Impact of an Innovative ADC System on Medication Administration

March 1, 2016

Nilesh Desai, BS, RPh, MBA
Administrator
Pharmacy and Clinical Operations
Hackensack University Medical Center

DISCLAIMER: The views and opinions expressed in this presentation are those of the author and do not necessarily represent official policy or position of HIMSS.
Conflict of Interest

Nilesh Desai, BS, RPh, MBA

Has no real or apparent conflicts of interest to report.
Agenda

• Introduction
• Background
• Findings
• Conclusion
Learning Objectives

• Measure improvement in the medication administration process before and after implementation of a new technology in a large university medical center setting
• Describe compliance with federal regulations related to the administration of time-critical medications
• Report nurse satisfaction with ADC related to the medication administration process
• Discuss the impact of new technology on nurse satisfaction related to the medication administration process
STEPS and the IMPROVE Study
Introduction

Study Site is a Nonprofit teaching and research hospital in NJ:

- 1,727 beds, nearly 10,000 employees, and 3,359 credentialed physicians
- U.S. News & World Report - # 1 hospital in NJ and top four in New York metro area
- Healthgrades®
  - America’s Best 100 Hospitals in 10 areas – most in the nation.
  - America’s 50 Best Hospitals for seven years in a row.
  - Distinguished Hospital Award for Clinical Excellence 11 years in a row.
- Leapfrog- Top Hospital
- Joint Commission:19 Gold Seals of Approval–most in the country
- Magnet® – First hospital in NJ and second in the nation
BACKGROUND

How Today’s Healthcare Environment Impacted Our Decision to Design the IMPROVE Clinical Study

©HIMSS 2016
Aging Population Analysis and Readmission Rates

**AGING POPULATION**

- 2013: 14.1%
- 2030: 20%+

**HOSPITAL READMISSIONS (2011)**

- 1 in 5 patients readmitted within 30 days
- Estimated cost: $25B annually

Percent of Americans **Age 65 and Older**
The Aging Population Drives Readmission Rates and Concerns about Errors

1 ERROR EVERY DAY  Patients are at risk for one medication error for every day they are hospitalized.

INCREASE IN LOS BY 4-10 DAYS  Medication errors extend a patient’s length of stay (LOS) an average of 4-10 days.

1/3 OF ALL MEDICATION ERRORS  Errors in medication administration and delivery account for 1/3 of all medication errors.
Did you know…..?

• On average nurses spend around 37% of their time with patients.

• Spending additional time on medication tasks account for about 27% of all interruptions that nurses experience when they should be focused on patients.
Medication Automation Systems
An important part of the medication management workflow for nursing and patients

On average, nurses in a 300-bed hospital deliver between 2,400-4,000 medications a day.
Federal Regulations – Time-Critical Medications

In 2008, CMS (Medicare) issued a “30 minute rule” for medication delivery.

- Hospital reimbursements were threatened to decrease.
- 70% of nurses surveyed stated this was unsafe practice.
- The rule applied to all medications.

In 2011, the rule was repealed - Hospitals now develop their own medication delivery policy.

**EXCEPT FOR:** Time-critical medications remained within the rule – delivery within 30 minutes before or after scheduled dose.

This rule has prompted technology integration to play a greater role in medication delivery.
Healthcare reform is changing the fundamentals of patient care.

↑ Demands to deliver higher quality care to patients with multiple comorbidities and who are living longer.

Directly impacts how nurses care for their patients in the acute care setting.
Drivers for Change

Rising Healthcare Costs
- Medicare reimbursement
- Leveraging growing investment in technology
Drivers for Change

Rising Healthcare Costs
- Medicare reimbursement
- Leveraging growing investment in technology

Regulatory Compliance
- Mandates for quality and safety
- Capture HIT Stimulus – enhanced integration
Drivers for Change

Rising Healthcare Costs
- Medicare reimbursement
- Leveraging growing investment in technology

Regulatory Compliance
- Mandates for quality and safety
- Capture HIT Stimulus – enhanced integration

Quality Care Delivery
- Accountable care
- Positive patient outcomes
- Workflow efficiency
Controlled “Chaos”

Multiple factors pull nurses away from their patients (examples):
• documentation of assessments, interventions
• patient response to treatment
• being ready and waiting for information, supplies,
• medications

Hospitals must support the provision of quality care required for Medicare reimbursement, to comply with the healthcare law and healthcare payments, and to promote positive patient outcomes while increasing efficiency.
Surveys and Reviews: Organizations which Measure Quality Care & the Effectiveness of Healthcare Technology
Recognized Organizations That Measure Quality Care

Examples:

Only about 6% of U.S. hospitals achieve Magnet designation. There are currently 389 Magnet hospitals in the nation.
Recognized Organizations That Measure Healthcare Technology

Examples:

KLAS®
Provides impartial ratings of healthcare technology to help providers make informed decisions.

