Scanning for Safety: Implementing Real-Time Barcode Scanning and Auto-programming

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Presenters

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Financial Relationship Disclosures

- Stacy Carson: Smiths Medical: Consultant

- All other presenters of this session report no financial relationships relevant to this activity.

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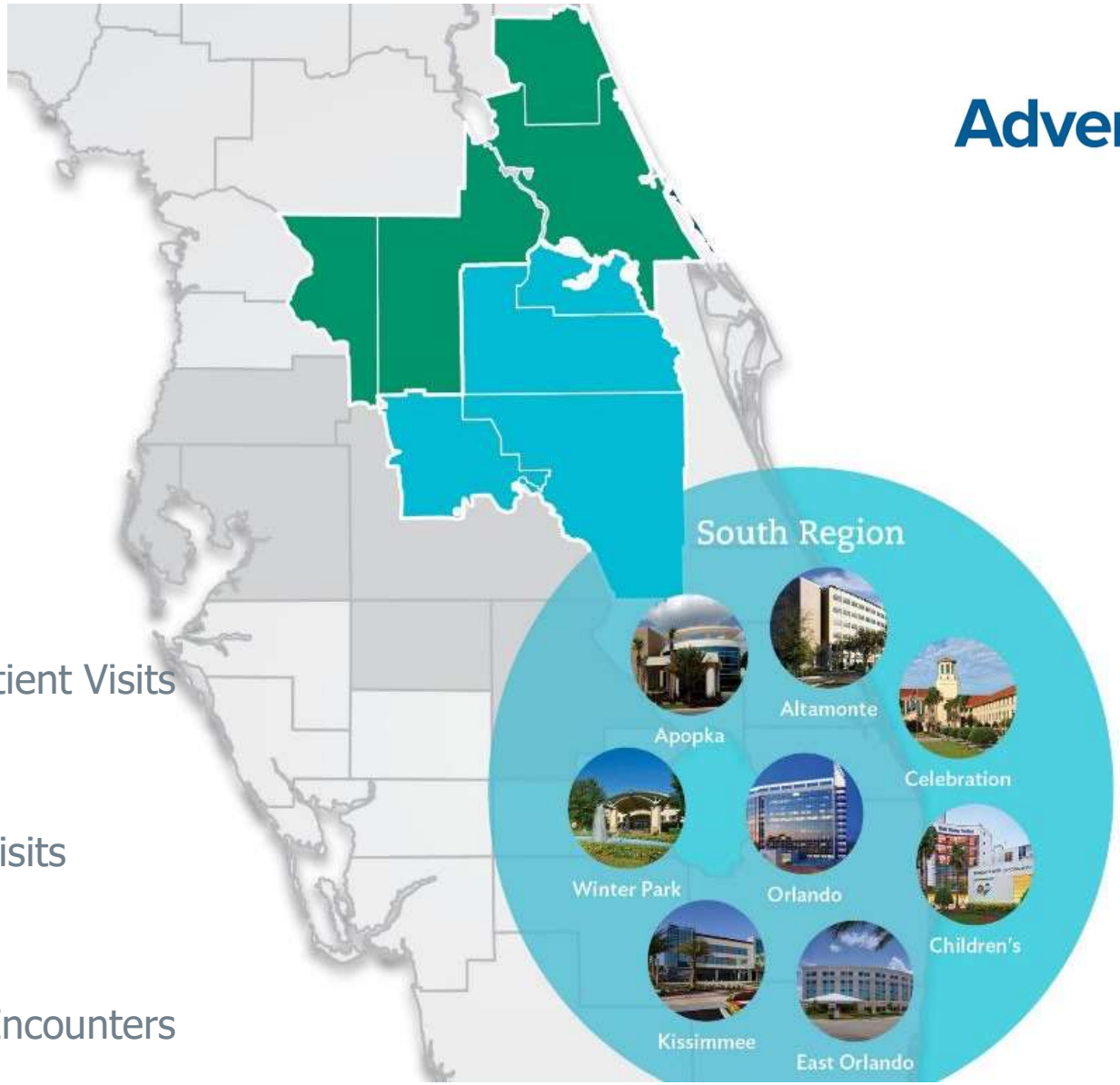
8 Hospitals

2,993 Beds

133,352 Inpatient Visits

586,513 ED Visits

2.5+M Patient Encounters



Learning Objectives

- Recognize the high-risk nature of the medication administration process and how safety technology can mitigate the risk
- Review an example of a chemotherapy simulation where safety technology was implemented
- Formulate a plan to integrate safety technology in simulation

Background

Medication Safety Terms

Medication Error

Preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of the health care professional, patient or consumer

Adverse Drug Reaction (ADR)

Harm directly caused by a drug at normal doses during normal use

Adverse Drug Event (ADE)

