# Aim *for* Excellence

## 2019

*A Compendium of*
## INITIATIVES & LESSONS LEARNED

**MHA**
MISSOURI HOSPITAL ASSOCIATION

# FOREWORD

Hospitals and health systems strive to provide high quality care in a safe, timely, efficient, effective, equitable and patient-centered manner. The transformative changes taking place in health care today foster coordination across the continuum of care and collaborative partnerships among providers, patients and families. The Missouri Hospital Association, along with hospital leaders, providers and staff, are improving quality and safety in Missouri's hospitals.

MHA's Aim for Excellence Award recognizes Missouri hospitals' innovation and outcomes related to the Triple Aim. The award is one of several means to highlight excellence, disseminate successful models of care and motivate improvement throughout Missouri hospitals and health systems. Recognizing different community settings and patient populations, the award is divided into three categories:

1. critical access and rural hospitals
2. small and large metropolitan statistical area hospitals
3. care collaboratives or health care systems

This year, 13 applications were submitted. We would like to acknowledge and thank our judges from academic and health-related backgrounds, who brought a high level of expertise to the evaluation. Based on overall aggregate scores, three MHA-member organizations were identified as winners, and three were chosen for honorable mention. These six hospitals, along with other high-scoring applicants, have agreed to share their quality improvement journeys.

Health care professionals are encouraged to review the compendium to identify best practices and lessons learned, and to recognize peers leading transformational improvement. Continued innovation among thought leaders is necessary in this rapidly advancing health care environment.

*Please note that compendium content is derived from hospital applications and has been edited only for grammar and punctuation. In some cases, content has been condensed.*

# TABLE OF CONTENTS

# *Care Coordination*

## CRITICAL ACCESS AND RURAL HOSPITALS

Aim *for* EXCELLENCE

# *Care Coordination — Critical Access and Rural Hospitals*

**CCMH**
**CARROLL COUNTY MEMORIAL HOSPITAL**
*People who care . . . caring for you*

CONTACT:

Breanna Bredehoeft
Director of Operations

*breannab@ccmhospital.org*

## PROJECT DESCRIPTION

This project was commissioned to research, analyze and provide recommendations on how to improve workflow and processes in the hospital's Outpatient Clinic (OPC) in order to enhance the patient experience, and increase efficiency and overall workflow for the clinic. The information and data collected assisted the project team in recognizing waste in current workflows and processes, and establishing improved procedures and practices.

The project team was comprised of a group of six hospital staff with various backgrounds, including operations, nursing, revenue cycle, informatics and pharmacy. Members of the team obtained their Lean Six Sigma Green Belt and were able to utilize Lean tools and techniques to aid in the project. The project team was able to define the project, measure objectives, analyze data collected, provide recommendations for improvement and strive to control concerns expressed by key stakeholders.

As a critical access hospital, strategies in care delivery have continued to morph and develop to provide patients a more all-encompassing care experience in their hometown. In the last several years, the hospital has increased their outpatient services they provide to the community tremendously. In 2010, there were 382 clinic visits with 7 different specialties. In 2017, the clinic almost doubled in size with 706 visits across 20 specialties. The physicians that staff these clinics travel from various hospitals within the KC metro and mid-Missouri area on a weekly or monthly basis. With the increase in outpatient clinics and high demand for these services in the area, the project team began investigating the current workflows and processes in place within the OPC.
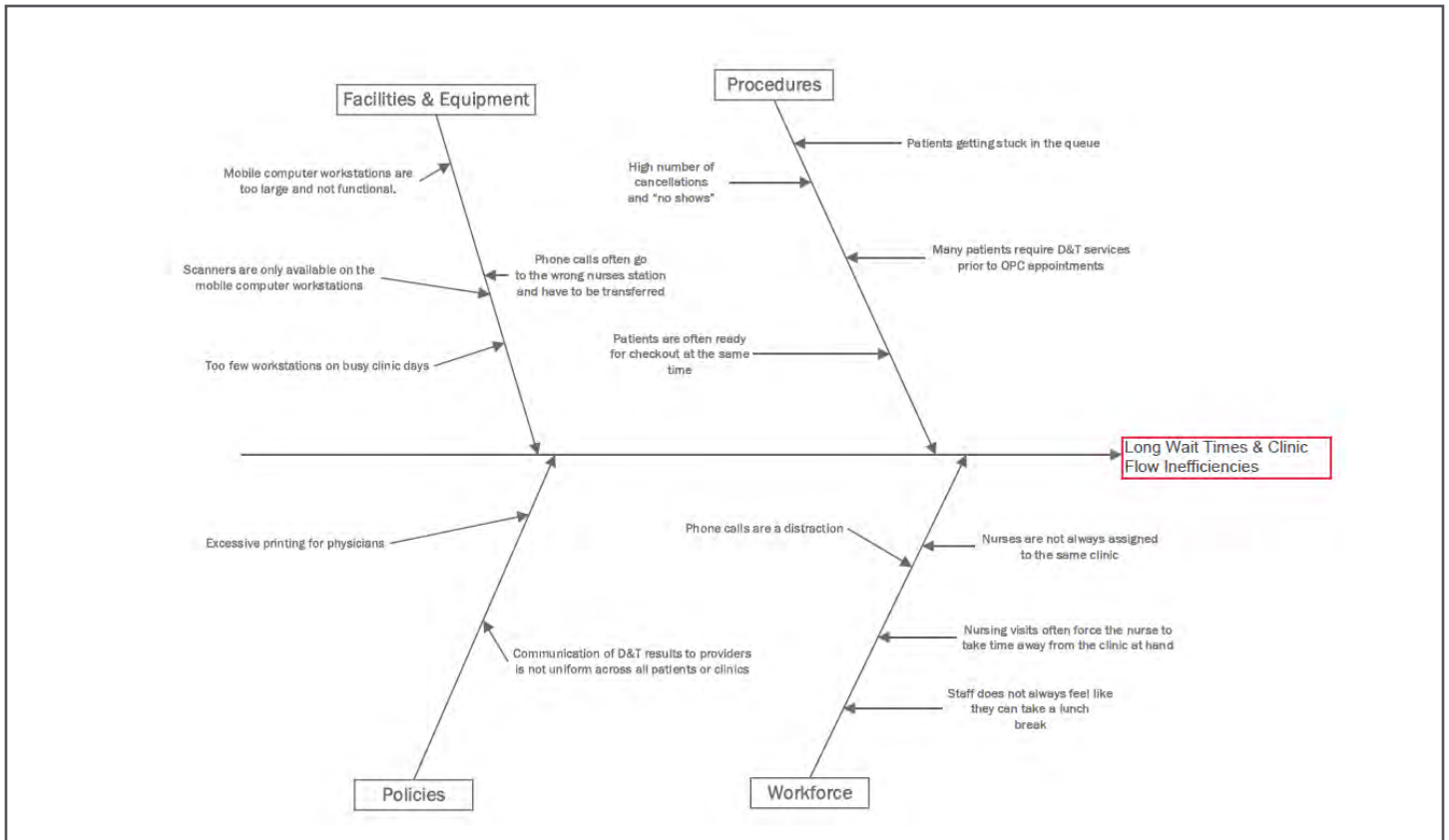
## PROJECT GOAL

This project aimed to take a further look at the busiest clinics, including pain management, orthopedics and urology. Each of these clinics had their own set of complexities. Many of the patients within these clinics will have initial consultations, procedures and follow-up appointments. The project team completed unconstructed staff interviews, time studies, observations pertaining to processes, patient hand-offs, communication, etc., data analysis of reports and review of patient satisfaction scores for the clinic. The qualitative and quantitative information gathered during this project was used to modify current, or implement new, standardized processes to establish workflows that will optimize clinic and physician time, increase efficiency and provide the highest quality of patient experience.

## IMPROVEMENT STRATEGY

Subsequent to data collection, the team was able to analyze and provide statistical and observational data to the OPC staff regarding their initial concerns. Major findings of this study were:

- patient satisfaction scores for the clinic were at 89.5% overall, falling below the goal of at least 93%;
- per patient comments and staff perception, there were excessive steps in the clinic workflow;
- 61% of patients seeing orthopedics, pain or urology had to go to the lab or radiology after initial registration;
- significant amounts of non-value added time during patient's visit;
- lack of consistency and standardization in clinic workflow and processes.

Fishbone diagram: Long Wait Times & Clinic Flow Inefficiencies

**Facilities & Equipment**
- Mobile computer workstations are too large and not functional.
- Scanners are only available on the mobile computer workstations
- Too few workstations on busy clinic days

**Procedures**
- Patients getting stuck in the queue
- High number of cancellations and "no shows"
- Many patients require D&T services prior to OPC appointments
- Phone calls often go to the wrong nurses station and have to be transferred
- Patients are often ready for checkout at the same time

**Policies**
- Excessive printing for physicians
- Communication of D&T results to providers is not uniform across all patients or clinics

**Workforce**
- Phone calls are a distraction
- Nurses are not always assigned to the same clinic
- Nursing visits often force the nurse to take time away from the clinic at hand
- Staff does not always feel like they can take a lunch break

| PAIN CLINIC | | | | |
|---|---|---|---|---|
| Before UA's in OPC | Minutes | After UA's in OPC | Minutes | % Decrease |
| Average Total Time in Clinic | 42 | Average Total Time in Clinic | 39 | 7% |
| Average Total Time Between Registration and Nurse Call Back | 9 | Average Total Time between Registration and Nurse Call Back | 4 | 56% |

| UROLOGY | | | | |
|---|---|---|---|---|
| Before UA's in OPC | Minutes | After UA's in OPC | Minutes | % Decrease |
| Average Total Time in Clinic | 51 | Average Total Time in Clinic | 38 | 25% |
| Average Total Time Between Registration and Nurse Call Back | 14 | Average Total Time Between Registration and Nurse Call Back | 4 | 71% |

## RESULTS

After analysis was performed, the team was able to present findings to the clinic staff and key stakeholders. From findings, the project team and stakeholders brainstormed recommendations to address concerns and mitigate problems. These recommendations included hiring a phlebotomist to work in the clinic to aid in drawing labs and taking specimens to the laboratory, staffing radiology with a portable X-ray machine on orthopedic clinic days, ensuring adequate staffing for clinic days, assigning a nurse to specified clinics to improve workflow and relationships with physicians, scheduling walk-ins and nursing visits for non-busy clinic times, and providing clinic environment and IT updates to help support clinical staff.

## LESSONS LEARNED

Many lessons were learned during the OPC project. These lessons learned included gaining staff buy-in at the inception of the project to ensure success, realizing limitations due to varying schedules with project team and clinic schedules, and maintaining strong communications with all interested parties in order to be transparent and set groundwork for future project success.

With numerous key players within the project, successful implementation of recommendations requires standardization, effective communication and stakeholder buy-in. Overall, the findings in this study proved the labyrinthine operations of a critical access hospital, but with provided recommendations, the project team hoped to gain control of the established concerns within the clinic and obtain goals to provide high quality patient care to patients in the community.

# *Care Coordination — Critical Access and Rural Hospitals*

**HONORABLE MENTION**

**Golden Valley Memorial HEALTHCARE**

CONTACT:

Tina Jones
Director, Quality

*tajones@gvmh.org*

## PROJECT DESCRIPTION

Using the Centers for Medicare & Medicaid Services guidelines for Transitional Care Management services to provide post-discharge support to the organization's primary care provider's patients discharged from an acute medical inpatient stay.

## PROJECT GOAL

Contact 70% of eligible patients within 48 business hours of discharge from an acute medical inpatient stay to verify that follow-up appointments have been scheduled and new medications obtained, and to inquire on the patient's health status.

## IMPROVEMENT STRATEGY

Utilizing discharge reports from the acute care hospital, patients discharged from a medical inpatient stay will be contacted and have their needs assessed. Patients without follow-up appointments will be scheduled within an appropriate timeframe related to the complexity of the medical needs. Appointments will be patient-centered, scheduled at times that meet the patient's availability, when at all possible. Medication reconciliation will begin during the initial communication with an emphasis on verifying that new medications were obtained and verifying the patient's compliance with their new and existing medications. Patient's needs for services will be assessed during the initial communication with emphasis on restarting any service that the patient had prior to their admission. Examples of services include home health, meals on wheels, durable medical equipment deliveries, etc. The patient's knowledge of their disease process and when to contact their provider's office will be assessed. The patient will be educated about "warning signs" and when to call their provider versus going to an emergency department or calling 911. The goal is for the patient to have communication with their provider when their illness is in the early stage of progression and avoid readmittance to the hospital.

