

# **Pharmacy Safety Systems in New York State Hospitals Survey Results to Site Visits to Advancing Leading Practices**

**Prepared for Health Research Inc. in collaboration with New York State  
Department of Health Patient Safety Center**

*Funding for this project is from the NY State Attorney General's settlement with  
Cardinal Health, Inc.*

June 9<sup>th</sup>, 2010

## Project Scope

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### Purpose of Hospital Pharmacy Systems Survey:

- To improve the culture of safety in New York State's hospitals and hasten the adoption of evidence-based technologies and other pharmaceutical safety interventions.
- Inventory the current medication safety practices that are currently employed in the state's hospitals.
- Inventory and identify statewide practices that are sustainable taking into factors such as cost, implementation, maintenance and hospital resources.
- Identify statewide best practices in specific areas that can be replicated by a variety of hospital types in diverse locations.
- Demonstrate the cost effectiveness of identified best practice.
- Develop evidence-based hospital specific recommendations to assist hospitals in developing strategies to reduce medication errors and improve patient safety.
- Disseminate a catalog of best practices and benchmarks to guide performance improvement.

**FDA launches program to prevent errors in medication use**

By Sandra Young, CNN Senior Medical Producer  
November 4, 2009 6:05 p.m. EST

July 21, 2006

**Report Finds a Heavy Toll From Medication Errors**

By GARDINER HARRIS

Medication errors harm 1.5 million people and kill  
thousand in the U.S. annually, a report said

**The Most Common Medication Errors**

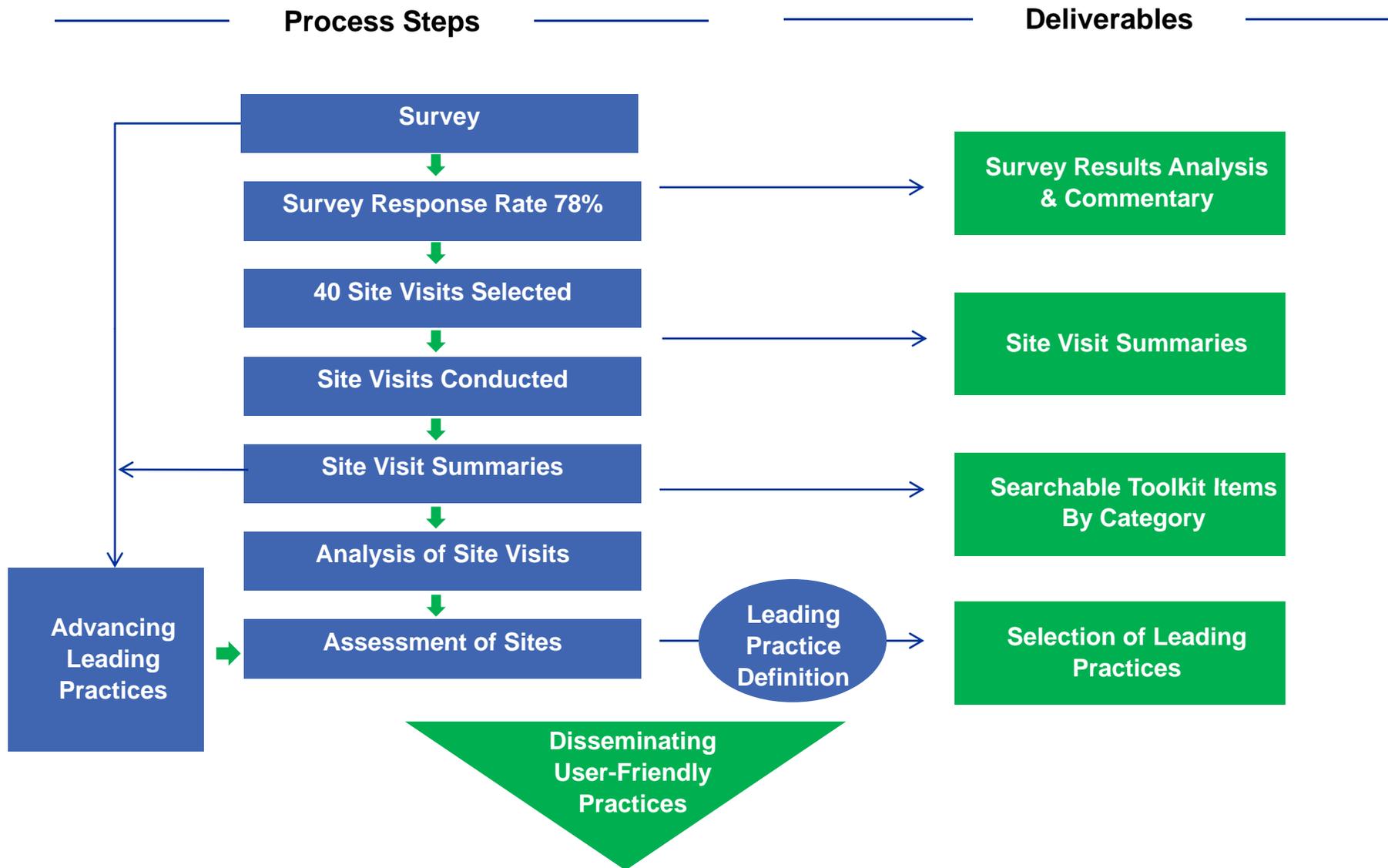
Medical Author: [Melissa Conrad Stoppler, MD](#)  
Medical Editor: [Jay W. Marks, MD](#)

Dennis Quaid's Newborn Twins Victims of Medication Error

Wednesday November 21, 2007

# Organizing and Communicating Leading Practices

## From Practice to Perfect . . . Disseminating User-Friendly Practices



## **Survey Results**

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### **Representation of Responses**

## Survey Yielded a 79% Response Rate

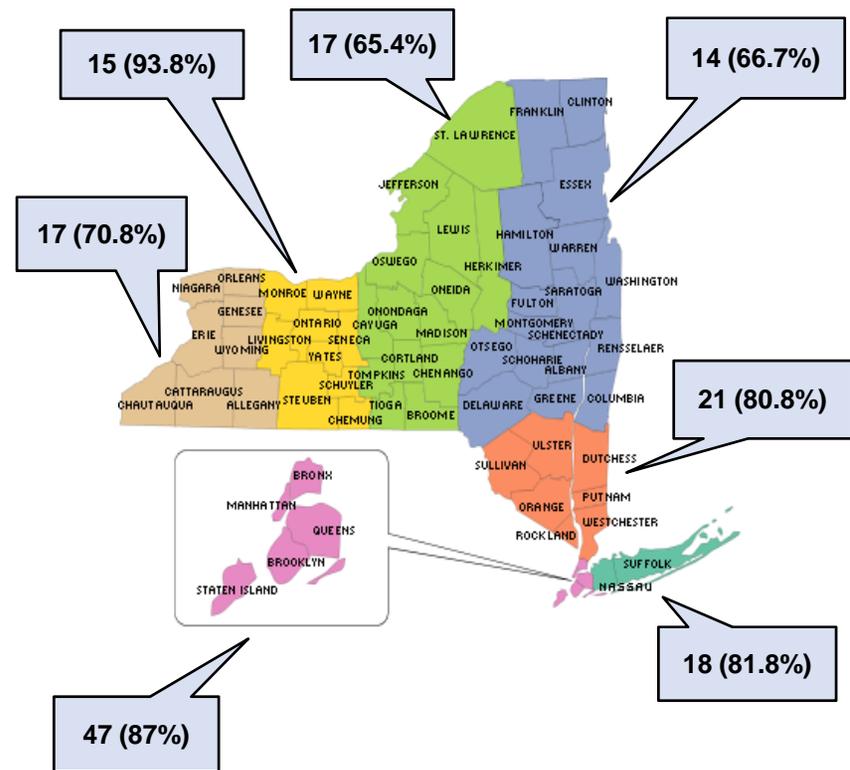
**189 Pharmacy directors representing 218 hospitals in New York State were surveyed. 149 completed responses were received, making the response rate 78.8%.**

### Response Rates

Response rate	Number
Potential respondents	189
Completed surveys	149
<b>Response rate</b>	<b>78.8%</b>

	Response Rate
<b>Teaching hospitals</b>	
Yes	81 (52.1%)
No	68 (47.9%)
<b>Pediatric patients</b>	
Yes	141 (94.4%)
No	8 (5.6%)

### Responses by Region (a)



Note:

a) Percentage of pharmacy directors that have completed the survey, by bed region

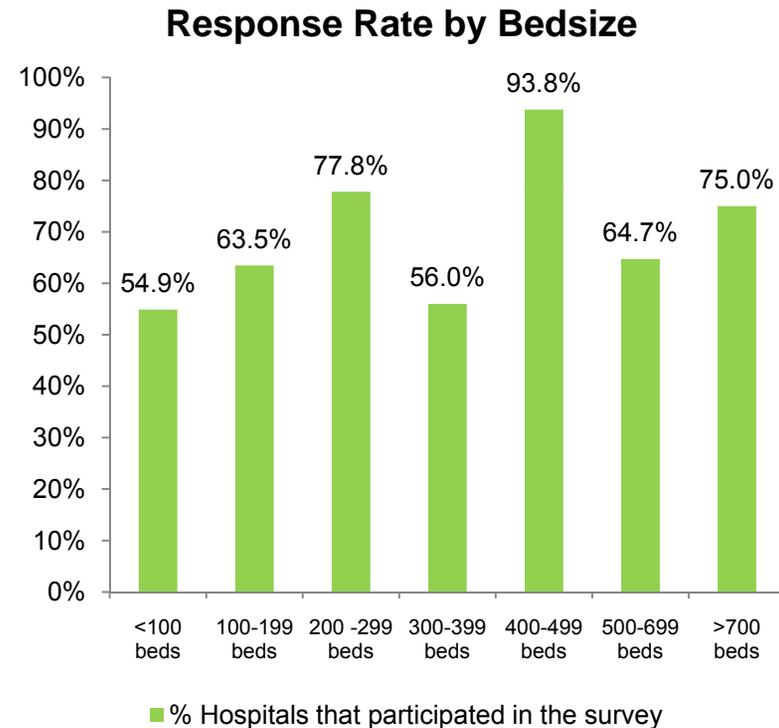
## Responses Represented All Bed Sizes

The responses of the survey fairly represent the hospitals across the State of New York based on bed size.

### Summary

- Our responses show a bell shaped distribution among the various sized hospitals.
- Medication safety practices in each category of hospital bed size is well represented.

### Response Rate by Bed Size Distribution



Note:

a) Percentage of hospitals that have completed the survey, by bed size

**Survey Results on  
Medication Safety Practices**

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## Agency for Healthcare Research/Quality's Hospital Survey on Patient Safety Culture

**A focus on culture as the foundation of patient safety efforts is fundamental in 49% of the hospitals. The culture of safety should be promoted in the remaining 51% of the hospitals.**

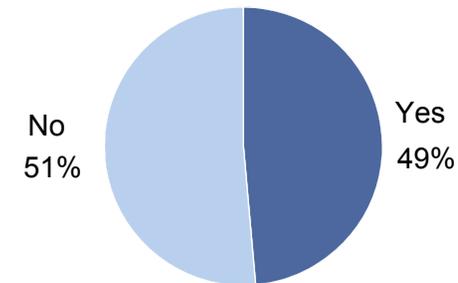
- As part of its goal to support a culture of patient safety and quality improvement in the Nation's health care system, the Agency for Healthcare Research and Quality (AHRQ) sponsored the development of patient safety culture assessment tools for hospitals, nursing homes, and ambulatory outpatient medical offices.
- 49% have completed the AHRQ survey. Of the group who completed the survey, 78% have an actionable plan in place.



