

Medication Reconciliation on Hospital Admission

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Objectives

- **Define medication reconciliation as a component of medication management**
- **Describe the impact and importance of medication reconciliation on admission in reducing medication errors and adverse drug events**
- **Present a standardized process for medication reconciliation on admission**
- **Suggest strategies to focus resources on high risk patients, high risk drugs, and high risk conditions for intervention opportunities**

Medication Management

- Safe and effective use of prescription and over-the-counter medications
- Components
 - Medication history
 - Medication reconciliation
 - Medication adherence



http://www.nextstepincare.org/left_top_menu/Provider_Home/ accessed 8/25/10

Medication Management

■ Medication History

- up-to-date listing of all prescription and over-the-counter medications, herbal supplements and vitamins

■ Medication Reconciliation

- comparison of previous medication list to new one
 - resolve discrepancies
 - identify and resolve medication related problems
- should occur whenever there is a care transition, or change in medications or diagnosis

■ Medication Adherence

Medication Discrepancies

- **Unintended or unexplained differences among documented medication lists across different sites of care. Examples are:**
 - **Omissions**
 - **Duplications**
 - **Dose/frequency/route of administration errors**
 - **Drug name discrepant/incorrect**
- **> 50% of patients have at least 1 discrepancy on admission** (Cornish, 2005)
- **Up to 67% of admission medication histories contain errors** (Tam, 2005)

Medication Discrepancies & Adverse Drug Events (ADEs)

- **ADE: an injury resulting from medical intervention related to a drug**
- **Medication discrepancies are an important contributor to ADEs among hospitalized patients**
- **3-28% of admissions are due to ADEs** (Classen, 1997)
- **ADE's are costly** (Classen, 1997; Bates, 1997)
- **LOS ↑ by 4.6 days => \$4,700**
- **Preventable ADE's in a 700 bed teaching hospital cost about 2.8 million/year**

“Emergency Hospitalizations for Adverse Drug Events in Older Americans”

- **2007-2009 National adverse drug event (ADE) data**
 - Looked at frequency & rates of hospitalization of older persons after emergency dept visits due to ADEs
 - 5077 cases with 99,628 emergency hospitalizations for ADEs
 - 2/3 hospitalizations due to unintentional overdoses
 - Highest risk medications (implicated in 67% of hospitalizations)
 - Warfarin (33.3%) – alone or in combination with others
 - Insulins (13.9%) and oral hypoglycemic agents (10.7%)
 - Oral antiplatelet agents (13.3%)

Impact of Medication Reconciliation on Admission

- **Medication reconciliation at admission resulted in 43% reduction in actual ADEs caused by errors in admission orders** (Boockvar, 2011)
- **Medication reconciliation, as part of a package of interventions, decreased the rate of medication errors by 70% and reduced adverse drug events by over 15%** (Whittington, 2004)

Drivers for Improvement

- **The Joint Commission – NPSG 03.06.01**
- **Centers for Medicare & Medicaid Services**
- **Meaningful Use of Electronic Health Records**
- **Partnerships for Patients**

The Admission Medication Reconciliation Process

The Patient is at the Center of the Process!

- **Four Components**
 - **Verification**
 - **Clarification**
 - **Documentation**
 - **Transfer/Transitions**
- **Performed by**
 - **Prescribers, nurses – most common**
 - **Pharmacists – less common**

The Admission Medication Reconciliation Process

Verification of medications upon admission

- Obtain an accurate and complete list of medications the patient is taking prior to admission - the "medication history". Sources include:
 - Patient
 - Family, caregivers
 - Primary care provider
 - Other healthcare providers – nursing home, assisted living facility, home healthcare agency
 - Community pharmacies
 - Past medical records
 - Electronic Health Information Exchange (HIE)

The Admission Medication Reconciliation Process

Verification of medications upon admission

- **What should be included?**
 - **Prescribed medications**
 - **“As needed” medications**
 - **Over-the-counter medications**
 - **Herbals/nutraceuticals**
 - **Vitamins and other supplements**
- **Dose, route, frequency, date & time of last dose**