## RESULTS

From Jan. 1, 2018, until Dec. 31, 2018, more than 90% of eligible patients were contacted within the first 48 hours after discharge from the acute care hospital. The communication goal was met and exceeded. Another very positive outcome was seen as a result of these contacts. With no changes occurring in the admission or discharge processes of the acute care hospital, the implementation of Transitional Care Management services within the organization's primary care provider's medical practice resulted in an 8.2% reduction in the readmission of patients who receive care in the practice.

## LESSONS LEARNED

Communications occurring early in the first days after a discharge from an acute care hospital have a positive impact on the safety and health outcomes of patients. Achieving positive results requires a significant amount of time from dedicated clinical staff. Accommodating the large volume of eligible patients and delivering a high level of care required the allocation of a full-time licensed nurse to complete the Transitional Care Management services.

# *Care Coordination — Critical Access and Rural Hospitals*

CONTACT:

Amy Pickren
Director of Inpatient
and Quality Management

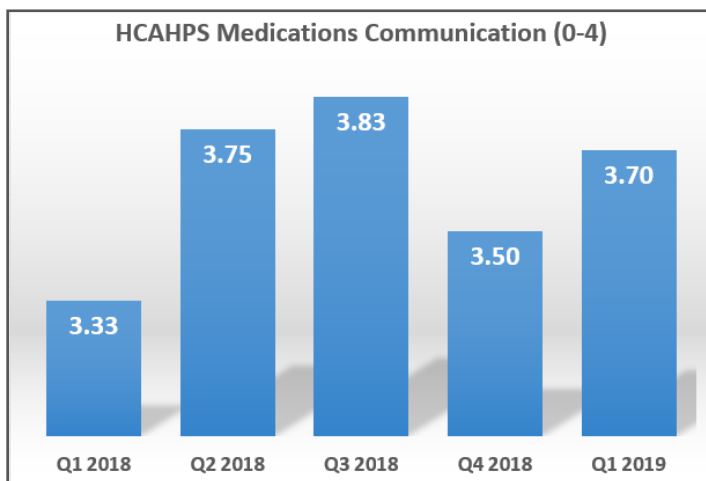*apickren@hcchospital.org*

## PROJECT DESCRIPTION

An interdisciplinary Transitions of Care team was established in April 2018 to improve the discharge process; enhance communication between patients, health care providers and other caregivers; and reduce the likelihood of readmission within 30 days. The team included the Care Coordinator, nursing staff, ancillary departments, Home Health, primary care clinics and physicians, and a local pharmacy. The team aims to provide education to overcome barriers prior to discharge and provide post-discharge, patient-specific follow-up care at various intervals based on a risk-adjusted assessment performed upon admission.

## PROJECT GOAL

1. Reduce hospital inpatient 30-day readmission rate to below 5%.

2. Increase HCAHPS care transition scores to >3.5 on a 4.0 scale.

3. Increase HCAHPS communication about medicine scores to >3.7 on a 4.0 scale.

## IMPROVEMENT STRATEGY

Prior to the project implementation, a registered nurse printed discharge instructions and provided any needed instructions before the patient returned home. However, many readmitted patients did not understand new medication regimens, were unable to get to the pharmacy to get new medications, or did not understand follow-up care. Patients discharged to long-term care facilities frequently had complications related to gaps in nurse-to-nurse hand-offs, medication changes or communication with physicians. The improvement strategy involved the following components:

**HCAHPS Medications Communication (0-4)**

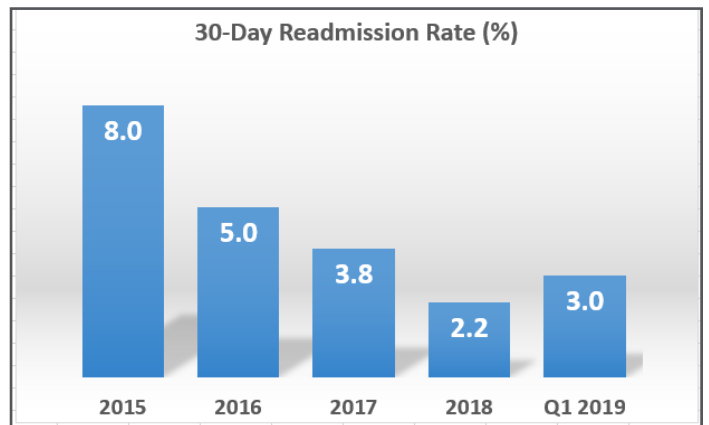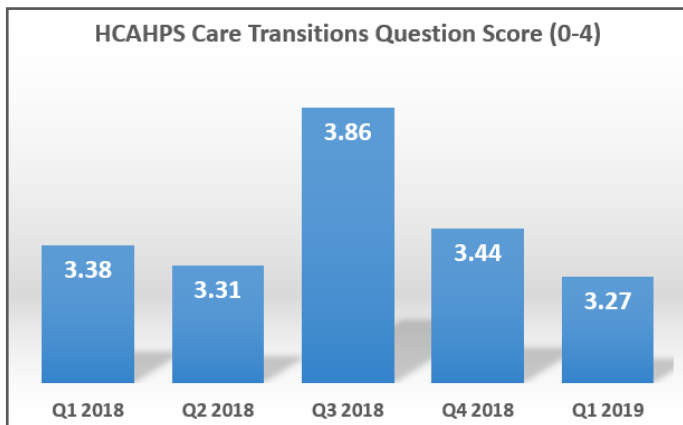| Q1 2018 | Q2 2018 | Q3 2018 | Q4 2018 | Q1 2019 |
|---------|---------|---------|---------|---------|
| 3.33 | 3.75 | 3.83 | 3.50 | 3.70 |

- At admission, an R.N. completes the LACE index tool to assess a patient's risk of readmission.

- Newly prescribed medications can be delivered to the bedside prior to discharge. This partnership with a local pharmacy is convenient for the patient, and provides an opportunity for additional education and instructions about medications.

- The Care Coordinator calls the patient within 72 hours to help identify any areas of concern, clarify any confusion, and confirm any follow-up appointments with primary care providers or specialists.

- All patients can receive a complimentary home visit from a nurse within 72 hours of discharge.
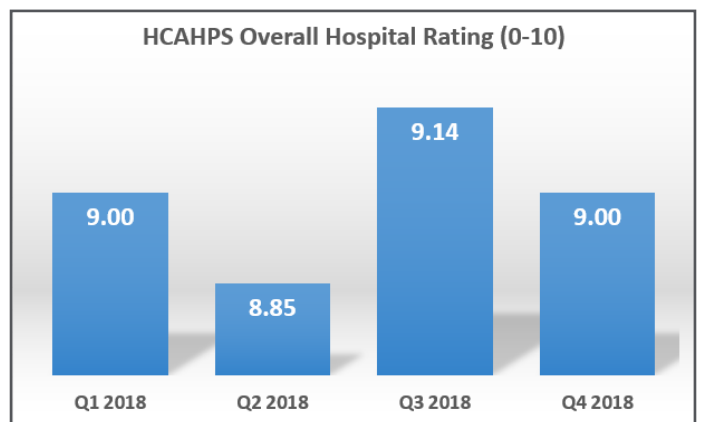
## RESULTS

Forty percent of all patients discharged to home received a complimentary nurse home visit, and the Care Coordination nurse attempted 100% of follow-up by phone call. The readmission rate remained below the annual target of 5% for 2018 and for the first quarter of 2019. HCAHPS care transition scores averaged 3.5. The communication about medicines score averaged 3.6 for 2018, just below the target. Overall patient satisfaction for 2018 averaged 9.0 on a 10.0 scale.

**HCAHPS Care Transitions Question Score (0-4)**

| Q1 2018 | Q2 2018 | Q3 2018 | Q4 2018 | Q1 2019 |
|---------|---------|---------|---------|---------|
| 3.38 | 3.31 | 3.86 | 3.44 | 3.27 |

**30-Day Readmission Rate (%)**

| 2015 | 2016 | 2017 | 2018 | Q1 2019 |
|------|------|------|------|---------|
| 8.0 | 5.0 | 3.8 | 2.2 | 3.0 |

## LESSONS LEARNED

Some patients discharged to home refused home visits or follow-up phone calls. Beginning in April 2019, all patients, including those discharging to home who refuse post-discharge care, received updated personal medication cards prior to discharge. The cards include new or current medication regimens, doses, changes and last doses taken. The Care Coordinator uses teach-back methods to ensure patients understand all discharge instructions.

**HCAHPS Overall Hospital Rating (0-10)**

| Q1 2018 | Q2 2018 | Q3 2018 | Q4 2018 |
|---------|---------|---------|---------|
| 9.00 | 8.85 | 9.14 | 9.00 |

# *Clinical Excellence*
## CARE COLLABORATIVE OR HEALTH SYSTEM

Aim *for* Excellence

**WINNER**

**Mercy**

CONTACT:

Andrew Eilers
Sr. Managing Consultant

*Andrew.Eilers@mercy.net*

## PROJECT DESCRIPTION

Reaching adequate SEP-1 bundle adherence has continued to elude most health care providers. The Missouri average for compliance is only 48% and the top 10% of hospitals across the country are only able to achieve about 85.8% success rate.[3, 4] The criteria, though simple, proves to be a moving target that complicates workflow. Despite the complexity of the measures, they can be summarized into very straight-forward actions. The process relies heavily on our ability to monitor patients across the health system via our virtual services, and leverages the Electronic Medical Record (EMR) in several ways to facilitate communication of the patient's progress, ultimately improving sepsis bundle compliance and having a positive impact on patient outcomes.

## PROJECT GOAL

Our goal was to improve the quality of care and patient experience across the system for the sepsis patient population. The initial approach focused on improved compliance to the CMS SEP-1 Sepsis bundle as an effort to improve communication and standardize the approach to care across the system. This would allow us to better implement evidence-based care and improve the overall workflow, and support increased communication among care teams. Our approach involved the use of a novel virtual sepsis monitoring team, improvements in the standard order sets used to initiate care, extensive co-worker education, and improvements to the tools available in the EMR to track and monitor patient progress. With some of our facilities reporting monthly SEP-1 adherence rates below 10% and an overall system compliance rate of 30% in calendar year 2017, we set our initial SEP-1 compliance goal at 65%.