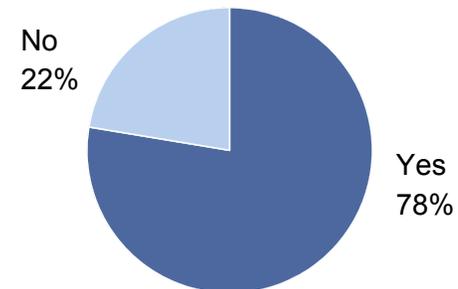
Include the link to the survey and encourage participation

<http://www.ahrq.gov/qual/patientsafetyculture/hospsurvindex.htm>

Has your hospital administered the Agency for Healthcare Research and Quality's (AHRQ) Hospital Survey on Patient Safety Culture?



If yes, does your hospital have an actionable plan in place based on the responses/results of the AHRQ survey?

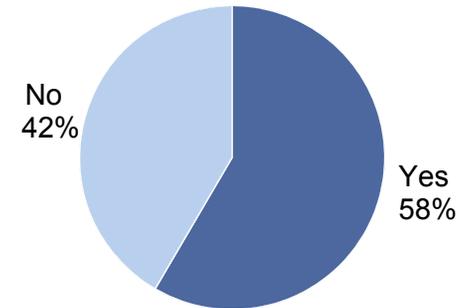


## Medication Safety Plan, and Executive Involvement

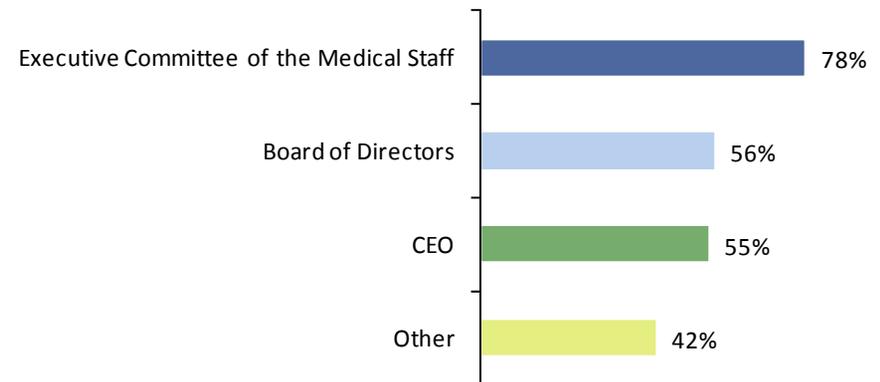
**A medication safety plan exists in 58% of the hospitals, leaving room for improvement of awareness of medication safety and translating that into an actionable plan with executive leadership involvement.**

- Only 58% of respondents have a medication safety plan in place.
- In the majority of the hospitals having a medication safety plan, the Chief of Pharmacy is responsible for the medication safety plan.
- The Pharmacy and Therapeutics committee is charged with the responsibility to track and manage the medication safety plan.
- In more than 50% of the hospitals leadership is involved in medication safety and issues get reported to Senior Medical Staff, CEO or Board of Directors.

Do you have a specific and detailed medication safety plan?



Medication safety issues get reported to:\*



*\*This is a multiple select question. Percentages may not add to 100.*

## Tracking of Near Misses

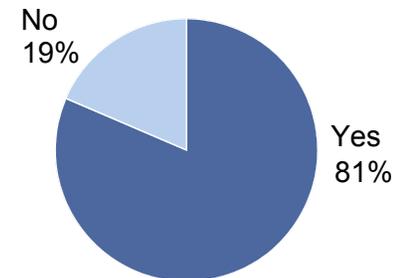
The maturity of a medication safety program can be indicated by how “near misses” are tracked, trended and acted upon. 81% of hospitals consider this important and take steps to prevent “near misses”.

- National Coordinating Council Medication Error Reporting and Prevention (NCCMERP) designed a framework in which an important element of a medication safety program, is tracking near misses<sup>(a)</sup>. 81% of the hospitals indicate that they track near misses, which is an indicator as to how proactive their safety program is structured.
- 94% of the hospitals who track near misses, also use these near misses to make changes to prevent medication errors.
- Findings to be included in the leading practice toolkit:

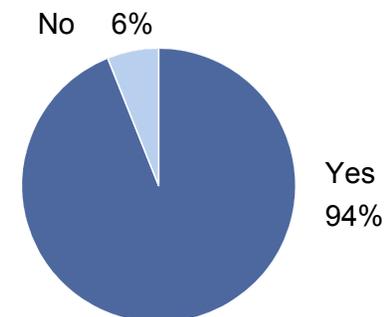


Encourage the use of the NCCMERP Index and the tracking of near misses  
<http://www.nccmerp.org>

Does your hospital collect and report categories (near misses) or C” from the National Coordinating Council Medication Error Reporting and Prevention (NCCMERP)?



If yes, have you used A, B (near misses) to make changes to prevent errors?



(a) NCCMERP Index (<http://www.nccmerp.org>)

## Root Cause Analysis

**Root Cause Analysis is used to identify and institute corrective action. A clear definition on when to use Root Cause Analysis would provide better structure and guidance how to use it.**

- Most hospitals (87%) have used Root Cause Analysis to improve medication safety.
- 13% of hospitals have not had an error requiring a root cause analysis. An inference can be made that they did not have a NYPORTS reportable error.
- There are various triggers to root cause analyses with 54% being an error that caused patient harm or 26% being a near miss.
- Examples of leading practices can be part of the toolkit and include:

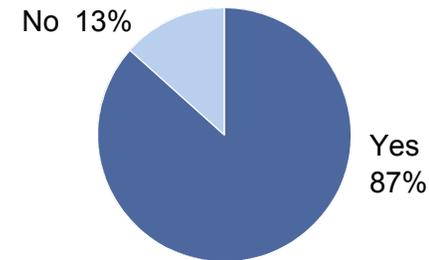
A root cause analysis is triggered in many different ways.



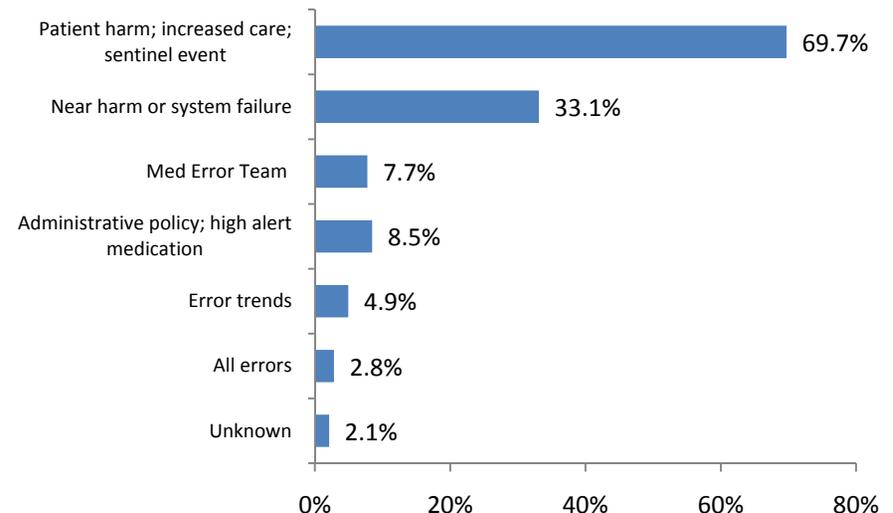
1. Med Error Review Team can decide with help of quality to do a root cause analysis on any error of any level.
2. All errors reported that are D <sup>(a)</sup> and above require a form of root cause analysis.
3. All risk issues require root cause analysis.
4. Our Patient Safety Council can initiate a root cause analysis if they deem it necessary.

(a) NCCMERP Index (<http://www.nccmerp.org>)

Have you had a medication error that required a root cause analysis and change in practice or process in response?



What triggers a root cause analysis? (\*)

