Intervention to Improve Safety by Optimizing Oral Contrast Dispensing at a Large Academic Medical Center

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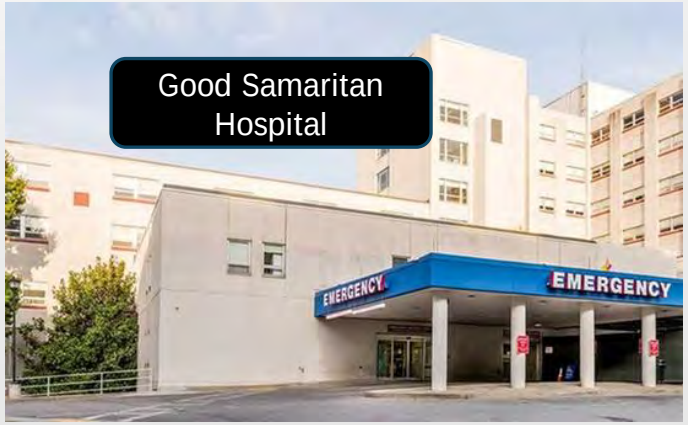
Faculty Disclosure

- I have no relevant financial relationships to disclose.

University of Kentucky HealthCare

- Academic, Tertiary Care Center
  - Comprehensive Stroke Center
  - NCI Designated Cancer Center
- 3 Hospital System
  - 1040 licensed beds, 225 ICU
- Level I Trauma Center
- Level IV Neonatal ICU
- Level III PICU



Medication-Use Safety and Quality Team

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Technology

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Adult Services

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Objectives

Upon completion of this educational activity, you will be able to:

1. Identify a workflow with high risk of human error.
2. Discuss human behavior and risk reduction strategies.
3. Describe error prevention strategies in unique healthcare settings.

Acronyms & Abbreviations

- ADC = Automated Dispensing Cabinet
- EHR = Electronic Health Record
- ISMP = Institute for Safe Medication Practices
- Pharm Tech = Pharmacy Technician
- Rad Tech = Radiology Technologist
- RN = Registered Nurse
- RCA = Root Cause Analysis
- SOP = Standard Operating Procedure

Identifying The Issue

What Happened?

- A nurse called Central Pharmacy stating Patient A (JS, room 12-133) was accidently given Patient B's (SJ, room 12-113) oral contrast solution, iohexol.
- The bottle had a hand-written label and generic typed instructions to administer to patient prior to CT scan.

Patient Name: S---J---

Room Number: 12-133

Please start contrast now and save 100mL for arrival in CT. Once reaching the 100mL line, please call 3-9730 to inform them

What Happened?

- The pharmacist could see in the EHR that Patient JS (Room 12-133) was ordered a CT scan, but this scan did not require oral contrast solution. The Pharmacist confirmed that Patient SJ (Room 12-113) was also ordered a CT scan and did require the oral contrast solution to be administered before the scan.

Patient Name: S---J---

Room Number: 12-133

Please start contrast now and save 100mL for arrival in CT. Once reaching the 100mL line, please call 3-9730 to inform them

What is “Risk” in a Workflow

A risk is a possibility of failure

Root Cause Analysis (RCA)

- A structured problem-solving technique that results in one or more corrective actions to prevent recurrence of an error.
- Steps of a Root Cause Analysis:
  - What happened
  - Why did it happen
  - What can we do to prevent it from happening again
- Involves understanding the fundamental causes of errors and events.

Risk Identification

ISMP's 10 Key Elements of Medication Use System

1. Patient Information
2. Drug Information
3. Communication of Drug Orders and Other Drug Information
4. Drug Labeling, Packaging, and Nomenclature
5. Drug Standardization, Storage, and Distribution
6. Medication Device Acquisition, Use, and Monitoring
7. Environmental Factors, Workflow, and Staffing Patterns
8. Staff Competency and Education
9. Patient Education
10. Quality Processes and Risk Management

Key Elements of Medication Use, *ISMP*.

Risk Identification

Reactive

- Error reporting systems
- Direct observation
- Trigger tools
- Root Cause Analysis

Proactive

- Quality improvement initiatives
- Leadership rounding
- Focus groups
- Failure Mode & Effects Analysis

Systems for identifying, reporting, analyzing, and reducing the risk of medication errors.

