## TABLE OF CONTENTS

1. **THE WILLIAM W. BACKUS HOSPITAL**
   - New Model of Care for High Risk Patients
   - Page 5

2. **DAY KIMBALL HEALTHCARE**
   - Improving C. diff SIR Rates
   - Page 11

3. **DAY KIMBALL HEALTHCARE**
   - Improving SSI Rates
   - Page 15

4. **DAY KIMBALL HEALTHCARE**
   - Restructuring the Patient Access Model
   - Page 19

5. **THE CHARLOTTE HUNGERFORD HOSPITAL**
   - Reducing Hospital-Acquired Pressure Injuries
   - Page 26

6. **MIDDLESEX HEALTH**
   - Reducing Colon Surgery Infection Rates
   - Page 29

7. **MIDSTATE MEDICAL CENTER**
   - Reducing HAI Pneumonia Rates
   - Page 36

8. **NUVANCE HEALTH DANBURY HOSPITAL**
   - Primary Stroke Center accredited by The Joint Commission
   - Page 40

9. **NUVANCE HEALTH NORWALK HOSPITAL**
   - Comprehensive Center for Total Joint Replacement
   - Page 44

10. **NUVANCE HEALTH DANBURY HOSPITAL/NORWALK HOSPITAL**
    - Reducing SSIs in Gynecologic Oncology
    - Page 49

11. **SAINT FRANCIS HOSPITAL AND MEDICAL CENTER**
    - Sternal Wound Infection Project
    - Page 53

12. **HOSPITAL FOR SPECIAL CARE**
    - Preventing Patient Harm
    - Page 59

13. **HOSPITAL FOR SPECIAL CARE**
    - Reducing C. diff Using Data and Teamwork
    - Page 62

14. **HOSPITAL FOR SPECIAL CARE**
    - UTI Reduction
    - Page 65

15. **ST. VINCENT’S MEDICAL CENTER**
    - C. diff Infection Rate Reduction
    - Page 68

16. **YALE NEW HAVEN HOSPITAL HEART AND VASCULAR CENTER**
    - Reducing Deep Sternal Wound Infections
    - Page 70
CONNECTICUT HOSPITAL ASSOCIATION   ||           ||   QUALITY EXCELLENCE

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Connecticut hospitals and health systems are working across the continuum of patient care to improve quality. They are committed to making sure patients experience compassionate, empathetic, and coordinated care – every visit. Doctors and nurses are partnering with patients and their families, building relationships that put the patient first, and working to ensure patients are satisfied and engaged in their healthcare.

The results speak for themselves. Quality Excellence is a compilation of just some of the exceptional quality projects under way in Connecticut hospitals and health systems.

PREVENTIVE MEDICINE TEAM: CREATING A PATIENT-CENTERED, DATA-DRIVEN PROGRAM THAT IMPROVES THE QUALITY OF LIFE AND REDUCES HOSPITAL UTILIZATION FOR FREQUENTLY ADMITTED PATIENTS

The William W. Backus Hospital, a part of Hartford HealthCare (HHC), is a 213 bed community hospital in eastern Connecticut. Backus is committed to healthcare’s triple aim of improved quality, lower cost, and healthier populations, which lies at the heart of HHC’s mission “to improve the health and healing of the communities we serve.” Based on internal and national data, we chose to embrace this mission with our sickest patients who are complex and frequently admitted to the hospital. To improve the health outcomes of this population, Backus developed specific quality and utilization metrics. Through a performance improvement process, we used this data to develop and evaluate a new model of care for our highest risk patients.

The creation of the Preventive Medicine Team (PMT) was the foundation for our new model. Comprising an advanced practice nurse and a licensed social worker, the team partners with hospitalists to employ complex care management strategies that aim to drive quality while optimizing resource utilization. By identifying social determinants of health and improving self-management of chronic disease, the team members define a holistic approach that improves continuity of care through transitions and improves patient reported quality of life. These improvements then can generate appropriate utilization of the ED, the hospital, and outpatient care.