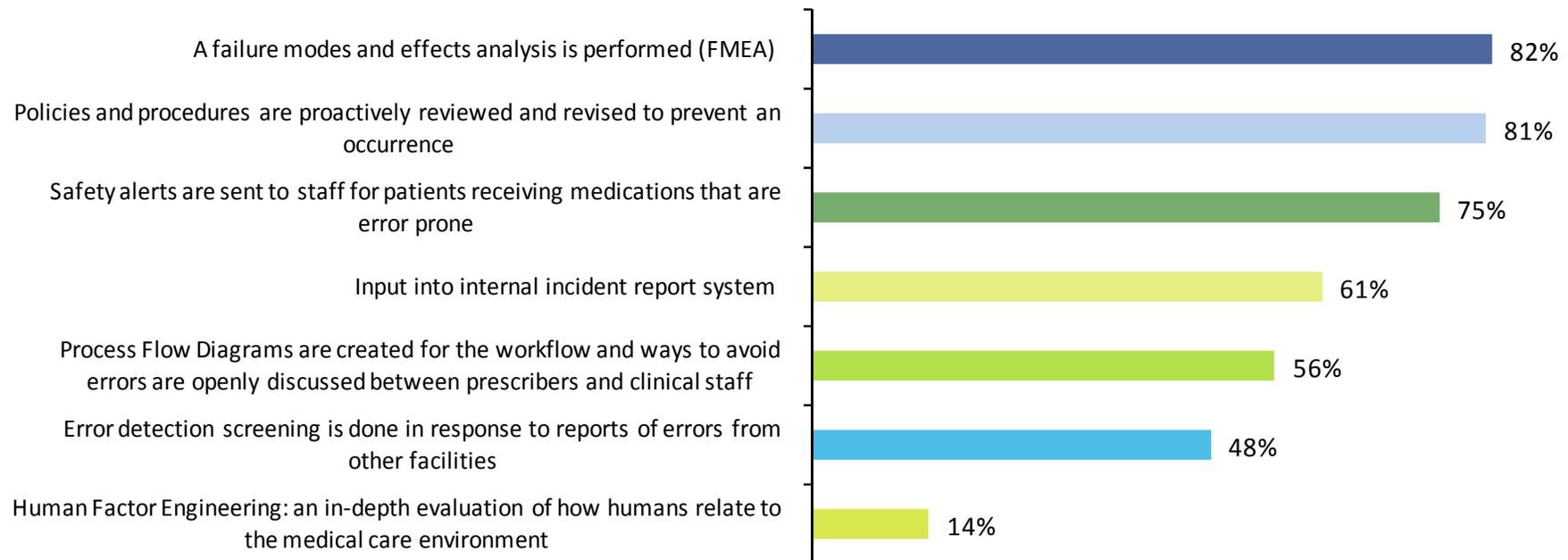


**\*This is a multiple select question. Percentages may not add to 100.**

## Corrective Actions

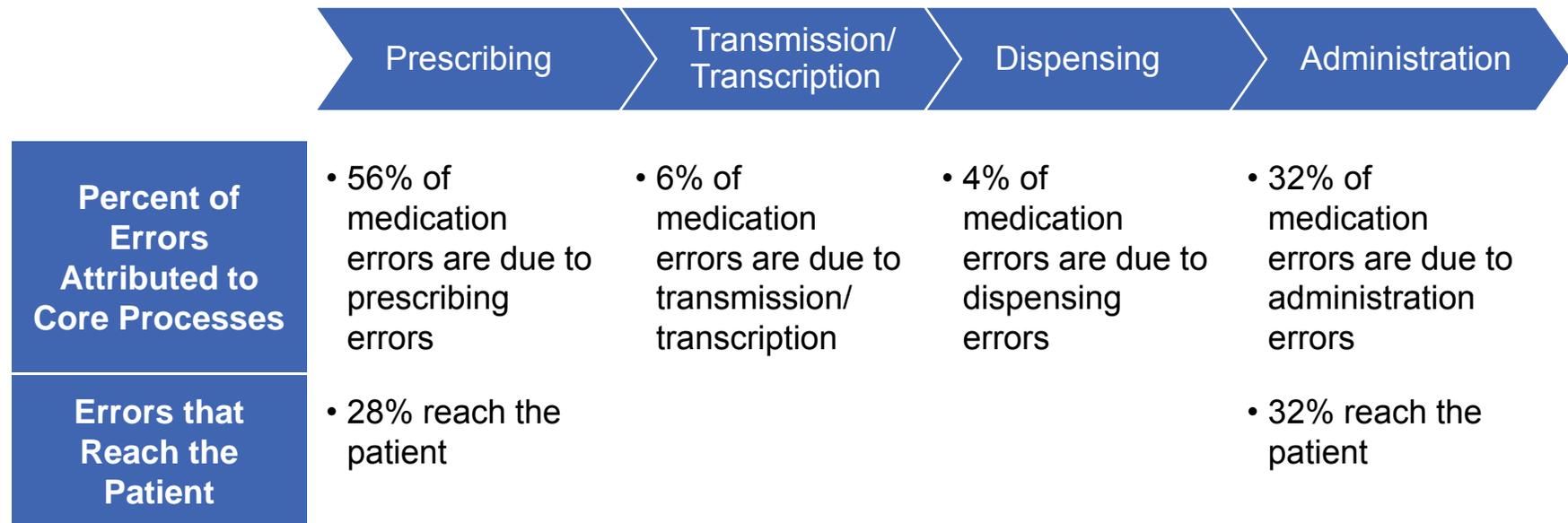
**Performing FMEA and communicating safety alerts for error prone medications are the most common corrective actions. About 50% of the facilities use quality improvement techniques such as creation process flow diagrams and proactive screening for errors. The least used technique is human factor engineering, which requires more sophistication in a medication error program.**

Most hospitals use staff interviews, education and policy changes to create corrective/preventive actions. To better identify leading practice corrective/preventive actions, what actions does your hospital take outside of staff interviews, education and policy changes? (\*)



*\*This is a multiple select question. Percentages may not add to 100.*

## Focusing on the Medication Processes Where Errors Occur



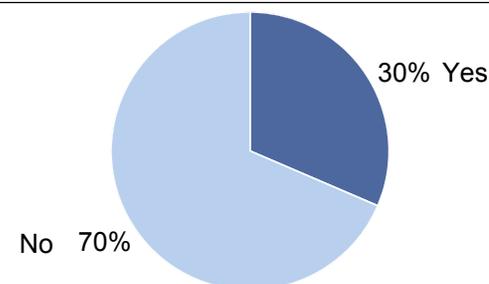
- Bates DW, Cullen DJ, Laird N, Petersen LA, et al. Incidence of adverse drug events and potential adverse drug events. Implications for prevention. ADE Prevention Study Group. JAMA 1995 Jul5;274(1):29-34.

## Computerized Physician Order Entry (CPOE) for Medication Ordering

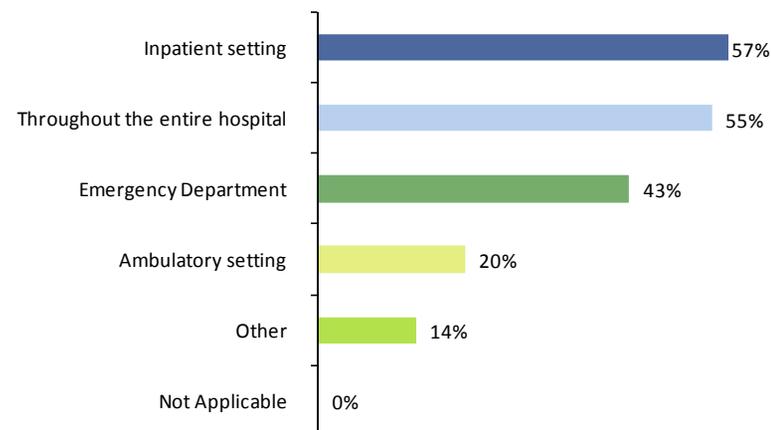
**CPOE is a differentiator in adopted technology: those with CPOE have an integrated system and have had CPOE for over one year. Those that don't have CPOE, have no plans to implement in the next 12 months.**

- 30% of the hospitals have CPOE for medication ordering, of which 84% has had CPOE for over one year. Of the 99 hospitals not having CPOE, 44 have plans to implement CPOE in the next 12 months.
- In 88% of those hospitals that have CPOE, it's integrated with other Information systems and 55% have implemented CPOE throughout the entire hospital.
- 45% of hospitals that have implemented CPOE use it in one or more departments, with most of them having implemented CPOE in the Inpatient setting, followed by the ED.
- Of the hospitals with CPOE:
  - 67% are teaching hospitals
  - 88% have bed size > 200

Does your hospital have Computerized Physician Order Entry (CPOE) for medication ordering?



Where is CPOE implemented? (\*)

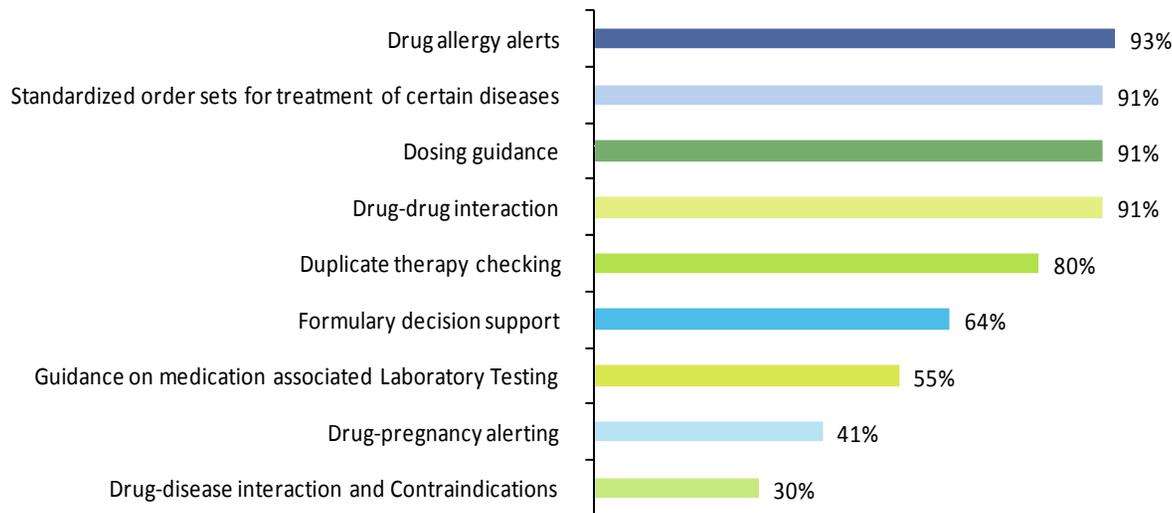


*\*This is a multiple select question. Percentages may not add to 100.*

## CPOE and Physician Decision Tools

**An overwhelming majority of the hospitals that have implemented CPOE have a form of physician decision support for order prescribing, with 91% having standardized order sets.**

Please select all decision support tools that are readily available to physicians for computerized order entry in electronic medical record (\*)



*\*This is a multiple select question. Percentages may not add to 100.*

- Decision support tools are an initial step in creating (evidence based) clinical pathways. CPOE with physician decision support will increase prescriber's attention to potential medication errors.
- Of the 30% of the hospitals with CPOE, all but one have a physician decision support tool available.
- The tools most widely used are:
  - Drug allergy alerts
  - Standardized order sets
  - Dosing guidance
  - Drug-drug interaction
- 93% of the hospitals with CPOE have more than 4 digital decision support tools.
- 84% of the hospitals have pre-printed paper order sets or paper care protocols.

## Electronic Medication Administration Records (eMAR) and Alert Functions

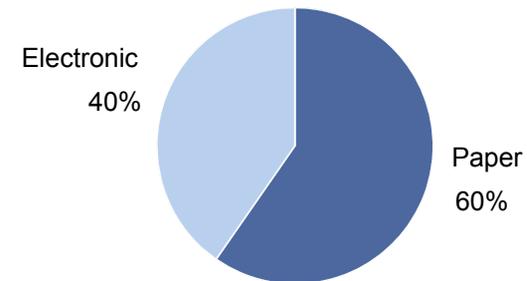
**Only 40% of the hospitals have implemented an eMAR. The majority of those that have implemented an eMAR use its full potential by having incorporated 4 or more alert functions to alert clinicians for potential medication errors.**

- Significant reduction in errors can be achieved when alerts are provided to drug administrators; by implementation of an eMAR.
- 40% of the hospitals have an eMAR in place, leaving the majority of the hospitals still with a paper medication administration record.
- >80% of the eMARs have alert functions for
  - Missed or overdue doses; or
  - Medication administration time due; or
  - Medication allergies
- 75% of the hospitals have 4 or more alerts and 2% of the hospitals have all 8 alerts in their eMAR

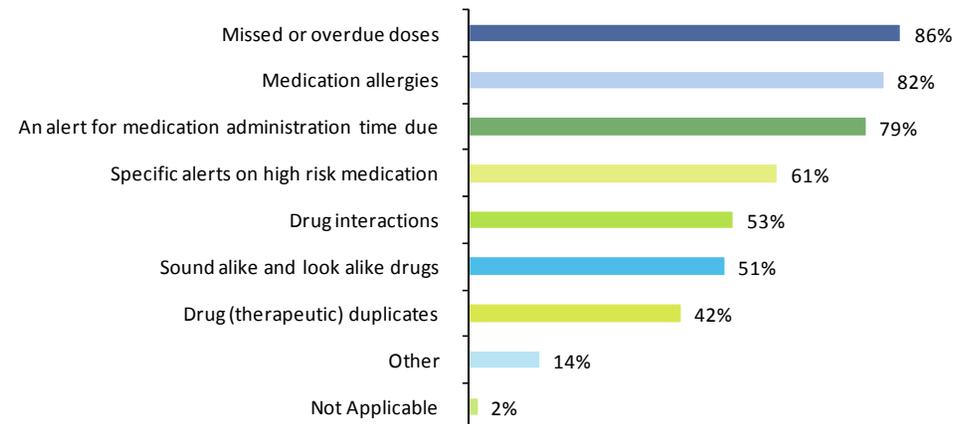


Custom programming of alerts for sound-alike and look-alike medications, drug interactions and therapeutic duplicates into the eMAR.

Our Medication Administration Records are:



Our eMAR contains the following alert functions

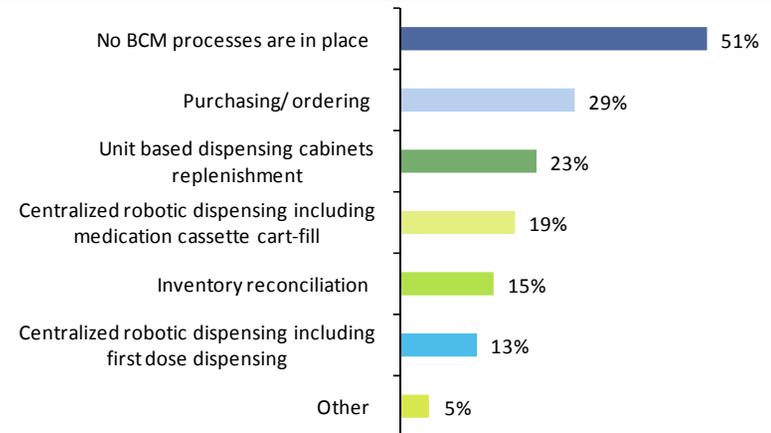


## Bar Coding and Bar Coded Medication Administration (BCMA)

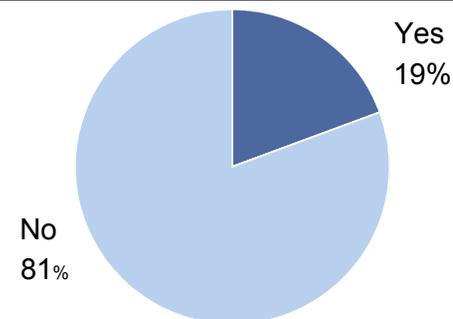
Bar coding is used in the majority of the hospitals, however mainly for purchasing and inventory purposes. Only 19% of the hospitals actually implemented Bar Coded Medication Administration at the bed side.