The Admission Medication Reconciliation Process

Clarification

- Admission orders are reconciled (compared) to medication history list
- Confirm whether differences are intended or unintended
 - Intended: purposeful changes, omissions, additions based on patients clinical status or formulary
 - Unintended: medication discrepancy requires communication with prescriber and resolution of problem

The Admission Medication Reconciliation Process

Documentation

- **Nature of the discrepancy and the resolution should be clearly documented**
- **Final “one source of truth” admission medication list**
 - **Should be in a single location within the medical record**
 - **Easily accessible for all healthcare providers**

The Admission Medication Reconciliation Process

Transfer/transitions

- **Internal transfers**
 - **Should perform medication reconciliation – always go back to admission med rec**
 - **Comparison of admission med rec, admission orders, interim orders and transfer orders**
 - **Document rationale for ALL medication changes**
 - **Admission to ICU increases the risk of unintentional discontinuance of medications for chronic diseases**

Medication Reconciliation Forms

- **Paper – based**
- **Electronic**
- **Hardwire medication rec into order sets**
 - **Embed into workflow, ensure one “live” list**
 - **Consistent implementation in all areas**
 - **Incorporate CPOE (computerized prescriber order entry) and CDS (clinical decision support) rules where appropriate**

MEDICATION RECONCILIATION ORDER FORM

List all patient medications prior to assessment. Include OTCs & alternative meds (herbals). (Alternative meds will not be continued on admission).

Before an outpatient receives any medication as part of their test or procedure, list all of their current home medications looking for allergies, interactions, duplications, or other concerns. A complete reconciliation is required only if the patient is to be admitted to the hospital.

Allergies: _____

DO NOT USE ABBREVIATIONS: .#, #.0, IU, MS, MgSO4, MSO4, QD, QOD, U

Information Source: _____ Patient _____ Family _____ Primary Care Physician
 _____ Patient's Pharmacy(s) _____ (See Back)
 _____ MAR from _____ Other, specify _____

Check here if patient is not currently on any medication.

Medication Name	Dose	Route	Frequency	Last Dose		Physician Decision: Continue? Circle one	
				Date	Time	Y	N
1						Y	N
2						Y	N
3						Y	N
4						Y	N
5						Y	N
6						Y	N
7						Y	N

On the lines below, enter orders for new medications that the patient isn't currently taking or changes to their current regimen.

Completed by _____ Nurse Signature _____ Date/Time _____
(print name)

I have reviewed this list of patient medications and to the best of my knowledge, the additional medications I have ordered will not result in any adverse reaction(s).

Medication Reconciliation Challenges

- **Lack of standardized process, clear ownership**
- **Communication failures**
- **Coordination gaps**
- **Non-formulary medications and therapeutic interchanges**
- **Lack of standardized medication list “source of truth” document**

The MATCH Work Plan

Medications at Transitions and Clinical Handoffs (MATCH) Toolkit for Medication Reconciliation

Engage the patient and caregiver in the medication reconciliation process

- Foundational leadership and team
- Establish charter
- Determine scope
- Define roles and responsibilities
- Develop flow chart of current processes
- Integrate process into workflow
- Develop/redesign medication reconciliation process
- Evaluate process
- Audit and educate

Measuring Effectiveness of the Medication Reconciliation Process: Audit Techniques

Electronic Reports

**Easy, efficient;
assesses
adherence to
process
("quantity"
assessment)**

**Tracks
percent
adherence for
documenting
medications
patient takes
prior to
admission**

**Tracks
percent
adherence in
completing
medication
reconciliation
documentation
form**

**May be able to
sample up to
100% of
patients**

Measuring Effectiveness of the Medication Reconciliation Process: Audit Techniques

Manual Retrospective Evaluation

<p>Time consuming, can obtain percent adherence to process; can assess the effectiveness and patient safety benefits</p>	<p>Tracks quality of medication history verification and documentation</p>	<p>Tracks the type of discrepancies, number of interventions, drug/drug class involved, harm averted, etc</p>	<p>Sample size is determined by the time and resources available for manual auditing</p>
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Measuring Effectiveness of the Medication Reconciliation Process: Audit Techniques