Injury resulting from medical intervention related to a drug at any dose

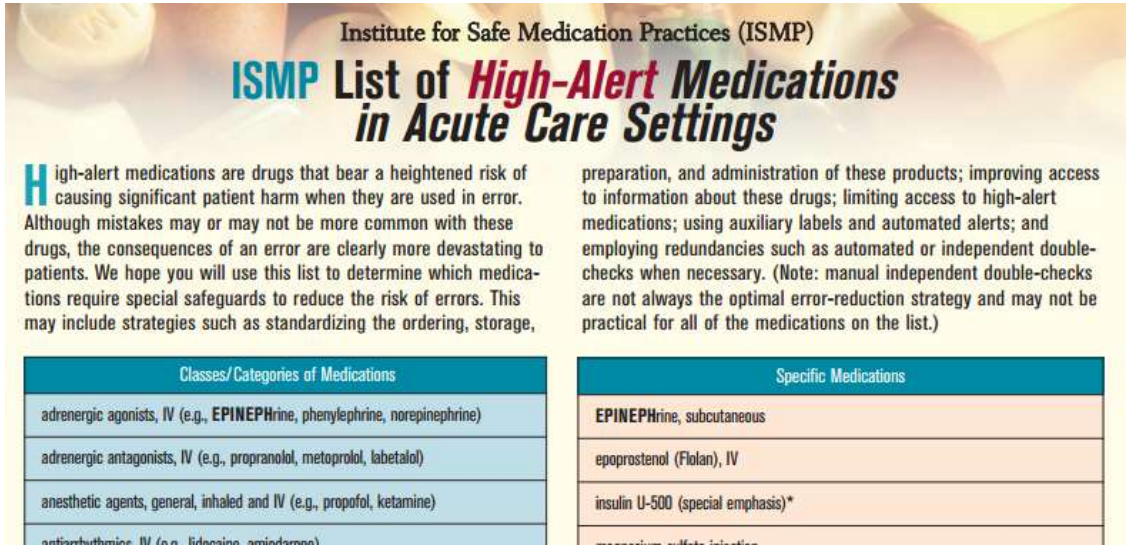
- May include ADRs
- May result from errors in prescribing, dispensing and administration
- Categorized as preventable and non-preventable

http://health.gov/hcq/pdfs/ade-action-plan-508c.pdf
http://www.nccmerp.org/sites/default/files/nccmerp_fact_sheet_2015-02-v91.pdf
Bates, et al. *JAMA*. 1995; 274(1): 29-34.

Medication Use Process

Definition: High Alert Medications

- Medications that bear a heightened risk of causing significant patient harm when they are used in error
- Although mistakes may or may not be more common with these drugs, the consequences of an error are clearly more devastating to patients
  - Examples:
    - Parenteral nutrition preparations
    - Neuromuscular blockers
    - **Chemotherapeutic agents**
    - Concentrated electrolytes
    - Narcotics / Opioids (IV, transdermal, and Oral)



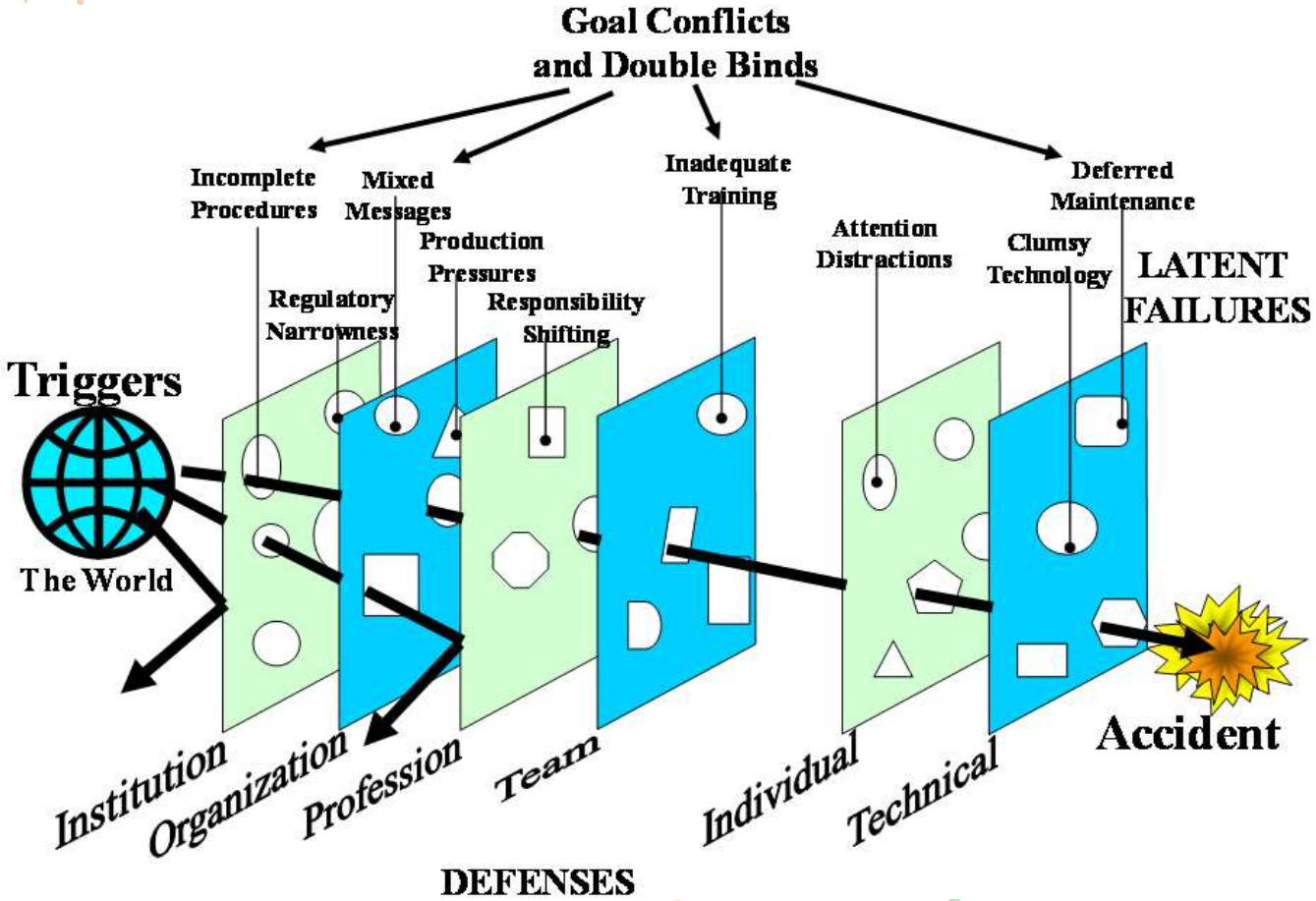
Institute for Safe Medication Practices (ISMP)