- Although Bar Coding is in place in 52% of the hospitals, Bar Coding is mainly used for purchasing and inventory purposes.
- 19% of the hospitals actually use Bar Coding at the bed side for medication administration purposes, scanning the bar code at the patient's wristband.
- Of the 115 hospitals that haven't implemented BCMA yet, 53 have the intentions to implement it in the next 12 months, putting .BCMA higher in priority than CPOE (44 hospitals have intentions to implement CPOE in the next 12 months). Which is not surprising given the needed resources for implementation.
- Of the hospitals with BCMA:
  - 37.0% are teaching hospitals
  - 70.3% have bed size > 200

To what extent is a Bar Coded Medication (BCM) with machine-readable coding for all unit-dose medications and dosage forms in use in the pharmacy?



Is the BCM Administration in place?



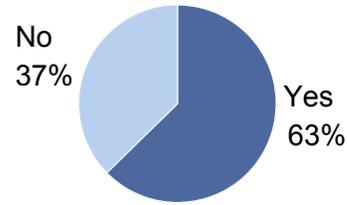
## Smart Pumps

**63% of hospitals have invested in smart pumps and have created libraries that are turned on. Improvements can be made in the use of smart pump overrides and tracking of overrides.**

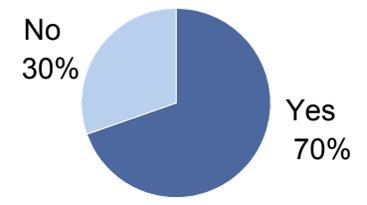
- Smart pumps are an important step in stopping preventable errors from reaching the patient. Libraries are installed to aid the nurse in giving the right drug in safe and effective doses.
  - 63% of the hospitals implemented smart pumps of which 97% have libraries that are turned on.
  - 70% of the hospitals with smart pumps, allow their nurses to override the library.
  - In 74% of the smart pumps, nurses override the pump libraries in 30% or more of the times or the hospital does not track the overrides.
  - Implementation of smart pumps without proper use of libraries have little effect on medication safety as safety checks are by-passed. Tracking overrides is important to assess library issues or medication safety practices, to know where to focus improvement efforts.
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Turn on libraries, define acceptable overrides, start tracking overrides.

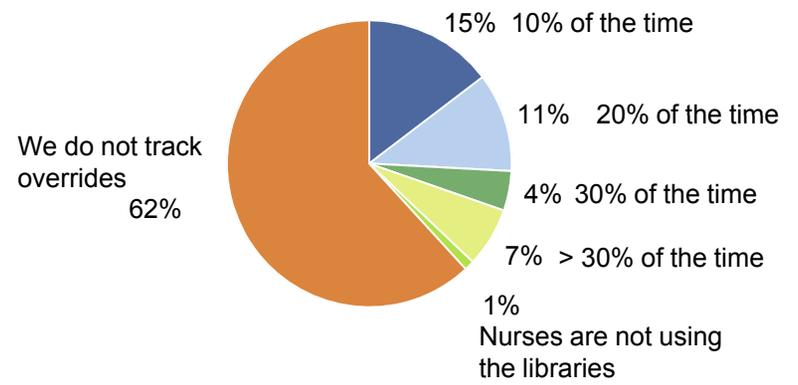
Do you have smart pumps?



Nurses are permitted to override the library and use the pump without the library:



Nursing overrides the pump libraries:

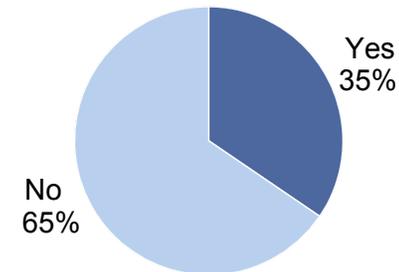


## Regional Health Information Organizations (RHIO)

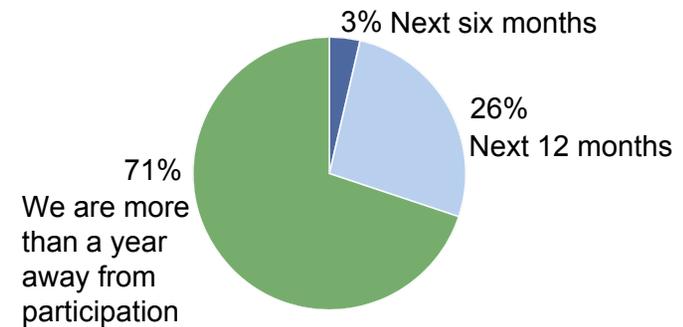
**Sharing information among hospitals can be improved. Currently, the majority of the hospitals do not participate in a Regional Health Information Organization and do not have plans to participate in the next 12 months.**

- 33% of the hospitals participate in one of the RHIO's.
- Of the participating hospitals, 73% indicate that they are an active member in the decision making process in the RHIO.
- Only 20% of the participating hospitals retrieve or post medication information on Health Information Exchange (HIE) that is available to clinicians at the point of care.
- 71% of the hospitals that do not participate in a RHIO, indicate that they are more than a year away from participation.

Does your hospital participate in one of the Regional Health Information Organization (RHIO) networks that are available in every region of the New York State to facilitate sharing of clinical information between health care providers?



If no, do you have a plan to participate in the:

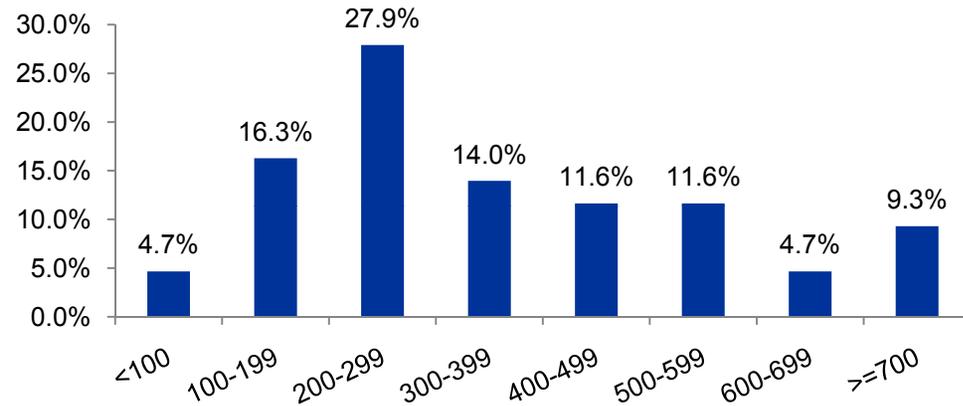


## Technology Impacts to Medication Safety

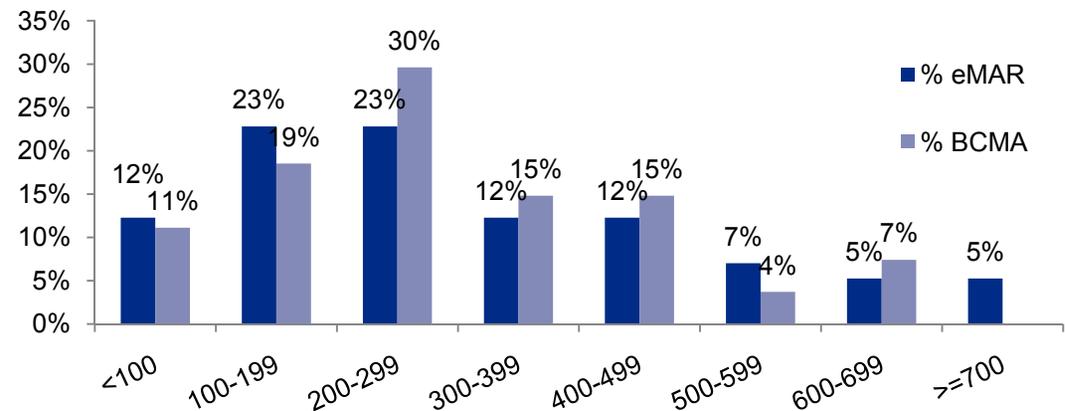
All hospitals report that technology have impacted medication safety, with easier identification of the sources of errors and increased awareness among personnel as the most beneficial effects. The actual implementation of technology is lower than 50%.

- 80% of the respondents indicated that technology reduced the number of errors or the impact of errors.
- The actual implementation of CPOE, eMAR and Bar coding is lower than 50%.
- Electronic Medication Administration Records are more widely implemented than Bar Coded Medication Administration or CPOE.

% of hospitals with CPOE by bed size



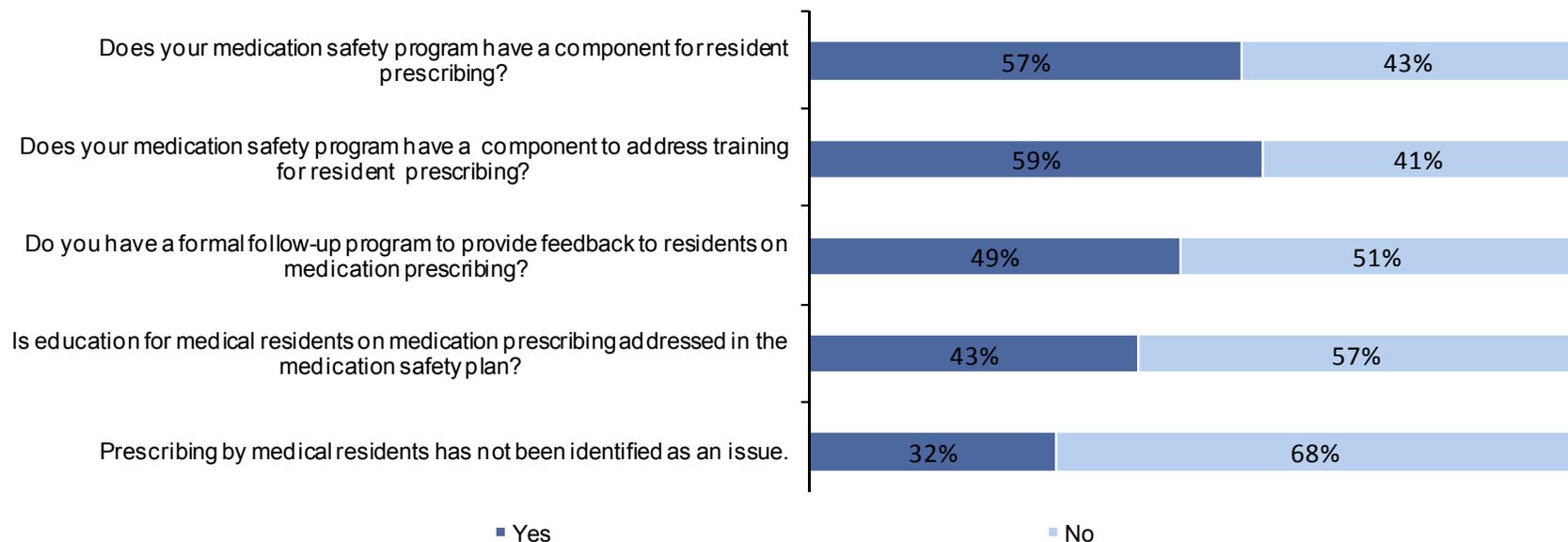
% of hospitals with eMAR and BCMA by bed size



## Prescribing – Educational Programs on Prescribing for Medical Residents

Although 68% of the teaching hospitals indicate that prescribing by medical residents is identified as an issue, only 57% of the medication safety programs have a component for resident prescribing and only 49% of the teaching hospitals have a formal follow-up program to residents on medication prescribing.

