Improving Medication Reconciliation Processes:
Transitions of Care for the Pharmacy Technician and Pharmacist

ROOM Code: MEDREC

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Cleveland Clinic Heart and Vascular Institute
Disclosures

- I have no actual or potential conflict of interest in relation to this program/presentation.
Objectives

1. Describe the most common errors made in the medication reconciliation process.

2. Identify high risk medications and drug classes.

3. Implement evidence-based patient interview techniques.
Part 1: Defining The Problem

Room code: MEDREC
Reflection Question #1:
Room Code: MEDREC

Which patient(s) will be at the highest risk for a medication error?

A. 75 year old, spanish speaking patient discharged from the cardiology service
B. 70 year old transferred from a nursing home with an EMS written med list to the ED
C. 65 year old with five home medications being transferred from the ED to the floor
D. 60 year old with three home medications being seen by their primary provider
E. A, B, and C
F. All of the above
Reflection Question #2
Room Code: MEDREC

Which medication classes are at the highest risk of medication-related errors leading to an emergency department visit?

A. Antihypertensives, psychiatric agents, herbal supplements
B. Opioids, anticoagulants, and antidiabetic agents
C. Gastrointestinal agents, antibiotics, sedatives/anxiolytics
D. A and B
E. B and C
Reflection Question #3
Room Code: MEDREC

Which question is most appropriate for obtaining an accurate history from a patient?

A. “Do you still take lisinopril 5 mg by mouth once daily?”
B. “You stopped taking metoprolol last admission, right?”
C. “Do you use any inhalers? Can you tell me how you take that at home?”
D. The patient’s family brought all of the medication bottles in, allowing you to transcribe the medication history directly from the bottles.
E. “Yo what up, you takin’ any drugssssss?” (this one is wrong)
In one sentence, how do you define medication reconciliation?
Leadership and providers don't agree with the necessity of medication reconciliation. Therefore our current process meets a very superficial "check the box" requirement for inspection purposes only. It is a far reach from doing the right thing!

Unfortunately, many of the nursing staff consider this to be low priority – they are "too busy." Until nursing leadership makes it a priority for nurses, and hospital administration makes it a priority for physicians, I fear we will swim in circles on this issue.

I really feel that the initial reconciliation on admission is an accident waiting to happen. We have had some severe near misses. The physician takes these reconciliation sheets as gospel. Something needs to be fixed???

The intent is admirable, but in reality, the nurse is doing all of the leg work. Pharmacy and physicians take no ownership of the process.
Definitions

- The World Health Organization “High 5’s Project” Defined the Problem:
  - “Medication reconciliation is the formal process in which healthcare professionals partner with patients to ensure accurate and complete medication information transfer at interfaces of care.”

- The American Pharmacists Association (APhA) and the American Society of Health-System Pharmacists (ASHP) define medication reconciliation as:
  - “The comprehensive evaluation of a patient's medication regimen any time there is a change in therapy in an effort to avoid medication errors such as omissions, duplications, dosing errors, or drug interactions, as well as to observe compliance and adherence patterns. This process should include a comparison of the existing and previous medication regimens and should occur at every transition of care in which new medications are ordered, existing orders are rewritten or adjusted, or if the patient has added nonprescription medication to [his or her] self-care.”

Joint Commission

- National patient safety goal since 2006
- Required documentation:
  - Obtain and/or update information on the medications the patient is currently taking. This information is documented in a list or other format that is useful to those who manage medications.
  - Provide the patient (or family as needed) with written information on the medications the patient should be taking when he or she leaves the organization’s care (for example, name, dose, route, frequency, purpose)

https://www.jointcommission.org/assets/1/6/NPSG_Chapter_OME_Jan2017.pdf
Three Causes of Errors

- Admission to the Facility (22%)
- Transition or Transfer Level of Care (66%)
- Discharge (12%)

Types of Errors

- Omission
- Wrong dose
- Wrong frequency
- Added drug
- Substitutions
Part 2: The Evidence
Three Causes of Errors

- Admission to the Facility (22%)
- Transition or Transfer Level of Care (66%)
- Discharge (12%)

Admission to the Facility
Reflection Question #5:
Room Code: MEDREC

How many Emergency Department visits occur annually per 1000 persons?