ISMP List of *High-Alert* Medications in Acute Care Settings

High-alert medications are drugs that bear a heightened risk of causing significant patient harm when they are used in error. Although mistakes may or may not be more common with these drugs, the consequences of an error are clearly more devastating to patients. We hope you will use this list to determine which medications require special safeguards to reduce the risk of errors. This may include strategies such as standardizing the ordering, storage, preparation, and administration of these products; improving access to information about these drugs; limiting access to high-alert medications; using auxiliary labels and automated alerts; and employing redundancies such as automated or independent double-checks when necessary. (Note: manual independent double-checks are not always the optimal error-reduction strategy and may not be practical for all of the medications on the list.)

Classes/Categories of Medications	Specific Medications
adrenergic agonists, IV (e.g., **EPINEPH**rine, phenylephrine, norepinephrine)	**EPINEPH**rine, subcutaneous
adrenergic antagonists, IV (e.g., propranolol, metoprolol, labetalol)	epoprostenol (Flolan), IV
anesthetic agents, general, inhaled and IV (e.g., propofol, ketamine)	insulin U-500 (special emphasis)*

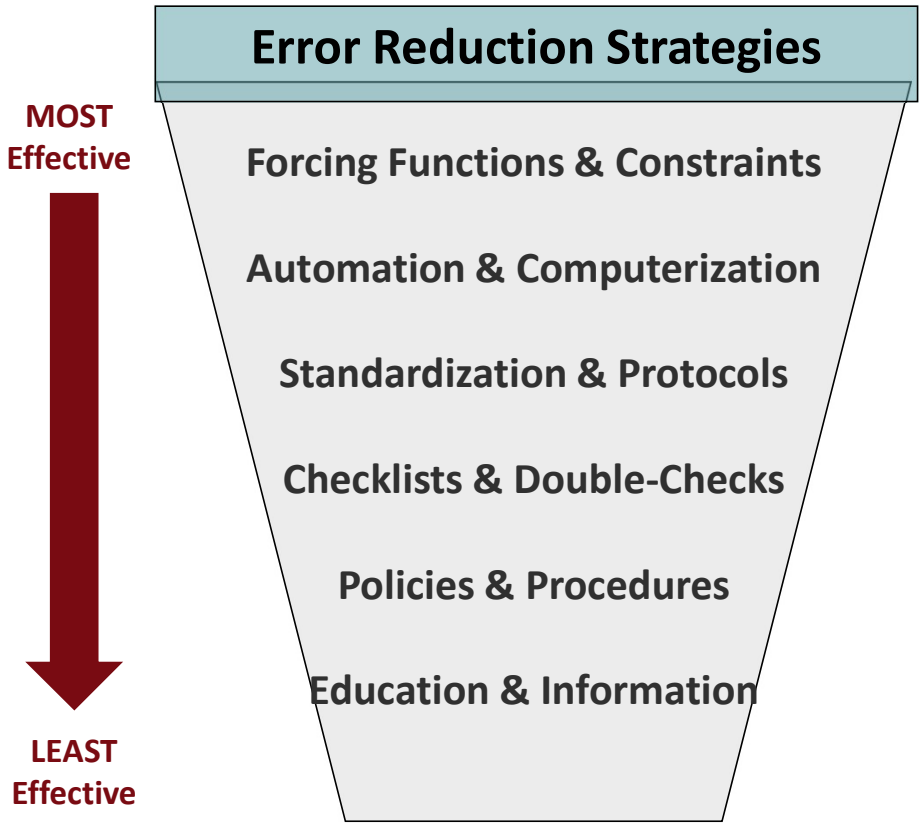
Emphasis on Multifactorial Nature of Errors



Reason J. *BMJ.* 2000; 320: 768-770.