ECRI Institute
Applies scientific research to discover which medical procedures, devices, drugs, and processes are best, all to improve patient care.
IMPROVE Clinical Study – Study Design

Areas:
1) Medical-Surgical  2) Orthopedic  3) Oncology

Study Design:
Single-center
Retrospective-Prospective Study

Six-month Study Duration:
June 2014 – December 2014

Data Collected from Two Different Time Points:
January to March 2013 and January to March 2014
The Improve Study Objectives

PRIMARY OBJECTIVE:
To assess the efficiency of medication administration process for time critical IV antibiotics pre and post install of the new ADC system.

SECONDARY OBJECTIVES:
1. Evaluate medication error rates for two time-sensitive medications pre-install and post-install of innovative ADC system.
2. Evaluate ADC system’s impact on patient safety pre and post install.
3. Evaluate how nursing staff felt about the impact of automated dispensing cabinets (ADCs) on the safe administration of medication and on their contribution to patient safety.
The Improve Study  - Primary Endpoints

Primary Endpoint 1
Time to first dose for a frequently administered IV antibiotic, Piperacillin/Tazobactam (Zosyn®)

Primary Endpoint 2
Scheduled time to administration time for all doses of all IV antibiotics
The Improve Study  - Secondary Endpoints

The “in-basket message” process works as follows:
1. Pharmacy receives a message in the form of an “in-basket message” from nursing when a patient medication dose cannot be located.
2. Nursing sends messages specific to a medication to pharmacy, and a pharmacist responds.
3. This “missing med” is captured in the EMR system by patient and by medication.
The Improve Study - Secondary Endpoints

Measured nursing feedback to medication dispensing systems from the following areas:

1) Medical-Surgical
2) Orthopedic
3) Oncology

Perceived experience compared to previous system:

Survey of 122 nurses
(Method: used Adaptation of MAS-NAS Medication Administration Survey)
Relationship to the IMPROVE Study Results

Time Critical Scheduled Medications

Include but not limited to:

- Antibiotics
- Anticoagulants
- Insulin
- Anticonvulsants
- Immunosuppressive agents
- Pain medication
- Medications prescribed for administration within a specified period of time of the medication order
- Medications that must be administered apart from other medications for optimal therapeutic effect; or
- Medications prescribed more frequently than every 4 hours.
With some medications the length of time between doses does not significantly change the medication’s therapeutic affect.

- These medications have an administration window.
- The doctor, nurse and pharmacist collaborate to determine the time schedule.
What did we learn from the IMPROVE Clinical Study?
Study Results – Primary Endpoint Results

**Primary Endpoint 1**

Outcome: **40.0%**

Reduction in time to first dose for Piperacillin / Tazobactam

Over 8,000 Pip/Tazo doses were evaluated in IMPROVE

**Primary Endpoint 2**

Outcome: **13.3%**

Reduction in scheduled time to administration time – all IV antibiotics

Over 47,000 IV antibiotic doses were evaluated in IMPROVE
Study Results – Primary Endpoint Results

Primary Endpoint 1

Outcome: 40.0%

Reduction in time to first dose for piperacillin / tazobactam
Study Results – Primary Endpoint Results

Primary Endpoint 2

Outcome: \[\downarrow 13.34\%\]

Reduction in scheduled time to administration time – all IV antibiotics
Study Results – Secondary Endpoint Results

 Secondary Endpoint

Outcome: ↓ 17.68%

Reduction in in-basket messages related to missing medications

 Secondary Endpoint

Rated 2x higher for Efficiency of Medication Administration

Compared to previous system:
Survey of 122 nurses (two time points, MAS-NAS Survey)
# Study Results—Secondary Endpoint Nurse Survey

<table>
<thead>
<tr>
<th>Categories Rated by The Nurses</th>
<th>Odds Ratio&lt;sup&gt;a&lt;/sup&gt;</th>
<th>95% Confidence Interval</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Efficiency of medication administration</td>
<td>1.96</td>
<td>1.34, 2.87</td>
<td>0.0005</td>
</tr>
<tr>
<td>Effectiveness in reducing &amp; preventing medication errors</td>
<td>1.58</td>
<td>1.07, 2.33</td>
<td>0.0225</td>
</tr>
<tr>
<td>Ease of checking active medication orders before administering medications</td>
<td>1.55</td>
<td>1.04, 2.30</td>
<td>0.0298</td>
</tr>
<tr>
<td>Drug alert feature</td>
<td>1.53</td>
<td>1.04, 2.26</td>
<td>0.0295</td>
</tr>
<tr>
<td>Availability of information on drug actions/ possible side effects</td>
<td>1.53</td>
<td>1.04, 2.26</td>
<td>0.0314</td>
</tr>
<tr>
<td>Need for stashes of medications</td>
<td>0.69&lt;sup&gt;b&lt;/sup&gt;</td>
<td>0.48, 0.99</td>
<td>0.0426</td>
</tr>
<tr>
<td>Availability of information on how to treat adverse reactions to a medication</td>
<td>1.49</td>
<td>1.04, 2.14</td>
<td>0.0310</td>
</tr>
</tbody>
</table>

<sup>a</sup> The odds ratio indicates the likelihood of a response of “strongly agree”.