## IMPROVEMENT STRATEGY

Sepsis is one of the deadliest and most costly conditions worldwide. Nearly 250,000 Americans die from sepsis each year accounting for 1 in 3 in-hospital deaths.[1] The SEP-1 bundle guidelines provided by CMS were developed in cooperation with the Surviving Sepsis Campaign to establish standards designed to provide guidelines for the early identification of severe sepsis allowing providers to initiate early goal-directed therapy. By listening to the caregivers across the health system, we determined that the initial work had to focus on improved communication and surveillance of our patients. This work led to the creation of a novel virtual sepsis process, which allowed for improved centralized monitoring of the health system's patients throughout their inpatient stays, while effectively communicating the patient's progress to the bedside provider allowing them to focus solely on the care of the patient. Improvements within the EMR, such as the development of a timer and status report, reflect the progression through the sepsis bundle. Finally, improved order sets that allow the providers immediate access to the orders they need to manage the patient's care.
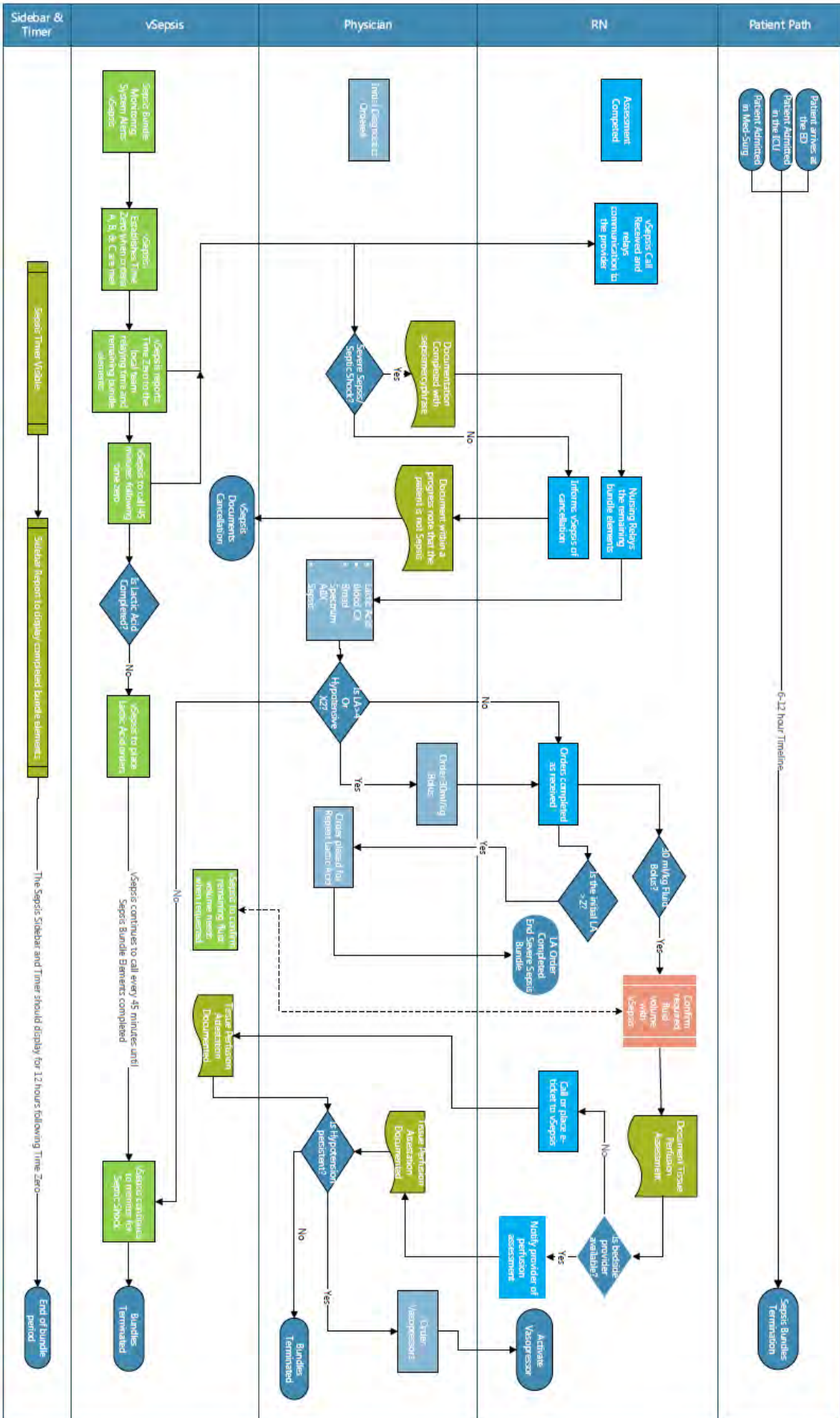
## RESULTS

The key measure for this work is compliance to the CMS SEP-1 sepsis bundles. This information is publicly reported and stands as a measure of quality of sepsis care. The national average for compliance to the sepsis bundle is approximately 56.2%.[4] Facilities in our system were underperforming in this area, with monthly adherence rates as low as 9%. Through this effort we have been able to achieve multiple individual facility monthly averages as high as 75% with an overall system average of greater than 56% across 12 facilities.

## LESSONS LEARNED

The key lesson learned through this project is that complete and transparent communication is required to achieve success. This communication begins at the bedside, must be accurately documented in the patient's record, diligently monitored by the team, and fully supported by leadership to reach the goal. Leveraging a centralized virtual sepsis response team was fundamental to the success of our program. Once the project is given the priority and scope necessary, the expert care team and the technology can come together to produce a successful process.

Sepsis Workflow

**Patient Path**
- Patient arrives at the ED
- Patient Admitted in the ICU
- Patient Admitted in Med-Surg
- 6-12 hour Timeline
- Sepsis Bundles Termination

**RN**
- Assessment Completed
- vSepsis Call Received and relays communication to the provider
- Nursing Relays the remaining bundle elements
- Informs vSepsis of cancellation
- Orders completed as received
- Call or place e-ticket to vSepsis
- Notify provider of perfusion assessment
- Activate Vasopressor

**Physician**
- Initial Diagnostic Orders
- Severe Sepsis Septic Shock? — Yes / No
- Document within a progress note that the patient is not Sepsis
- Lactic Acid Blood Cx Broad Spectrum ABX Sepsis
- Is LA-H Or Hypotensive X2?
- Order 30ml/kg Bolus
- Orders placed for Repeat Lactic H2?
- Is the initial LA >2?
- 30 ml/kg Fluid Bolus?
- Is Hypotension persistent? — Yes / No
- Order Vasopressor
- Bundles Terminated

**vSepsis**
- Sepsis Bundle Monitoring System Alerts vSepsis
- vSepsis Establishes Time Zero When ones A, B, & C are met
- vSepsis reports Time Zero to the local team relaying time and remaining bundle elements
- vSepsis to call RS relays following Time Zero
- Is Lactic Acid Completed?
- vSepsis to place Lactic Acid orders
- vSepsis Documents Cancellation
- Sepsis to confirm remaining fluid volume needs when required
- Sepsis to confirm required fluid volume with vSepsis
- Document Tissue Perfusion Assessment
- Tissue Perfusion Attestation Documented
- "Tissue Perfusion Attestation Documented"
- Is bedside provider available?
- Administrate additional 10 minutes for Septic Shock
- LA Order Completed End Severe Sepsis Bundle
- vSepsis continues to call every 45 minutes until Sepsis Bundle Elements completed
- Bundles Terminated

**Sidebar & Timer**
- Sepsis Timer Visible
- Sidebar Report to display completed bundle elements
- The Sepsis Sidebar and Timer should display for 12 hours following Time Zero
- End of bundle period

15

HONORABLE MENTION

**Saint Luke's Health System**

saintlukeshealthsystem.org

CONTACT:

Ginny Boos
Director of
Infection Prevention

*vboos@saint-lukes.org*

## PROJECT DESCRIPTION

Decreasing hospital-acquired *C. difficile* infections associated with inappropriate testing.

## PROJECT GOAL

To identify and implement processes to reduce hospital-acquired *C. difficile* infections by 20-25% as defined by CDC's National Healthcare Safety Network by December 2018.
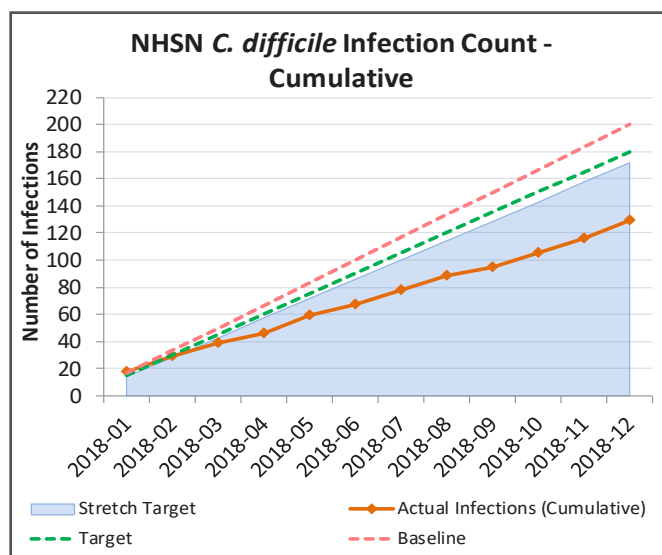
## IMPROVEMENT STRATEGY

Building on extensive improvement work done to reduce hospital-acquired *C. difficile* infections, we conducted a case review of all hospital-acquired *C. difficile* infections between January and August 2017 from four acute care hospitals to isolate and examine primary factors for testing resulting in a hospital-acquired infection. We sought to systematically apply the *C. difficile* testing criteria published in the 2017 IDSA/SHEA guidelines for hospitalized patients based on the presence of diarrhea and the absence of laxative use, and instituted a hard-stop lab rejection process for specimens that failed to meet the testing criteria. Our two-pronged improvement strategy to avoid unnecessary testing implemented in late November 2017 included: 1) an electronic health record provider alert to notify clinicians at the time of test ordering when testing criteria was not met and, if they chose to proceed with an order; 2) an electronic health record lab report to facilitate lab-based rejection of samples when testing criteria was not met.
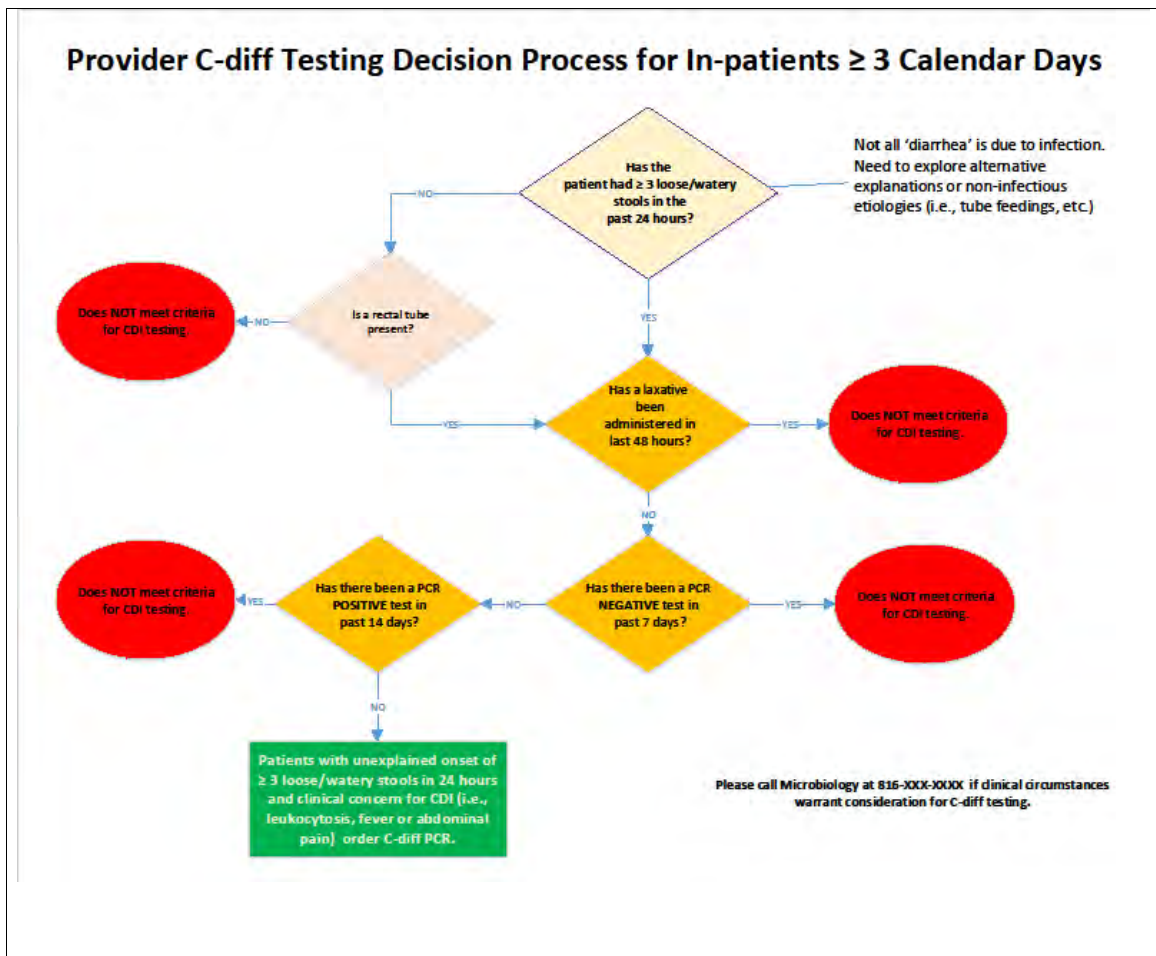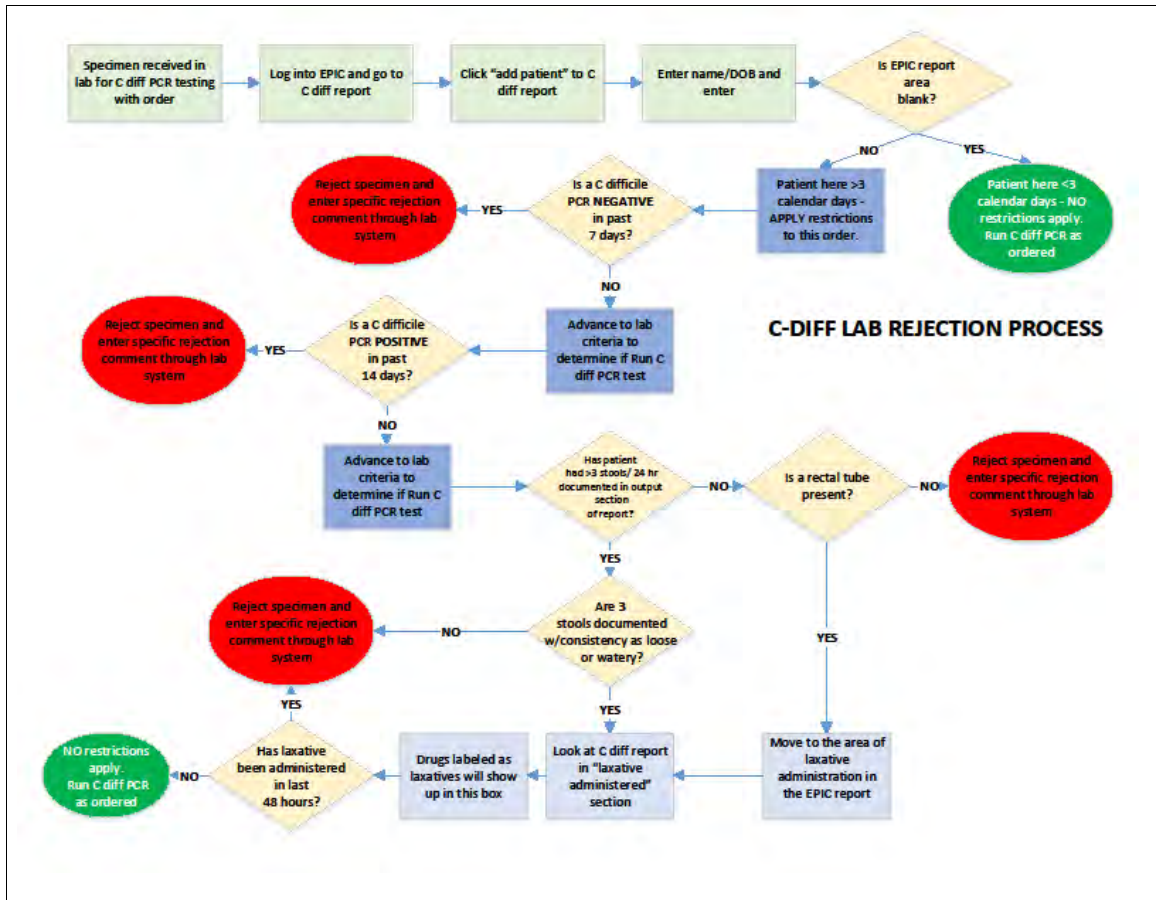
## RESULTS