Manual Prospective Evaluation

Independent reviewer performs “concurrent” medication reconciliation within 24 hours of initial admission med rec

Tracks interventions and shows missed opportunities with the current medication reconciliation process

Reviewer can intervene on any missed opportunities and provide real-time feedback to staff for continued process improvement

High-risk areas can be targeted for this evaluation to avoid potential harm (e.g., intensive care units, oncology).

Medication Discrepancy Tool (MDT)

- Adapted from Dr. Eric Coleman, Care Transitions Intervention (CTI) program to identify & characterize medication discrepancies that occur during transitions
- Discrepancies identified are characterized as either patient level or system level to capture wide range of transition related medication problems
- Identify problems, perform root cause analysis, apply system changes to resolve
- Tool can be found at: www.ipro.org/index/ct-tools-intervention-resources

Medication Discrepancy Tool (MDT)

Adapted from Medication Discrepancy Tool at www.caretransitions.org



Medication	Causes and Contributing Factors <i>List all that apply from list below (By Number)</i>	Resolution <i>List all that apply from list below (By Number)</i>
1.		
2.		
3.		
4.		
5.		
Causes and Contributing Factors:		Resolution:
<u>Discrepancies (Patient Level)</u> 1. Adverse drug reaction or side effect 2. Intolerance 3. Did not fill prescription 4. Patient feels they do not need prescription 5. Money/financial barriers 6. Intentional non-adherence (<i>"I was told to take this but I chose not to"</i>) 7. Non-intentional non-adherence (Knowledge deficit – <i>"I don't understand how to take this medication"</i>) 8. Performance deficit (<i>"Maybe someone showed me, but I can't demonstrate to you that I can"</i>)		1. Clinician contacted primary provider and clarified medication regimen 2. Discussed potential benefits and harm that may result from non-adherence 3. Provided resources and information to facilitate adherence 4. Addressed performance/knowledge deficit
<u>Discrepancies (System Level)</u> 9. Prescribed with known allergy/intolerance 10. Discharge instructions incomplete/inaccurate/illegible (includes use of "resume all meds" order) 11. Duplication (<i>Taking multiple drugs with the same action without any</i>		5. Encouraged patient to call their doctor 6. Primary provider will address problem at next visit

Review

- **Unresolved medication discrepancies at admission can lead to medication errors and ADEs**
- **Medication reconciliation on admission can prevent errors and ADEs**
- **Medication reconciliation:**
 - **A team process**
 - **Patient-centered, involve caregivers**
 - **Supported by strong leadership**
- **Root cause analysis of discrepancies on transition identifies opportunities for system improvements**

We Covered:

WHY med rec should be done

WHAT to do, and

HOW to measure it's effectiveness, but

WHO does it?

WHO receives?

“Hospital-Based Medication Reconciliation Practices”

- **Systematic review done to summarize available evidence on medication reconciliation interventions in the hospital setting and to identify the most effective practices**
- **Studies were grouped by type of medication reconciliation intervention and assigned quality ratings:**
 - **Pharmacist related**
 - **Information technology (IT)**
 - **Other (e.g. educating staff, use of standardized tool)**

“Hospital-Based Medication Reconciliation Practices”

■ **Studies included the following interventions – all compared to usual care:**

- **15/26 pharmacist driven**
- **6/26 information technology driven**
- **5/26 other**

■ **Results**

- **↓ medication discrepancies (17 of 17)**
- **↓ preventable adverse drug events (5 of 6)**
- **↓ adverse drug events (2 of 2)**
- **↓ in post-discharge healthcare use (2 of 8 – both studies used intensive pharmacist intervention)**

“Hospital-Based Medication Reconciliation Practices”