QIPS Terminology: FMEA vs RCA? *U of Nebraska Med Cen*. 2022.

RCA of Contrast Case

Apply Risk Identification

ISMP Key Element #1: Patient Information

- Using Room Number as a patient identifier
  - Per institutional policy, we should use two patient identifiers, and they can be Patient Name, Medical Record Number, Date of Birth, and/or Address

ISMP Key Element #4: Drug Labeling, Packaging, & Nomenclature

- Using a non-standard label with blanks to write-in patient name and room number

Apply Risk Identification

ISMP Key Element #5: Drug Standardization, Storage and Distribution

- Oral contrast workflow is different from any other drug dispensed in the hospital

Normal Medication Workflow

Pharm Tech dispenses patient-specific dose → Pharm Tech attaches standard printed label → Pharmacist verifies accuracy → Pharm Tech delivers medication via pneumatic tube, directly to RN, or to a patient-specific bin

Oral Contrast Workflow

Rad Tech obtains oral contrast from ADC via patient profile or override → Rad Tech attaches a sticker to the bottle and writes in patient information → Rad Tech delivers bottle via pneumatic tube, to unit clerk, or directly to RN

Apply Risk Identification

ISMP Key Element #7: Environmental Factors, Workflow, & Staffing Patterns

- Using an oral iohexol bottle that historically did not have a usable barcode for BCMA scanning

ISMP Key Element #8: Staff Competency & Education

- Lack of familiarity with oral contrast dispense and administration process

Human Behaviors & Risk Reduction Strategies

Human Behaviors

Human Error

- A slip, lapse, or mistake
- Examples: Accidently running a stop sign or Forgetting to check an expiration date

At-Risk

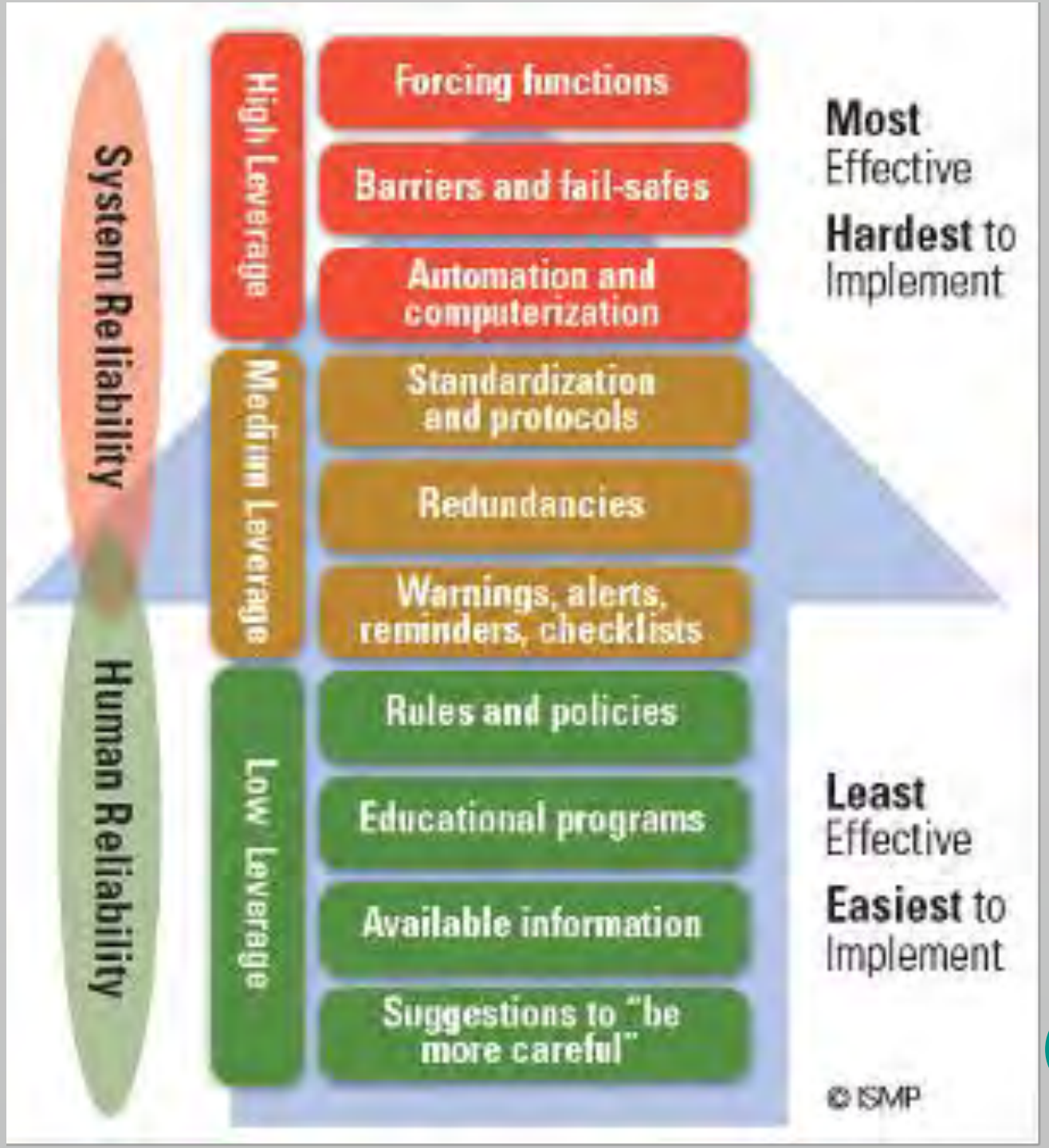
- A choice; risk believed to be justified or insignificant
- Examples: Speeding or Giving a medication before BCMA scan

