Delivering Value With IT: Grass Roots to Planned Projects
March 3, 2016
Bryan Bliven, Chief Information Officer
Eileen C. Phillips, RN, MSN, CIC, Infection Control Professional
Mike Bragg, Director of Technology

Health Care
Conflict of Interest

Bryan Bliven
Eileen Phillips
Mike Bragg

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

• University of Missouri Health Care Overview
• Determining the Value Proposition
• A Grass Roots Project: CAUTI Prevention and the EHR
• A Planned Project: Medical Device Integration
Learning Objectives

• Discuss the IT project selection and oversight process
• Describe evidence-based strategies used to reduce catheter utilization and catheter-associated urinary tract infection
• Discuss the use of the EHR as a tool to hard wire a nursing process change
• Identify how advances in the flow of data between medical devices and the electronic medical record are driving new opportunities for device integration
MU Health Care

- Located in Columbia, Missouri
- Level 1 Trauma Center/Safety Net Hospital
- Five inpatient facilities/538 beds
- 50 primary care and specialty clinics
- Workforce: 5,757

University Hospital
Ellis Fischel Cancer Center
Women’s and Children’s Hospital
Missouri Psychiatric Center
Missouri Orthopaedic Institute
## Governance

**Tiger Institute Prioritization & Steering Committee**

Comprised of: Hospital Leadership, Clinicians, and IT

<table>
<thead>
<tr>
<th>Chief Executive Officer</th>
<th>Chief Nursing Executive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chief Information Officer</td>
<td>Chief Medical Officer</td>
</tr>
<tr>
<td>Chief Financial Officer</td>
<td>Chief Medical Information Officer</td>
</tr>
<tr>
<td>Chief of Staff</td>
<td>Clinician Representative</td>
</tr>
<tr>
<td>Procurement</td>
<td>Ancillaries</td>
</tr>
<tr>
<td>School of Medicine</td>
<td>University Physicians</td>
</tr>
</tbody>
</table>

Selects and monitors IT projects
- Robust business case proposals
- Baseline data for key metrics
- Reporting of value derived
## Benefits Realization Process

- A culture that demands…

<table>
<thead>
<tr>
<th>Hard ROI</th>
<th>Soft ROI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurable returns that can be quantified in financial terms and/or process improvements</td>
<td>Returns that may or may not be measurable which deliver value but no direct financial benefit</td>
</tr>
<tr>
<td><strong>Benefit</strong></td>
<td><strong>Benefit</strong></td>
</tr>
<tr>
<td>Labor Savings</td>
<td>Patient Safety</td>
</tr>
<tr>
<td>Cost Savings</td>
<td>Satisfaction</td>
</tr>
<tr>
<td>Revenue</td>
<td>Regulatory Compliance</td>
</tr>
<tr>
<td>Elimination of Lag Time</td>
<td>Labor Efficiency (Not Realizable)</td>
</tr>
<tr>
<td>Patient Safety</td>
<td>Supports Academic Research Mission</td>
</tr>
<tr>
<td></td>
<td>Business Intelligence/Reporting</td>
</tr>
<tr>
<td></td>
<td>Elimination of Lag Time</td>
</tr>
<tr>
<td></td>
<td>Cost Savings</td>
</tr>
<tr>
<td></td>
<td>Revenue</td>
</tr>
</tbody>
</table>

- Standard benefits framework
- Project-specific metrics
Delivering Value

- **17% decrease in preventable medication errors through Med Admin**
- **25% decrease in CAUTIs**
- **27% decrease in Sepsis mortality rates**
- **34 FTEs eliminated from HIM staff**
- **10,000 square feet saved in HIM department**
- **78% decrease in monthly 3rd party transcription cost**

**Savings and Impact**

- $53K CAUTI and Revenue Cycle savings
- $303K ED throughput - patients seen sooner
- $1M ED throughput - patients seen sooner
- $1.2M Medication Administration Savings
- $2.5M Billing Improvements from Therapists
- $4.8M Medical Device Integration Savings
- $6.6M Revenue Design
- $13M HIM
  - Medical Records Staff Laser
  - Reimbursement
  - Risk, Harm, and Malicious
  - Recovery Audit Programs
  - Skilled Nursing
- $14M Grant revenues
- $19M Meaningful Use Revenue
- $23M Sepsis revenue