A. 250  
B. 350  
C. 450  
D. 600  
E. 675
Reflection Question #6:

Room Code: MEDREC

What is the average admission rate from emergency department visits?

A. 5%
B. 7.9%
C. 11.3%
D. 15.6%
E. 22.4%
Reflection Question #7:
Room Code: MEDREC

If a high acuity, urban hospital has an admission rate of 20% with approximately 80,000 emergency department encounters annually, how many medication histories would that be?

A. 10,000
B. 16,000
C. 20,000
D. Why is there so much math in this CE?
Who Is Responsible?

Everyone involved in patient care, from the nurse, to the provider, to the pharmacist, should feel a sense of responsibility. Organizational standards and process ownership are the key to developing a strong program.

“I was going to ask how working with a severely limited staff was, but I think I can already guess.”
Pharmacy Presence in the ED

- Markovic et. al evaluated medication histories collected by two groups:
  - ED Nurse followed by Technician (RN-PT)
  - Technician followed by Pharmacist (PT-RPh)
- 520 bed community hospital
  - 48,544 ED visits in 2015
- Nursing staff were significantly less accurate than pharmacy personnel.

<table>
<thead>
<tr>
<th></th>
<th>RN-PT</th>
<th>PT-RPh</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Medications</td>
<td>474</td>
<td>521</td>
<td>N/A</td>
</tr>
<tr>
<td>Histories with error (n%)</td>
<td>50 (100)</td>
<td>18 (36)</td>
<td>p&lt;0.0001</td>
</tr>
<tr>
<td>Medications with error (n%)</td>
<td>408 (86)</td>
<td>30 (5.6)</td>
<td>p&lt;0.0001</td>
</tr>
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</table>

- Pharmacy technician accuracy rate=94%
- Nursing Staff accuracy rate=14%
Omissions were the most frequent error from nursing:

<table>
<thead>
<tr>
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<th>Number of Discrepancies</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>RN-PT n (%)</td>
</tr>
<tr>
<td>Missing medication</td>
<td>109 (21.7)</td>
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<tr>
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<tr>
<td>Wrong Dose</td>
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<tr>
<td>Duplicate medication</td>
<td>21 (4.2)</td>
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<tr>
<td>Wrong medication</td>
<td>15 (3.0)</td>
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<tr>
<td>Missing formulation</td>
<td>12 (2.4)</td>
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</table>
Wrong frequency was the most frequent error from techs:

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Remarks on Markovic et al.

- 70% of the PT-RPh patient population were subsequently admitted
  - Ability to recognize high risk patients

- Lack of generalizability?
  - One technician, one facility
  - While this study may underestimate nursing staff abilities, the accuracy rate is error categories are consistent with previous trials.

- My conclusion?
  - Pharmacy technicians are proven to be a cost-effective addition to the medication reconciliation process, with a high rate of accuracy and acceptable rate of error.
Pharmacy Presence in the ED

● *Pevnick et. al* evaluated the impact of pharmacy personnel on admission med history (AMH) and the rate of AMH errors before admission med orders (AMO) are placed.