Reckless

- Disregard of substantial and unjustifiable risk
- Example: Coming into work intoxicated or Not putting sterile gloves on in the IV Room

A Just Culture Approach to Managing Med Errors, *Hosp Pharm*. 2017 Apr;52(4):308=315.

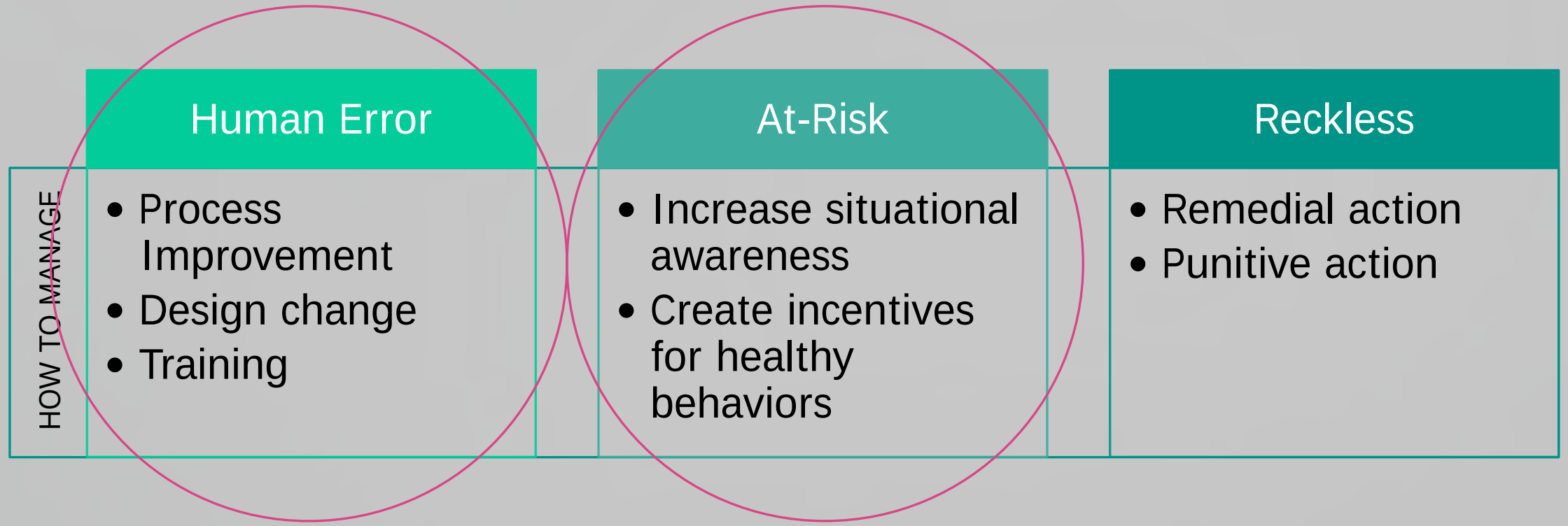
Hierarchy of Effectiveness



Hierarchy of Effectiveness, *ISMP*.