Systems Not People

- Medication errors are the property of a *system as a whole* rather than results of the acts or omissions of the people in the system
- Performance improvement requires changing the system, not the people



Why Focus on the Administration Phase? Errors in the Medication Use Process



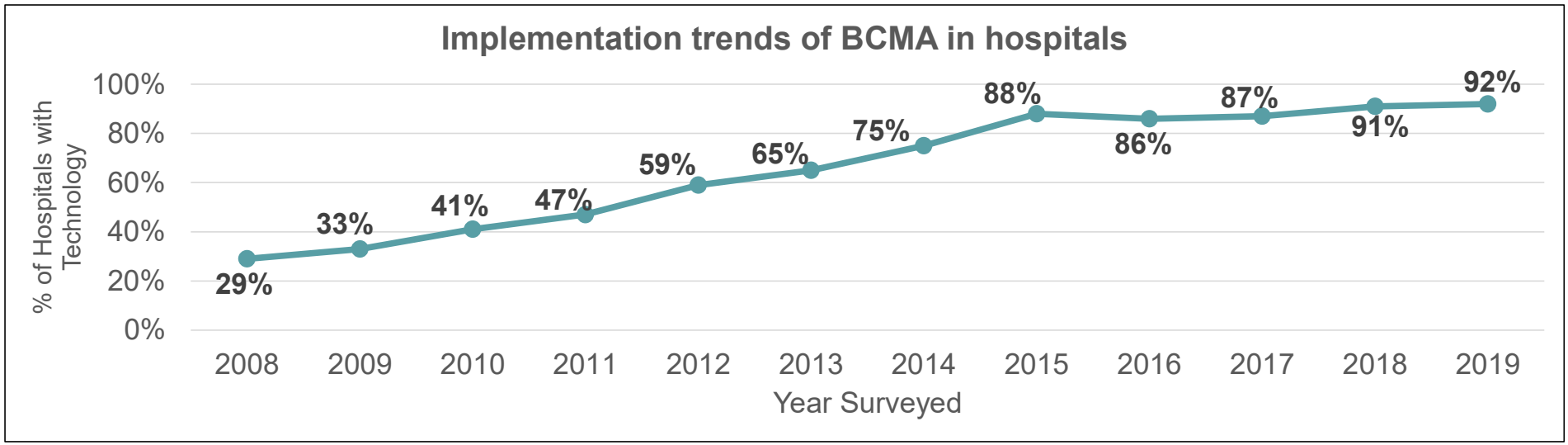

	PRESCRIBING	TRANSCRIBING	DISPENSING	ADMINISTERING
Errors:	**39%**	**12%**	**11%**	**39%**
Harm:	**28%**	**11%**	**28%**	**51%**
Intercepted:	**48%**	**33%**	**33%**	**2%**

Leape L. JAMA. 1995;274:35-43.

Medication Administration Technology

Barcode Medication Administration (BCMA)

- Involves scanning patient wristband + medication connected to medication order in the MAR
- Able to catch wrong medication & patient errors at the point of administration



BCMA/CPOE. State of Pharmacy Automation. PPP. Aug 2019.

Medication Administration Technology

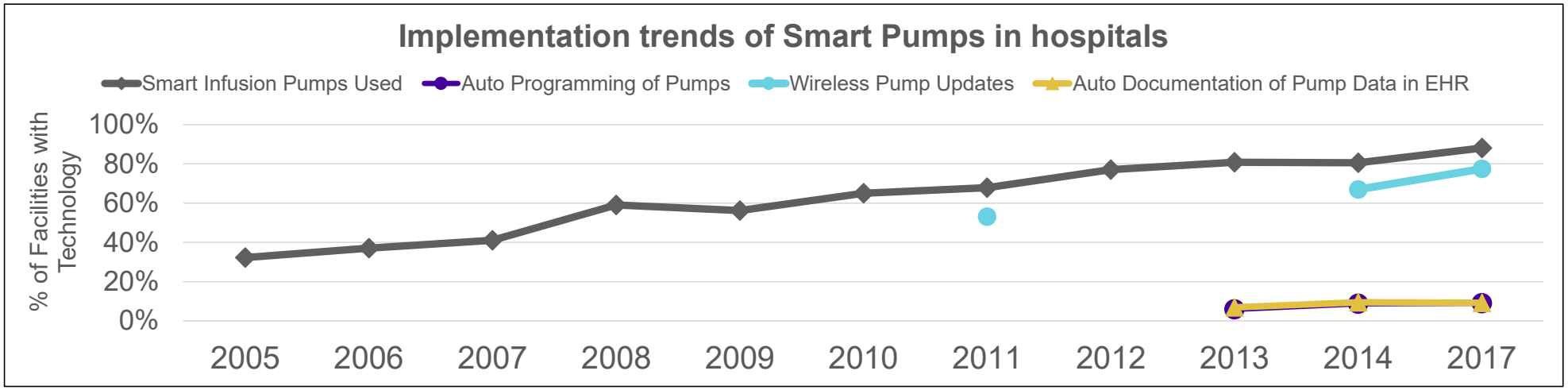
Am J Health-Syst Pharm. 2018;75:e463.