● Three arm trial with an enrollment of 306 patients:
  ○ Control group (no pharmacy intervention)
  ○ Pharmacy technician group
  ○ Pharmacist group

● **Evaluated number of errors as well as severity-rated error scores** based on classifications for ADEs (significant, serious, life-threatening)
  ○ Assigned scores of $1^1=1$, $2^2=4$, and $3^3=9$ respectively.
# Pharmacy Personnel Reduce AMH Errors

<table>
<thead>
<tr>
<th>Result</th>
<th>Usual Care (n=95)</th>
<th>Usual Care plus Pharmacist (n=94)</th>
<th>Usual Care Plus Pharmacist-Supervised Technician (n=89)</th>
<th>P value</th>
</tr>
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<tbody>
<tr>
<td>Mean AMH Error Outcomes (95% CI)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AMH Errors Per Patient</td>
<td>8.0 (6.8-9.1)</td>
<td>1.4 (1.0-1.8)</td>
<td>1.5 (1.0 to 1.9)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>AMH errors per patient, severe or life threatening only</td>
<td>4.6 (3.8-5.3)</td>
<td>0.8 (0.49-1.1)</td>
<td>0.7 (0.45-1.1)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>AMH error score per patient (primary outcome)</td>
<td>23.0 (19.7-26.2)</td>
<td>4.1 (2.7-5.5)</td>
<td>4.1 (2.6-5.6)</td>
<td>&lt;0.0001</td>
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## Results (because that’s what we’re here for)

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</thead>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AMO Errors Per Patient</td>
<td>3.2 (2.6-3.8)</td>
<td>0.6 (0.42-0.85)</td>
<td>0.6 (0.41-0.97)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>AMO errors per patient, severe or life threatening only</td>
<td>1.2 (0.85-1.5)</td>
<td>0.2 (0.12-0.36)</td>
<td>0.1 (0.06-0.24)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>AMO error score per patient (primary outcome)</td>
<td>6.9 (5.5-8.4)</td>
<td>1.5 (0.89-2.1)</td>
<td>1.2 (0.67-1.7)</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>
A pharmacy-driven model significantly reduces med history errors AND admission med order errors!
Remarks on Pevnick et. al

- Showed a statistically significant reduction in admission medication history and order error reduction.
  - 80%+ of enrolled patients were on insulin, an anticoagulant, or narrow TI drug.
  - Failed to show a statistically significant difference in length of stay or 30-day readmission rates. Tertiary outcomes and the trial was not designed to discover them.

- We know unequivocally a pharmacy presence in the admission process improves medication reconciliation accuracy and reduces error rates.
Part 3: Techniques and More
Warning:
Lots of words ahead
The Data Collection

- It is **NOT** sufficient to obtain a list or a bag of pills and call it a day for the majority of patient encounters.
- It is called a medication history for a reason...
- Learn your patient before entering the room!
  - A knowledge of their disease states and prior histories will inform you in knowing what possible medications have been omitted or what medications may be contraindicated and the patient is no longer taking.
  - Pharmacists: If you have a hunch about a drug missing or being old, research the origin of that hunch (e.g. “Gee, I could have sworn triptans are contraindicated in some cardiac conditions?”)
  - Technicians and students: If you’re unsure, concerned, or just curious a drug or disease state before speaking with a patient...ask about it! Knowledge is power in the med rec process.
The Data Collection

- A patient provided medication list serves as an excellent starting point.
  - **Basic patient encounter etiquette!**
    ■ A- Acknowledge the patient’s identity and if it presently okay to have a conversation.
    ■ I- Introduce yourself and your position.
    ■ D- Duration of the encounter should be defined,
    ■ Explanation of the service you are about to perform
    ■ T- Thank You. Thank the patient and ask if there is anything else you can do for them.
  - **Use open-ended questions and minimize yes/no questions.**
    ■ “Do you take a medication for your atrial fibrillation? What’s that called?”
    ■ “How many times a day do you take that?”
    ■ “Do you know how many milligrams you take?”
  - **Avoid leading questions that will impose a bias on the patient’s answer.**
    ■ “You still take metoprolol tartrate 25 mg twice daily, right?”