- **Common elements of successful interventions**
 - ***Targeting of a high-risk subgroup***
 - **Elderly**
 - **High risk drugs**
 - **History indicates health at risk**
 - ***Institutional support***
 - ***Performing the intervention in a defined population***
 - **Patients to/from a nursing home or home care agency**
 - **Elective surgical admission**

Intensive Pharmacist Intervention

- Medication histories and reconciliation on admission and discharge
- Patient and provider medication counseling during hospitalization
- Communication with the primary care physician on discharge
- Follow-up communication with the patient 2 months after discharge
 - Results
 - 16%↓ the odds of all hospital visits (odds ratio, 0.84; 95% CI, 0.72-0.99)
 - 47% ↓ in emergency department visits
 - 80% ↓ in drug related readmissions in the 12 months after hospital discharge

Who does it?

Allocation of Scarce Resources

- **Clinical Pharmacy Services (CPS)**
- Numerous studies have shown improved economic and health outcomes when CPS is incorporated within collaborative patient care team
- Resolving medication discrepancies is only the tip of the iceberg...pharmacotherapeutic interventions improve patient outcomes even unrelated to ADEs
- Challenge: cost of pharmacist is a perceived barrier

Seton Pharmacy Model

- **Clinical pharmacists deployed on each nursing unit for rounding, not dispensing**
- **Drug orders are processed by the pharmacist as medication specialist on the medical management team side by side with their nurse peers**
- **Pharmacists perform no physical dispensing activities**
- **Health system has saved significant dollars**

Seton Model Intensive Pharmacotherapeutic Review

Involves....

- Drug, Dose, Frequency
- Labs
- H&P, specialty consults
- Health Information Exchange review
- Guideline adherence

In-addition to:

- Identifying and resolving omissions, duplications, etc.

Systems-based Medication Reconciliation: Pharmacist Identified Therapeutic Problems*

Table 1. Common Therapeutic Problems Identified at Discharge

- Inadequate or Inappropriate anticoagulation management: 11%
- Heart failure patient with no diuretic: 4%
- Chronic obstructive pulmonary disease patient with no rescue Inhaler: 6%

- **392 discharges to home healthcare 11/2009-2/2010**
- **Pharmacotherapeutic interventions**
- **254/392 (64.8%) of patients**

- **17% evidence-based or best practice clinical guidance compliance**
- **10% resolution of duplication of therapy, incompatibility, omissions**
- **Savings: \$363 per pharmacotherapeutic intervention**

Seton Model: Tips for Success

Team approach

- Medication Safety Committee

Scrutinize each fall out

- Use of MDT

EHR - hardwire Medication Rec into order sets

Root Cause of Most Errors

- Ineffective Communication
- “Hand Offs” most vulnerable/chaotic

Profiling Patient Risk for Intervention

- **Elderly**
- **On high risk/high alert medication**
 - **ISMP High Alert Medication list**
 - **Institute for Healthcare Improvement High Alert drug classes:**
 - **Anticoagulants, opioid analgesics, insulin, sedatives**
 - **High risk drug classes for nursing home patients:**
 - **NSAIDs, digoxin, insulin, antipsychotics, sedatives/hypnotics, anticoagulants**
 - **Budnitz, et al: anticoagulants, antiplatelets, insulin, hypoglycemics**
- **High risk location/transfer (i.e. nursing home to hospital, ICU to floor)**
- **Health history indicates high risk**

ISMP's List of *High-Alert Medications*

High-alert medications are drugs that bear a heightened risk of causing significant patient harm when they are used in error. Although mistakes may or may not be more common with these drugs, the consequences of an error are clearly more devastating to patients. We hope you will use this list to determine which medications require special safeguards to reduce the risk of errors. This may include strategies such as standardizing the ordering, storage,

preparation, and administration of these products; improving access to information about these drugs; limiting access to high-alert medications; using auxiliary labels and automated alerts; and employing redundancies such as automated or independent double-checks when necessary. (Note: manual independent double-checks are not always the optimal error-reduction strategy and may not be practical for all of the medications on the list).