The intervention demonstrated a 40% reduction of hospital-acquired *C. difficile* infections by the end of December 2017, but leveled off to a combined 30% reduction across the health system by December 2018.

## LESSONS LEARNED

Communication strategies are equally as important as the implementation strategies to change culture. A narrated and standardized PowerPoint defining the problem and intervention for all clinical groups was used to inform the health care teams and was reinforced with colorful decision-level flowcharts. Given the complex and variable clinical decisions for *C. difficile* infection testing, multiple approaches were needed, including broad and consistent communication efforts, utilizing the electronic health record provider alerts and lab report to facilitate lab-based rejections of specimens not meeting the testing criteria. With this multi-prong strategy, implementation of our intervention was able to positively influence the human factors associated with the clinical decisions.

**NHSN *C. difficile* Infection Count - Cumulative**

Legend: Stretch Target, Actual Infections (Cumulative), Target, Baseline

Y-axis: Number of Infections (0 to 220)

X-axis: 2018-01 through 2018-12

# C-DIFF LAB REJECTION PROCESS



# Provider C-diff Testing Decision Process for In-patients ≥ 3 Calendar Days



Not all 'diarrhea' is due to infection. Need to explore alternative explanations or non-infectious etiologies (i.e., tube feedings, etc.)

Patients with unexplained onset of ≥ 3 loose/watery stools in 24 hours and clinical concern for CDI (i.e., leukocytosis, fever or abdominal pain) order C-diff PCR.

Please call Microbiology at 816-XXX-XXXX if clinical circumstances warrant consideration for C-diff testing.

# *Clinical Excellence*

## SMALL AND LARGE METROPOLITAN HOSPITALS

Aim *for* EXCELLENCE

**WINNER**

**SAINT FRANCIS MEDICAL CENTER**
*Medicine to the Highest Power*

CONTACT:
Leigh-Ann White
Director of
Quality & Performance
Improvement

*lwhite@sfmc.net*

## PROJECT DESCRIPTION

Research suggests that 2-5% of patients who undergo an inpatient surgery will develop a surgical site infection and up to 60% of them are preventable by using evidence-based guidelines (Anderson, et. al., 2014). The development of an SSI places a patient at 2-11 times higher risk of mortality when compared to those who do not develop an SSI (Anderson, et. al., 2014). Billions of dollars are spent annually on providing additional care to patients with preventable SSIs. In 2016, we set out on a journey to mitigate the occurrence of SSIs through a systemwide initiative of research and process improvement. As a Lean Thinking organization that strives each day to provide the highest quality care at the lowest cost to our customers, we challenged the status quo by further reducing our 2015 overall SSI rate of 0.75%. While we were already well below the national average, we knew there was more to be done to improve patient outcomes, cost and experience.



MRSA SSI's CY2015 to CY2018
(Cardiovascular, Neurosurgery, & Orthopedic Populations)
78% Improvement CY15 to CY18

## PROJECT GOAL

The primary goal of this project was to achieve a 50% reduction in the baseline rates for surgical site overall, deep and MRSA infections. Our long-term goal in active pursuit is to achieve top decile performance by reaching zero SSIs.

## IMPROVEMENT STRATEGY

Utilizing both the lean DMAIC (Define, Measure, Analyze, Improve & Control) process as well as Apparent Cause Analysis (ACA), we set out to define who was experiencing SSIs and why. We collected data measurements for analysis followed by the use of statistical tools to determine the areas of opportunity. One approach to our analysis included the performance of ACA with stakeholders to determine potential causes for the infections. Opportunities we identified were hand hygiene, environmental cleaning, antimicrobial administration, as well as patient education and support. Our multidisciplinary team collaboratively developed improvement strategies for implementation and sustainment or control of those improvements. The prevention of SSIs is increasingly important as the number of surgical procedures performed in the United States continues to rise.
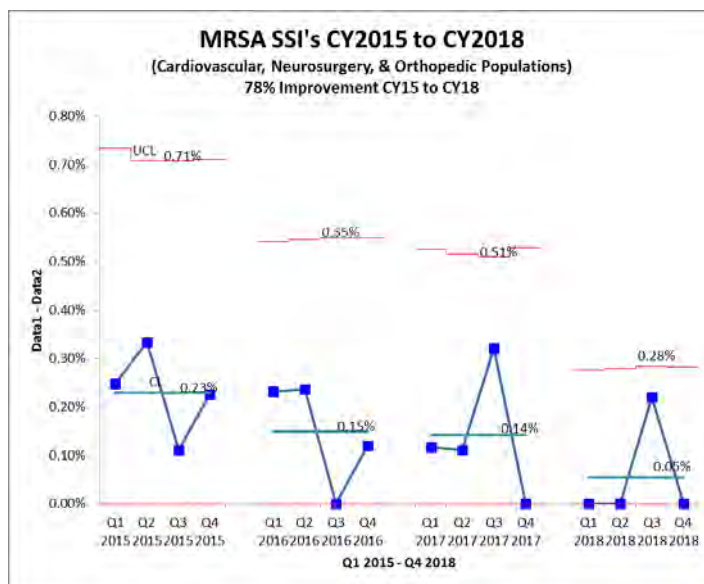
## RESULTS

Our improvement efforts yielded a 45.3% improvement in SSIs overall — 43.2% improvement in all deep SSIs, and a 78% improvement in MRSA SSIs for the cardiovascular, neurosurgical, and orthopedic populations from calendar year 2015 to calendar year 2018.

## LESSONS LEARNED

The most significant positive lesson learned was the importance of communication between colleagues in all areas of patient care, as well as patient involvement. Because there are many factors that increase the patient's risk of SSI along the surgical pathway, engaging everyone involved, including the patient, is crucial. Effective SSI prevention clearly extends beyond the confines of the operating room. Increasing patient participation in their care emphasizes the idea that health care is a shared responsibility. In our co-design approach, providing communication back to colleagues and patients displaying the fruits of their labor, and engagement solidified our relationship as benefiting the lives of those we serve while keeping our mission at the forefront.

**HONORABLE MENTION**

**Southeast Hospital**

CONTACT:

Regina Moore
Clinical Quality Analyst

*regmoore@sehealth.org*

## PROJECT DESCRIPTION

The alignment of our facility with the CMS sepsis quality measure to improve care started in the spring of 2015. The need for improvement stimulated the formation of a multidisciplinary team established through the Performance Improvement Committee. The initiative was collaboratively supported by team members from ICU, Pharmacy, Laboratory, ED, CMO and an executive champion. The goal was to improve patient care, reduce subsequent mortalities through early recognition and treatment, and improve the financial impact of sepsis. Work was initiated by reviewing many best practice process improvements, but with little traction gained. Our sepsis accomplishments averaged a 14% success rate. The national benchmark, at that time, was 37%.

In the fall of 2017, we enrolled in the HIIN 2.0 Sepsis Immersion Project. The team was quick to recognize the benefits of said project. (Team member turnover and gaps in executive leadership had proven to be roadblocks up to that time.)