Bringing It Back to Our Case

What Behaviors Were Present?



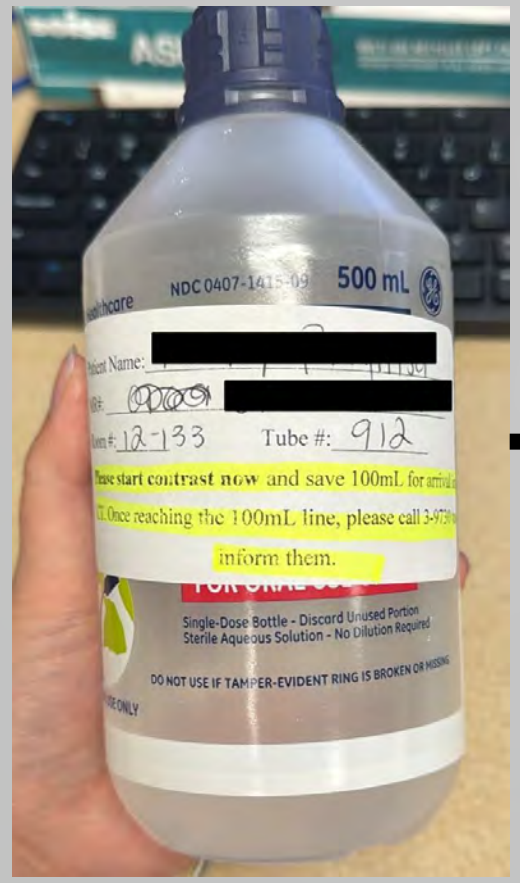
So What Did We Do?

Mirrored an Existing Process

When an RN dispenses an insulin dose to be drawn up from a multi-dose vial, a patient-specific label automatically prints at the ADC.

Nursing staff label their patient-specific dose and use the printed barcode for BCMA scanning. The multi-dose vial remains in the ADC.

1. Introduced a Patient-Specific Oral Contrast Label Printed at the ADC



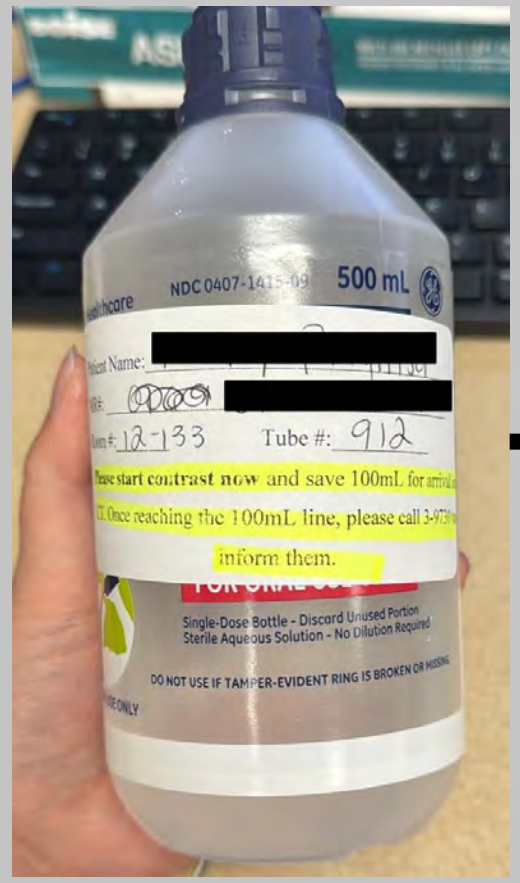
Test, Contrast
ID: Temporary 6N

Dose: **500 mL**

iohexol oral
4.5 g/500 mL (500 mL) Solution

Printed by: Test, Pharmacy
Removed: Oct 10, 2024 08:59 Expires: (___/___/___)

2. Re-Designed the “homemade” sticker used by Rad Techs



Technologist: PLACE PYXIS LABEL HERE(DO NOT cover administration instructions with Pyxis Label)

Patient Name: _____

MR#: _____ DOB: _____

Floor/Unit #: _____

Tube #: _____ Expires 8 hours after opened.