Smart Infusion Pumps

- Contains drug library with standard concentrations and dose limits, default durations
- When library used, helps prevent **catastrophic misprogramming**

Pump Auto-programming

- Auto populates infusion information from the order in MAR into the pump
- Removes some human elements in programming pump



Demographics – from FHSA meeting & list serve

Do you currently use the safety technology, BCMA, in your simulations?

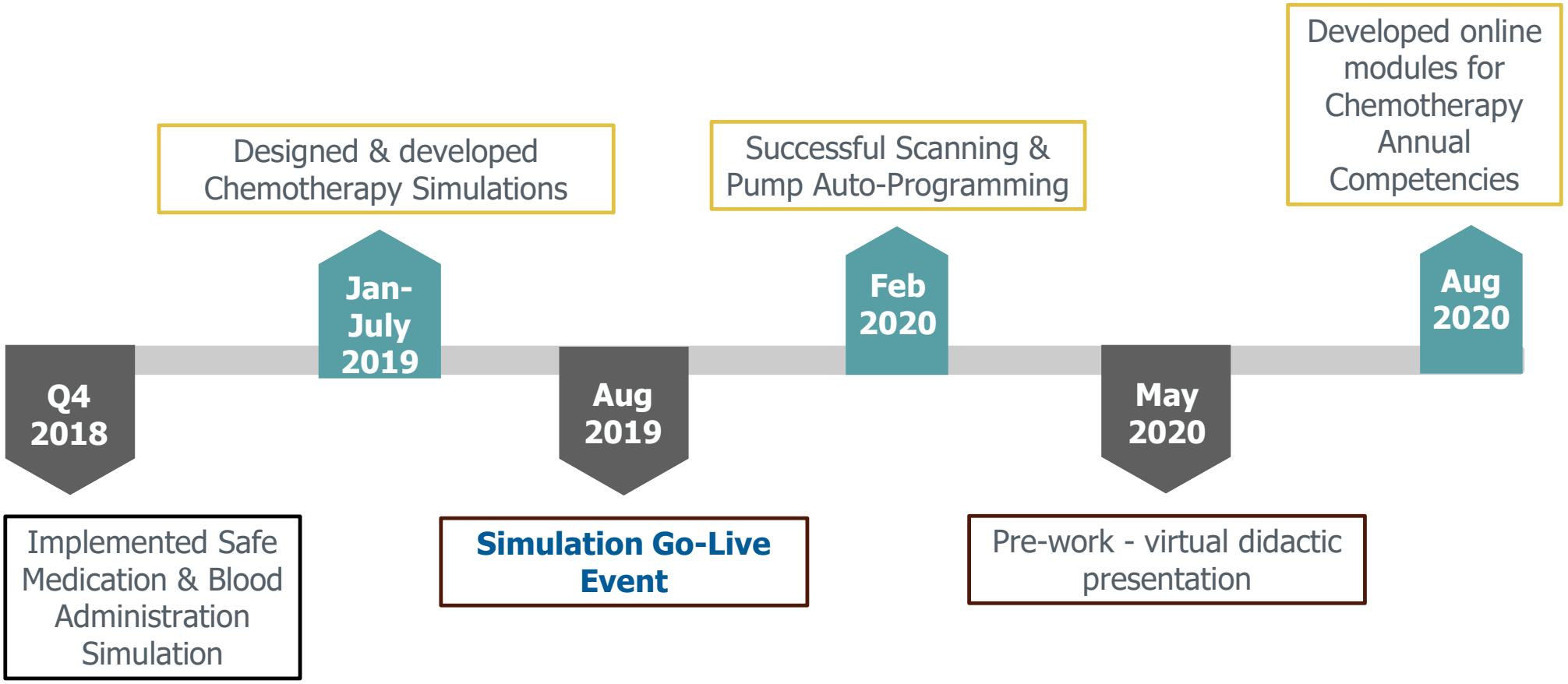
Answers: 0/11

Do you use IV smart pumps (auto programming) in your simulations?