Objectives of the PMT

- Identify and develop a registry of at-risk patients
- Understand the medical and social needs of these patients
- Initiate interventions that continue after discharge
- Create individualized transitional care guides that document these interventions and follow the patient through the healthcare system
- Establish a data registry and analysis that supports the direct care of individual patients and can track the team’s impact on quality and utilization

The results speak for themselves. Quality Excellence is a compilation of just some of the exceptional quality projects under way in Connecticut hospitals and health systems.
During the “Study” phase, the team tracked readmissions, length of stay, and ED visits. As a countermeasure, patient health-related quality of life (HRQOL) was regularly monitored. During the “Adjust” phase, the PMT met weekly with the support team to discuss progress and modify as needed. The “Share” phase is an ongoing process as plans are made to implement this program at other hospitals in our system. In addition, the team has regularly updated our community partners including two Federally Qualified Health Centers about their work.

The PMT tracks metrics for patients on the registry using demographics, risks, diagnoses, psychosocial determinants of health, HRQOL responses, interventions, and outcomes to help us understand barriers to the patient’s health that may lead to frequent ED visits and hospitalizations. A single HRQOL question has been shown to be a meaningful way to determine the impact of healthcare. It acted as a balancing measure against a focus on utilization. Outcome measures and results include:

**Hospital Encounters 6 Months Pre PMT and 6 Months Post PMT (Figures 1-5)**

- Total encounters, inpatient and observation - 65% decrease
- Total ED visits - 38% decrease
- Average length of stay - unchanged
- Total inpatient/observation days - 66% decrease
- Health Related Quality of Life - 68% improvement

Our outcomes demonstrate a significant reduction in total hospital encounters, ED utilization, and hospital days, while patients reported that quality of life improved. This all occurred without a change in length of stay.

In the past, these high-risk patients at Backus were cared for episodically. They were treated for an acute or chronic condition in the ED or as an inpatient and were discharged with little or no plan to address the root cause of their health issues. This frequently resulted in utilization of high-intensity healthcare such as ED visits or hospitalizations.

The PMT has developed standard work to identify patients that meet inclusion criteria (3+ admissions/6 months or hospitalist referral), risk-stratify these patients, and develop and implement interventions aimed at improving the continuity of care by actively participating in their patient’s care during and after hospitalization. This includes:

- Personal interview and in-depth clinical and psychosocial assessment
- Intensive medical reconciliation at admission and discharge by PMT APRN
- Identification of social determinants of health
- Depression screening (PHQ-2/PHQ-9 if indicated)
- Health-related quality of life assessment (HRQOL)
- Personalized Transitional Care Guide
- Education on chronic disease states (COPD, DM, CHF)
- Patient follow-up after discharge; home visits as needed
- Discharge coordination with community medical providers and partners
- Continued supportive relationship with patient/families after discharge

**Strategies Utilized**

- Enhance transitions of care through the healthcare continuum with a detailed inpatient/outpatient plan of care
- Motivate patients to better manage chronic disease
- Educate patients about the social and behavioral factors that challenge their health management
- Continue a relationship with the patient post-discharge including home visits when appropriate
- Assist clinical staff and social services with management of the patient

First and foremost, the impetus of the program was to do what is best for our patients by creating a patient-centered model of care to improve overall health and prevent unnecessary hospitalization. The PMT was created as part of an overarching Preventive Medicine Initiative, which was born out of a 2014 Strategic Plan for the hospital. The plan identified the need to develop competencies around preventive medicine. This need was supported by data that showed our region consistently ranked among the bottom in the state’s health rankings for health behaviors and outcomes (Robert Wood Johnson County Health Rankings). The Strategic Plan laid out primary (healthy), secondary (chronically ill), and tertiary (complex) prevention models. Primary and secondary prevention models were to focus on core competencies in population health management. The PMT was developed to address tertiary prevention for a complex population.

Between August 2016 and July 2017, 100 patients admitted to Backus were identified as having a total of 695 inpatient and observation encounters, accounting for $17.3 million in charges. Review of these patients revealed a vulnerable population that often experienced fragmented care that led to poor health outcomes. As part of the Strategic Plan and in response to these data, we developed the Preventive Medicine Team, in part based on programs developed at Wisconsin-based Gundersen Health and Duke University Medical Center.

The PMT is aligned with Backus’ 2019 Quality and Safety Plan for performance improvement focusing on the hospital’s overall mission and strategic initiatives. The objectives of the Quality and Safety Plan are to improve the quality of patient care, enhance appropriate utilization of resources, both efficiently and effectively, and to reduce or eliminate unnecessary risks and hazards within the hospital. With its basis in quality and utilization, the PMT aligns with these objectives.