## PROJECT GOAL

With the sepsis team comprised of many new members, best practice action items and plans were put into place. The project goal remained the same: saving more lives by improving care through alignment with the CMS sepsis measure bundles. With our past rate at 14% and the national average at 37%, we set our goal at improving to at least the national average. The national benchmark increased mid-project to 49%. The ability to participate in a real-time network through the HIIN allowed access to new resources trialed by other facilities, and stimulated a rejuvenation for re-deploying previously attempted methods.
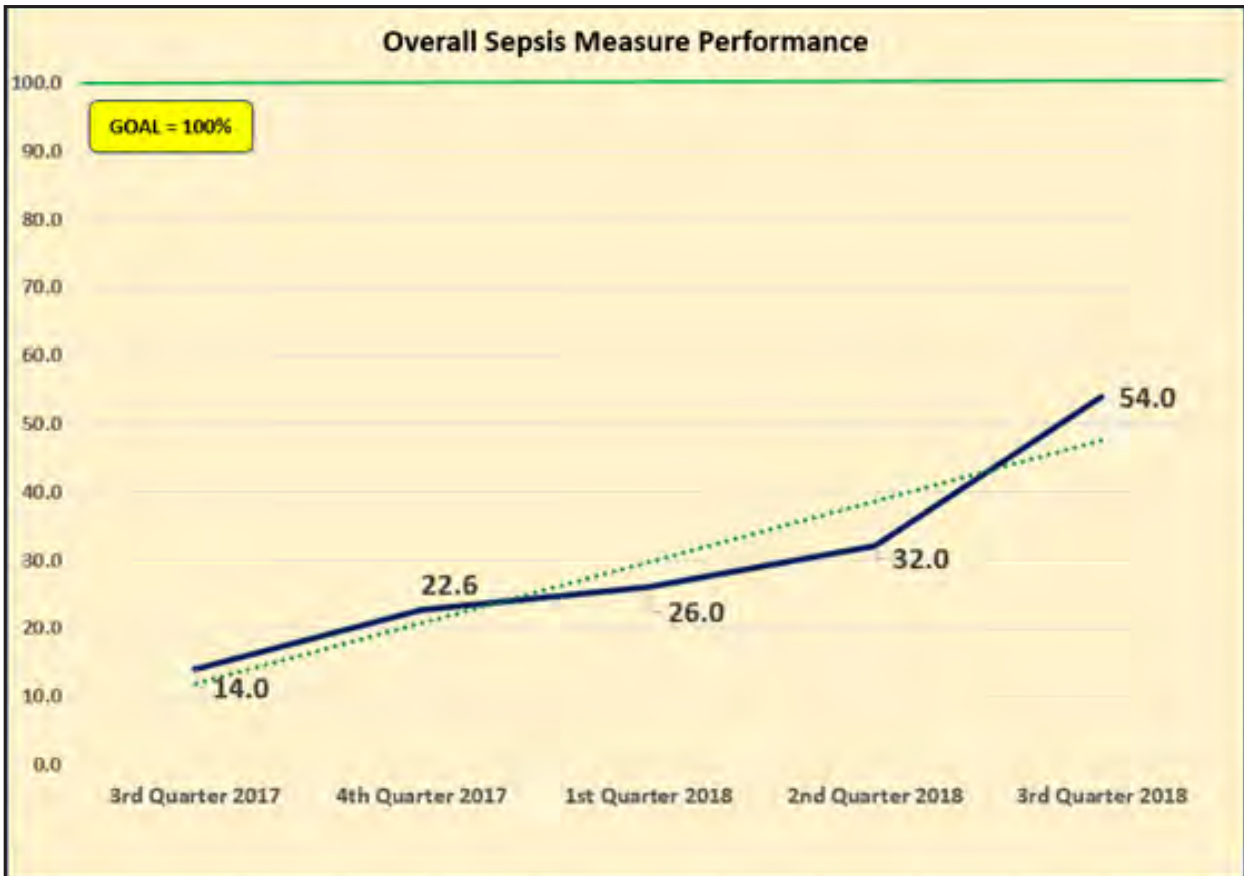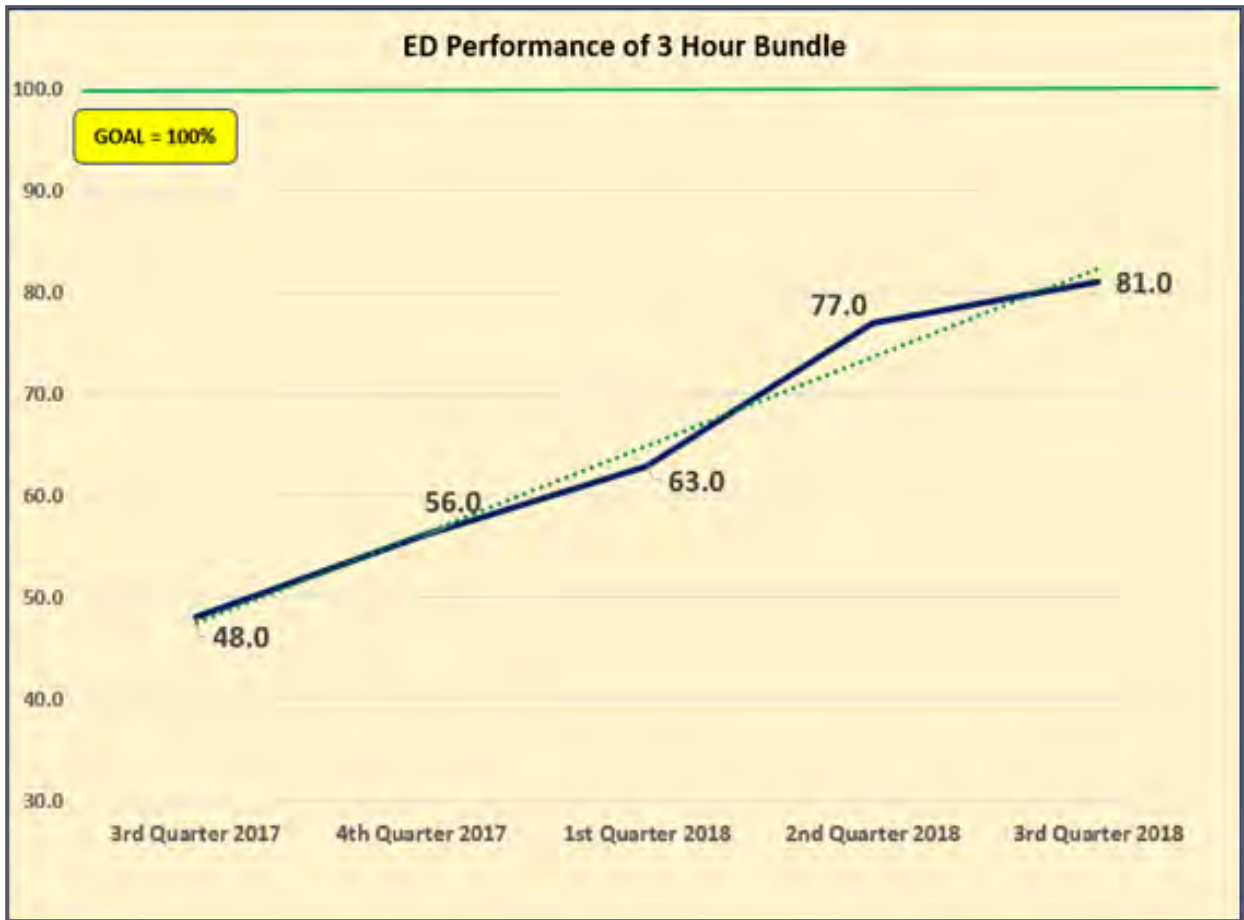
## IMPROVEMENT STRATEGY

The team prioritized and decided to focus on the ED process for improvement, where we had found through audits that 90% of severe sepsis cases presented or developed. Time Zero (time when all elements of severe sepsis have presented and start the treatment clock, per CMS) became the focus area. We would equip the ED physicians with the skill set and knowledge to recognize when patients were at Time Zero and to document it. Increasing knowledge provided everyone crucial awareness of the timelines involved with the 3-hour and 6-hour measure bundles. Chart auditing was increased from the CMS-required minimum of 20% to 40%, and direct feedback was provided on each case regardless of case performance or outcomes. Dissemination of every sepsis mortality and post-operative sepsis case was performed and reviewed by the team.

## RESULTS

The HIIN 2.0 Sepsis Immersion period was from November 2017 through September 2018. Over this period of time, we saw a 285% improvement (from 14% to 54%) in measure performance, surpassing our original goal of 49% (then current national benchmark). As an added bonus, post-operative sepsis mortality decreased by 68%, during this project.

## LESSONS LEARNED:

Consistent support and leadership on all levels is crucial. Without it, implementation of change is not successful. Education and feedback are key. In the sustainment phase, the project will continue and expand to the hospitalists. The implementation of disseminating sepsis readmissions, eICU (remote physicians able to monitor patients via camera and access the medical record), Rapid Response rounding on sepsis patients, sepsis alerting within the electronic medical record, and continued partnership and engagement of medical providers (in-house and communitywide) will be key in sustaining our efforts.

## ED Performance of 3 Hour Bundle

GOAL = 100%

- 3rd Quarter 2017: 48.0
- 4th Quarter 2017: 56.0
- 1st Quarter 2018: 63.0
- 2nd Quarter 2018: 77.0
- 3rd Quarter 2018: 81.0

## Overall Sepsis Measure Performance

GOAL = 100%

- 3rd Quarter 2017: 14.0
- 4th Quarter 2017: 22.6
- 1st Quarter 2018: 26.0
- 2nd Quarter 2018: 32.0
- 3rd Quarter 2018: 54.0

**MERCY HOSPITAL SPRINGFIELD**

CONTACT:

Diana Henderson
Executive Director -
Quality Management

*Diana.Henderson@Mercy.Net*

## PROJECT DESCRIPTION

Our hospital recognized an opportunity to improve patient outcomes and decrease mortality of patients with sepsis by optimizing sepsis care. In order to improve compliance with the Centers for Medicare & Medicaid Services sepsis treatment bundle, our team needed to have a better understanding of each step involved in the 3- and 6-hour bundle elements. We assessed our current processes, identified gaps and worked as a team to bridge those gaps to provide best practice standards of care for sepsis patients in our hospital.

## PROJECT GOAL

Our goal was to increase CMS Core Measure SEP-1 Sepsis bundle compliance to >50%, reduce average length-of-stay (ALOS), mortality and readmissions.

## IMPROVEMENT STRATEGY

The sepsis multidisciplinary team was chartered by hospital leadership. The multidisciplinary team included representation from the emergency department, nursing (intensive care and medical units), physician champions (ED, critical care, hospitalist), pharmacy, clinical educator, care management, medical documentation specialist, virtual partner, finance and quality. Rapid cycle change strategies (listed below) were key to the improvements achieved.

- analysis of bundle compliance, ALOS, mortality rates, readmissions and direct cost-per-case
- collaboration with our virtual partner to improve the care of patients with severe sepsis and septic shock
- revised our inpatient sepsis protocol, ED flowchart and sepsis order set
- frequent and ongoing education and communication to providers and nursing
- patient hand-offs between the ED, intensive care units and medical nursing units to ensure continuity of care
- badge buddies with time zero definition (criteria A, B and C) and antibiotic selection were created and distributed
- critical care coordinator (CCC) position was trialed and after success with increasing compliance with the sepsis bundle — approval for the position was acquired

- Sepsis Rapid Response Team created to ensure early identification and treatment of sepsis patients, specifically timely collection of lactic acid and blood cultures
- electronic health record – development of a sepsis bundle status report and tracker that allows communication to optimize the ability to focus on necessary patient care while ensuring sepsis bundle compliance
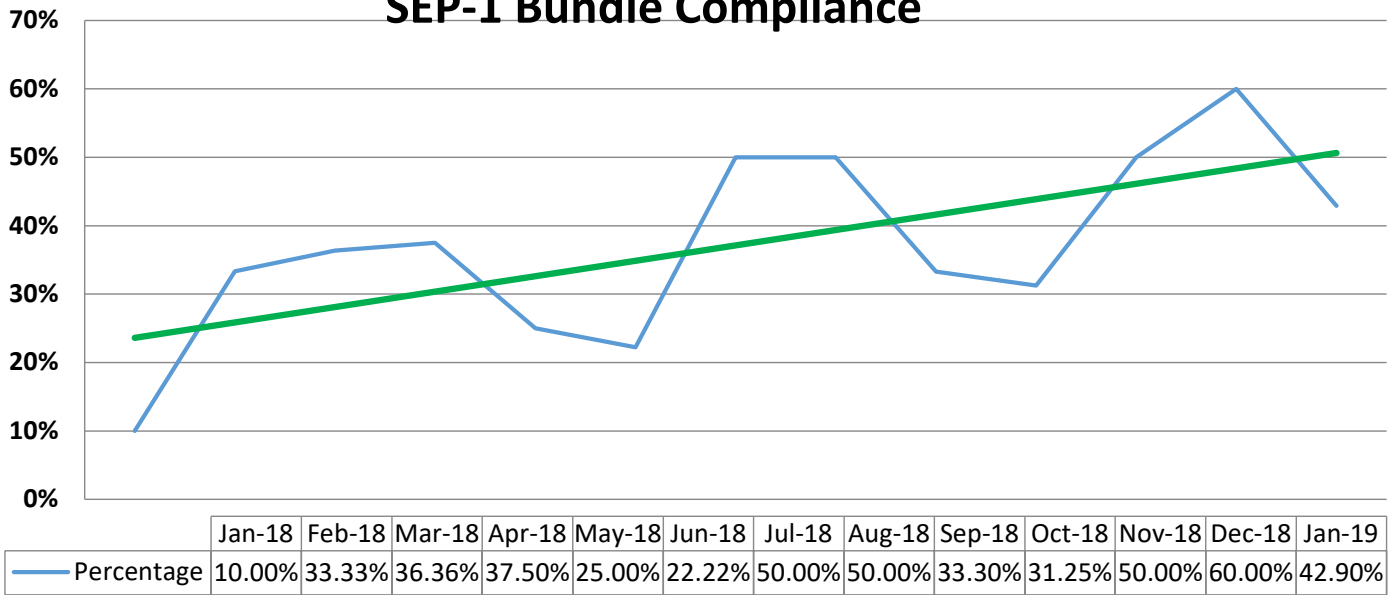- efforts to increase utilization of sepsis pathway

## RESULTS

Baseline 12/17 CMS abstracted bundle compliance was 7% (national average was 49%). After implementation of interventions, bundle compliance increased to 60% in 12/18. A pilot of the CCC position showed 82% bundle compliance over a two-week period. Our hospital has realized an increase in identification of sepsis without organ dysfunction and a decrease in the volume of severe sepsis and septic shock patients. We are recognizing sepsis earlier and intervening to prevent those patients from progressing to severe sepsis and septic shock. The average length-of-stay for patients in DRG 871 (Septicemia or severe sepsis without mechanical ventilation > 96 hours with MCC) has decreased by 0.99 days and total direct cost-per-case has decreased by $1,511 when comparing fiscal year 2018 to February 2019. The 30-day mortality rate has decreased from a high of 25% in 10/17 to a low of 16% in 2 of the last 3 months (12/18, 2/19).