Answers: 0/11

Overview of the Simulation Project

Timeline


Q4 2018
Implemented Safe Medication & Blood Administration Simulation
Jan-July 2019
Designed & developed Chemotherapy Simulations
Aug 2019
Simulation Go-Live Event
Feb 2020
Successful Scanning & Pump Auto-Programming
May 2020
Pre-work - virtual didactic presentation
Aug 2020
Developed online modules for Chemotherapy Annual Competencies

Stakeholders

ONCOLOGY EDUCATOR

NURSING INFORMATICS – EHR EXPERT

PHARMACY

MEDICAL SIMULATION TEAM

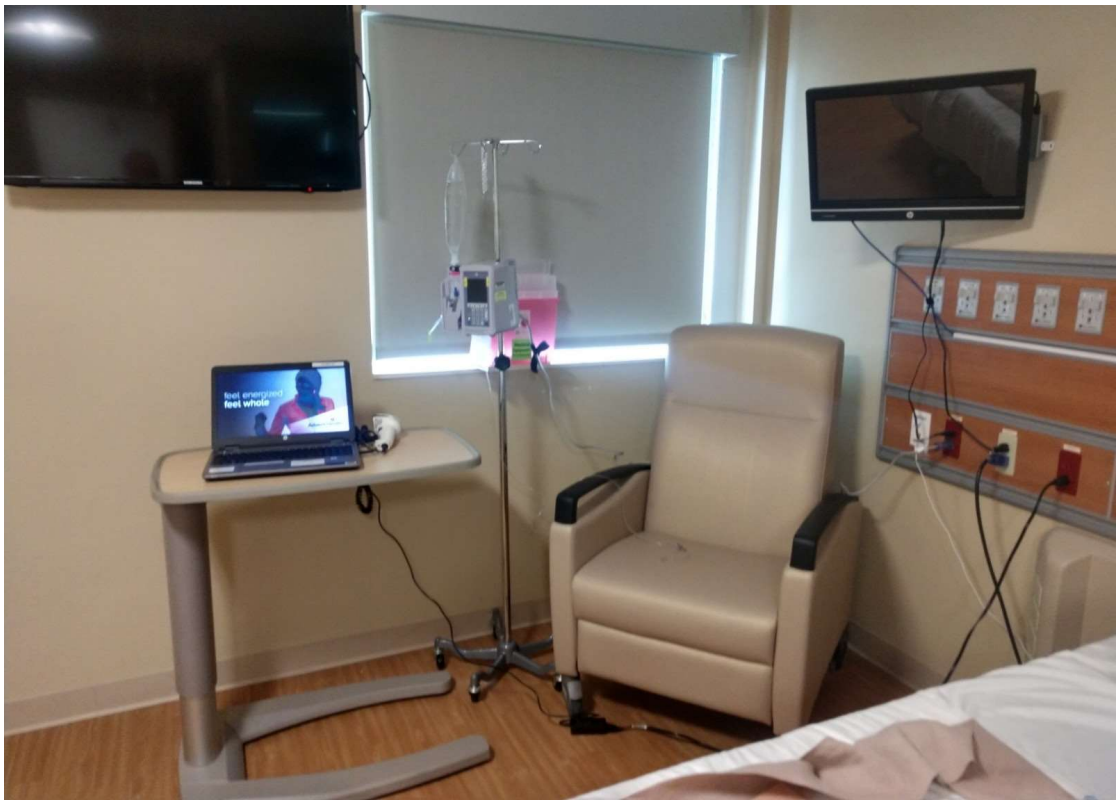
Developed 4 Simulation Scenarios

Chemotherapy Medication Administration

Chemotherapy Spill

Chemotherapy Extravasation

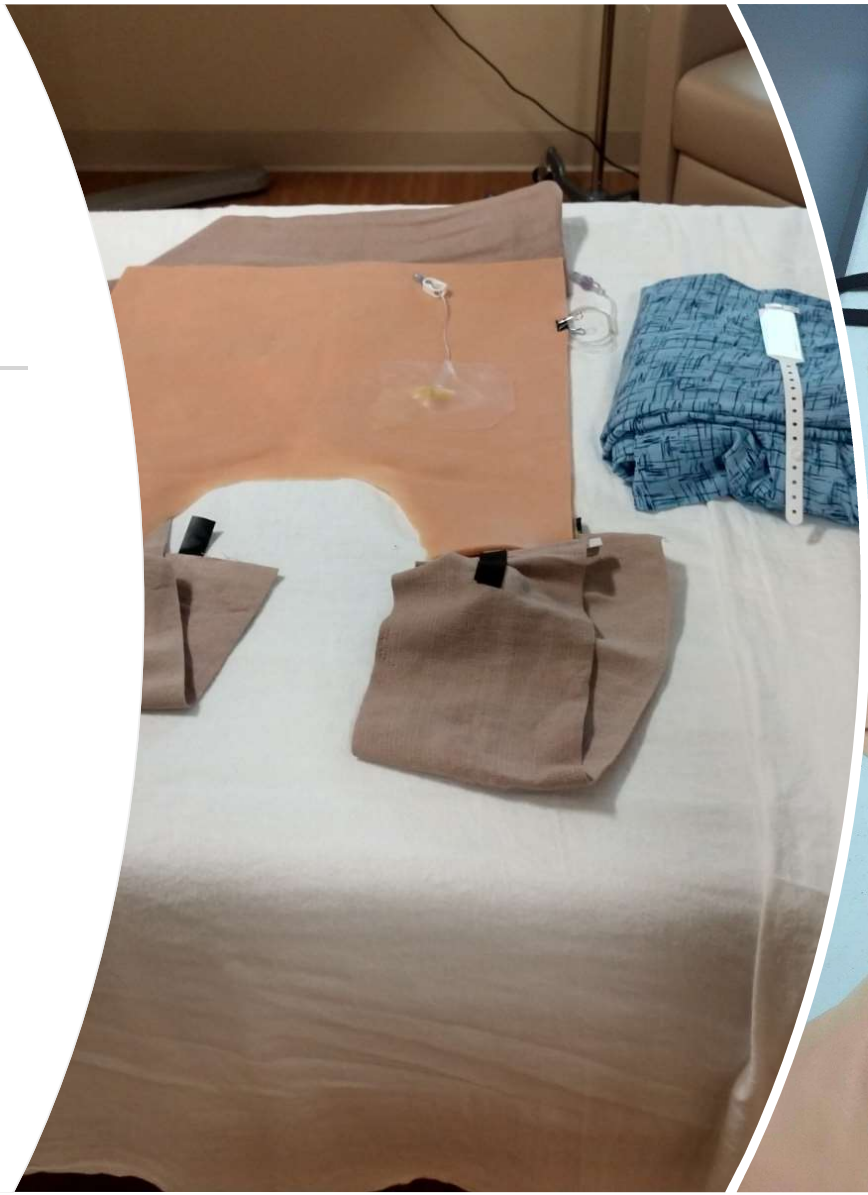
Chemotherapy Reaction


feel energized
feel whole


CHEMOTHERAPY DRUG
Nurse 1 – Chemo
Administration

Simulation Modality

- Standardized Patients
- Moulage
- IT equipment



Schedule

Chemotherapy Simulation Schedule: AHEO															
Round #1															
	1230-1305	1305-13010	1310-1335	1335-1350	1350-1405	1405-1420	1420-1435	1435-1450	1450-1455	1455-1510	1510-1525	1525-1540	1540-1555	1555-1610	1610-1625