The Plan-Do-Study-Adjust-Share (PDSA-S) model, outlined in our Quality and Safety Plan, is used to test and implement change in a real work setting. The team was able to utilize this methodology and develop a program that has the capability to be replicated in other institutions in the HHCS system. The “Plan” phase involved review of best practice and understanding historical clinical and utilization data. Measures were established, including criteria for inclusion (three admissions in six months) and follow-up data such as readmissions and length of stay. At the same time, countermeasures were established that included the patient’s own self-reported quality of life. The team also created a project charter, and identified an executive sponsor, project lead, and support team.

The “Do” phase of the cycle started with the development of a team including an Advanced Practice Registered Nurse (APRN) and Licensed Masters Social Worker (LMSW) whose goal was to follow these patients closely and understand the medical needs and social determinants of health that drove their frequent admissions. The program was designed to care for the patient in the hospital and after their transition including the possibility of a house call.
Although there is no national standard data set on complex patients, our reduction in hospital utilization and ED visits was comparable to the published studies from Gundersen Health and Duke Medical Center. In addition, there is extensive data to demonstrate the impact of complex patients on resource consumption. According to the Agency for Healthcare Research and Quality (AHRQ) in 2014, the top 1% of persons ranked by their healthcare expenditures accounted for 23% of total expenditures and the top 5% of the population accounted for 50% of total expenditures. On a local level the 2016 Robert Wood Johnson Foundation’s County Health Rankings for New London County’s preventable admission rate of 51 (number of hospital stays for ambulatory-care sensitive conditions per 1,000 Medicare enrollees) is above the state average of 46 and significantly above the top performers rate of 36.

References

Figure 1. Demonstrates a 65% reduction in mean hospital encounters for the 6 months post compared to the 6 months pre PMT enrollment for 137 patients. * Wilcoxon signed-rank testing

Figure 2. Demonstrates a 38% reduction in mean Emergency Department visits for the 6 months post compared to the 6 months pre PMT enrollment for 137 patients. * Wilcoxon signed-rank testing

Figure 3. Demonstrates a 66% reduction in mean hospital days for the 6 months post compared to the 6 months pre PMT enrollment for 137 patients. * Wilcoxon signed-rank testing

Figure 4. Demonstrates no significant increase in length of stay associated with the reduction in hospital encounters for the 6 months post compared to the 6 months pre PMT enrollment for 137 patients. **Paired t-test

Figure 5. Of 113 patients who completed HRQOL more than 30 days after discharge 68% reported an improvement, 9% reported no change and 2% reported a decrease. It is of note that 18% died, highlighting the severity of illness of this patient population. When the deceased subset is removed from the analysis the improved group increases to 83%.

Top Primary Admitting ICD-10 Codes/Diagnoses

- **J** Codes — Respiratory (COPD/Pneumonia)
- **R** Codes — Symptoms/abnormal lab findings (Sepsis, Syncope, Ambulatory Dysfunction)
- **N** Codes — Genitourinary System (UTI, Acute Kidney Injury, Renal Colic)
- **I** Codes — Circulatory Diseases (CHF Hypertensive Emergency, AFib Hypotension)
- **K** Codes — Digestive System (Gastroenteritis, Alcoholic gastritis, Pancreatitis, GI Bleed, Crohn’s)
- Other Codes

<table>
<thead>
<tr>
<th>ICD-10 Code</th>
<th>% of Patients</th>
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<tbody>
<tr>
<td>J Codes</td>
<td>27%</td>
</tr>
<tr>
<td>R Codes</td>
<td>13%</td>
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<tr>
<td>N Codes</td>
<td>13%</td>
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<td>I Codes</td>
<td>13%</td>
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<tr>
<td>K Codes</td>
<td>10%</td>
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<tr>
<td>Other Codes</td>
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In 2015, we recognized an increase in our numbers of hospital onset C. diff infections. A Leadership Committee was formed to address the increase, and numerous changes were put in place throughout the facility. Many of these changes were part of a C. diff Quality Initiative as well as updating policies, procedures, and processes to current guidelines and recommendations. Through a facility-wide effort, our hospital saw a significant decrease in hospital onset C. diff infections and we are extremely proud to say our last infection was in December of 2017.

