

Medication Reconciliation and the Iowa Continuity of Care Study

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The speaker has no conflict to disclose.



Objectives

- Define medication reconciliation
- Discuss the importance of medication reconciliation with regards to patient safety.
- Explain the Iowa Continuity of Care study, its methods, design and the role of the pharmacist
- Explain the medication reconciliation process used, barriers and challenges faced, and successes encountered in the Iowa Continuity of Care Study.



Medication Discrepancies¹⁻³

- Incomplete medication histories account for 27% of all prescribing errors in hospitals
- Medication discrepancies in up to 67% patient cases
- 1+ unintentional medication errors on hospital admission in up to 54% patient cases
- Medication errors account for ~ 25% of all medication-related injuries
 - Thus preventable



Adverse Drug Events⁴

- 1.5 million preventable ADEs yearly in the US
 - \$3.5 billion in costs
- Medicare enrollees:
 - 27,617 Medicare patients followed x 12 months
 - 1,523 ADEs noted: 38% serious/fatal, 62% significant
 - 42.2% of serious/fatal ADEs deemed preventable
 - Extrapolated to US Medicare population:
 - 500,000 preventable ADEs among 38 million patients



Medication Reconciliation (Med Rec) Defined⁵⁻⁷

- Resar
 - The process of verifying medication use, identifying variances, and rectifying medication errors at interfaces of care.
- Barsteiner
 - The process of identifying the most complete and accurate list of medications a patient is taking and using this list to provide correct medications for the patient anywhere within the organization.
- Joint Commission
 - The process of comparing the medications* that the patient/client/resident is currently taking with the medications that the organization is planning to provide.

* Medications are defined as a drug, sample medications, herbal remedies, vitamins, nutritional, OTC drugs, vaccines, diagnostic and contrast agents, respiratory therapy treatments, parenteral nutrition, blood derivatives and IV solutions (plain, with electrolytes and/or drugs).



Medication Reconciliation: Intent

- Avoid medication errors and ADEs
 - Omissions, duplications, dosing errors, interactions
- Determine appropriate pharmacotherapy
 - Continuation or discontinuation
 - Dose change
 - Initiation of new medication
- Ensure communication of complete, accurate medication list across the continuum of care
 - Another setting, service, provider, level of care



Pharmacist-Conducted Med Rec⁸

- 2004 Gleason et al

Design	Prospective, observational
Purpose	1. Identify the type, frequency and severity of med discrepancies in admission orders 2. Assess whether pharmacist-obtained and reconciled histories reduced med errors and the potential for patient harm
Methods	1. Met with patients to discussed prior to admission med 2. Reconciled medications listed in inpatient orders, MD note, admission profile, and info from the patient interview
Results	<ul style="list-style-type: none"> • 204 patients interviewed; 54.4% of patients had 1+ med error • 97 med interventions completed: <ul style="list-style-type: none"> - 41 (42.3%) = omission of home med - 34 (35.1%) = dose discrepancy • NCCMERP rating scale indicated 15 (22%) discrepancies could have resulted in patient harm
Conclusions	Pharmacist-conducted med rec reduced opportunities for med errors and potential for patient harm

Med Rec with and without Counseling⁹

- 2009 Karapinar-Carkit et al

Design	Prospective, observational
Purpose	Examine the effect of med rec with and without patient counseling at the time of hospital discharge on the number and type of interventions
Methods	Group 1: Pharmaceutical consultant reconciled inpatient medication record using 1+ sources (outpatient pharmacy, PCP, med vials brought in by patient) Group 2: Same as above PLUS patient interview for the following: <ol style="list-style-type: none"> 1. Medication verification, clarification 2. Transmission of updated med list to next provider, i.e. PCP and/or community pharmacist
Results	<ul style="list-style-type: none"> • 97% of patients had 1+ intervention • Mean interventions at discharge: 2.7 without counseling vs. 5.3 with counseling • Counseling = 1 additional Rx-related intervention and 1.6 patient med handling interventions per patient
Conclusions	Patient counseling is essential to medication reconciliation

Challenges in Completing Med Rec^{8,10-13}

- Time
- Dispensing workload
- Workflow changes
- Day of the week
- Staffing
- Cost
- Patient complexity
- Plausibility



The Iowa Continuity of Care study: Background and methods

BARRY L. CARTER, KAREN B. FARRIS, PAUL W. ABRAMOWITZ, DAVID B. WEETMAN, PETER J. KABOLL, JEFFREY D. DAWSON, PAUL A. JAMES, ALAN J. CHRISTENSEN, AND JOHN M. BROOKS

