Primary Intended Outcome

Begin medication admission history services in the emergency department (ED) to ensure continuity of care for admitted patients.

Relevant PPMI Recommendation(s)

**B23:** The following characteristics or activities should be considered essential to pharmacist-provided drug-therapy management in optimal pharmacy practice models:

**B23k:** Medication reconciliation in the ED; upon admission, interhospital transfer, and discharge; and in the ambulatory care setting.

**B24:** Every pharmacy department should:

**B24c:** Develop a plan to allocate pharmacy student time to drug therapy management services.

**Situation Analysis**

It is estimated that up to 27% of all prescribing errors that occur in the hospital result from incomplete medication histories at the time of admission. There is extensive literature available to demonstrate the accuracy, timeliness, and thorough nature of medication list retrieval by pharmacists (and students) in comparison with physicians, nurses, and other allied health personnel. Retrieval of an accurate list on admission can help improve the overall medication reconciliation process and increase patient safety while admitted to the institution.

The following steps were outlined prior to the start of the pilot:

**Patient selection:** Patients’ medication lists will be reviewed if patients are admitted to the clinical decision unit (CDU) and are on more than four medications at home. Considering this is an observation unit, patients will have completed triage with a registered nurse with a medication list review. Pharmacy personnel will also be consulted for any patient as deemed necessary by

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Submitted by: Rebecca A. Taylor, Pharm.D., MBA, BCPS, Education Manager, Cleveland Clinic, 9500 Euclid Avenue, HB105, Cleveland, OH 44195, (216) 444-1756, taylorr3@ccf.org

The Cleveland Clinic team, from left to right: Jonathan Williams, Pharm.D., M.S.; Matthew Campbell, Pharm.D.; Samuel Calabrese, RPh, MBA; Rebecca Taylor, Pharm.D., MBA, BCPS; and Elizabeth Wells, Pharm.D.
ED staff. Any patient who is not considered a reliable historian will be excluded if secondary sources such as family, nursing facilities, outpatient pharmacies, and outside hospitals are not available. The timeline for this project included an initial pilot in August-September 2011 with a larger program launch in December 2011.

**Retrieval of list:** Medication lists would be retrieved according to the steps below.

1. From 10 a.m. to 4 p.m., Monday through Friday, pharmacists or pharmacy students will interview patients admitted to the CDU if they meet the above criteria using the EPIC medication reconciliation workflow currently used by nursing.

2. Patients will be interviewed with an open-ended question style and asked about all prescription, over-the-counter, or herbal medications.

3. EPIC medication reconciliation records will be updated to discontinue any medications the patient no longer takes. Medication reconciliation is the physician’s final responsibility.

4. Discrepancies will be resolved with patients, families, or ambulatory pharmacy during business hours.

5. Pharmacists will discuss recommendations with a medical resident or physician if medications are deemed inappropriate upon admission to the hospital (i.e., a patient who is admitted with a GI bleed should have aspirin and NSAIDS withheld).

6. Physicians are to complete the remaining steps of medication reconciliation and order, re-order, or discontinue medications as appropriate.

7. Data will be collected on volume of patients interviewed, discrepancies found and categorized, education provided to patients, and amount of time for medication list retrieval.

8. Each student will simulate two patient cases with a preceptor prior to interviewing a patient, and two patient interviews will be observed and evaluated by the pharmacist preceptor before allowing the student to interview patients independently.

**Workflow:** The workflow will follow the chart below:

![Workflow Chart](image)
Service Description

One APPE student completed the pilot program in August and September 2011 under the supervision of a licensed pharmacist. The pilot program was approved by the institutional review board as exempt. All told, 273 patients were interviewed over 37 days, with an average of 6.6 hours of student time spent per day. A total of 1,646 updates and interventions were made, with an average of 44.49 per day. Patients included had at least four home medications and were good historians who could verbally communicate with the student.

Significant interventions included patient education and counseling (3%), contacting outside resources such as outpatient pharmacies or nursing homes to ensure the accuracy of the medication records (7%), clarifying patient allergies (7%), contacting physicians (15%), or updating medication records to ensure accuracy (68%). Physicians were contacted when discharge prescriptions were needed (13%), home medication stopped on admission (16%), home medication were omitted (31%), or discussion became necessary regarding dosage, frequency, or drug selection (40%).

We decided to expand the student pilot to one APPE student per month in the ED for the academic year 2011-2012, and consider adding an additional student for the academic year 2012-2013 to staff the first and second shifts. The ED pharmacy practice model was also evolving to include first- and second-shift services every day, beginning in January 2012. We were able to secure 11 months of students. One month will have first and second shift as a pilot. Students underwent training in medication list retrieval and demonstrated the ability to gather an accurate medication list under the supervision of a pharmacist. Licensed pharmacists were also consulted as needed for clinical recommendations. Pharmacists were always available within the ED for student or patient questions.

Key Elements for Success

1. Physician champion in the CDU,
2. Motivated and independent APPE students, and
3. Engaged pharmacists who allow students to work independently.

Resource Utilization

Personnel: There was no additional cost. Using APPE students could potentially avoid costs associated with technical staff. The legality of technicians gathering medication histories in the state of Ohio is unclear, so this information is omitted.

Recognized Intangible Benefits

1. Extending pharmacist services without adding FTEs,
2. Physician and nurse satisfaction in ED, and
3. Enhanced student recruitment.

Outcome Measures

1. Medication history discrepancies, interventions, and
2. Admission histories captured by pharmacy department (10% of patients during pilot; increase to 40% during academic year 2012-2013).
Lessons Learned

1. Workflow changes are necessary to incorporate students more appropriately into the ED.
2. We needed to market rotation to multiple schools of pharmacy as initial interest was lacking.
3. Balancing student assignments between medication histories and patient care plans is critical to ensuring success in completing rotation objectives.

Suggestions for Other Hospitals/Health Systems

Partner with local schools of pharmacy to ensure 12 months of consistent coverage. Some schools do not provide rotations during December and May, so multiple partnerships may be necessary.

Orient students to the fact that hours of rotations may change based on patient volume. A typical rotation day may be 10 a.m. to 6 p.m. vs. the historical 7 a.m. to 4 p.m. student rotation schedule.

Helpful References


Team Members

Other key individuals involved in this project were:

- Jonathan Williams, Pharm.D., M.S., Manager, Heart and Vascular Institute and Emergency Services
- Elizabeth Wells, Pharm.D., Emergency Department Pharmacist
- Matthew Campbell, Pharm.D., Emergency Department Lead Pharmacist
- Samuel Calabrese, RPh, MBA, Associate Chief Pharmacy Officer