Impetus for the Project
The impetus for the initiation of decreasing our hospital onset C. diff infection rate was that we saw a significant increase in C. diff, and recognized that current practices were insufficient to prevent these infections. The C. diff Leadership Committee was created to review current processes and practices and to improve our patient safety by decreasing our infection rates through adoption of more current guidelines and recommendations.

Organizational Goals for Quality
Decreasing hospital onset C. diff infections became an annual goal for the Infection Prevention Committee beginning in fiscal year 2015 and it continues to be monitored very closely by the Committee. In fiscal year 2018, the organization as a whole adopted high reliability principles, which included patient safety as a priority, and the reduction and/or prevention of C. diff continues to be a focus organization-wide.

Measure of Patient Care and Operations/Procedures
The measures of patient care and operations/procedures are reviewed on a daily basis. In keeping with high reliability practices, we use a “days since” model to report hospital onset C. diff infections at our morning safety huddle. “Days since” are also reported weekly to all clinical staff so they are kept updated on their progress. All levels of the organization, up to and including the Board of Directors, receive monthly status reports on current hospital onset C. diff infections. As required, all hospital onset C. diff infections are reported to National Safety Healthcare Network (NHSN) to be made publicly available.

For more information, contact: Lisa Hageman, RN, MSN, Manager, Preventive Medicine, The William W. Backus Hospital, at (860) 425-8739.
Other procedures and operations that are monitored and reported regularly include Adenosine triphosphate (ATP) testing of patient rooms randomly at discharge as well as reviewing current and retrospective antimicrobial use. ATP testing results are shared within the environmental services department regularly as well as with the Infection Prevention Committee monthly. Antimicrobial use is reviewed by pharmacy as an ongoing process and reported at the Antimicrobial Stewardship Committee as well as the Pharmacy and Therapeutics Committee and Infection Prevention Committees.

Old Operations, Procedures, and Results

The C. diff Leadership Committee was initially created to review our current (early 2015) practices and discern, if possible, where we needed to improve.

Proper cleaning was one of the first items of focus for the group. In accordance with current guidelines, rooms of known C. diff patients (hospital or community onset) were being cleaned with a 10% bleach solution. This was a process that could potentially involve many unintentional missteps. There was a reliance on staff to prepare accurately a 10% solution and to also ensure that the solution itself was used within the “use by” timeframe so it would be effective. At that time also, ATP or black light testing was not being performed to validate that cleaning was being done properly. Finally, the rooms of only known active C. diff patients, but not potential asymptomatic carriers, were being cleaned with the bleach solution, therefore missing an opportunity to make sure spores in all patient rooms were being removed.

Another environmental/facility issue brought to the Committee was that some patient rooms were not conducive to caring for C. diff patients. We looked into this issue and found that there were some inpatient rooms that had the sink inconveniently located on the far side of the room, so when staff were doffing their garb and washing their hands, there was potential to contaminate themselves on the way out the door. This issue was rectified with portable sinks for those rooms, which would allow for the final action to be hand washing.

When the organization recognized our increase in hospital onset infections, our Antimicrobial Stewardship Program was still in its infancy. An increased effort was made to implement fully the program and begin educating our staff on the importance of antimicrobial management. This has helped in all facets of the organization, but we feel this has been particularly important in decreasing our number of hospital onset C. diff infections.

The process of specimen testing was another area that was closely examined. There was not a set of criteria that would assist in the decision to send a sample for testing. One of the best practices suggested by the Connecticut Hospital Association was to adopt a “Diarrhea Decision Tree” to help staff decide whether the specimen was appropriate to be sending. The Decision Tree and the education that went out to staff have been extremely helpful in decreasing inappropriate testing.

Finally, we reviewed our actual microbiologic testing. At the time, we were doing only polymerase chain reaction (PCR) testing on samples but, because the testing was so sensitive, we were diagnosing carriers as well as active cases of C. diff. Changing our testing methods to a two-step test has benefited us by enabling us to diagnose patients more accurately, and also to treat only patients who require it.