©HIMSS 2016
Catheter-Associated Urinary Tract Infection (CAUTI) Prevention
**Problem**

Ineffective CAUTI reduction strategies

- Education
- Supply changes (one level tray)
- Changed silver-coated catheter back to non-coated
- Implementation of **paper-based** catheter indication protocol (modified HOUDINI)

<table>
<thead>
<tr>
<th>Adult ICUs</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rate of Infection (per 1,000 device days)</td>
<td>2.77</td>
<td>2.33</td>
<td>2.54</td>
</tr>
<tr>
<td>Utilization</td>
<td>0.60</td>
<td>0.52</td>
<td>0.53</td>
</tr>
</tbody>
</table>
Historical ICU Data Showing Problem

UNIVERSITY OF MO HEALTHCARE UHC
Catheter-Associated Urinary Tract Infections
Adult Critical Care Jan 2012-May 2015
Catheter indication data on infections
July 2013-December 2013

- Inappropriate use of the catheter (catheter not indicated) 9/22 infections (41%)
- Infections identified at ≥5 catheter days (91%)
Pre-Implementation Process

- Urinary catheter discontinued upon physician order (with nursing input)
- Variety of practices used to discontinue catheters
- Paper based or verbal decision support used, inconsistently
Process Leadership Development Team Appointed

• Projects chosen based on strategic plan
• Strengthen the performance improvement culture
• Improve ability to provide high quality care
• Capacity building in PI
Project Description / Strategy

- Implement electronic decision support through the EHR for catheter removal based on indications.
- Provide context-specific definitions for indications (immobility and I and O).
- Determine resources needed for alternatives to indwelling catheters (bladder scans, female urinal).
- Change the culture of urinary catheter use and reporting.
- Education (computer based training, handouts, audits).
- Audits by unit champions.
- Rewards.
Clinician Involvement (EHR)

- The EHR Reminder was developed by a cross functional team that included: 2 staff nurses from MICU, 2 clinical managers, 1 infection control representative, & 1 unit educator
- Presented to multidisciplinary informatics council
Engaged Clinicians
System-wide Goal

Reduce the system-wide CAUTI rate by 10% to a rate of 5.2 per 10,000 patient days through the implementation of audits, education, rewards, data reporting, and insertion decisions.
Monthly Operating Dashboard
Goal < 5.2

This depicts the FY15 accumulative totals for CAUTI.
The left side shows monthly improvement.
The right side shows the annual improvement.
We ended up at 3.81 CAUTI per 10,000 patient days.
System Wide Catheter Utilization Rate

EHR forced decision for indication initiated
Rate Per 10,000 Days Downward Trend

System Wide CAUTI Per 10,000 Pt. Days

CAUTI rate per patient day

Month

6.4 6.5 3.9 1.3 6.7 6.1 9.5 7.5 5.3 2.3 3.7 10.5 4.5 1.1 2.4 4.9 3.4 3.2 3.6 5.1 4.3 0.0 2.3 7.6 3.3 3.5 2.1 4.5 3.3
Mortality & Bloodstream Infections

Mortality
• None related to CAUTI identified pre or post

Secondary Bloodstream Infections
• 2014
  – 20% ↓ in bloodstream infections (w/ cost savings)
  – 16% ↓ in CAUTI (w/ overall cost savings of 19%)
• 2013

<table>
<thead>
<tr>
<th>Infections</th>
<th>Cost per Infection$</th>
<th>2013 Cost of Treatment $</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAUTI</td>
<td>49</td>
<td>896</td>
</tr>
<tr>
<td>Secondary Bloodstream Infection</td>
<td>5</td>
<td>45,814</td>
</tr>
<tr>
<td>Total</td>
<td>54</td>
<td></td>
</tr>
</tbody>
</table>
Medical Device Integration
How Do We Integrate Medical Devices?