CARE STUDY¹⁴



Continuity of Care Study: Primary Investigators



COC Staff & Funding

- Project Manager
Connie Shelsky, RN BSN
- Clinical Pharmacists
Amy Martin, Pharm.D.
Meaghan Rogers, Pharm.D.
- Research Assistants
Kent Ball, BS
Andrew Pretorius, BS
- Funding
National Heart, Lung, and Blood Institute
1R01 HL082711



COC Overview

<i>Design</i>	Randomized, prospective
<i>Enrollment</i>	1000 patients at UIHC over 5 years
<i>Duration</i>	90 days with access to health records 6 months following discharge
<i>Groups</i>	Usual care, minimal intervention, enhanced intervention
<i>Outcome Measures</i>	<ol style="list-style-type: none"> 1. Compare medication appropriateness 2. Determine if ADEs are detected, prevented or resolved 3. Compare frequency of hospital readmissions, ED visits and office visits 4. Determine cost-effectiveness of each intervention group



COC Inclusion/Exclusion Criteria

- | <u>Inclusion</u> | <u>Exclusion</u> |
|--|---|
| <ul style="list-style-type: none"> • English/Spanish speaking • ≥ 18 years old • Admitted to General Medicine, Family Medicine, Cardiology or Orthopedics • Diagnosed with HTN, HLP, HF, CAD, MI, CVA, TIA, asthma, COPD, DM or receiving oral anticoagulation • Have PCP in the community • Receive meds in the community | <ul style="list-style-type: none"> • Diagnosed with dementia or cognitive impairment • Have severe psychiatric or psychosocial factors including substance abuse • Admitted to the psychiatric, surgery or hematology/oncology services • Have a life expectancy estimated at < 6 months • Have PCP at UIHC • Receive long-term meds at UIHC |



COC Methods: Screening, Enrollment & Randomization

- Screening
 - Blinded research assistant screens patients admitted to included services every AM
- Enrollment by research assistant
 - Obtains written, informed consent
 - Collects demographic information
 - Administers baseline surveys
- Randomization by project manager
 - Usual care or intervention



COC Methods: Study Groups

- | <u>Usual Care</u> | <u>Intervention</u> |
|---|---|
| <ul style="list-style-type: none"> • Research assistant uses inpatient-generated med list as home meds • Conducts follow-up phone calls at 30 & 90 days | <ul style="list-style-type: none"> • Pharmacist contacts community pharmacy • Interviews patient about medications • Reconciles inpatient med list • Contacts inpatient providers if necessary • Provides patient with wallet card with discharge med list |



The Role of the Pharmacist

- Conduct thorough medication reconciliation
 - Community pharmacy records
 - Patient interview
 - UIHC medical chart
 - PCP, specialist records if necessary
- Ensure appropriate therapy for diagnosed disease states using published guidelines
- Review laboratory data to assess health status
- Review medications, indications, dosing and side effects with patient



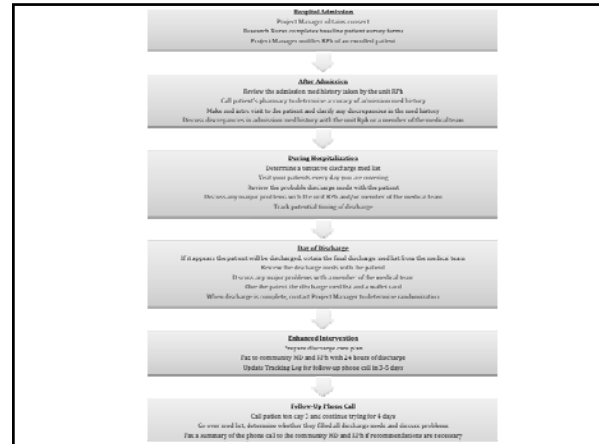
The Role of the Pharmacist

- Update UIHC ambulatory medication list
- Contact providers with medication discrepancies, recommendations
- Generate note in patient chart
- Monitor and visit patient daily
- Create wallet card and provide discharge counseling in addition to nurse discharge counseling
- Contact project manager for randomization following discharge
 - Minimal or enhanced



Intervention Groups: Minimal vs. Enhanced

<p style="text-align: center;"><u>Minimal</u></p> <ul style="list-style-type: none"> Pharmacist involvement ends following wallet card creation Research assistant conducts follow-up phone calls at 30 & 90 days 	<p style="text-align: center;"><u>Enhanced</u></p> <ul style="list-style-type: none"> Pharmacist prepares discharge care plan with updated med list Faxes discharge care plan to PCP and community pharmacy Calls patient in 3-5 days for follow-up and counseling Contacts PCP/community pharmacy if issues arise Research assistant follow-up at 30 & 90 days
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Intervention Groups: Documentation

- Each patient interaction type, date, duration
- Admission medications
- Allergies
- Medication problems
- Medication recommendations and acceptance
- Discharge medications
- Wallet card
- Discharge care plan
- Pharmacist follow-up
- Additional and/or optional contact

Patient Case: RJ

RJ presented to UIHC ETC 1/10/10 with c/o SOB at rest. Admitted to cardiology for further monitoring.