## LESSONS LEARNED

Multidisciplinary team collaboration with motivated team members is essential for success. We needed to understand current state in order to identify and bridge gaps to best practice. We set clear expectations for action items with assigned owners and dates for completion. We reviewed missed opportunities with the sepsis bundle to identify contributing factors (process, system and individual). Frequent and ongoing education is necessary, which includes the "why" behind the process.
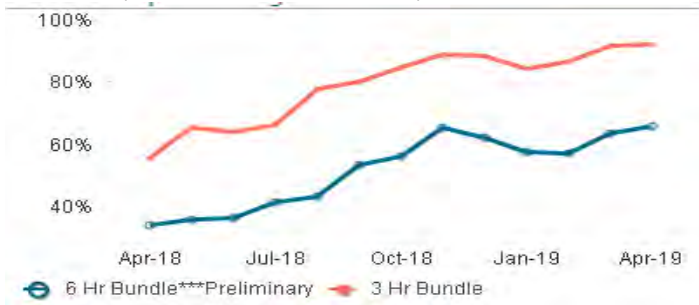
# SEP-1 Bundle Compliance

| | Jan-18 | Feb-18 | Mar-18 | Apr-18 | May-18 | Jun-18 | Jul-18 | Aug-18 | Sep-18 | Oct-18 | Nov-18 | Dec-18 | Jan-19 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Percentage | 10.00% | 33.33% | 36.36% | 37.50% | 25.00% | 22.22% | 50.00% | 50.00% | 33.30% | 31.25% | 50.00% | 60.00% | 42.90% |

Benchmarks from Hospital Compare preview report 4/26/19:

| State Rate | National Rate | Top 10% |
|---|---|---|
| 49% | 55% | 78% |

Bundle compliance data from our virtual partner:

6 Hr Bundle***Preliminary    3 Hr Bundle

| Date | 6 Hr Bundle***Preliminary | 3 Hr Bundle |
|---|---|---|
| Apr-18 | | 34.2% |
| May-18 | | 36.0% |
| Jun-18 | | 36.5% |
| Jul-18 | | 41.6% |
| Aug-18 | | 43.4% |
| Sep-18 | | 53.4% |
| Oct-18 | | 56.2% |
| Nov-18 | | 65.2% |
| Dec-18 | | 62.0% |
| Jan-19 | | 57.8% |
| Feb-19 | | 56.9% |
| Mar-19 | | 63.5% |
| Apr-19 | | 66.0% |

## Sepsis 30 Day Readmission Rates
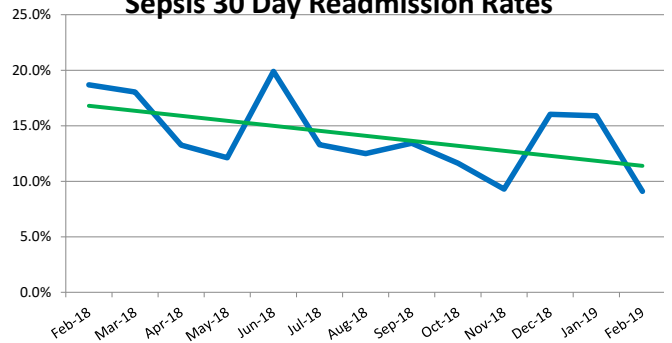
## Sepsis DRG 871 ALOS
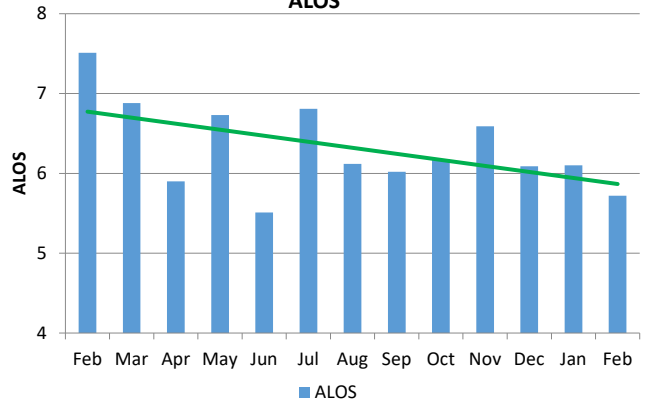
Average length of stay (ALOS) decreased by 0.99 days (comparing FY18 = 6.71 to February 2019 = 5.72)

## Total Direct Cost per Case
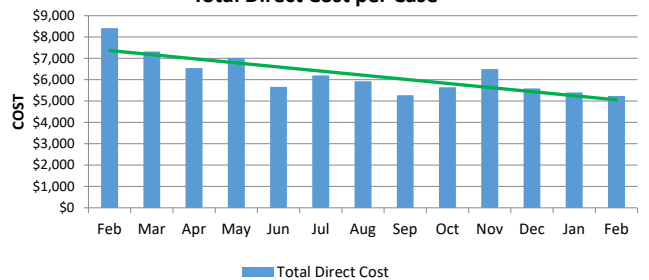
Total direct cost per case decreased by $1,511 (comparing FY18 = $6,744 to February 2019 = $5,233)

CONTACT:

Tamara Strand
Director,
Clinical Performance
Improvement

*tami.strand@stlukes-stl.com*

ST. LUKE'S HOSPITAL — CHESTERFIELD

## PROJECT DESCRIPTION

This project involved designing a more patient-centric, coordinated approach to post-discharge care for patients undergoing a total joint replacement procedure. The objective was to ensure that patients were involved in the discharge planning process prior to their hospital admission, that the discharge setting was determined based on the needs of each individual patient and that, if applicable, transitions to the next level of care took place in a timely, yet safe, manner.

## PROJECT GOAL

- work with the patients to set their post-discharge expectations
- achieve discharge disposition patterns representative of national and regional benchmarks
- optimize the length of stay for those patients discharged to a skilled nursing facility
- maintain, if not improve, high quality clinical outcomes and patient satisfaction

### Discharge Disposition Trends
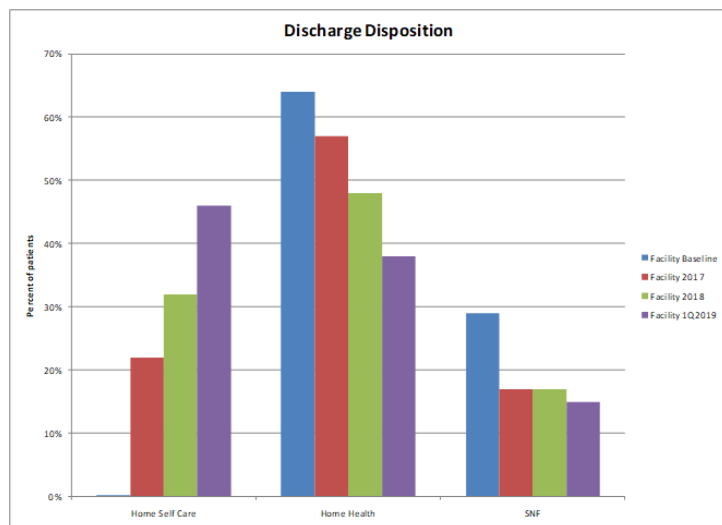


## IMPROVEMENT STRATEGY

Our overarching strategy was to include the patient and all personnel who interact with the patient pre-surgery, during the hospital stay and after discharge, in designing a more coordinated discharge plan and recovery process. Using evidence-based resources, we developed criteria for use in determining the most appropriate discharge setting for each patient and criteria to indicate they were ready to move on to the next level of care. We developed educational tools and checklists that were provided to the patients by the physician's office so the patient would know what to expect, and could plan and prepare for their surgery and recovery. Working with regional skilled nursing facilities, home health agencies and outpatient therapy providers, we set expectations and criteria-based processes for their use in caring for our total joint replacement patients. We met with each orthopedic surgeon and their office staff, as well as our pre-anesthesia clinic, to ensure they all were on board with our new discharge planning process, and asked them to help reinforce the initiative's objectives and educational messages when communicating with patients contemplating a total joint replacement procedure.
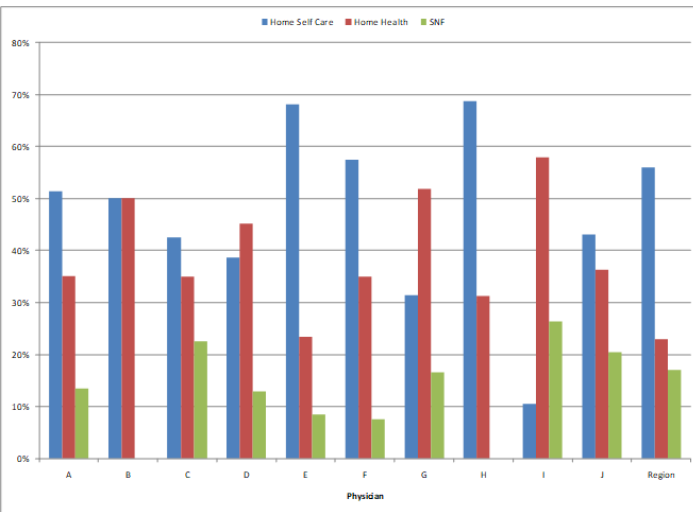
## RESULTS

- increased the percent of patients discharged directly to outpatient therapy from <1% to 46%
- decreased the percent of patients discharged to a skilled nursing facility from 29% to 15%
- decreased the length of stay for patients discharged to a skilled nursing facility from 17 to 11 days
- readmission rates remained below the national average of 4% and below our goal of 3%
- functional outcome scores (HOOS/KOOS Jr.) improved by 10 to 12 points
- overall and transitions of care patient satisfaction results remained above the Press Ganey 80th percentile

## LESSONS LEARNED

The most important lesson we learned is that you need to engage ALL stakeholders in a process, not just those closest to the process, and you need to engage them continuously and provide feedback on the project results in order to achieve and sustain the project goals. We also learned that there is no substitute for face-to-face communication when trying to engage stakeholders in a process improvement initiative. Taking the time to sit down and discuss the initiative not only allows stakeholders to identify potential barriers, but also demonstrates the importance and the organization's commitment to the initiative.
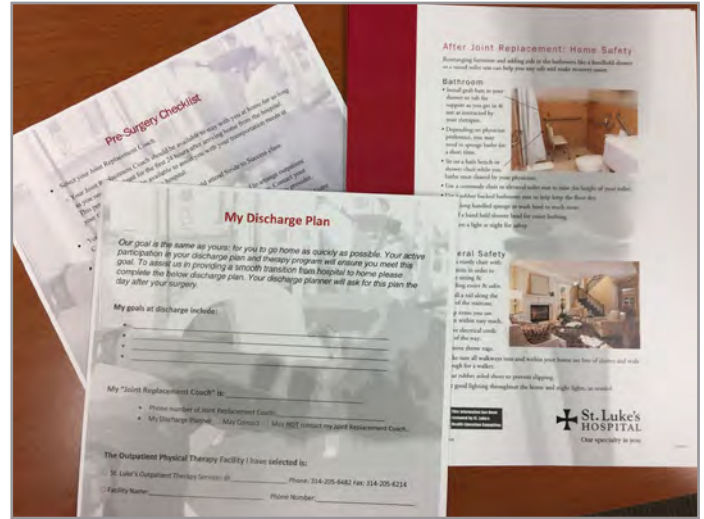


### Discharge Disposition Results by Physician for 1Q2019



### National and Regional Discharge Disposition Trends

| Discharge Disposition | National Baseline | National 2017 | National 2018 |
|---|---|---|---|
| Home Self Care | 28% | 37% | 39% |
| Home Health | 36% | 39% | 38% |
| SNF | 30% | 19% | 18% |

| Discharge Disposition | Regional Baseline | Regional 2017 | Regional 2018 |
|---|---|---|---|
| Home Self Care | 37% | 52% | 56% |
| Home Health | 27% | 27% | 23% |
| SNF | 30% | 18% | 17% |

### Skilled Nursing Facility Length-of-Stay Trends

| SNF LOS | Baseline 2012-2014 | CJR 3Q16 - 4Q18 |
|---|---|---|
| Facility | 17 days | 11 days |
| CJR Peer | 17 days | 13 days |