In New York State, medical residents are independent prescribers. Please respond to the following if you have medical residents.

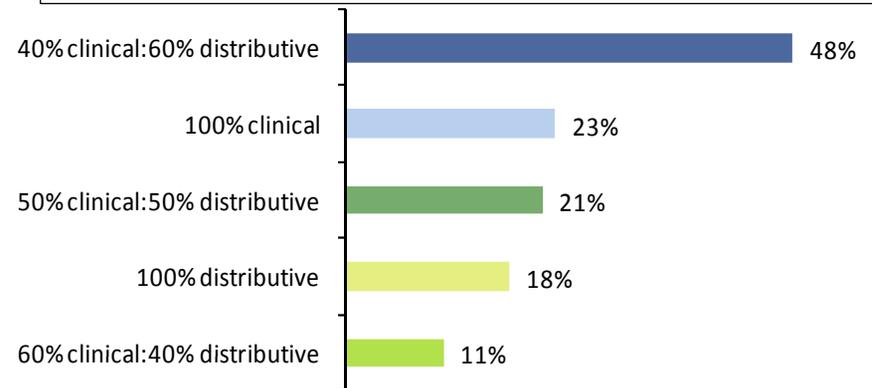


## Transmission/Transcription – Pharmacy Deployment

**There is a clear trend towards the increased role of the clinical pharmacists in all practice settings, with less emphasis on the distributive pharmacists functions.**

- The deployment of clinical pharmacists on the nursing unit is a leading medication safety practice has been associated with a reduction in medication errors.
- Responses to the survey indicate that the majority of the pharmacists have a 40% clinical and 60% distributive split to their daily functions.
- Historically, clinical pharmacists have been primarily deployed in the teaching hospital setting.
- To assess the difference between teaching and non-teaching hospitals we further stratified the responses. As suspected, the majority of 100% clinical pharmacists are deployed in teaching hospitals while non-teaching hospitals have more of a mix of shared clinical and distributive functions.

What is the percentage split between clinical and distributive functions of pharmacists?



What is the percentage split between clinical and distributive functions for teaching hospitals?

	Teaching	Non-Teaching
<b>100% Clinical</b>	24	8
<b>60% clinical:40% distributive</b>	11	4
<b>50% clinical:50% distributive</b>	19	11
<b>40% clinical:60% distributive</b>	27	41
<b>100% distributive</b>	12	13
<b>Total</b>	<b>93</b>	<b>77</b>

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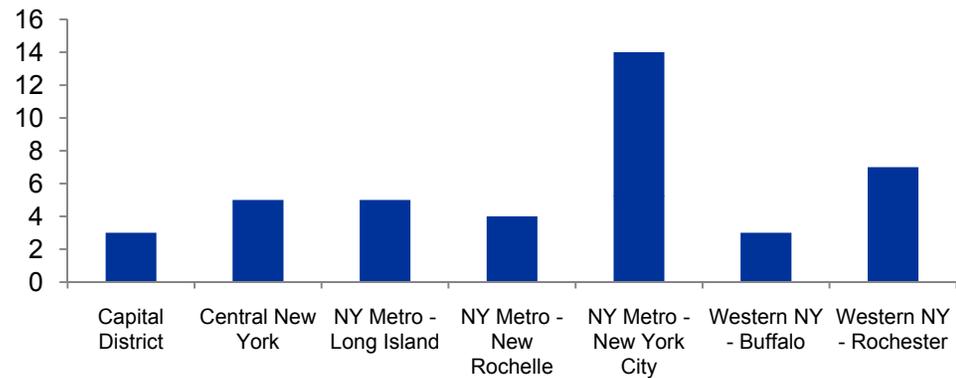
## Site Visits

## Completed Site Visits at 40 Hospitals

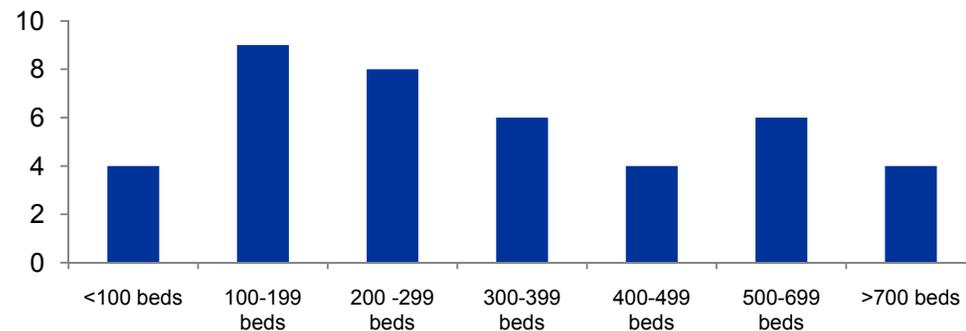
The survey answers clearly identified leading practices worthy of site visits. The selected hospitals are evenly distributed across all regions and bed size.

Potential Leading Practice	Selected Hospitals
Medication Reconciliation	3
CPOE	9
Bar Coded Medication Administration	8
Smart pumps	5
Physician Decision support tools	6
eMAR	7
High risk medication	12
Anesthesia initiatives	5
Pharmacist Deployment	8

# of Hospitals by Region



Bedsizes Distribution



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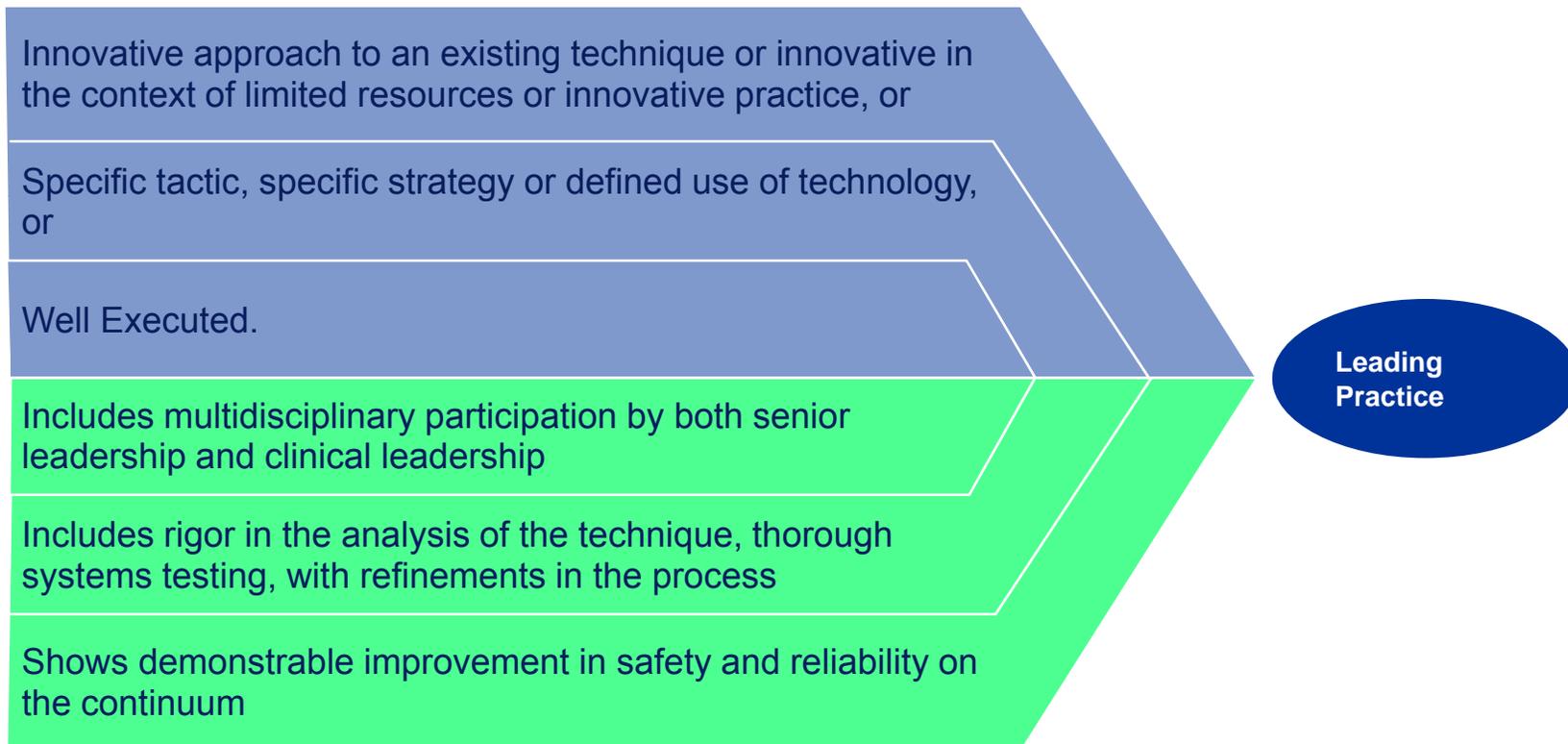
## Leading Practices

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## Leading Practice Selection Criteria

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### *Evaluation of each practice against the criteria*



# Leading Practice in Medication Safety Identified by Process

Advancing Leading Practices in Medication Safety				
				
Element	Level I Practice	Level II Practice	Level III Practice	
Medication Administration	Smart Pumps	Nurses are mandated to use all safety functions of Smart pumps including libraries. Overrides are not tracked.	Smart pumps overrides are tracked. Minimum and maximum infusion rates are reviewed. Additions, deletions or modifications are identified. Changes are made to the library at least quarterly (wirelessly) or annually (manual updates).	
			Nurses are mandated to use all safety functions of Smart Pumps including libraries. Overrides are tracked. Performance improvement efforts exist to reduce the overrides.	Smart pumps are able to push information back to the bedside flow record with rate, dose and duration of an infusion
			Smart Pump attributes include wireless connection to a pump brain; libraries that minimize user choice, standard concentration and volume options, single channel for high risk medications, visually indicate when a dose is outside pre-set limits, and have non-numeric keypads. Screens visible from a distance of 4 feet	Pump overrides follow a standard multistep process: RN verifies physician order, two RNs are required at the point of care, specific documentation is required, notification of the Unit Manager required who notifies pharmacy Pediatric smart pump library links the drug and dosage to a diagnosis for proper selection within the library In a manual pump update, usage information is collected from each pump.