<sup>b</sup> For this item, an odds ratio less than 1 indicates improvement (decreased need to stash medication).
PROCESS OVERVIEW

How Technology Made A Difference in the IMPROVE Clinical Study
IMPROVE Clinical Study Goal

*Designed to evaluate the impact of a new automated dispensing system (ADC) compared to a previous ADC for two main areas:*

Efficiency and Nurse Satisfaction
Medication Automation Systems

- Supports Regulatory Compliance of Medication Management
- Enhances Patient Safety
- Improves Clinician Efficiency
- Efficient Storage & Medication Management
Medication Delivery Workflow

- Orders from EMR to ADC Server
- Inventory refills from ADC server to individual units
- Med administration back to EMR

Medication Delivery is busy, complicated
Medication Delivery

Medication administration back to EMR

Orders from EMR to ADC Server

Inventory refills

Inventory refills from ADC server to individual units

ADT & orders messages from ADC server to units; med administration back to ADC server

Medication administration
IMPROVE Study: IV Medication Process

**BEFORE**

1. IV medication order is received by pharmacy
2. Pharmacy pulls the IV medication from stock and prepares and **labels the medication**
3. The labeled IV medication is then **transported** to the nursing unit
4. The IV medication is placed in room-specific bin at nursing unit
5. The nurse has no easy way of knowing when medications arrived
   -⚠️ Searching
   -⚠️ Calls to Pharmacy
   -⚠️ Delays
6. The nurse retrieves the medication, then administers to patient
BEFORE

1. IV Medication order is received by Pharmacy

Pharmacy pulls the IV medication from stock and prepares and **labels the medication**

2. The labeled IV medication is then **transported** to the nursing unit

The IV medication is placed in room-specific bin at nursing unit

3. The nurse had no easy way of knowing when medications arrived
   - Searching
   - Calls to Pharmacy
   - Delays

The nurse retrieves the medication, then administered to patient

AFTER

1. IV medication order is received by pharmacy

Medications are a stocked item in the cabinet

2. The nurse confirms availability at the cabinet or remotely in the EHR

Nurse retrieves and labels the dose at the cabinet for administration to the patient

IMPROVE Study: IV Medication Process
Save Time and Improve Efficiency

Integrated Medication Label Printer
- Manage patient-specific medication in the cabinet
- “On demand” labels by nurse

Patient specific medication bins

Remote medication cuing / wasting
- Remote medication management via EHR

Single dose narcotic dispensing
- Virtually no countbacks

Greater Cabinet Capacity
- More stocked medications

Updated Server
- Faster transactions at the cabinet

↓ 40.00%
15 min to 9 min
All IV medications

↓ 13.34%
15 min to 13 min

↓ 17.68%
In-basket messages
IMPROVE Clinical Study

IMPROVE Study Results Demonstrated the Value of Collaboration and New Technology

Nursing

Pharmacy
STEPS and the IMPROVE Study

REALIZING THE VALUE OF HEALTH IT

Health IT creates five kinds of value of benefit to patients, healthcare providers and communities.

S - SATISFACTION
T - TREATMENT/CLINICAL
E - ELECTRONIC SECURE DATA
P - PATIENT ENGAGEMENT AND POPULATION MANAGEMENT
S - SAVINGS

©HIMSS 2016
STEPS: Clinical Value Metrics – IMPROVE

↑ efficiency in medication administration

↓ in Medication Errors
STEPS: Satisfaction - Results

MAS-NAS QUESTIONNAIRE

Significant ↑ in satisfaction post –install compared to pre-install

↓ Time to administer medications
↓ Medication Errors
↓ Drug-drug interactions
↓ Need for stashes of medications
↓ Need to call for missing medications
STEPS: Electronic Secure Data

▲ Availability of patient and medication information in a secure system

▼ A potential in medication errors
Population health Management, an in accountable care through value-based payment models

Advances in technologies can help healthcare costs
STEPS: Savings

- Up to 1.5 million patients per year in the US are harmed by medication errors, with 400K adverse events being preventable. 7K per year die from medication errors; Costs $3.5 billion/year

- ↓ in medication errors reduces adverse drug events and ↓ cost of healthcare
Thank You!!!
NDesai@HackensackUMC.org
551-996-2089