New Operations, Procedures, and Results

As an organization, we decided to take on the issue from all directions. Exhibit A shows a timeline graph that demonstrates the major undertakings and subsequent results.
Day Kimball began to notice an increase in the numbers of colon surgical site infections (SSI) toward the end of 2016. At that time, we enlisted the assistance of an outside consultant to review our current policies, procedures, and practices, and identify any gaps or areas for improvement. This was extremely helpful for our organization to ensure we had a solid foundation on which to build and improve.

Next, we reviewed the best practice recommendations from the Quality Initiatives from the Connecticut Hospital Association Board as well as the updated SSI Prevention Guidelines from the Centers for Disease Control and Prevention (CDC)/Healthcare Infection Control Practices Advisory Committee (HICPAC), and the Association of periOperative Registered Nurses (AORN), and began the process of incorporating them into our day-to-day practice.

Policies and practices for such things as environmental cleaning were reviewed as well. We implemented a process for Adenosine Triphosphate (ATP) testing of all ORs at the end of the night to ensure all areas were cleaned appropriately. There was also a change in cleaning product to a sporicidal solution to remove any potential infectious spore forming organisms as well as common microbes.

More recently, we have started to implement the Enhanced Recovery After Surgery (ERAS). Exhibit A shows protocols for all our colon surgeries and we have seen the changes that have been made thus far to be effective in maintaining an infection rate of zero.

Impetus for the Project

The impetus behind our initiation of this project was to provide the safest possible environment for our colon surgery patients. An increase in the number of colon surgical site infections had been identified, which placed us into the category of “at or above” state and national average for publically reportable colon surgical site infections. These increases in infections made us stop and review our current practices as well as begin with adoption of best practice guidelines that had recently been released.
Organizational Goals for Quality
The quality goals for the organization for fiscal year 2018 included increasing patient safety, decreasing colon surgical site infections, and becoming a highly reliable organization. We have been able to work successfully toward achieving these goals by incorporating new ERAS protocols as well as adopting best practice guidelines. By decreasing our rates of infection, we are increasing patient safety as well as patient satisfaction.

Progress on these goals is reported monthly at a minimum across the organization in keeping with high reliability principles.

Measure of Patient Care and Operations/Procedures
Multiple measures are monitored regularly and contributed to our successes in decreasing our colon surgical site infection rates. As an organization, we report all colon surgery infections to NHSN and they are then posted publically by CMS. Internally, all colon surgical site infections are reviewed with the Infection Prevention Committee members and the Board of Directors on a monthly basis. These reports are also shared through the organization at multiple other committee meetings.

Progress and tracking of patients who have had surgery with the ERAS protocols incorporated is done by the Director of Perioperative Services. This is done to ensure the policies and procedures that have been adopted are being followed appropriately and to track whether any infections have developed.

Environmental services continues to conduct and track ATP testing in the operating rooms to ensure cleanliness is being maintained. The results of this testing is shared at Infection Prevention Committee monthly meetings.

Old Operations, Procedures, and Results
In the fall of 2016, we invited consultants to review our current policies, practices, and procedures and make any recommendations they felt would increase patient safety. One of the processes to change was the product used for cleaning. We had previously been using a quaternary solution for the ORs and suggestions were made for a change of product and also on ways to make our cleaning processes even more effective.

With our review of current best practice, we were able to identify processes that could be easily implemented such as tight glycemic control, normothermia, and adequate oxygen levels throughout the surgical time period including preoperatively and postoperatively. These new practices started to be integrated into our patient care toward the end of 2016 and into the beginning of 2017.

A review was also done with respect to preoperative patient preparation and looked at skin preparation techniques – specifically ensuring that instructions for use for skin antiseptics were followed as well as making certain any necessary clipping was done prior to entry to the OR proper.

New Operations, Procedures, and Results
Since we identified our areas of opportunity to improve the surgical experience, we have made great strides in decreasing our number of colon surgical site infections. As we improved our processes, procedures, and policies, and adopted the ERAS protocol and updated best practice guidelines, we have seen a significant decrease in our number of colon site infections. We plan to continue our implementation of ERAS as well as monitor patient outcomes as a result of the protocol use and to ensure we stay up-to-date with all best practice guidelines for the prevention of surgical site infections.