## Establishing a Culture of Safety

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“Building a culture of safety remains a somewhat elusive construct, and health care organizations often struggle with how to develop a safety culture infrastructure that will result in continuous improvements in quality of care”

--*Developing a Medication Patient Safety Program- Infrastructure and Strategy. Mark SM, Weber RJ. Hospital Pharmacy 2007:42;149-155.*

## Culture of Medication Safety Leading Practices

Leading Practice	Hospital
Patient safety walking rounds occur weekly using the tracer methodology and include medications.	New York Presbyterian Mercy Medical Center
Timely direct feedback is provided to those who submit incident/occurrence reports, showing them that reporting is valued and made a difference .	St Luke's Roosevelt
Leadership creates alignment of Performance Improvement plans, Strategic plans and Financial plans to facilitate patient safety. Leadership determines the safety goal, the tactical plans and approves the funding for safety initiatives.	New York Presbyterian
Physician evaluation and compensation is dependent on compliance and engagement in patient safety .	Jacobi Medical Center

## Culture of Medication Safety Leading Practices, continued

Leading Practice	Hospital
The Just Culture policy defines human error vs. reckless behavior and specifies the response to each.	Staten Island University Hospital
A SWAT team responds when errors occur. The Attending Physicians discusses the event with the patient.	Staten Island University Hospital
Patients participate in multiple safety committees.	Memorial Sloan-Kettering
The Board is actively engaged in discussions of medication safety and error prevention through regular reports from the Patient Safety Officer/Senior Leadership . Information on actual errors and error prevention efforts is shared.	Mercy Medical Center (Rockville)
Online incident report form triggers immediate notification via email to a multi-disciplinary team for investigation and follow-up of errors and near misses.	Women and Children's Hospital of Buffalo

## Prescribing Leading Practices - CPOE

Leading Practice	Hospital
CPOE reviewed daily to implement changes to improve patient safety by surveillance team (epidemiologist, physicians, pharmacy).	Bronx-Lebanon Hospital Center
Continuous monitoring of practices (data mining) is used as the basis for modifications to CPOE. Changes can be made within 24 hours of detection.	Bronx-Lebanon Hospital Center
System changes are hard coded so to prevent recurrence of errors .	Bronx-Lebanon Hospital Center
Physicians required to identify the indications for all medications related to a specific ICD-9 diagnosis code.	Bronx-Lebanon Hospital Center
CPOE includes a high-risk medication checklist to force the consideration of the risks vs. benefits before prescribing, e.g. anticoagulants.	Winthrop University Hospital
CPOE clinical decision support systems include evidence of the comparative effectiveness of medications for specific patient populations.	Not Observed

## Prescribing Leading Practices - Resident Participation and Training

Leading Practice	Hospital
Chief Medical Resident provides regular feedback on prescribing practices to the medical residents, which is used to modify CPOE to prevent errors. Feedback is provided formally and informally (during rounds) and is used in the residents evaluations.	Bronx-Lebanon Hospital Center
Medical Residents have a Resident Patient Safety Officer to serve as the primary contact and to lead safety efforts of the medical residents, who is paid for this role .	NY Presbyterian
Medical residents have a Quality Council that meets monthly to discuss and resolve resident-identified issues from the front line.	NY Presbyterian
Medical residents have an active role in the hospital PI process and serve on all hospital quality committees.	Mt. Sinai
Medical residents participate in the NY State "Near Miss" reporting program.	St. Luke's Roosevelt

## Clinical Pharmacy Leading Practices

Leading Practice	Hospital
<p>In a low technology environment, decentralized pharmacists are placed on the unit and can process orders, dispense first doses and provide face-to-face clinical services.</p>	<p>Staten Island University Hospital</p>
<p>Clinical pharmacists work queue that organizes tasks such as medication reconciliation, target drug monitoring, core clinical activities, and high risk drug monitoring.</p>	<p>Putnam Medical Center</p>
<p>Clinical pharmacists participate in antimicrobial stewardship and provides alerts when a revision in antimicrobial therapy is needed or the presence of an infection marker without treatment.</p>	<p>Bronx-Lebanon Hospital Center</p>
<p>Clinical pharmacists provide services to high – risk error prone areas (ICU, OR, ED). For example medication orders are reviewed and verified, protocols developed, inventory secured, etc.</p>	<p>Strong Memorial Hospital, Maimonides Medical Center</p>
<p>A Medication Safety Officer is in place and coordinates medication safety activities with the Patient Safety Officer. The Medication Safety Officer is responsible for the medication safety plan and execution.</p>	<p>SUNY Downstate</p>

Source: ....

## Dispensing Leading Practices - Automated Dispensing Cabinetry

Leading Practice	Hospital
Two nurses are required to witness overrides of narcotics and emergency medications.	Albany Medical Center
Overrides are permissible for a limited number of medications for specific P&T approved conditions.	Albany Medical Center Northern Westchester Hospital
Replenishment of medications uses bar code technology.	Women and Children's Hospital of Buffalo Olean General Cayuga Medical Center
The Institute for Safe Medication Practices (ISMP) self-assessment tool has been conducted and interventions have been instituted to address "less than fully implemented".	St Luke's Roosevelt
Automated Dispensing Cabinetry (ADC) safety is a standing agenda item for medication safety committee.	St Luke's Roosevelt
Specific tasks that should not be interrupted are defined as "silent zone" tasks such as the area around the ADC, while medications are being prepared.	St Luke's Roosevelt

## Administration Leading Practices - Bar Coding

Leading Practice	Hospital
Medications are only accessible by barcode scanning of the correct patient drawer associated with the patient wristband.	Olean General
Nursing reviews a list of all undocumented medications as a handoff during shift transitions.	Jacobi Medical Center
To facilitate bar code medication administration (BCMA) a formal liaison role exists as a go-between with pharmacy and nursing, responsible for troubleshooting all BCMA issues. A nurse or pharmacy technician who reports to the director of pharmacy.	Albany Medical Center Northern Westchester Hospital St. Peter's Medical Center
Medications that can not be scanned, like ointments, have a defined process to document administration such as a double check by two nurses.	Samaritan Medical Center

## Administration Leading Practices - Smart Pumps

Leading Practice	Hospital
Nurses are mandated to use all safety functions of Smart Pumps including libraries, and overrides are tracked .	Lutheran Medical Center
Overrides are tracked: <ul style="list-style-type: none"> <li>• Minimums and maximums are reviewed.</li> <li>• Additions, deletions or modifications are identified.</li> <li>• Changes are made to the library at least quarterly either manually or wirelessly.</li> </ul>	Lutheran Medical Center
In a manual pump update, usage information is collected from each pump.	Lutheran Medical Center
Pump overrides follow a standard multistep process: RN verifies physician order, two RNs are required at the point of care, specific documentation is required, notification of the Unit Manager required who notifies pharmacy.	Lutheran Medical Center
Information is pushed back to the bedside flow record with rate, dose and duration of an infusion.	Bronx-Lebanon Hospital Center
Pediatric Smart Pump library links the drug and dosage to a diagnosis for proper selection within the library.	Women and Children’s Hospital of Buffalo

## Administration Leading Practices - Anesthesia and OR

Leading Practice	Hospital
Medication time outs occur each time a medication is introduced into the sterile field	Stony Brook Medical Center
Introduction of a toxic dosage into the sterile field is forbidden	Stony Brook Medical Center
Maximum doses permitted are based on patient weight.	Stony Brook Medical Center

## Medication Reconciliation Leading Practices

Leading Practice	Hospital
Integrated into the pharmacy order verification process and addresses auto-substitutions, generic/brand name issues, and therapeutic duplications	Seton Medical Center/St. Mary's Medical Center
Medication reconciliation information is posted to a health information exchange	Seton Medical Center/St. Mary's Medical Center
Medication reconciliation information is part of an integrated electronic health record that includes outpatient and inpatient visits	Bronx- Lebanon Hospital Center
CPOE automates Medication Reconciliation and Medication Renewal	Bronx-Lebanon Hospital Center Maimonides
Pharmacist investigations into reconciliation variances are documented in the medical record	Putnam Medical Center
Medication reconciliation in the outpatient setting is required at the time of service	Putnam Medical Center Seton Medical Center/St. Mary's Medical Center

## Medication Reconciliation - Community Outreach

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Leading Practice	Hospital
A community drug drive is held to safely dispose of expired and unused medications from the community	Mount St. Mary's

## Leading Practices High Risk Medications - Chemotherapy

Leading Practice	Hospital
<p>In a non-CPOE environment, pre-printed order forms are mandated that force the prescriber to provide comprehensive and standardized information</p> <p>Pharmacy verification system compels the review of laboratory results</p> <p>The medication profile allows visibility of all previous visits and all current active orders in one view.</p> <p>Inclusion of a cancer patient in the Medication Safety Committee.</p>	<p>Memorial Sloan-Kettering</p>
<p>Two nurses are required to double check chemotherapy prior to administration</p>	<p>Memorial Sloan-Kettering Women and Children's Hospital of Buffalo</p>
<p>Chemotherapy orders must be signed by a physician, pharmacist and nurse</p> <p>Community based standards of care established through collaboration with providers across the region which include: standard ordering processes, administration, and documentation</p>	<p>Women and Children's Hospital of Buffalo</p>
<p>A chemotherapy certified nurse is sent to administer chemotherapy when the need arises outside of the designated chemotherapy unit</p>	<p>Staten Island University Hospital</p>

## Leading Practices High Risk Medications - Insulin

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Leading Practice	Hospital
Reduction of the number of insulin products on the formulary to one analog (replaced regular insulin) and one long acting ensures greater familiarity	Maimonides Medical Center
Insulin pens, or individually drawn up insulin doses are dispensed Evidenced-based standardized algorithm for assessment, initiation and monitoring of inpatient hyperglycemia is mandated house-wide. Includes an educational component and ongoing tracking of efficacy with hypo- and hyperglycemic episodes	St Luke's Roosevelt

## Leading Practices High Risk Medications - Anticoagulation

Leading Practice	Hospital
<p>Hard stops are built into the anticoagulation ordering process. No initial warfarin without INR.</p> <p>Pharmacy does not dispense anticoagulants without an INR</p> <p>A cross-functional policy exists that delineates the responsibilities of physicians, nurses and pharmacists in the management of anticoagulation</p> <p>An anticoagulation PI dashboard monitors occurrences, laboratory results, proper indication and dosage, and patient/family education</p>	<p>Mercy Medical Center</p>
<p>Mandatory selection of indication is required for anticoagulants as part of CPOE</p> <p>Completion of a safety checklist, standardized order lists, risk factors and indications force the prescriber to consider the risk vs. the benefit of prescribed therapy</p>	<p>Winthrop University Hospital</p>

## Leading Practices - Pediatrics

Leading Practice	Hospital
Electronic medical record links to standard on-line pediatric references	Women and Children's Hospital of Buffalo
Standardized ordering format that includes the diagnosis, and drug information that facilitates dose verification process by matching drug dose frequency to diagnosis	Women and Children's Hospital of Buffalo
TPN ordering process standardizes calculations to eliminate error	Women and Children's Hospital of Buffalo
When complex or unusual medications are prescribed, the outpatient local pharmacy is contacted to ensure that the right medication, right concentration is dispensed to ensure continuity of care	Women and Children's Hospital of Buffalo

## Leading Practices High Risk Medication – Sound Alike Look Alike

Leading Practice	Hospital
Proactive communication of potential mix-ups, particularly in special needs populations (look alike eye medications) Advocacy for safer eye/ear medications	New York Eye & Ear Infirmary
Counsel patients about the potential for mix-ups when SALAD medications are prescribed (eye/ear)	New York Eye & Ear Infirmary

# Examples of Look Alike products compared with what a sight challenged person sees

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## Toolkit by Category

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## Toolkit Items by Category