Classes/Categories of Medications
adrenergic agonists, IV (e.g., EPINEPHrine, phenylephrine, norepinephrine)
adrenergic antagonists, IV (e.g., propranolol, metoprolol, labetalol)
anesthetic agents, general, inhaled and IV (e.g., propofol, ketamine)
antiarrhythmics, IV (e.g., lidocaine, amiodarone)
antithrombotic agents, including: <ul style="list-style-type: none"> ■ anticoagulants (e.g., warfarin, low-molecular-weight heparin, IV unfractionated heparin) ■ Factor Xa inhibitors (e.g., fondaparinux) ■ direct thrombin inhibitors (e.g., argatroban, bivalirudin, dabigatran etexilate, lepirudin) ■ thrombolytics (e.g., alteplase, reteplase, tenecteplase) ■ glycoprotein IIb/IIIa inhibitors (e.g., eptifibatide)
cardioplegic solutions
chemotherapeutic agents, parenteral and oral
dextrose, hypertonic, 20% or greater

Specific Medications
epoprostenol (Flolan), IV
magnesium sulfate injection
methotrexate, oral, non-oncologic use
opium tincture
oxytocin, IV
nitroprusside sodium for injection
potassium chloride for injection concentrate
potassium phosphates injection
promethazine, IV
vasopressin, IV or intrathecal

ISMP'S List of High-Alert Medications

dialysis solutions, peritoneal and hemodialysis
epidural or intrathecal medications
hypoglycemics, oral
inotropic medications, IV (e.g., digoxin, milrinone)
insulin, subcutaneous and IV
liposomal forms of drugs (e.g., liposomal amphotericin B) and conventional counterparts (e.g., amphotericin B desoxycholate)
moderate sedation agents, IV (e.g., dexmedetomidine, midazolam)
moderate sedation agents, oral, for children (e.g., chloral hydrate)
narcotics/opioids <ul style="list-style-type: none"> ■ IV ■ transdermal ■ oral (including liquid concentrates, immediate and sustained-release formulations)
neuromuscular blocking agents (e.g., succinylcholine, rocuronium, vecuronium)
parenteral nutrition preparations
radiocontrast agents, IV
sterile water for injection, inhalation, and irrigation (excluding pour bottles) in containers of 100 mL or more
sodium chloride for injection, hypertonic, greater than 0.9% concentration

Background

Based on error reports submitted to the ISMP National Medication Errors Reporting Program, reports of harmful errors in the literature, and input from practitioners and safety experts, ISMP created and periodically updates a list of potential high-alert medications. During October 2011-February 2012, 772 practitioners responded to an ISMP survey designed to identify which medications were most frequently considered high-alert drugs by individuals and organizations. Further, to assure relevance and completeness, the clinical staff at ISMP, members of our advisory board, and safety experts throughout the US were asked to review the potential list. This list of drugs and drug categories reflects the collective thinking of all who provided input.

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Summary

- **Unresolved medication discrepancies at admission can lead to medication errors and ADEs**
- **Medication reconciliation on admission can prevent errors and ADEs**
- **Medication reconciliation:**
 - **A team process**
 - **Patient-centered, involve caregivers**
 - **Supported by strong leadership**
- **Root cause analysis of discrepancies on transition identifies opportunities for system improvements**
- **Clinical pharmacy services should be utilized whenever possible – especially for patients who are at high risk due to medications, location or condition**

Resources

MATCH Medication Reconciliation

Toolkit: <http://www.ahrq.gov/qual/match/>

Society of Hospital Medicine – Marquis Medication Reconciliation Resource Center

http://www.hospitalmedicine.org/Content/NavigationMenu/QualityImprovement/QIResourceRooms2/MARQUIS/Medication_Reconcili.htm

Resources

The Joint Commission: <http://www.jcrinc.com/Quality-and-Safety-Risk-Areas/Medication-Safety/>

Institute for Safe Medication Practices:
<http://www.ismp.org/>

Agency for Healthcare Research and Quality:
<http://www.ahrq.gov/qual/patientsafetyix.htm>

For more information

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