Use of Data Sets
The results of our drive to decrease colon surgical site infections and increase the safety of our patients can be seen in many areas of data reported. As required, all hospital onset infections are submitted to NHSN that, in turn, shares this data with other stakeholders. We receive monthly reports from, among others, Partnership for Patients, TEIC reports, and ChimeData. Also, any colon surgical site infections will be published and are accessible publically through the CMS Hospital Compare website.

Exhibit A

COLORECTAL SERVICE LINE
ERAS PROTOCOL
1. Preoperative Physician’s Office
   • Educate patient re: immediate post op activity
   • Educate patient re: post op diet advancement
   • Educate patient re: pain management/avoidance of narcotics
   • Educate patient re: refraining from nicotine
   • Body wash with chlorhexidine gluconate
   • Glucose control

2. Preoperative Holding Area
   • Limit pre-op fluids
   • Glucose control
   • Pre-warming
   • Standardized antibiotic protocol

3. Intraoperative
   • Normothermia
   • Minimize IV fluids
   • Limit use of NGT/OGT
   • Limit use of Foley
   • Glucose control
   • Optimized tissue oxygenation
   • Clean/standardized fascial closure process
4. PACU
   - Post op management of N/V
   - Limit IV fluid
   - Glucose control
   - Optimized tissue oxygenation

5. Med/Surg Unit
   - Early ambulation
   - Advance diet as tolerated
   - Limit IV fluids
   - Limit narcotic use – liberal use of Ofirmev and Toradol
   - Manage post op N/V
   - Glucose control
   - Standardized antibiotic protocol
   - Optimized tissue oxygenation

Exhibit B

Day Kimball Healthcare

For more information, contact Michelle La France, Public Relations and Community Outreach Manager, Corporate Communications Department, Day Kimball Healthcare, at (860) 963-6598.
day (approximately 16 patients per day) resulted in overall poor patient access and low patient satisfaction.

Our management team knew they had to address these inefficiencies and create common goals to ensure patients have consistent and reliable access to providers. A strategy was needed that would improve patient care, satisfaction, and access, while also creating standardized and efficient workflows that supported clinicians and staff.

**Improvement in Patient Care through the use of Data**

To address these challenges, our management team, in collaboration with our medical group practices, developed a data-driven approach to create a leading practice, consumer-centric scheduling experience.

Data collection and analysis of both schedule utilization and patient volume by provider showed that our model of providing after hours care was inefficient and provided us with insight to consolidate these appointments into our normal daily schedules. Historic scheduling data was used to redesign provider schedules to meet patient volumes, access goals, and utilization targets.

Modifications to internal operations, procedures, and outcomes led to the development and implementation of a new patient access model, as described below.

**New Operations, Procedures, and Results**

A strategy was developed to include new operations and procedures that would create and build a sustainable appointment scheduling process to maximize patient access and improve patient care in our region. In October 2017, strategic implementation of rapid-process improvements began.

The process change included developing a template schedule based on industry-standard appointment types and lengths (15 minutes for office visits, 30 minutes for physicals), opening all 13 practices to new patients, and implementing uniform standards for bookable hours per week, weekly goals, and limits on earned time off.

Additional strategies included establishing a central scheduling group as a single access point for new patients, partnering with an online appointment booking app, and centralizing medical records to support new patient intake and chart creation.

A flow chart, shown in Exhibit A, was developed to streamline our new patient process by creating more predictable and efficient workflows.

The integration of the online appointment booking app has allowed new and existing patients to self-schedule their primary and specialty care appointments in a convenient manner. Through the mobile app or online, users now have the ability to choose and book a new patient appointment, self-schedule their primary and specialty care appointments in a convenient manner. Through the online appointment booking app, users now have the ability to choose and book a new patient appointment, schedule and increased access to care.

For our patients, the benefits of these new processes have included improved satisfaction from easier and faster communication and access to the services they need. Patients also experience shorter wait times to see their providers, which then leads to greater loyalty to our healthcare system. The estimated average wait time for annual physicals, non-acute, and new patient appointments is now approximately 30 days or less, and we are able to offer same-day access for acute appointments.

From a hospital and health system perspective, benefits of these new processes include better optimization of provider productivity and business performance, increased revenues, and more informed strategic decision making. Provider Relative Value Units (RVUs) increased year over year from 85,498 in fiscal year 2017 to 94,040 in fiscal year 2018 (see Exhibit F).