Toolkit Category	Toolkit Item
<b>Anesthesia/ Intra-operative</b>	<ul style="list-style-type: none"> <li>• A Medication Time Out is required before and during surgery for any medication introduced to the sterile field.</li> <li>• Forbid introduction of a toxic dosage into the sterile surgical areas. The maximum dose allowed onto the sterile field is specific to patient weight.</li> </ul>
<b>Bar-Coded Medication Administration (BCMA)</b>	<ul style="list-style-type: none"> <li>• Use of the American Hospital Association (AHA) assessment tool for technology guides preparation for BCMA (12 months preparation).</li> <li>• Purchase scanners that can work on multiple bar code types. When a scanner is inoperable, it becomes a level 1 priority and moves to the top of the IT request queue.</li> <li>• Require two nurses to confirm administration of items that are selected not to be scanned for either infection control or dosage change reasons (e.g. insulin infusions and heparin dose changes).</li> <li>• Have a novel educational program to encourage buy-in to BCMA. For example using a “Zebra- Stripes are in!” title and a BCMA Zebra mascot. A reward contest with a plush animal zebra was given away as an incentive for participation.</li> <li>• Required a mandatory competency prior to permitting the use of BCMA. The program that must be completed prior to using the system to administer medications.</li> <li>• Pilot the implement BCMA with a defined patient population and with a limited number of medications (Respiratory Therapy).</li> <li>• Decentralized pharmacy technicians who work closely with nursing on specific units serve as BCMA liaison to ensure proper medications are available, facilitate medication storage and transport, and coordinate patient-administered drugs and medication inspections.</li> <li>• Use nurse to serve as liaison between pharmacy, physicians and nursing for BCMA and/or CPOE facilitation. The nurse reports to the director of pharmacy.</li> <li>• BCMA process was rolled out over a 12 month period of time to areas with a common patient population (Cardiac Intensive Care and Step Down Unit) , with two weeks in between each go-live.</li> </ul>
<b>Chemotherapy</b>	<ul style="list-style-type: none"> <li>• Require two pharmacists to double check calculations that are performed manually. Compare the drug label to the physician order or protocol.</li> <li>• For pharmacy verification of orders, the medication profile shows all visits and all orders in one view to ensure that the prescribed orders match the intended protocol and that cumulative doses have not been exceeded.</li> <li>• Mandated the use of preprinted order form creates the standardization needed to ensure that the safety checks are done each and every time by all practitioners.</li> <li>• Standardize and automate Pediatric TPN and Standardized Infusion calculations to eliminate errors.</li> </ul>
<b>Clinical Pharmacists</b>	<ul style="list-style-type: none"> <li>• Decentralization of pharmacists has allowed for multidisciplinary rounding on the Med/Surg units.</li> <li>• Deployment of Clinical Pharmacist in Emergency Room, Pediatrics and other clinical areas improves care and reduces costs and errors.</li> <li>• The collaborative impact of Clinical Pharmacists and the medical team improves the use of target drugs.</li> <li>• Pharmacy can order Vancomycin levels through a collaborative agreement.</li> <li>• Clinical pharmacist work queue uses markers programmed into the pharmacy system. Prompts are developed for specific tasks and this self-developed system uses the dispensing system to organize the clinical pharmacists work and allows for tracking of work tasks.</li> </ul>

## Toolkit Items by Category

Toolkit Category	Toolkit Item
<p><b>Communications</b></p>	<ul style="list-style-type: none"> <li>• Electronic “hold acknowledgement” reduces miscommunication between clinicians and the pharmacy.</li> <li>• Conduct monthly Safety Rounds in a conference format with the Associate VP for Safety and Quality.</li> <li>• Full-time safety nurses provide a point of contact for front line staff to communicate concerns.</li> <li>• Cultural transformation that features front-line staff involvement in medication safety via safety cells that report up through a safety infrastructure with access to the senior leadership and the Board of Directors.</li> <li>• Use of the Susan Sheridan video to increase awareness of patient safety. <a href="http://www.who.int/patientsafety/information_centre/interviews/sheridan/en/index.html">http://www.who.int/patientsafety/information_centre/interviews/sheridan/en/index.html</a></li> <li>• Weekly safety rounds to keep safety top of mind.</li> <li>• Medication tracer rounds where each step of the medication use process is evaluated by a team comprised of the health system Chief Medical Officer, the CNO and the Pharmacy.</li> <li>• Use of Situation-Background-Assessment-Recommendation (SBAR) technique for communicating about a patient within a health care team.</li> <li>• Use of Just Culture ARCC technique: Ask a question, Raise an awareness, voice a Concern, go up the Chain of Command. Technique in place to avoid passive acceptance of physician errors</li> <li>• Nursing uses a printout of all undocumented medications as a handoff for the shift to shift report.</li> </ul>
<p><b>Community Outreach</b></p>	<ul style="list-style-type: none"> <li>• Community drug drive to safely dispose of expired and unused medications was highly successful. This annual initiative was conducted with the approval of local and state law enforcement authorities and led to the safe and appropriate disposal of over 5 tons of medications. The success was due to community marketing and collaboration with local and state authorities to obtain the requisite licenses and to hand over the drugs to the hospital.</li> <li>• Developed a health card (a medication list wallet card) and the Vial for Life (list of medications in a green Rx vial placed in the patient’s refrigerator for EMS retrieval) to facilitate medication reconciliation.</li> <li>• Pharmacist involvement in patient counseling can promote better patient outcomes.</li> </ul>
<p><b>Culture</b></p>	<ul style="list-style-type: none"> <li>• Report safety issues to the Board of Directors, CEO and Executive Committee of Medical Staff. A culture of safety with supporting governance structure promotes implementation and accountability for medication safety efforts.</li> <li>• Comprehensive safety culture uses the existing committees of the hospital, making safety a primary focus.</li> <li>• Medication Safety Plan is responsibility of VP of Patient Care Services, who in turn reports directly to the CEO and the Board of Directors.</li> <li>• Comprehensive PI Oversight committee to prioritize and address medication safety issues.</li> <li>• Focus on culture with proactive remediation of potential medication errors can make demonstrable improvements in a limited technology environment (no CPOE, BCMA or EHR).</li> <li>• Cultural transformation that features front-line staff involvement in medication safety via safety cells that report up through a safety infrastructure with access to the senior leadership and the Board of Directors.</li> <li>• High-level guidance and sponsorship of medication safety planning and implementation by senior leadership and the Board of Directors.</li> <li>• Medication safety infrastructure featuring Medication Safety Officer and unit-based medication safety champions; committees that incorporate front-line staff input and assign accountability for medication safety throughout the organization.</li> </ul>

## Toolkit Items by Category

Toolkit Category	Toolkit Item
<p><b>Culture (con.)</b></p>	<ul style="list-style-type: none"> <li>• Development of a non-punitive and collaborative culture that begins with leadership and involves everyone in patient safety and medication safety.</li> <li>• Use nursing instructions: nurses to call pharmacy anytime they are uncomfortable with a dosage or medication they are about to administer.</li> <li>• Have a patient on the Patient Safety Committee.</li> <li>• Included a patient on the Pharmacy Quality Assurance Committee.</li> <li>• To encourage staff participation in issue resolution, provide them with paid time for meeting work regarding medication management.</li> <li>• Develop a supportive reporting culture by encouraging near miss reporting and giving awards such as "caught being great."</li> <li>• "Just Culture" that empowers any staff member or clinician to call a halt to any process they feel is unsafe. 'Stop the Line" is practiced.</li> <li>• A patient safety nurse who rounds daily can serve as a trusted advisor to front-line staff.</li> <li>• Include front line staff (pharmacists and nurses) in a Medication Safety Council.</li> <li>• Patient Safety Fridays, a form of tracer rounds, involves Senior Leadership, reinforcing the goal of safety with a dedicated time. The day includes didactics, tracer rounds, staff teaching and feedback, and discussion of the findings.</li> </ul>
<p><b>Data Analysis</b></p>	<ul style="list-style-type: none"> <li>• Proactive tracking of ADC data to identify adverse drug reactions.</li> </ul>
<p><b>Decision Support</b></p>	<ul style="list-style-type: none"> <li>• Extensive use of decision support in CPOE with standardized order sets and decision support tools that provide point of entry alerts/warnings; required to complete review of safety check lists, risk factors and indications before orders are authorized.</li> <li>• Risk vs. benefit of high-risk medications built into preprinted orders force the prescriber to weigh the need for the high-risk medication (e.g. anticoagulation).</li> </ul>
<p><b>Dispensing</b></p>	<ul style="list-style-type: none"> <li>• Outsourced off-site pharmacy services provide 24/7 pharmacist review of orders enabling the eMAR to be up-to-date with current orders. Fully utilizes the eMAR functionality and can improve turnaround time while increasing safety.</li> <li>• Use a bar code for medication delivery to medication cart to ensure delivery to the correct patient. This process calls for medications to be delivered by pharmacy to patient care unit using a bar code, thereby reducing errors and improving communication.</li> <li>• Institute formulary changes to a therapeutic equivalent when sound alike errors are repeated.</li> <li>• Use Bar Code scanning for replenishment of ADCs.</li> <li>• Pharmacy enforces a "no dispense" policy for orders with unapproved abbreviations.</li> <li>• Use bar code medication verification for refilling of ADCs.</li> <li>• Nursing is not permitted to restock a medication in an ADC, it must be placed in the returned medication bin for pharmacy to restock using bar code technology.</li> </ul>
<p><b>Education</b></p>	<ul style="list-style-type: none"> <li>• Developed safety training video showing steps leading up to a patient safety incident. Used digital camera and basic software to create training video at a very low cost; this video was the catalyst to examine all aspects of the medication use process and institute major changes with BCMA and smart pumps.</li> <li>• Chief Resident responsible for providing continuous feedback to Medical Residents.</li> <li>• House staff have a quality council that meet monthly to discuss issues from the front line and are empowered to resolve issues.</li> <li>• House staff have a Resident Patient Safety Officer which is a stipend position .</li> </ul>

## Toolkit Items by Category

Toolkit Category	Toolkit Item
<b>Electronic Medication Administration Record (eMAR)</b>	<ul style="list-style-type: none"> <li>Initiated campaign titled “eMAR= every Medication Always Right”.</li> </ul>
<b>Forced Function</b>	<ul style="list-style-type: none"> <li>BCMA is a “forced” function—the only way to pass medications is by scanning the medication using Computer on Wheels . Eliminated the opportunity for a paper-based work around.</li> <li>Introduce a number of hard stops built into the anticoagulation process. Without an INR, anticoagulants cannot be ordered.</li> <li>All leadership, physicians and staff are trained on organization-wide “Red Rules” whose violation stops all processes of care until addressed. Mandatory compliance with these rules is supported throughout the organization to empower staff and promote safety.</li> <li>Proactive changes in CPOE so that errors in prescribing cannot happen again, and make changes in CPOE within 24 hours due to near misses.</li> <li>Specific care tags or markers were developed within the system as reminders (e.g. vaccines, Warfarin INR markers) to increase compliance with core measures and other mandatory duties that require standardization.</li> </ul>
<b>High-Risk Medications</b>	<ul style="list-style-type: none"> <li>High-Alert Emergency drug kit with instructions and drug usage info for infrequently used medications.* This idea is replicable in all hospitals regardless of service line or size.</li> <li>Comprehensive Pyxis safety alerts programmed for high-risk medications, antidotes and SALAD drugs.</li> <li>Admixture products were reviewed for risk mitigation strategies. Specific plans were developed to reduce the risk of use.</li> <li>High-Risk Medications ordered STAT have pharmacist review prior to administration.</li> <li>Hydro-morphine warning in ADC: Warning this medication is seven times more potent than morphine.</li> <li>Instituting a national initiative to reduce look-alike errors with eye and ear drops.</li> <li>Pharmacy coordinates orders for barium and gastrografin. Pharmacy delivers correct dose to patient room. Have developed a questionnaire for CT scans that obtains information on renal function, allergy/asthma history.</li> <li>Standing orders to remove and replace all medication transdermal patches for patients undergoing MRI.</li> <li>Weight based Heparin infusion doses are rounded to the nearest 50 units/hour.</li> </ul>
<b>Insulin</b>	<ul style="list-style-type: none"> <li>Insulin selections of two types to standardize usage along with greater awareness of dietary processes made demonstrable improvement in hypo- and hyperglycemic episodes.</li> <li>Physician leadership in the improvement of high risk medications like insulin, can lead to evidence based standardization with improved clinical outcomes.</li> <li>Individual insulin doses are drawn up for Lantus, Levimir, Novolin N, and Novolog 70/30 insulin. Patient specific bags are prepared with an outer label, a label on the syringe and a label for the compounding log with the patient name and dose and expiration date. Needleless dispensing required the acquisition of an insulin needle that would fit the syringe. Dead space is accommodated with an extra 2 Units of fill.</li> </ul>