		Transition	Chemo Administration	Debrief	Large Group Debrief	Chemo Spill	Debrief	Large Group Debrief	Transition	Extravasation	Debrief	Large Group Debrief	Chemo Reaction	Debrief	Large Group Debrief
Group 1 - Ed:Nora SOS: Karl SP: Natalie, Mary Lee	Pre-Brief: Lecture Hall	Transition	Pt Room 1	Back of LH	Large Group Debrief: Lecture Hall	Pt Room 1	Back of LH	Large Group Debrief: Lecture Hall	Transition	Pt Room 1	Back of LH	Large Group Debrief: Lecture Hall	Pt Room 1	Back of LH	Large Group Debrief/ End Day: Lecture Hall
Group 2 Ed: Ella-Mae SOS: Meriam SP: Alissa, Perl			Pt Room 2	Skills Lab A		Pt Room 2	Skills Lab A			Pt Room 2	Skills Lab A		Pt Room 2	Skills Lab A	
Group 3 ED: Emilee/Erin SOS: Claudia SP: Diana, Isabel			Pt Room 3	Skills Lab B		Pt Room 3	Skills Lab B			Pt Room 3	Skills Lab B		Pt Room 3	Skills Lab B	

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*Schedule will change depending on where training is located

Nursing Informatics

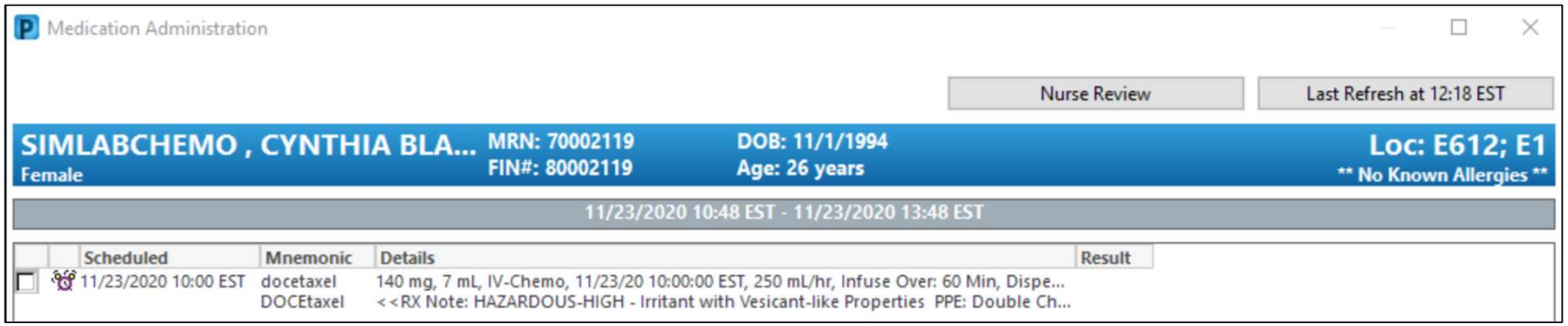
Nursing Informatics – The Ask

- ASK: Create the Train Domain patients and tasks associated with chemo medication administration