As our medical group advanced throughout fiscal year 2018, it experienced 29,732 active patients, which yielded 112,521 patient visits. Financial results show improvement both on a stand alone basis and in overall contribution to the health system as a whole, as reflected in Exhibits B and C.

Our medical group practice experienced new patient growth in the areas of primary care and OB/GYN, with a 24.5% increase from 1,797 new patients in fiscal year 2017 to 2,237 new patients in fiscal year 2018 (See Exhibit D). Primary care patient volume for the first quarter of fiscal year 2019 showed 20,217 patient visits compared to 19,314 patient visits in the first quarter of fiscal year 2018, for an improvement of 903 patient visits year over year for the same time period (see Exhibit E).

**Quality Outcome Reports**

Our medical group employs a robust group of primary care physicians and advanced practice clinicians in addition to a growing number of specialists in the areas of primary care, specialty care, surgical care, and inpatient medicine. According to the Medical Group Management Association, 95% of our practices’ physicians now work above the national median benchmark for productivity. Improved productivity and capacity within our medical group practices has led to progress on patient satisfaction Press Ganey scores (see Exhibits G, H, and I) associated with the ease of scheduling and increased access to care.

Our primary care physicians have earned Level 3 Patient Centered Medical Home recognition from the National Committee for Quality Assurance, the highest level available. This recognition confirms that our primary care providers meet stringent guidelines for effective and efficient coordination of care.

As a result of meeting high standards for quality and efficiency of care, our medical group is also

Another component of the process improvement included a culture change. Regular and reliable feedback was provided to physicians and providers to demonstrate the direct impact their efforts have on the viability of our medical group and health system. It is important from a cultural standpoint for our physicians and providers to overcome skepticism and to realize their immediate compensation rewards resulting from improved productivity.

**Measurable Outcomes**

The restructured patient access model and its successful implementation led to increased patient volume in all 13 medical practices and now allows for approximately 24 patient visits per day.

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part of the Anthem Blue Cross and Blue Shield’s Enhanced Personal Health Care Program. Since our medical group is part of this program those who are covered by Anthem Blue Cross and Blue Shield insurance pay a lower co-payment for care at our medical group’s primary care practices than they would at other primary care practices that are not part of the Enhanced Personal Health Care Program.

**Continued Monitoring**

Our management team and medical group have worked diligently to control costs and improve productivity. As detailed above, these efforts are paying off. Continuation of data collection and analysis allows our medical group to maintain the goal of improved patient access, resulting in long-term achievement in excellence in patient care.

Our medical group participates in quality assurance programs to monitor a patient’s status with regard to hypertension, diabetes, obesity, BMI, smoking status, vaccinations, medication management, annual preventive visits, and provides counseling and treatment options, as well as patient specific education related to their diseases and disorders. These measures are monitored on an on-going basis to ensure patients are receiving top-quality care.

Monitoring of patients due for annual physicals and follow-up visits for existing medical conditions is also done on a weekly basis to ensure patients are receiving provider-recommended care. Exhibit J provides an example of the template used to monitor schedule utilization data on a weekly basis and assists the central scheduling group with pinpointing areas in the schedules to place annual physicals and follow-up visits based on reports that identify patients who need these types of visits.

Likewise, under the new model, patient access to primary care is monitored on a weekly basis through schedule utilization and patient volume reporting. Variances in the access model are addressed by leadership.

Under the direction of the executive director of our medical group, our health system’s leadership team, and our practice managers, we have developed an operational plan for the coming year to focus on service and quality. The goal of the operational plan is to optimize performance under value-based purchasing programs to ensure the sustainability of our medical group as a vital part of our health system.
Exhibit F

Comparison of Patient Visits: Q1 FY18 vs. Q1 FY19

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Exhibit G

Ease of Scheduling Appointments

Exhibit H

Standard Access

Exhibit I

Comparison of Patient Visits: Q1 FY18 vs. Q1 FY19

Exhibit J

Sample Medical Group Schedule Utilization December 2018

Exhibit K

Utilization by Provider – December 2017

For more information, contact Michelle La France, Public Relations and Community Outreach Manager, Corporate Communications Department, Day Kimball Healthcare, at (860) 963-6598.
A MULTIDISCIPLINARY TEAM TARGETED REDUCTION OF HOSPITAL-ACQUIRED PRESSURE INJURIES, AS DEFINED BY AHRQ PATIENT SAFETY INDICATOR (PSI) 03