- Demographics**
 - 80 yo male
 - Medicare and private insurance
 - Lives alone
- Labs**
 - 1/10: BG 79-269, INR 2.7
 - 1/11: TC 130, HDL 33, LDL 80, TG 83, BG 78-123, A1c 5.9, Alb 4, Mg 2.4, AST 28, ALT 24, INR 3.1
 - 1/12: Na 142, K 2.8, Cl 106, S-Cr 1.2, BUN 24, BG 99-104, INR 2.5
- Diagnoses**
 - CHF
 - DM
 - HLP
 - HTN
 - A.fib
 - Aortic stenosis
 - Mitral regurgitation

Patient Case RJ: Medications upon Admission

<p><u>Local pharmacy</u></p> <ul style="list-style-type: none"> Amiodarone 200 mg QD Amlodipine 5 mg QD Coreg 12.5 mg BID Doxazosin 4 mg QD Zetia 10 mg QD Metformin 500 mg QD Glucotrol XL 5 mg QD Lescol 20 mg QD Furosemide 80 mg BID Benicar 40 mg QD KCl 10 mEq QD Warfarin 5 mg QD UD 	<p><u>Inpatient record</u></p> <ul style="list-style-type: none"> Amiodarone 200 mg QD Amlodipine 5 mg QD Coreg 12.5 mg QD Doxazosin 4 mg QD Zetia 10 mg QD Metformin 500 mg BID Glucotrol XL 5 mg QD Lescol 20 mg QHS Furosemide 160 mg QD Benicar 40 mg QD KCl 10 mEq QD Aspirin QD Warfarin 2.5 mg QD Fish oil 1200 mg QD 	<p><u>Patient report</u></p> <ul style="list-style-type: none"> Amiodarone 200 mg QD Amlodipine 5 mg QD Coreg 12.5 mg QD Doxazosin 4 mg QD Zetia 10 mg QD Metformin 500 mg QD Glucotrol XL 5 mg QD Lescol 20 mg with dinner Furosemide 160 mg QD Benicar 40 mg QD KCl 20 mEq QD Aspirin 81 mg QD Warfarin 5 mg M/F, 2.5 mg all other days Fish oil QD Q-Gel 1 cap QD Vitamin C 500 mg QD
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Patient Case RJ: Counseling

- Edema continues
- Experiences BG lows periodically at home
- Uncertain if other statin tried, has taken Lescol for years
 - Medical record suggested myalgias with Lipitor
- Does not monitor BP at home, hypertensive as inpatient
- Uncertain if ACE-inhibitors used in past, has been on Benicar for several years

Patient Case RJ: Counseling

- Aware of INR goal, warfarin dose and recent lab results (INR 2.7)
- Reported difficulty initiating urination but uncertain if diagnosed with BPH
- Takes OTC Q-Gel, fish oil, vitamin C
- Finds current monthly medication cost incredibly burdensome and stressful



Patient Case RJ: Discharge Medication List

- Amiodarone 200 mg QD
- Amlodipine 5 mg QD
- Vitamin C 500 mg QD
- Coreg 12.5 mg BID AC
- Doxazosin 4 mg every AM
- Zetia 10 mg QHS
- Lescol 20 mg QHS
- *Furosemide 80 mg BID*
- Glipizide 5 mg QD
- Metformin 500 mg QD
- Benicar 40 mg QD
- Fish oil 1 cap QD
- *KCl 10 mEq every PM*
- *Saw Palmetto 1 tab QD*
- Q-Gel QD
- *Warfarin 2.5 mg QHS*



Patient Case RJ: Discharge Care Plan

- CHF
 - ACC/AHA Guidelines recommend ACE-inhibitor, BB, diuretic, aldosterone antagonist
 - ✦ No aldosterone antagonist on medication profile
 - CHF is precaution with amlodipine
 - ALLHAT trial – alpha-blockers worsen CHF
 - ✦ Doxazosin 4 mg daily, indication unknown
- Recommendations:
 1. Initiate spironolactone 25 mg QD
 2. Discontinue doxazosin 4 mg QD
 3. Monitor edema, s/s CHF exacerbation