1. Inventory integration capable equipment
2. Work with clinicians to prioritize the integration priority based upon equipment counts, workflow impact, and integration capability
3. Perform workflow assessment for the equipment intended to be integrated
4. Perform technical call with identified resources
5. Survey the proposed care area that the equipment resides in order to determine any infrastructure requirement gaps
6. Create project charter document
7. Schedule and hold meeting with the resources responsible for education surrounding the project to discuss training requirements, associated timelines, and cost for training.
8. Schedule and hold a kickoff call including all project resources to discuss the project charter, receive all necessary approvals, and determine an appropriate pilot unit(s).
9. Perform connectivity test for integration components in the proposed patient care area
10. Acquire testing device from the hospital and perform data flow testing from the device to your test integration middleware
11. Meet with the clinicians to review parameter inventory previously acquired.
12. Perform requested mappings and changes to the Test system
13. Create work plan for tasks that will be completed in the Production environment and upon work completed in the test system to include a very thorough back out plan
14. Validate integration performance in the test system
15. Schedule and hold a subsequent meeting with clinicians to validate the integration is performing as expected in the test system
16. Begin training end users of the integration accordingly in order to meet the proposed go-live date
17. Complete the appropriate change management as determined by local policies and procedures
18. Notify stakeholders and impacted users if the changes required by the integration require any potential downtime that would impact their workflow
19. Perform requested mappings and changes to the Production system
20. Validate integration performance in the production system
21. Schedule and hold a subsequent meeting with clinicians to validate the integration is performing as expected in the production system
22. Identify pilot support model, to include clinician support process and expectations
23. Begin pilot in the unit(s) identified during the kick-off
24. Once all identified pilot issues have been addressed satisfactorily, begin the organization roll out
25. Thirty days after the completion of the roll out hold an after action review meeting
26. It is highly recommended at this point to create an oversight committee
The Basics of Device Integration

- Collaborate with Clinicians
- Match Technology to Workflows
- Match Data Points between Devices & EMR
- Train Users
- Deploy & Validate
Why Integrate Medical Devices?

1. Reduce variables in time to chart data
2. Ensure accuracy
3. Increase evidence to support patient care and validate condition trends
4. Return focus to patient care…not charting
1. Reduce Variables (Entry Time)

**Paper**

- This process takes, on average, 3 minutes per patient.
- The average lag from vital sign collection to entry into the EMR is 1.8 hours.

**VitalsLink**

- This process takes, on average, less than 60 seconds which saves 1.8 hours of lag time.

**Steps in PowerChart that are eliminated**

- Nurse connects vital sign collection devices to patient and collects readings sequentially.
- Nurse records all vital readings on paper.

**Recurring step with each patient**

- Log-in to PowerChart.
- Look-up patient.
- Enter vital signs from paper into PowerChart.
- End.

**Recurring step with each patient**

- Start.
- Scan Nurse ID.
- Scan Patient Wristband.
- Nurse connects vital sign collection devices to patient all at once.
- Devices automatically record vitals.
- Press Save on the monitor to send data to EMR.
- End.
2. Ensure Accuracy (Error Tracking)

• MU Health Care pioneered reporting and developed a solution—“MU Health Patient Safety Network”
• Remediation can be conducted as:
  – RCA for very serious cases or those with learning opportunities
  – Referral to functional areas for further investigation
  – Engagement of governance resources to approve/track any automation fixes
  – MU Health Care Quality Improvement Program
2. Ensure Accuracy (Alternatives)

- The alternative is to track errors that must be reported in order to continue operations.
- Errors in patient-to-device association lead to downstream charting errors and compound situations.
- Barcode scanning facilitates positive patient ID.
2. Ensure Accuracy (Barcode Scanning)
Alternative ROI

Since the implementation of handheld barcode scanners in June 2010, we estimate that this reduction in medication errors has decreased our total cost of care by $1.2 million.