RN to BCMA scan and administer contrast now.

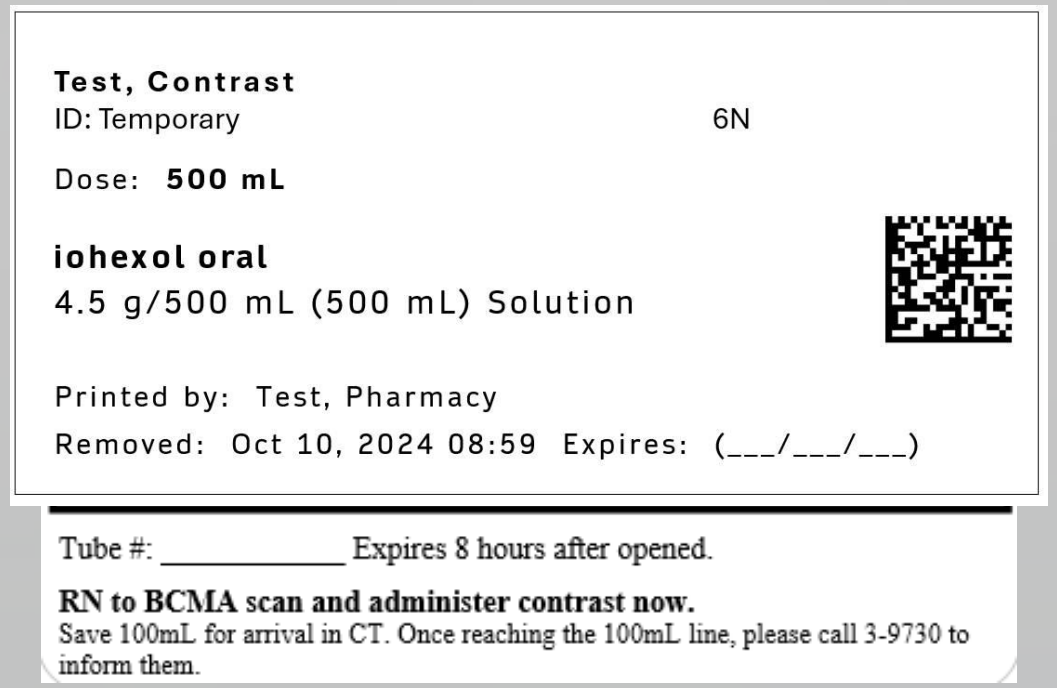
Save 100mL for arrival in CT. Once reaching the 100mL line, please call 3-9730 to inform them.

The Workflow Today

Rad Tech dispenses an oral contrast bottle from ADC and a patient-specific label automatically prints

Rad Tech attaches patient-specific label over the standard sticker on the bottle

Rad Tech delivers bottle via pneumatic tube, to unit clerk, or directly to RN



Instructions for administration and phone number left visible.

Other Necessary Steps to Change This Workflow

Other Necessary Steps

- Expanded scope to include additional oral contrast agents such as barium
- Reviewed oral contrast agents for addition to the Autoverification List
- Created an SOP for Rad Techs to dispense and label oral contrast agents in compliance with institutional, state, and federal laws and regulations
- Created an SOP for all staff to change paper at the ADC Printer
- Disseminated education to nursing regarding barcode scanning improvement and compliance expectations
- Future Goals: Removal of oral iohexol from ADC Override List

Interdisciplinary Collaboration

Departments:

- Pharmacy Leadership
- EHR Analysts
- Pharmacy Automations Team
- Medication Safety
- Radiology
- Nursing
- Neurology/Neurosurgery

Formal Committees/Meetings:

- Enterprise Pharmacy Operations
- Pyxis Task Force
- Clinical Decision Support Task Force
- Med-Use Safety and Informatics Subcommittee
- Enterprise Pharmacy & Therapeutics Committee
- Enterprise Nursing Advisory Council

What is the Highest Leverage Strategy for Preventing Errors?

1. Education
2. Rules
3. Alerts
4. Automation

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