Patient Case RJ: Discharge Care Plan

- HLP
 - ATP III Update 2004 guidelines: goal LDL < 70
 - ✦ LDL 80 this admission, ~ 15% above goal
 - ✦ Regimen includes Zetia and Lescol
 - Lescol 20 mg QD reduces LDL ~ 22%, no generic available
 - Zetia 10 mg QD reduces LDL ~ 18%, no generic available
 - Simvastatin reduces LDL 26-47% as monotherapy, on \$4 generic list
- Recommendations:
 1. Discontinue Lescol and Zetia
 2. Initiate simvastatin 40 mg QHS
 3. Check lipid panel in 4-6 weeks



Patient Case RJ: Discharge Care Plan

- DM
 - ADA Guidelines: titrate metformin to effective dose then add additional agents, goal A1c < 7%
 - ✦ Regimen includes metformin 500 mg QD and glipizide 5 mg QD
 - ✦ Hypoglycemia occurring
 - Labs during admission: BG 78-269, A1c 5.9%
- Recommendations
 1. Discontinue glipizide
 2. Monitor BG daily, A1c in 3 months
 3. Increase metformin by 500 mg weekly to target dose 1000 mg BID if BG persistently elevated following glipizide discontinuation



Patient Case RJ: Discharge Care Plan

- HTN
 - ADA, AHA Guidelines: goal BP < 130/80, ACE-inhibitor as first-line agent
 - ✦ Regimen includes amlodipine 5 mg QD, Coreg 12.5 mg BID, Benicar 40 mg QD and doxazosin 4 mg QD
 - ✦ Doxazosin indication unknown
 - ✦ Benicar has no generic alternative
 - BP consistently > 130/80 during inpatient stay
- Recommendations
 1. Replace Benicar with lisinopril 10 mg QD
 2. Replace doxazosin with spironolactone 25 mg QD
 3. Monitor for lightheadedness, syncope, orthostasis, renal function, K+



Patient Case RJ: Discharge Care Plan

- Anticoagulation
 - CHEST Guidelines: atrial fibrillation goal INR 2.0 – 3.0
 - ✦ Home warfarin dose 5 mg M/F and 2.5 mg all other days
 - ✦ Admission INR 2.7, admission note stated "INR supratherapeutic"
- Inpatient anticoagulation course:
 - ✦ Warfarin administration: 2 mg on 1/10 and 1 mg on 1/11
 - ✦ Discharged 1/12 with INR 2.5 and warfarin dose 2 mg daily, per discharge summary (discharge med list shows dose 2.5 mg QHS)
 - ✦ No f/u INR scheduled
- Recommendations
 1. Resume home warfarin dose
 2. Schedule f/u INR now for 3 days following discharge



Patient Case RJ: Discharge Care Plan

- OTC Product Use
 - OTC regimen includes Co-Q 10 QD, vitamin C 500 mg BID, aspirin 81 mg QD, fish oil 1200 mg QD
 - ✦ Research does not show benefit from Co-Q 10
 - ✦ Vitamin C from diet
- Recommendations
 1. Discontinue Co-Q 10, vitamin C
 2. Increase vegetable and fruit intake



Patient Case RJ: Time Requirement

Date	Contact Type	Comments	Time
1/12/10	Intro visit		60
1/12/10	Verify meds		5
1/12/10	Other	Enter meds, problems into database	30
1/13/10	Create WC		30
1/13/10	Create DCP		120
1/13/10	Finish DCP		90
1/13/10	Fax DCP to PCP		2
1/13/10	Fax DCP to RPh		2
1/13/10	Fax DCP to cardiologist		2
1/19/10	3-5 day phone call	LM	2
1/20/10	3-5 day phone call	LM	2
1/21/10	3-5 day phone call		25
1/21/10	Other	Create and fax recommendations to PCP	15
2/1/10	Other	Cardiologist called to discuss recommendations	10
2/1/10	Other	Emailed cardiologist COC methods	10

Total time spent – 6.8 hours



COC Pharmacist Challenges Faced

- Timing of enrollment
- Complexity of hospital stay
 - Procedures
 - PT, respiratory therapies...
- Patient recall
- Medication compliance
- Mail-order pharmacy
- Multiple pharmacies used



Pharmacist Challenges Faced

- Incomplete documentation in medical record
- Inadequate treatment of diagnosed disease states
- Difficulty contacting hospital physicians
- Provider perception of COC pharmacists' role
- Provider resistance to initiate or change medications as inpatient and upon discharge
- Inefficient patient status updates