### 30-Day Readmission Rates

| 30-day Readmission Rates | 1Q2016 | 2017 | 2018 |
|---|---|---|---|
| Facility | 1.3% | 2.2% | 1.8% |

### Functional Outcomes (HOOS/KOOS Jr.) Scores

| Functional Outcomes Improvement | 1Q16 | 2017 | 2018 |
|---|---|---|---|
| Pre-surgical average score | NA | 13 | 14 |
| 9 month post-surgery average score | NA | 3 | 2 |
| Score improvement (decrease in score) | NA | 10 | 12 |

Note: Lower score indicates higher/better functioning

### HCAHPS Patient Experience Top Box Scores

| Question | Top Box Answers | 2016 | 2017 | 2018 | 2018 percentile* |
|---|---|---|---|---|---|
| Overall Rating | 9 or 10 | 87% | 88% | 86% | 83 |
| Would Recommend | Definitely Yes | 89% | 91% | 88% | 84 |
| Care Transitions | Always | 64% | 70% | 67% | 81 |

# *Clinical Excellence*
## CRITICAL ACCESS AND RURAL HOSPITALS

**Aim** *for* **EXCELLENCE**

**WINNER**

# MOSAIC™
## LIFE·CARE

**MOSAIC MEDICAL CENTER — ALBANY**

CONTACT:

Lori Bishop
Director of Nursing,
Quality and Clinical
Services

*lori.bishop@mymlc.com*

## PROJECT DESCRIPTION

Our organization recognized total harm reduction as a pertinent and pivotal safety issue for the patients we served, in 2017. In preceding years, we had focused on specific individual measures which contributed to the reduction goal. Movement was noted in each individual area we focused on, but other areas would "drift" or not move without direct focus. It became apparent that we needed to focus on changing the culture and the mindset of our teams. It was apparent that to be a highly reliable safety organization with hardwired practices, we needed to emphasize the importance of harm prevention overall and the trust we could build with patients and families through the realization of this goal. The overall aim of the organization became a meaningful change in practice that would translate to our patients and their families. Encouraging our staff to own the processes and the environment, as well as our reputation for safety became the goal.

## PROJECT GOAL

Reduce total patient harms by 50% from a baseline of 10 patient harms or 14.45 harms per 1,000 patient discharges and sustain a decrease over time, with an initial goal of twelve months. Focus on becoming a highly reliable safety organization with a hardwired safety culture using evidence-based practices and socio-adaptive techniques to improve outcomes while, reducing and preventing unnecessary patient suffering.

## IMPROVEMENT STRATEGY

The safety committee and its multidisciplinary team with representation from environmental services, outpatient, clinics, lab, radiology, dietary, surgery, nursing, infection prevention, maintenance, pharmacy, administration and disaster prep were tasked with the oversight. The team developed an action plan, overseeing implementation of the plan and hardwiring the interventions, ideas and assessments as common practice in the organization. Consistent communication of results, assessment of data, intervention implementations, feedback loops, innovative teaching and rapid PDSA cycles were a priority for the team.

Strategies included:
- participation in the HIIN program through MHA to access proven strategies, tools, mentorships and idea sharing among peers
- utilization of proven reduction toolkits with effective hardwiring in the EHR
- communication of current results to employees on a routine basis with consistency of definitions
- education of providers, staff and community partners on reduction strategies and population-specific management goals in innovative and meaningful ways
- continuous review of processes and data, including root cause analysis, employing rapid PDSA cycles
- feedback on all harms through pertinent committees and medical directors

## RESULTS

With the employment of the strategies mentioned and commitment from administration through the front-line staff and service areas, we have been able to decrease to 2 total patient harms for the past 12 months or 3.51 harms per 1,000 patient discharges. This translates to a 75% reduction in harm and suffering for our patients and the families who support them.
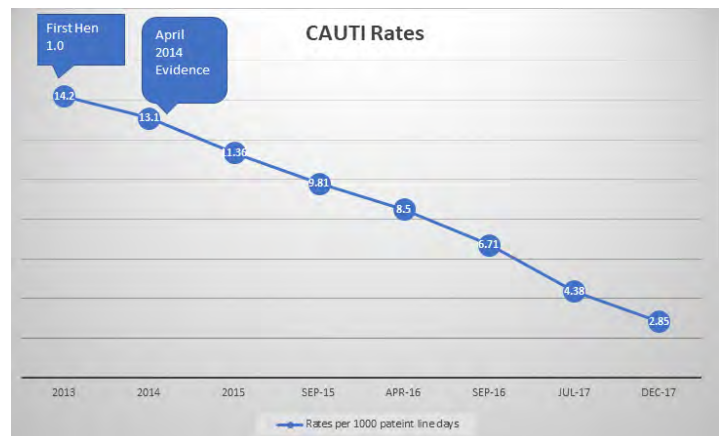
# Harm Reduction Trending
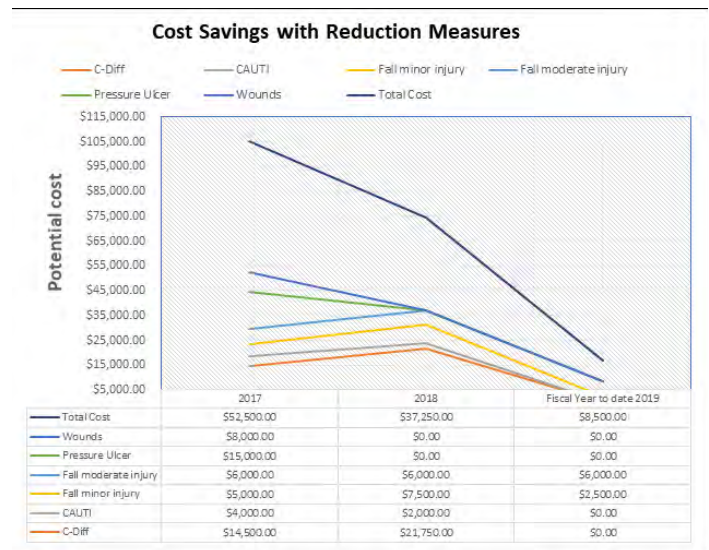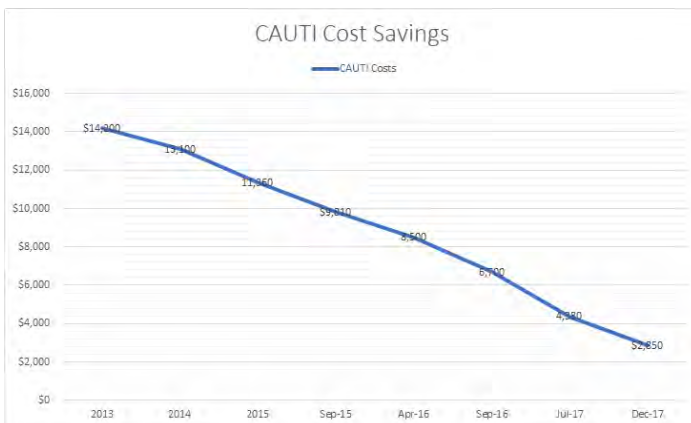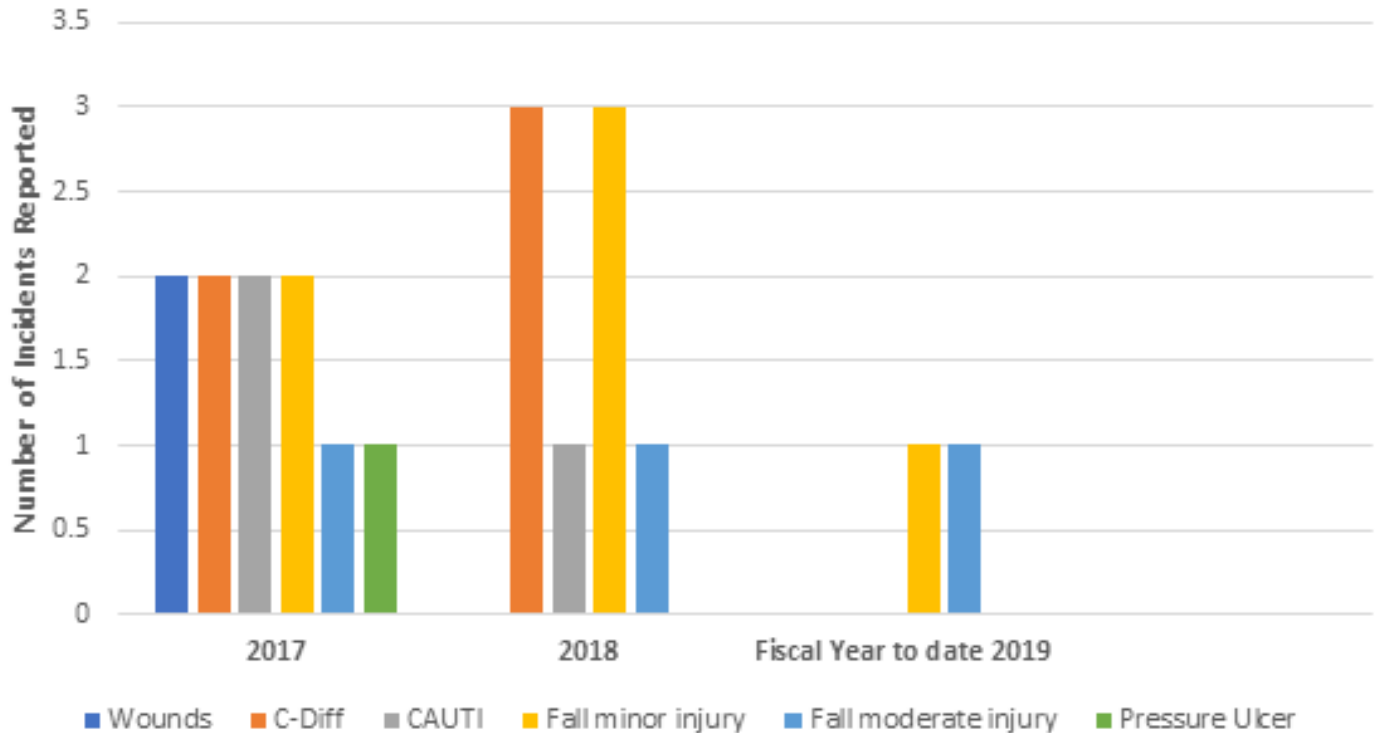


## LESSONS LEARNED

Many lessons were identified with the following identified as the priority learnings:

- Education is not "one size fits all," everyone learns differently and must be met where they are, if you hope to engage everyone across the organization and care teams and get dedicated "buy-in."

- Data sharing should be concise and consistent in its definition. Limit elements to the most important and focus on the overarching goal. Sharing too much information becomes overwhelming and staff will lose interest.

- If you wish to attain and maintain a culture of safety and high reliability, continued education, reinforcement of the priority and modeled behavior must be part of everyday operations and interactions.





| | 2017 | 2018 | Fiscal Year to date 2019 |
|---|---|---|---|
| Total Cost | $52,500.00 | $37,250.00 | $8,500.00 |
| Wounds | $8,000.00 | $0.00 | $0.00 |
| Pressure Ulcer | $15,000.00 | $0.00 | $0.00 |
| Fall moderate injury | $6,000.00 | $6,000.00 | $6,000.00 |
| Fall minor injury | $5,000.00 | $7,500.00 | $2,500.00 |
| CAUTI | $4,000.00 | $2,000.00 | $0.00 |
| C-Diff | $14,500.00 | $21,750.00 | $0.00 |

# ABBREVIATIONS LEGEND

**ACA** — Apparent Causes Analysis — A straightforward analytical approach used to identify obvious causes based on the facts pertaining to the incident.

**ACH** — Acute Care Hospital

**AHRQ** — Agency for Healthcare Research and Quality — One of 12 agencies within the United States Department of Health and Human Services. AHRQ is the lead Federal agency charged with improving the safety and quality of America's health care system. AHRQ develops the knowledge, tools and data needed to help Americans, health care professionals, and policymakers make informed health decisions. AHRQ works with HHS and other partners to make sure that the evidence is understood and used in an effort to achieve the goals of better care, smarter spending and healthier people.

**APIC** — Association for Professionals in Infection Control and Epidemiology

**APRN** — Advanced Practice Registered Nurse

**CAUTI** — Catheter-Associated Urinary Tract Infection

**CC** — Care Coordinator

**CCM** — Chronic Care Management

**CDC** — Centers for Disease Control and Prevention

**CHF** — Congestive Heart Failure

**CJR** — Medicare's Comprehensive Joint Replacement Bundled Payment Program. This program bundles payment and encourages coordination of care for total joint replacement patients from hospital admission through 90-days post-hospital discharge.