## Toolkit Items by Category

Toolkit Category	Toolkit Item
<p><b>Medication Administration</b></p>	<ul style="list-style-type: none"> <li>• Policy to not administer sleeping medications after 1 a.m. has achieved strong physician compliance and has been named an Ascension system-wide best practice to prevent falls and improve daytime activity and functioning.</li> <li>• Access to medications in the Computerized medication cart is by bar code. Must scan bar code to open the medication cart, and the Medication cart automatically locks. COWs have patient specific medication drawers accessible via bar code.</li> <li>• Specific Computer on Wheels (COWs) for Respiratory Therapy (RT) medications and increased computer access for Respiratory Therapists led to reduction in missed doses. To reduce missed treatments to zero, cooperation between nursing and RT is needed. If RT is not able to administer a dose, nursing is alerted to administer the dose instead. RT can also electronically handoff scheduled RT orders to nursing and follow up by phone.</li> <li>• In a manual transcription environment, pharmacy can provide a sticker (label) created for each medication for Medication Administration Record.</li> <li>• The area around the medication room is a silent zone, and only one nurse at a time is allowed in the medication room. If the area is not enclosed, a red zone on the floor indicates the silent zone. Have moved the NICU Pyxis to facilitate the silent zone.</li> <li>• Implement a zone of silence for specifically selected tasks where interruptions may lead to errors.</li> </ul>
<p><b>Medication Reconciliation</b></p>	<ul style="list-style-type: none"> <li>• Involve decentralized pharmacists in medication reconciliation for complex and high risk patients, including all nursing home patients.</li> <li>• Medication Reconciliation is initiated in the ED and automatically prints in the Pharmacy. Pharmacist proactively compares the Medication Reconciliation form to the admission orders and contacts the physician for variances. Medication reconciliation process is performed at admission and in all transitions of care.</li> </ul>
<p><b>Overrides</b></p>	<ul style="list-style-type: none"> <li>• ADC overrides (Pyxis) require a second nurse to validate withdrawal. There are a limited number of medications with permission to override: Morphine, Percocet/Lortab, and Nitroglycerin tablets.</li> <li>• Pyxis overrides require acknowledgement by two nurses.</li> <li>• ADC overrides are restricted to a limited number of medications that are approved by P&amp;T for specific clinical situations.</li> <li>• Require a second nurse confirmation for narcotic overrides.</li> </ul>
<p><b>Pediatrics</b></p>	<ul style="list-style-type: none"> <li>• Pediatric infusion concentrations were standardized, and the full process including ordering, order entry, preparation, checking, smart pump programming, and administration was standardized.</li> <li>• Physically separate pediatric inventory from adult inventory.</li> <li>• Remove adult forms from pediatric floor stock.</li> <li>• Round Tylenol doses to the nearest dosage form strength to avoid error.</li> <li>• Standardize and automate Pediatric TPN and Standardized Infusion calculations to eliminate errors.</li> </ul>
<p><b>Physician Involvement</b></p>	<ul style="list-style-type: none"> <li>• Culture of safety uses physicians as Medication Safety Champions.</li> <li>• Actively share ownership and responsibility for patient safety systems and processes with physicians (e.g. ownership of CPOE).</li> <li>• Only the Chair of a Department can approve a non-formulary drug.</li> <li>• Successful CPOE implementation in a community hospital was lead by the Vice President of Medical Affairs as physician champion.</li> </ul>

## Toolkit Items by Category

Toolkit Category	Toolkit Item
<p><b>Prescribing (Computerized Physician Order Entry, CPOE)</b></p>	<ul style="list-style-type: none"> <li>• Require physicians to identify indications for all medications related to a specific ICD9 code.</li> <li>• In CPOE specific order types are locked out—Pediatrics and Chemotherapy—so that the wrong selection cannot be made.</li> <li>• Do not permit free text of allergies into the CPOE system or have pharmacy screen entries so that allergy interactions are consistently used.</li> <li>• For commonly prescribed vaccines with similar names, a picture of the product with indications, dose and route helps ensure that the proper drug/dose is prescribed and administered.</li> <li>• CPOE system does not permit free-text order entry to ensure that all allergy checks and safety rules are not bypassed.</li> <li>• In CPOE system, if a Drug Alert is skipped, it is an "unresolved alert" which is escalated to the attending.</li> </ul>
<p><b>Prescribing</b></p>	<ul style="list-style-type: none"> <li>• Forced order format with diagnosis ensures standardized prescribing and aids in dose checking for pediatric orders.</li> <li>• Utilize the more comprehensive Institute for Safe Medication Practices (ISMP) list of unapproved abbreviations.</li> <li>• Require anticoagulation pre-printed order forms to be used.</li> <li>• Require physicians to identify indications for all medications related to a specific ICD9 code.</li> <li>• In CPOE specific order types are locked out—Pediatrics and Chemotherapy—so that the wrong selection cannot be made.</li> <li>• Do not permit free text of allergies into the CPOE system or have pharmacy screen entries so that allergy interactions are consistently used.</li> <li>• For commonly prescribed vaccines with similar names, a picture of the product with indications, dose and route helps ensure that the proper drug/dose is prescribed and administered.</li> <li>• CPOE system does not permit free-text order entry to ensure that all allergy checks and safety rules are not bypassed.</li> <li>• PCA order options are limited to choices that promote safe usage.</li> <li>• In a paper-based order system in a community hospital, illegible orders sent to MD via email for clarification.</li> <li>• For hospitals or departments without electronic systems the use of paper-based protocols are mandated.</li> <li>• In CPOE system, if a Drug Alert is skipped, it is an "unresolved alert" which is escalated to the attending.</li> </ul>
<p><b>Process Change</b></p>	<ul style="list-style-type: none"> <li>• Developed safety training video showing steps leading up to a patient safety incident. Used digital camera and basic software to create training video at a very low cost; this video was the catalyst to examine all aspects of the medication use process and institute major changes with BCMA and smart pumps.</li> <li>• Uses a strategy to focus first on improving processes, then implementing new technology.</li> <li>• Medication Order Forms only have kilograms, they have removed pounds to avoid confusion or potential errors.</li> <li>• FMEA can be an effective tool if results are meticulously followed up and changes implemented.</li> </ul>
<p><b>Reporting</b></p>	<ul style="list-style-type: none"> <li>• Cultural improvements including non-punitive responses has increased the willingness of staff to report "near misses" .</li> <li>• Encouraging the reporting of "near misses" assists with the identification of areas for further improvement.</li> <li>• Medication errors are reported online; immediate investigation of errors is triggered by automatic email notification to key safety personnel.</li> </ul>

## Toolkit Items by Category

Toolkit Category	Toolkit Item
<p><b>Smart Pumps</b></p>	<ul style="list-style-type: none"> <li>• Extensive use of a customized pediatric smart pump library.</li> <li>• Innovative use of smart pump that ties the drug to the diagnosis for proper selection of library.</li> <li>• To override the Smart Pump library, a multi-step process must be followed. The RN must verify the physician's order, two RNs are required at the point of care, and documentation is required. Pump overrides should be monitored and investigated to determine if the library should be updated and to avoid potentially dangerous workarounds.</li> <li>• Smart Pump libraries are reviewed and updated on a quarterly basis to assess minimums and maximums and whether modifications to the library are needed. The pumps are updated quarterly by a manual process where every pump must be touched to update.</li> </ul>
<p><b>Standardization</b></p>	<ul style="list-style-type: none"> <li>• Standardization between health systems, if possible, has the potential to improve medication safety for a large group of patients. (Women and Children's Hospital uses the same chemotherapy order format as the Cancer hospital serving the same patient population in a different health system.)</li> <li>• In a limited technology environment, pharmacy dispensing software can be programmed to trigger quality measures. A dummy medication can be created for the quality measure, which will then appear on the MAR for nursing to address (e.g. administration of vaccines or removal of Foley catheter).</li> <li>• Using the principles of a High Reliability Organization, the eight steps of the medication process were examined and specific action plans were devised to increase standardization.</li> <li>• All medication rooms have a standard configuration as part of the goal of being a High Reliability Organization.</li> <li>• Add safety messages or programming to the pharmacy item master, so that it carries through CPOE, Pharmacy IT System, and eMAR.</li> <li>• Institute standardized concentrations for drips.</li> </ul>
<p><b>Teamwork</b></p>	<ul style="list-style-type: none"> <li>• Empower the right team to design and implement the medication safety program with administrative support from the Senior Leadership.</li> <li>• Operational decisions were pushed to the end user group: Medication Safety Champions and Super-Users.</li> <li>• Use of TeamSTEPPS program to facilitate performance improvement and build effective teams.</li> <li>• Use of safety coaches on each floor of the hospital.</li> </ul>

## Toolkit Items by Category

Toolkit Category	Toolkit Item
<p style="text-align: center;"><b>Technology</b></p>	<ul style="list-style-type: none"> <li>• Customize purchased EHR (Meditech) software to develop coordinated medication safety programs, i.e. a medication reconciliation program that coordinates with BCMA.</li> <li>• Use a model to calculate Return On Investment (ROI) cost and benefits as defined by cost savings vs. cost avoidance. Elements included in the ROI: less paper; increased accessibility (less resource time in passing medications); fewer errors due to decision support; more efficient workflow; better/ more timely analysis; and, increased accuracy and better outcomes.</li> <li>• Use a single drug library platform for the CPOE, drug administration and IV smart pumps.</li> <li>• Smart pumps send infusion information back to the bedside flow record.</li> <li>• Select ADC configuration with the physical dimensions of the item to be stored in mind. Omnicell ADC drawers were selected to accommodate syringes for the OR.</li> <li>• Clinical pathways for medication ordering include safety alerts to nursing (monitoring parameters and side effects) and trigger pharmacist intervention for high-risk medications.</li> <li>• The ISMP ADC self assessment tool can be used to improve ADC safety deployment.</li> <li>• Use consistent nomenclature for medications in all technology systems (i.e. brand, generic, strength, concentration, Tall Man, and warnings) improves standardization across all platforms.</li> </ul>
<p style="text-align: center;"><b>Technology Implementation</b></p>	<ul style="list-style-type: none"> <li>• Have extra staff available for the roll-out period.</li> </ul>

## Key Acronyms

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- **ADC:** Automatic Dispensing Cabinetry
- **ADR:** Adverse Drug Reaction
- **AHRQ:** Agency for Healthcare Research and Quality
- **BCMA:** Bar-Coded Medication Administration
- **COW:** Computer on Wheels (also WOW)
- **CPOE:** Computerized Physician Order Entry
- **CT:** Computerized Tomography (scan)
- **EHR:** Electronic Health Record
- **eMAR:** Electronic Medical Administration Record
- **FMEA:** Failure Mode and Effects Analysis
- **ICD9:** 9<sup>th</sup> version of the International Classification of Diseases
- **INR:** International Normalized Ratio
- **OR:** Operating Room
- **P & T Committee:** Pharmacy and Therapeutics Committee
- **PI:** Performance Improvement
- **RCA:** Root Cause Analysis
- **RN:** Registered Nurse
- **ROI:** Return on Investment
- **SALAD:** Sound-Alike or Look-Alike Drugs
- **SBAR:** Situation-Background-Assessment-Recommendation
- **SOPS:** AHRQ-developed Survey on Patient Safety (SOPS)
- **TeamSTEPPS:** TeamSTEPPS is a AHRQ and Defense Department developed teamwork system to improve communication and teamwork skills among health professionals
- **WOW:** Workstation on Wheels (also COW)