  - Create a sustainable solution with:
    - Limited number of patient profiles built out
    - MAR tasks built out for medication administration
    - Ensure medication order profiled
    - Ensure medication BCMA scanning available
    - Patient wrist bands for patient BCMA scanning

Train Domain – Background

- Refreshes every night
- Updated every quarter
  - Open window
- Complete overhauls every 4-5 years



Train Domain = Mirrors production domain for hands-on training
Production Domain = Live domain used for admitted patients

Nursing Informatics – Barriers

- Barriers Encountered
  - Limitation on who can enter chemotherapy orders
  - Discovered background build issues (MAR tasks) (daily due times @ 1000 & simulation in afternoon)
  - Issues with other training classes conflicting when using shared patient profiles
  - Pump interoperability training module built out
    - Applied to existing patient profiles
    - Appeared during live simulation when not part of simulation
  - Issues with standardized patients remembering the “Sim” names
  - Student knowledge of MAR vs. MAW
    - Ability to auto program

MAR = Medication Administration Record
MAW = Medication Administration Wizard; Cerner term

Nursing Informatics – The Fixes

Name	Room	Bed
SIMLABCHEMO , CYNTHIA BLACK	E612	E1
SIMLABCHEMO , KAREN SMITH	E610	E2
SIMLABCHEMO , NORA JOHNSON	E611	E1
SIMLABCHEMO , SARAH GOOD	E612	E2

- Overhaul of Train Domain
  - 20 specific User Logins created for simulation
    - 6 specific to chemotherapy
  - 4 Chemotherapy simulation patients given “real” names
    - Ensured drug added to profile
      - Partnered with pharmacy
    - Patient bands created

  - Put simulation patients in another facility in train domain
    - Eliminates issue with pump interoperability module
- Education on MAR vs. MAW
- Education on what to do with a “Late Medication” warning

Nursing Informatics – Lessons Learned

- Ensure simulation lab has their own patients
  - Don’t share if you don’t have to
- Checks and balances of patient profile prior to going live
- Ensure minimization of other initiatives affecting the training domain

Pharmacy / Medication Safety

Pharmacy – The Ask

- ASK: Ensure we have a scannable medication label and enable BCMA and Pump autoprogramming technology during a chemotherapy administration simulation

  - Create a sustainable solution with:
    - Appropriate chemotherapy orders on patient profile
    - Real and reusable pharmacy medication labels
    - Hospital large volume infusion pumps that work with auto programming
    - Recirculator tubing for pumps

Pharmacy – Barriers

Static Barcode

- Barriers to Overcome
  - Profiling of the chemotherapy
  - Patient-specific IV chemotherapy order in Train domain
    - BCMA using a non-static barcode
      - Patient-specific weight-based medication order
  - Pharmacy Medication Label Printers
  - Reprint of medication labels
  - Pump Auto-programming
    - Knowledge gap
    - Pumps not communicating with train domain

Non-static Barcode

Pharmacy – The Fixes

- Chemotherapy orders profiled during “open window” of train domain
- Tested and ensured patient-specific IV labels worked daily
- Printer in Train domain mapped to Orlando campus pharmacy
- NEVER reprint labels
- Pump Auto-programming
  - Ensure staff using correct pump profile; e.g., chemotherapy
  - Ensure pumps pointed at test server
  - Set up IV fluids on primary line

Pharmacy Lessons Learned

- Don’t reprint patient specific pharmacy IV labels
  - Can’t reuse these when EHR profile refreshes daily
- Test, test, and test some more prior to go live
- Understand how train domains in EHR and pump servers communicate

VIDEO

7 minutes 41 seconds

Take-aways: Setting up Safety Technology in Your Simulation

Important to model simulation training off of “real life” expectations of the workplace

Use of technology, like BCMA & smart infusion pumps, is a standard in most facilities

Recipe for Success: Partner with correct stakeholders; refer to facility Policies and Standard Operating Procedures; Utilize resources of your facility; Create sustainable solutions to use in the simulation

Contributions – Thank you!

- We could not have completed this project without the help of the following people:

  - AdventHealth Learning Network (ALN)
  - Scott Pantke
  - Medical Simulation Team
  - Oncology Education Staff
  - CFD-S Pharmacy Informatics Team
  - CFD-S Nursing Informatics Team

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THANK YOU!

For QUESTIONS / COMMENTS, please reach out to:

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