Blood Transfusion Administration

- Blood Transfusion Administration was implemented to ensure we give the right blood to the right patient

- Usage of Blood Transfusion Administration solution saves 5 minutes of nursing time per transfusion

- 478 Nursing Hours Saved Since Go-Live
- 5 Wrong Infusions Avoided
- 5,736 infusions since January

Blood Transfusion Adoption at UH & WCH
2. Ensure Accuracy (Device Association Errors)
2. Ensure Accuracy (Reduce Workflow Complexity)

Previous

- Patient Admit
- Select Monitor Setup
- Select Admit/Discharge
- Select Admit
- Purge Data
- Call IDX to "Touch visit level"
- IDX touch visit
- Patient demographics loaded successfully
- Patient Associated with Another Monitor?
- Call Last Department Nurse To Discharge
- Click on BMDi icon and select monitor
- Results available for nurse to pull in
- Patient Associated

Current

- Patient Admit
- Log in PowerChart iView
- Click on P2DA icon
- Select Associate Patient
- Scan SpaceLabs Monitor
- Patient Associated with Another Monitor?
- Call Last Department Nurse To Discharge
- Results available for nurse to pull in
- Patient Associated
2. Ensure Accuracy (Device Association Errors)

* Annualized Data
3. Increase Evidence (Patient Decline)

Devices Integrated vs. Patient Decline with Case Mix Index (CMI)

* Denotes Annualized Data
3. Increase Evidence (Tiger Teams)

Device Integration vs. Tiger Team Call

* Denotes Annualized Data
4. Return Focus to Patient Care

<table>
<thead>
<tr>
<th>Device</th>
<th>Quantity</th>
<th>Used Annually</th>
<th>Lag Eliminated Per Use</th>
<th>Annual Time Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physiological Monitors</td>
<td>384</td>
<td>7,680</td>
<td>2.6 hrs</td>
<td>5,120 hrs</td>
</tr>
<tr>
<td>Vital Sign Monitors</td>
<td>208</td>
<td>303,680</td>
<td>1.8 hrs</td>
<td>25,306 hrs</td>
</tr>
<tr>
<td>Anesthesia Vents</td>
<td>21</td>
<td>9,176</td>
<td>5 min</td>
<td>3,059 hrs</td>
</tr>
<tr>
<td>FetaLink</td>
<td>42</td>
<td>2,320</td>
<td>1 hr</td>
<td>2,320 hrs</td>
</tr>
<tr>
<td>Respiratory Vents</td>
<td>67</td>
<td>2,100</td>
<td>2 hrs</td>
<td>350 hrs</td>
</tr>
<tr>
<td>Cardiac Output</td>
<td>26</td>
<td>636</td>
<td>30 min</td>
<td>106 hrs</td>
</tr>
<tr>
<td>Dialysis</td>
<td>22</td>
<td>720</td>
<td>1 hr</td>
<td>240 hrs</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>770</strong></td>
<td><strong>225,312</strong></td>
<td><strong>5 min - 2.6 hrs</strong></td>
<td><strong>36,051 hrs</strong></td>
</tr>
</tbody>
</table>
Quality Driven Technology Implementations

- Beds (Fall Reduction Initiative Committee)
  - Wireless integration of discrete data and alerts.
- Physiological Monitoring Devices (AHRQ Pressure Ulcer Reduction Project)
  - Updating physiological monitors with custom manual parameters, and improving documentation workflows.
- MU Health Patient Safety Network
  - Streamlining the assignment workflow and the flow of alerts thru the iBus to strategically position the organization to:
    - Exceed the 2016 JCO National Patient Safety Goals regarding Alarm Fatigue Management.
    - Enhance secondary alerting technologies.
- Blood Transfusion (Performance Improvement / PDSA)
  - Barcode scanning workflow proven to increase scanning compliance
  - Proven safety; capture of 5 avoided transfusion errors
Questions

• Bryan Bliven  
  Chief Information Officer  
  Email: blivenbr@health.missouri.edu  
  Twitter: @bbliven24

• Eileen C. Phillips, RN, MSN, CIC  
  Infection Control Professional  
  Email: phillipse@health.missouri.edu

• Mike Bragg  
  Director of Technology  
  Email: braggl@health.missouri.edu

Health Care