**CLABSI** — Central Line-Associated Bloodstream Infection

**CMS** — Centers for Medicare & Medicaid Services

**COWS** — Computer on Wheels

**DC** — Discharge

**DC'd** — Discharged

**DCs** — Discharges

**DMAIC** — Define, Measure, Analyze, Improve and Control — data-driven improvement cycle used for improving, optimizing and stabilizing business processes and designs, and a core tool used to drive Six Sigma projects.

**EHR** — Electronic Health Record

**EMR** — Electronic Medical Record

**EMS** — Emergency Medical System

**F/U** — Follow-Up

**FMEA** — Failure Modes Effects Analysis

**FTE** — Full-Time Employee

**HAI** — Healthcare-Associated Infection — An infection which results from medical care.

**HCAHPS** — Hospital Consumer Assessment of Healthcare Providers and Systems — Patient experience survey where results often are presented in terms of the "top box" score. (The top box score is the percent of patients answering the most favorable response option or who answered a 9 or 10 on an answer scale of 1-10.)

**HH** — Home Health

**HIIN** — Hospital Improvement Innovation Network

**HRET** — Health Research and Educational Trust

**IHI** — Institute for Healthcare Improvement

**LPN** — Licensed Practical Nurse

**MDM** — Medical Decision-Making

**MHA** — Missouri Hospital Association

**NAHQ** — National Association for Healthcare Quality

**NHSN** — National Healthcare Safety Network — Secure, Internet-based surveillance system that expands and integrates patient and health care personnel safety surveillance systems managed by the Division of Healthcare Quality Promotion at the COC.

**PATOS** — Present at the Time of Surgery — A modifier to identify patients who enter the operating room with evidence or suspicion of an existing infection at the surgical site.

**PCP** — Primary Care Provider

**PDCA** — Plan-Do-Check-Adjust

**PDSA** — Plan-Do-Study-Act — A reiterative approach to process improvement.

**PEC** — Physician's Excellence Committee — A select group of physicians who review cases presented regarding quality issues in patient care, case by case.

**RN** — Registered Nurse

**SBAR** — Situation, Background, Assessment, Recommendation — Provides a framework for communication between health care team members.

**SIR** — Standardized Infection Ratio — A summary measure used to track healthcare-associated infections at a national, state or local level over time.

**SNF** — Skilled Nursing Facility

**SO** — Strategic Objective

**SSI** — Surgical Site Infection — A surgical site infection is an infection that occurs after surgery in the part of the body where the surgery took place. Surgical site infections can sometimes be superficial infections involving the skin only. Other surgical site infections are more serious and can involve tissues under the skin, organs or implanted material.

**TCM** — Transitional Care Management

**TST** — Targeted Solution Tool

# DEFINITIONS LEGEND

**Avera** — eICU company utilized for care and quality reports

**Badge Buddies** — reference card that attaches to ID badge holder

**Baseline Time Period** — baseline (or pre-project) data was January – March 2016 unless otherwise indicated

**Bottleneck** — work stage that gets more work requests than it can process at its maximum throughput capacity, causing an interruption to the flow of work and delays across the production process

**Care Discovery Quality Measures** — web-based data abstraction tool used for quality reports of sepsis measures

**CMS Core Measure SEP-1** — sepsis core measure involving minimum sets of actions required by 3-hour and 6-hour time points after a patient reaches severe sepsis or septic shock

**Criteria A** — suspected source of infection

**Criteria B** — SIR criteria

**Criteria C** — organ dysfunction

**Deep Surgical Site Infection** — infection that occurs after surgery in the part of the body where the surgery took place beneath the incision area in muscle and the tissues surrounding the muscles

**Discharge Disposition** — setting to which a patient is sent at the time of discharge from the hospital (examples include: home/self care, home with home health services or a skilled nursing facility — total joint replacement patients discharged to home/self care would be followed by outpatient physical therapy.

**eICU** — remote physician with camera access to patient who can access and document in the electronic medical record (orders and progress notes)

**Fall Risk Assessment Tool** — tool used by health care facilities to assess a patient's level of probability to fall (usually embedded in the EHR) and then employee-specific interventions based on the level of probability to prevent all falls

**HOOS/KOOS Jr. Functional Status Survey** — an abbreviated version of the hip dysfunction (or knee injury) osteoarthritis outcome survey (higher scores indicate lower function and are taken by patients immediately prior to surgery and again nine months post-surgery — a decrease in the score between the pre- and post-surgery survey indicates an improvement in the patient's functional status)

**HRET HIIN (Health Research and Educational Trust Hospital Improvement Innovation Network)** — CMS-sponsored efforts to reduce by 20%, all-cause harm to patients in the hospital

**Ishikawa Diagrams** — referred to as a fishbone diagram — shows the causes of a specific event

**Kaizen Event** — short duration improvement event that gathers stakeholders into one place, maps existing processes, improves on the existing processes, and solicits buy-in from all parties related to the process

**Lean Six Sigma** — method that relies on a collaborative team effort to improve performance by systematically removing waste and reducing variation (combines lean manufacturing and Six Sigma to eliminate the eight kinds of waste: defects, over-production, waiting, non-utilized talent, transportation, inventory, motion and extra processing, and also provides a framework for overall organizational culture change)

**Lean Six Sigma Green Belt** — certified professional who is well-versed in the core to advanced elements of Lean Six Sigma methodology, and leads improvement projects and/or serves as a team member of improvement projects

**Nutritional Optimization** — enhancing the nutritional and metabolic status of patients pre- and post-operatively

**PCR (Polymerase Chain Reaction) Screening** — test used to detect and identify pathogenic organisms such as MRSA and Staphylococcus aureus in patients undergoing surgery

**Press Ganey** — a national vendor that administers the HCAHPS patient experience survey and reports results in order to improve clinical and business outcomes

**Qualaris** — web-based data collection tool

**Queue** — technology used in the outpatient clinic that tracks the arrival of patients once checked in, and alarms patient when registration is ready

**Sepsis** — a potentially life-threatening condition caused by the body's response to an infection that can damage multiple organ systems

**Sepsis Pathway** — evidence-based guideline for coworkers to use in the medical health record

**Terminal Cleaning** — method used in health care environments to control the spread of infections by removing all detachable objects in the room, cleaning lighting and air duct surfaces, and cleaning everything downward from ceiling to the floor

**Time Zero** — Criteria A + Criteria B + Criteria C or documentation of severe sepsis or septic shock

**Total Joint Replacement Surgery** — a total hip or total knee replacement procedure (does not include partial hip replacement procedures or hip revision or knee revision procedures)

**Urinalysis** — test of urine and used to detect and manage a wide range of disorders

**Urine Toxicity Screens** — test that determines the approximate amount and type of legal or illegal drugs taken

# SOURCE CITATION

## Mercy

1. Centers for Disease Control and Prevention (2016, August 23). Sepsis Data & Reports, Retrieved May 3, 2019, from https://www.cdc.gov/sepsis/datareports/index.html.

2. Kim R, Ng A, Persaud A, Furmanek S, Kothari Y, Price J, Wiemken T, Saad M, Guardiola J, & Cavallazzi R. Antibiotic Timing and Outcomes in Sepsis. American Journal of Medicine. 2018; 355(6):524-529. doi: 10.1016/j.amjms.2018.02.007. Epub 2018 FEB 21.

3. Medicare.gov. Hospital Compare. Measurement period: (Data Period: Q3 (2017)-Q2 (2018)). https://www.medicare.gov/hospitalcompare/profile.html#profTab=2&ID=260020&Distn=9.0&dist=25&loc=63017&lat=38.6633659&lng=-90.5771493.

4. QualityNet. Benchmarks of Care Second Quarter 2017-Second Quarter 2018. Retrieved May 1, 2019 from https://www.qualitynet.org/dcs/ContentServer?c=Page&pagename=QnetPublic%2FPage%2FQnetTier2&cid=1228768205297.

5. Rivers, E, Nguyen, B, Havstad, S, et al. Early Goal-Directed Therapy in the Treatment of Severe Sepsis and Septic Shock. The New England Journal of Medicine. 2001;345 (9): 1368-1377.

6. Sherwin R, Winters M, Vilke G, & Wardi G. Does Early and Appropriate Antibiotic Administration Improve Mortality in Emergency Department patients with Severe Sepsis or Septic Shock? Journal of Emergency Medicine. 2017; 53(4):588-595. doi: 10.1016/j.jemermed.2016.12.009. Epub 2017 Sep 2.

## Mosaic Medical Center - Albany

Ganz DA, et al: Preventing falls in hospitals: A toolkit for improving quality of care. Prepared by RAND Corporation, Boston University School of Public Health, and ECRI Institute under Contract No. HHSA290201000017I TO #1. AHRQ Publication No. 13-0015-EF. 2013. Rockville, Maryland: Agency for Healthcare Research and Quality (accessed July 22, 2015).

Health Research & Educational Trust. (2016, October). Preventing patient falls: A systematic approach from the Joint Commission Center for Transforming Healthcare project. Chicago, IL: Health Research & Educational Trust.

LeDell K, Muto CA, Jarvis WR, Farr BM. SHEA guideline for preventing nosocomial transmission of multidrug-resistant strains of Staphylococcus aureus and Enterococcus. Infect. Control Hosp. Epidemiol. 2003;24(9):639–641.

## Saint Francis Medical Center

Anderson, D. J., Podgorny, K., Berrios-Torres, S.; Bratzler, D., Dellinger, E., Greene, L., Nyquist, A., Saiman, L., Yokoe, D., Maragakis, L., Kaye, K. (June 2014). Strategies to Prevent Surgical Site Infections in Acute Care Hospitals: 2014 Update. Infect Control Hospl Epidemiol.2014:35(6):605-627

Beshaw, M., Keister, K. (January 2019). Perioperative Strategies for Surgical Site Infection Prevention. Association of PeriOperative Nurses (AORN). 109(1). Doi.org/10.1002/aorn.12451, Retrieved from https://aornjournal.onlinelibrary.wiley.com/doi/epdf/10.1002/aorn.12451

Bodenheimer, T., Sinsky, C., (2014). From Triple Aim to Quadruple Aim: Care of the Patient Requires Care of the Provider. Annals of Family Medicine. 12(6): 573-576. Doi: 10.1370/afm.1713, Retrieved from http://www.annfammed.org/content/12/6/573.full

Bratzler DW, Dellinger EP, Olsen KM, et al. clinical practice guidelines for antimicrobial prophylaxis in surgery. Am J Health-System Pharm. 2013; 70(3): 195-283.

Guidelines for environmental cleaning. In: Guidelines for Perioperative Practice. Denver, CO: AORN; 2017:7-28.

Guidelines for surgical attire. In: Guidelines for Perioperative Practice. Denver, CO: AORN; 2017:105-127.

Fairfield KM, Askari R., Overview of perioperative nutritional support. http://www.uptodate.com/contents/overview-of-perioperative-nutrtional-support Accessed May 2018.

Health Research & Educational Trust (August 2018). Surgical Site Infections Change Package: 2018 Update. Chicago, IL: Health Research & Educational Trust. Retrieved from http://www.hret-hiin.org/.

The Joint Commission Center for Transforming Healthcare. Targeted Solution Tool for Hand Hygiene. http://www.centerfortransforminghealthcare.org/sshh.aspx. Accessed May 2018.

## Saint Luke's Health System

McDonald., L. C., et al., (2018). Clinical practice guidelines for Clostridium difficile infection in adults and children: 2017 update by the Infectious Disease Society of America (IDSA) and Society for Healthcare Epidemiology of America (SHEA). Clinical Infectious Diseases, 66(7), e1-e48.

Truong, C.Y., et al., (2017). Real-time electronic tracking of diarrheal episodes and laxative therapy enables verification of Clostridium difficile testing criteria and reduction of Clostridium difficile infection rates. Journal of Clinical Microbiology, 55(5) 1276-1284.

Zimlichman, E., Henderson, D., Tamir, O., Franz, C., Song, P., Yamin, CK., Keohane, C., Denham, C.R., & Bates, DW. (2013). Health care-associated infections a meta-analysis of costs and financial impact on the US health care system. JAMA Intern Med., 173(22) 2039-2046.