- Ask the patient about prescriptions, OTCs, herbals, and supplements.
The Data Collection

● Document your list as accurately as possible!
  ○ If a patient says they have 50 mg tablets of spironolactone but take half a tablet a day, document the correct formulation. This information informs prescription writing on discharge.
  ○ Delete medications a patient is no longer taking, even if they discontinued them on their own. The medication history is a reflection of what the patient is taking, not what they necessarily should be.
  ○ Additions, deletions, or corrections should be documented to maintain a thorough record.
  ○ Does your EHR allow for identifying the date/time of last dose taken? Facility/Nursing Home MARs will commonly have this documented, otherwise it never hurts to ask the patient!

● Standardization
  ○ Standardize a data collection form based on what outcomes you’re trying to achieve
  ○ Standardize your intervention documentation to strengthen your outcome reporting
Helpful Tips to Watch Out For:

- Oral methotrexate will commonly be taken with folic acid.
- Patients with heart failure will likely have a combination of the following drug classes, unless they have a contraindication:
  - ACE-Inhibitor (lisinopril, captopril) or ARB (valsartan, irbesartan)
  - Beta-blocker (carvedilol, metoprolol succinate)
  - Aldosterone antagonist (spironolactone)
  - Diuretic (furosemide, bumetanide, torsemide)
  - CHF patients may also be on hydralazine+isosorbide (but not all).
- Make sure to ask about OTC products in patients on lithium or tacrolimus!
  - Screening for any NSAIDs, a major drug interaction.
- Wellbutrin SR and Wellbutrin XL are easily mistaken for each other.
  - Wellbutrin SR is a twice-daily medication. Wellbutrin XL is once daily.
Helpful Tips to Watch Out For:

- Transplant patients will likely know their drugs better than you. Still confirm their medication history.
- Pay careful attention to warfarin regimens.
  - Patients work hard to get to a stable INR. Errors in their medication history can lead to changes to their warfarin dosing inpatient and on discharge, and may throw off their stability.
- Ask for the reason for “as needed” medications.
  - You may discover patients taking some medications inappropriately from this simple question.
  - I had a patient who confidently believed her zolpidem was for anxiety. That could have been dangerous!
- Don’t forget to ask about inhalers, injectables, and infusions!
  - Infusions are a pertinent part of the medication history, and if they only occur once a month, or even less frequent, they are easy to forget.
<table>
<thead>
<tr>
<th>Medication Classes</th>
<th>Specific Medications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypoglycemic agents, oral (glyburide, empagliflozin)</td>
<td>Methotrexate for non-oncologic indication</td>
</tr>
<tr>
<td>Insulin, all formulations</td>
<td>Digoxin</td>
</tr>
<tr>
<td>Immunosuppressants (tacrolimus, mycophenolate)</td>
<td>Lithium</td>
</tr>
<tr>
<td>Opioids, all formulations</td>
<td>carbamazepine</td>
</tr>
<tr>
<td>Anticoagulants (warfarin, xarelto, enoxaparin)</td>
<td></td>
</tr>
<tr>
<td>Chemotherapeutic agents, oral</td>
<td></td>
</tr>
<tr>
<td>Medication Classes with High Incidence of Errors</td>
<td></td>
</tr>
<tr>
<td>-----------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Cardiovascular agents</td>
<td></td>
</tr>
<tr>
<td>Hypoglycemic agents (insulins and oral)</td>
<td></td>
</tr>
<tr>
<td>Opioids, all formulations</td>
<td></td>
</tr>
<tr>
<td>CNS (central nervous system) agents</td>
<td></td>
</tr>
<tr>
<td>Antimicrobial agents</td>
<td></td>
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<tr>
<td>Chemotherapeutic agents</td>
<td></td>
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</tbody>
</table>
Case Application

● GY is a 70 year old patient presenting to the emergency department with chest pain. Her PMH is significant for CAD s/p CABG (Oct 2017), atrial fibrillation, type II diabetes, chronic pain syndrome, and rheumatoid arthritis.
● GY is determined to not be having an MI and is prepared for admission for observation and serial troponins.
● The medication list on the right is provided to nursing staff by GY’s husband.