Pharmacist Challenges Faced

- Incorrect medication list upon discharge
- Minimal discharge counseling by floor staff
- Medication discrepancies on discharge summaries
- Uncertain of PCP receipt, utilization of discharge care plan
- Patient unavailable for follow-up



Research Assistant 30 & 90 Day Follow-up

- ADE survey
- Self-reported adherence
- Overall health status
- Hospital readmissions
- Urgent care visits



PCP and Community Pharmacist Follow-up

Surveys sent to PCPs and community pharmacists for each patient in the study

Group	PCP	Community Pharmacist
Usual care	1. Value of community pharmacist interaction	1. Value of PCP interactions
Minimal	1. Value of community pharmacist interaction	1. Value of PCP interactions
Enhanced	1. Value of community pharmacist interaction 2. Value of COC pharmacist interaction	1. Value of PCP interactions 2. Value of data, information, recommendations of COC pharmacist



COC Data Collection & Analysis

- Community pharmacy and PCP records for days 1-90 following discharge
- Case abstracts developed
- Medication appropriateness determined by blinded evaluators
- ADEs identified and classified by blinded experts
- Readmissions and unscheduled office visits determined
- Cost-effectiveness analyzed



COC Secondary Measures & Side Projects

- Secondary Measures
 - Number of medications
 - Complete medication list
 - Use of inappropriate medications in elderly patients
 - Medication adherence
 - Barriers to adherence
- Side Projects
 - Hospital provider recommendation acceptance rates
 - Cardiovascular risk assessment
 - Medication reconciliation best practice



COC Lessons Learned

- Med Rec is time consuming and often requires multiple information sources
- True medication lists often inaccurate
 - Patient beliefs
 - Brief patient interviews
 - Knowledge of interviewer
- Serving as a member of the rounding team
 - Increased "face time"
 - Improved recommendation acceptance rates
- Provider inertia ubiquitous
- Documentation much appreciated



Conclusion

- Medication discrepancies, ADEs common in US hospitals
- Pharmacist-conducted medication reconciliation reduces discrepancies and potentially ADEs
- Iowa COC study designed to:
 - Improve communication among pharmacists, patients and their community providers
 - Improve patient medication knowledge and adherence
 - Reduce ADEs associated with suboptimal therapy
 - Optimize medication appropriateness and use
 - Reduce costs due to rehospitalizations or unscheduled office visits



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Post Test Questions and Answer Key

1. Medication reconciliation is performed only to avoid medication errors and ADEs.
 - a) True
 - b) False

2. Medication reconciliation reduces:
 - a) Hospital readmissions
 - b) Healthcare costs
 - c) Medication errors
 - d) All of the above

3. The Iowa Continuity of Care (COC) Study is designed to determine the effects of hospital pharmacists' enhanced communication with patients and their community providers.
 - a) True
 - b) False

4. In the COC study, patients with specific disease states are targeted for enrollment. Which disease state is not targeted?
 - a) Emphysema
 - b) Gout
 - c) Dyslipidemia
 - d) Atrial fibrillation

5. Contraindications and precautions to metformin use are often due to an increased risk of lactic acidosis with its administration. Which of the following does not increase this risk?
 - a) Age > 80 years old
 - b) Alcoholism
 - c) Male serum creatinine 1.4 mg/dL
 - d) All of the above increase the risk

Hospital Admission

Research Assistant obtains consent
Research Assistant completes baseline patient survey forms
Project Manager notifies RPh of an enrolled patient



After Admission

Review the admission med history taken by the unit RPh
Call patient's pharmacy to determine accuracy of admission med history
Make and intro visit to the patient and clarify any discrepancies in the med history
Discuss discrepancies in admission med history with the unit Rph or a member of the medical team



During Hospitalization

Determine a tentative discharge med list
Visit your patients every day you are covering
Review the probable discharge meds with the patient
Discuss any marjor problems with the unit RPh and/or member of the medical team
Track potential timing of discharge



Day of Discharge

If it appears the patient will be discharged, obtain the final discharge med list from the medical team
Review the discharge meds with the patient
Discuss any major problems with a member of the medical team
Give the patient the discharge med list and a wallet card
When discharge is complete, contact Project Manager to determine randomization



Enhanced Intervention

Prepare discharge care plan
Fax to community MD and RPh with 24 hours of discharge
Update Tracking Log for follow-up phone call in 3-5 days



Follow-Up Phone Call

Call patient on day 3 and continue trying for 4 days
Go over med list, determine whether they filled all discharge meds and discuss problems
Fax a summary of the phone call to the community MD and RPh if recommendations are necessary
Continue contacting the patient at least weekly until any identified problems are resolved and follow-up with MD and RPh