A Layered Learning Medication Reconciliation Program

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Clinical Assistant Professor, Ohio Northern University

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Ohio Northern University
Objectives

Pharmacist Learning Objectives:

Describe a medication reconciliation independent study course utilizing pharmacy students in an institutional setting

Review drug classes and patient factors associated with a high risk of medication reconciliation errors

Technician Learning Objective:

Review drug classes and patient factors associated with a high risk of medication reconciliation errors
Medication Reconciliation

Definition: the process of preventing unintended discrepancies in medication profiles by reviewing each patient’s full medication regimen at every care transition, including admission, transfer, and discharge

Strategy for minimizing adverse drug events (ADEs)

◦ In an observational study, errors in medication history were the most common cause of unintended medication discrepancies (186/257, 72%)

Included in The Joint Commission’s National Patient Safety Goals
Impact of ADEs

Retrospective study in Australia found a 5.5% risk of experiencing an adverse drug reaction (ADR) while hospitalized

In a meta-analysis of 24,128 patients, 1.6% of inpatients experienced a preventable adverse drug reaction
  ◦ 45% of inpatient ADRs were preventable

In a retrospective analysis, among 596 patients with ADEs, estimated direct cost per patient: $444.90
Who Can Perform Medication Reconciliation

Nurses
Physicians
Pharmacists
Pharmacy technicians
Students
  ◦ One study found that pharmacy students identified significantly more preadmission medications per patient than did nurses or physicians
Layered Learning

• A core group of clinicians leading a team which may include pharmacy residents and students

• Advantages include:
  • Supporting Practice Advancement Initiatives (PAI)
  • Partnerships between institutions and pharmacy schools may result in the success of each party
  • Students are low-cost resources
  • Improved patient satisfaction

Layered Learning: The LMHS Med Rec Model

Pharmacists
- Shared Faculty Member (course coordinator)
- Pharmacy Residents, Staff Pharmacists

Students (P4-P5 year)

Students (P2-P3 year)
Medication Reconciliation Course

Started in Fall 2015 as a semester-long independent study course at Ohio Northern University (0-6 program)

Fall Semester: P2 and P4 students
Spring Semester: P3 and P5 students

Why?
- Layered Learning
- Additional hands-on experience with patients
- Assist LMHS in correctly identifying home medications and preventing ADRs
Medication Reconciliation Course

Week 1: Overview/Background on Course and Med Rec

Weeks 2-4: On-site Training
- Students paired with a pharmacist, resident, and/or APPE student
- Computer training
- Shadow ER med rec technician
- “Putting it all together”

Weeks 5 and After
- “Independent” portion begins
- Pharmacists available 24/7 if questions arise
Medication Reconciliation Course

Expectations of students:

◦ A pair of students assigned each weekday
◦ Spend 1-3 hours at the site, typically in the afternoon/evening
◦ Identify patients, complete medication history, and update home medication list within the EMR
◦ Document interventions in EMR and give forms to pharmacist for review
  ◦ Urgent changes addressed by evening pharmacist(s)
  ◦ Non-urgent changes addressed by clinical pharmacist the following day
<table>
<thead>
<tr>
<th>Patient:</th>
<th></th>
<th>Inpatient Medication Needs Discontinued: (y/n)</th>
<th>RPh Addressed: (Initials)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOB:</td>
<td></td>
<td></td>
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<tr>
<td>CC:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Name(s)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Med Re Allergies Change:</td>
<td></td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Last Dose taken:</th>
<th>New Medication Added to Home Medication Profile:</th>
<th>Medication Needs Resumed Inpatient? (y/n)</th>
<th>RPh Addressed: (Initials)</th>
</tr>
</thead>
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High-Risk Disease State Home Medication Review