● Clopidogrel 75 mg one a day
● Lipitor 40 mg one a day
● Eliquis 20 mg one a day
● Lisinopril 40 mg one a day
● Metoprolol 25 mg twice a day
● Novolog
● Lantus
● Lidoderm patch one a day
● Tramadol PRN
● Bayer aspirin one a day
Reflection Question #8
Room code: MEDREC

Open-ended question:

Provide one clarification or question you have regarding GY’s medication list.

- Clopidogrel 75 mg one a day
- Lipitor 40 mg one a day
- Eliquis 20 mg one a day
- Lisinopril 40 mg one a day
- Metoprolol 25 mg two a day
- Novolog
- Lantus
- Lidoderm patch one a day
- Tramadol PRN
- Bayer aspirin one a day
Reflection Question #9
Room code: MEDREC

The nurse enters the medication list provided by the husband and the admitting resident orders these medications as listed.

What mistakes were made that could lead to an adverse drug event?

A. List was not verified with husband
B. List was not verified with the patient
C. Resident did not question entries
D. A and C
E. B and C
F. All of the above

- Clopidogrel 75 mg one a day
- Lipitor 40 mg one a day
- Eliquis 20 mg one a day
- Lisinopril 40 mg one a day
- Metoprolol 25 mg two a day
- Novolog
- Lantus
- Lidoderm patch one a day
- Tramadol PRN
- Bayer aspirin one a day
The ED technician reconciles the med list, and the pharmacist reviews it and compiles the following list:

- Clopidogrel 75 mg one tablet daily
- Lipitor 40 mg one tablet daily
- Eliquis 5 mg one tablet twice daily
- Metoprolol tartrate 25 mg twice a day
- Valsartan 160 mg one tablet daily
- Novolog 0-18 units tidmeals sliding scale
- Lantus 12 units beneath the skin at bedtime
- Lidoderm patch one a day
- Tramadol 25 mg PRN pain
- Bayer aspirin one a day
- Tylenol 650 mg PRN pain
GY is prepared to be discharged after her tests were negative. Her medication list has been reconciled by the medical resident and her husband is ready to depart the hospital with her.

Open ended question: What concerns do you have about the discharge medication list?

Start Taking These Medications:
- Imdur 60 mg one tablet daily
- Atorvastatin 80 mg one tablet at bedtime
- NTG 0.4 mg sublingual PRN chest pain
- Norco 1-2 tablets Q6HPRN pain

Continue Taking These Medications:
- Clopidogrel 75 mg one tablet daily
- Lipitor 40 mg one tablet daily
- Metoprolol tartrate 25 mg twice a day
- Valsartan 160 mg one tablet daily
- Novolog 0-18 units tidmeals sliding scale
- Lantus 12 units beneath the skin at bedtime
- Lidoderm patch one a day
- Tramadol 25 mg PRN pain
- Bayer aspirin one a day
- Tylenol 650 mg PRN pain

Stop Taking These Medications:
- Eliquis 5 mg twice daily
Conclusions:

● Medication reconciliation is an intervention-rich service pharmacists and pharmacy technicians can provide to a health system.
  ○ This CE focused on acute care settings, but the principles can be applied to retail, community, and beyond.
  ○ The end goal is continuity of care and reduced adverse drug events.

● Collecting accurate medication histories is like detective work.
  ○ You have to know how to ask the right question in the right way to get the truth.
Additional Reading:

- A study that assesses the impact of therapeutic substitutions on discharge medication reconciliation errors.

- A meta-analysis that looks at the impact students and technicians have on the med rec process.

- A guiding document that discusses the practices of ASHP-APHA defined “best practice” health systems.
  - ASHP-APHA Medication Management in Care Transitions Best Practices
Reflection Question #11
Room code: MEDREC

What is one piece of information you learned from this program that you feel is applicable to your job/practice (if anything, I won’t be offended if you say nothing).
Questions?