharge medication list with the medication list the patient arrived to the hospital with. The pharmacist also evaluates the discharge medication list for medication therapy problems. The hospital pharmacist communicates any potential questions/concerns with the physician who is writing the discharge orders to resolve them (**increase pharmacy's role**) because the hospital EHR will not allow

the discharge record to be completed if there is not an indication and/or diagnosis for all prescribed medication or else a reason none was included (**clinical decision support alert in EHR**).

3. The hospital pharmacist or nurse ensures the changes made to the medication list are communicated with the patient/family. If the patient is being discharged to a nursing home or other institution (i.e., assisted living), the reconciled medication list is handed off to the nursing home’s contracted pharmacy.
4. The nursing home’s contracted pharmacy evaluates the medication list for appropriateness and reconciles the medication list they received with the existing list in their system if the patient is a returning resident of the nursing home. The contracted pharmacy contacts the hospital pharmacy to resolve any questions/concerns. The nursing home’s contracted pharmacy communicates to the nursing home staff that they have reconciled the medication list with the hospital pharmacy. (**increase pharmacy’s role**)
5. The nursing home’s contracted pharmacy or nursing home staff notifies their pharmacy consultant that a medication reconciliation has been completed prior to the patient being discharged from the hospital. The patient receives the right medication at the right time once they are discharged from the hospital.

Adding a consistent medication reconciliation step prior to hospital discharge, completed by a hospital pharmacist, is estimated to take an average of one hour (see Table 4).

**Table 4: Cost of Health Care Professionals Time for Medication Reconciliation Prior to Hospital Discharge**

Task	Time (hrs)	Profession	Cost/hr*
Medication reconciliation prior to hospital discharge	0.25	Pharmacist	\$56.01
	0.25	Pharmacy Technician	\$14.83
Medication reconciliation/evaluation by nursing home’s contracted pharmacy	0.25	Pharmacist	\$56.01
	0.25	Pharmacy Technician	\$14.83
<b>Total</b>	<b>1 hr</b>		<b>\$35.41</b>

\*Average hourly wage, not fully loaded (Bureau of Labor Statistics 2014) (based on average of 14 medications/resident). Time was estimated based on field experience.

This cost is small compared to the savings from preventing post-discharge adverse drug events.

## Conclusion

The risks and costs of poor medication reconciliation as a patient transitions from a hospital to a nursing home are significant in terms of patient safety, and efficiency and cost to the health care system.

Medication management and medication reconciliation are best viewed as a shared responsibility across all care transitions. Improved patient outcomes and better directed health care dollars can result from improving the medication reconciliation process in transitions of care. We are only beginning to understand how complex and fragmented these processes are, and much more analysis and research needs to be allocated to improve medication safety and medication management.

## Want to facilitate health care quality improvement?

If you would like to discuss ways to improve medication reconciliation during care transitions between hospitals and nursing homes, please contact Stratis Health.



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## References

- <sup>1</sup> Stratis Health. *Health information technology for post acute care (HITPAC) final summary report*. March 2014.
- <sup>2</sup> Coleman EA, Smith JD, Raha D, Min S. Posthospital medication discrepancies: prevalence and contributing factors. *Archives of Internal Medicine*. 2005;165(16):1842-1847.
- <sup>3</sup> Halasymani L, Kripalani S, Coleman E, et al. Transition of care for hospitalized elderly patients-development of a checklist for hospitalists. *Journal of Hospital Medicine*. 2006;1(6):354-360.
- <sup>4</sup> Institute of Medicine. *To Err is Human*. 1999.
- <sup>5</sup> Coleman EA, Smith JD, Raha D, Min S. Posthospital medication discrepancies: prevalence and contributing factors. *Archives of Internal Medicine*. 2005;165(16): 1842-1847.
- <sup>6</sup> Institute for Healthcare Improvement. *How-to guide: Prevent adverse drug events (medication reconciliation)*. 2011.
- <sup>7</sup> Joint Commission on Accreditation of Healthcare Organizations. Using medication reconciliation to prevent errors. *Joint Commission Journal on Quality and Patient Safety*. 2006;32(4):230-232.
- <sup>8</sup> Centers for Medicare & Medicaid Services. *State Operations Manual Appendix PP - Guidance to Surveyors for Long Term Care Facilities*. Rev. 107, 04-04-14.
- <sup>9</sup> Centers for Disease Control and Prevention. *Cost of falls among older adults*. Retrieved on 6/30/14, from <http://www.cdc.gov/homeandrecreationalafety/falls/fallcost.html>
- <sup>10</sup> Institute of Medicine. *To Err is Human*. 1999.
- <sup>11</sup> Centers for Medicare & Medicaid Services. *State Operations Manual Appendix PP - Guidance to Surveyors for Long Term Care Facilities*. Rev. 107, 04-04-14.
- <sup>12</sup> Novak, Hastanan, et al. Improving the transition of highly complex patients into the community: the impact of a pharmacist in an outpatient clinic. *Support Care Cancer*. August 21, 2013.
- <sup>13</sup> Navir, Unroe, et al. Systematic review of interdisciplinary interventions in nursing homes. *Journal of American Medical Directors Association*. 2013 Jul;14(7):471.8.
- <sup>14</sup> Schuetz B, Mann E, Everett W. Educating health professionals collaboratively for team-based primary care. *Health Affairs*. 29 No. 8 (2010): 1476-1480.
- <sup>15</sup> Robbins, Stillwell, et al. Integrating patient safety and clinical pharmacy services. *Journal of Patient Safety*. 2013 June; 9(2):110-7.
- <sup>16</sup> Feldman, Costa Et al. Nurse-pharmacist collaboration on medication reconciliation prevents potential harm. *Journal of Hospital Medicine*. 2012 May-Jun: 7(5):396-401.