DATA COLLECTED DURING SPRING SEMESTER 2017
### Patient Demographics

#### Location of admission

<table>
<thead>
<tr>
<th>Admission Location</th>
<th>n (%)</th>
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<tbody>
<tr>
<td>Emergency department</td>
<td>51 (68.9%)</td>
</tr>
<tr>
<td>Transfer from another facility</td>
<td>12 (16.2%)</td>
</tr>
<tr>
<td>Direct admission</td>
<td>7 (9.5%)</td>
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<tr>
<td>Internal transfer</td>
<td>4 (5.4%)</td>
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</table>

#### Person who gathered initial medication history

<table>
<thead>
<tr>
<th>Title</th>
<th>n (%)</th>
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<tbody>
<tr>
<td>Pharmacy technician</td>
<td>44 (59.5%)</td>
</tr>
<tr>
<td>Other hospital staff</td>
<td>27 (36.5%)</td>
</tr>
<tr>
<td>APPE student</td>
<td>1 (1.4%)</td>
</tr>
<tr>
<td>Pharmacy intern</td>
<td>1 (1.4%)</td>
</tr>
<tr>
<td>Unknown</td>
<td>1 (1.4%)</td>
</tr>
</tbody>
</table>
Number of Discrepancies Identified

Students identified at least one error in home medication list in 50 of 74 patients (67.6%)

Overall average 2.01 ± 2.6 discrepancies per patient

- Female: 2.6 ± 2.9 discrepancies
- Male: 1.6 ± 2.3 discrepancies
Types of Discrepancies (N=151)

- Unnecessary medication: 60 (40%)
- Medication omission: 44 (29%)
- Wrong frequency: 14 (9%)
- Wrong drug: 8 (5%)
- Wrong dosage: 24 (16%)
- Wrong dosage form: 1 (1%)
Discrepancies by Drug Class

- N/A: 1
- Antiparasitic Agents: 1
- Sensory Organs: 1
- Genitourinary Agents: 2
- Dermatological Agents: 3
- Musculoskeletal System: 6
- Antiinfectives: 7
- Systemic Hormonal Preparations: 8
- Respiratory System: 19
- Nervous System: 21
- Alimentary Tract & Metabolism: 39
- Cardiovascular System: 43
<table>
<thead>
<tr>
<th>Disease State</th>
<th># Patients (%)</th>
<th>Mean Discrepancies ± SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart failure</td>
<td>36 (44.4%)</td>
<td>1.8 ± 2.4</td>
</tr>
<tr>
<td>COPD</td>
<td>26 (32.1%)</td>
<td>2.7 ± 3.1</td>
</tr>
<tr>
<td>Myocardial infarction</td>
<td>7 (8.6%)</td>
<td>1.3 ± 1.5</td>
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<tr>
<td>Acute renal failure</td>
<td>3 (3.7%)</td>
<td>1.3 ± 2.3</td>
</tr>
<tr>
<td>Hyperglycemia</td>
<td>2 (2.5%)</td>
<td>0.5 ± 0.7</td>
</tr>
<tr>
<td>End-stage renal disease</td>
<td>1 (1.2%)</td>
<td>4</td>
</tr>
<tr>
<td>Other</td>
<td>6 (7.4%)</td>
<td>1.5 ± 1.6</td>
</tr>
</tbody>
</table>
## Mean Number of Discrepancies by Person Who Gathered Initial Medication History

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<td>APPE student</td>
<td>1 (1.4%)</td>
<td>1</td>
</tr>
<tr>
<td>P6 student</td>
<td>1 (1.4%)</td>
<td>0</td>
</tr>
<tr>
<td>Unknown</td>
<td>1 (1.4%)</td>
<td>0</td>
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Medication Reconciliation Course

Evolved to meet the needs of the college/students and the hospital site

Fall 2017
- Patients without completed home medication lists + targeted review for COPD patients

Spring 2018
- Changed from an Independent Study to an IPPE Elective and offered at several other local institutions
Key Points

• Medication reconciliation is a complex, multi-faceted tool with the ultimate goal of preventing patient harm

• Layered learning models beyond traditional IPPE/APPE experiences provide benefit to students, institutions, and patients
Questions
References