Reduction of patient harm has been an overarching strategic imperative for Charlotte Hungerford Hospital since launching its high reliability journey in 2015. Development of hospital acquired pressure injuries (HAPIs) was identified as a significant area of opportunity. HAPIs were impacting hospitalized patients at unacceptable rates, representing a potential source of pain as well as other morbidities e.g. infection/sepsis. Additionally, higher rates of HAPIs impacted the organization’s reputation via publicly reported data such as Leapfrog and the CMS Star Rating, as well as reimbursement via pay-for performance models. As such, HAPI reduction was established as an improvement priority starting with approval of the 2016 Quality and Safety Plan. PSI-03 (Stage 3, Stage 4, and unstageable pressure injuries) was identified as a Key Performance Indicator on the organizational scorecard, with results shared monthly in a variety of forums, including the Quality Assessment and Performance Improvement Committee (QAPIC) whose minutes are reported out by the responsible manager at each monthly Wound Care Committee meeting, supporting transparency and enhancing accountability.

Through targeted improvement activity in 2016, the hospital decreased the rolling 12 month average rate of PSI-03 (HAPIs) from 8.18/1000 patient days in February to 2.2 in December. However, in 2017 an uptick in these events was noted. In an effort to reverse the emerging trend and create an approach for sustained success, a consultant was identified and a two-day, on-site assessment was completed in August. Findings and recommendations were received in September. Several actions were taken in response, including the implementation of a second person verification of all nursing admission skin assessments to better capture wounds present at admission; capital was allocated to support a prioritized replacement plan for mattresses and stretcher mattresses to provide more suitable patient care surfaces; daily surveillance (with detailed data collection) by the wound and ostomy care nurse (WOCN) was instituted. Membership and leadership of the existing Skin and Wound Care Committee was revised, adding representatives from quality, respiratory therapy and coding, to support transfer of knowledge and enhanced communication between all key stakeholders. A robust monitoring and data sharing plan was instituted to assess progress over time.

Between January and June of 2017, there were 7 pressure injuries that met the PSI 03 definition. Between July and December there were 2, representing a 71% reduction during the second half of the year.

By early 2018, a shift to a more superficial stage of HAPI at time of first wound identification was noted, indicating that the nursing team was assessing patients regularly, identifying wounds earlier, and intervening promptly to avoid wound progression. A second part-time wound and ostomy certified nurse was hired to further support the program, a hands-on skill session was deployed for RN and patient care technician staff, and a task force to develop and implement measures to become a “briefless” organization was launched to reduce the risk of moisture related dermatitis (that can increase the risk for skin breakdown).

In 2019, a standardized review by the clinical managers was instituted, whereby a comprehensive analysis of potential contributing factors is conducted. Findings and recommendations are reported out by the responsible manager at each monthly Wound Care Committee meeting, supporting transparency and enhancing accountability.

In addition to all actions outlined, the establishment of robust systems of internal data collection, analysis, and reporting has provided a timely and ongoing perspective of the impact of all improvement efforts, as well as a sense of transparency and ownership. The results of this project exceeded all expectation and targets, and sustained improvement continues.
For more information, contact Kate Betancourt, Director of Quality and Safety, The Charlotte Hungerford Hospital, at (860) 496-6347.

Middlesex Health has successfully reduced the occurrence of postoperative infection with colon surgery by monitoring and improving the body temperature of patients perioperatively. The colon surgical infection ratio (SIR) for Middlesex Hospital, a part of Middlesex Health, was decreased from a baseline of 2.185 for calendar year 2016 to a SIR of 0 by close of 2017 through multiple procedural changes aimed at maintaining normothermia throughout the perioperative period.

As with all quality initiatives at the hospital, data served as the impetus for project initiation, the source of identification of opportunity, and the means of measuring the impact of the plan for improvement. The hospital was concerned to find the SIR, as reported by the CMS Value Based Purchasing (CMS VBP) Hospital Compare, was at 2.185 for 2016. This is well in excess of an acceptable ratio of 1.0 and nearly twice that of the state of Connecticut SIR of 1.226 for the same time period (CMS, 2016) (see Exhibit 1). Given that 40-60% of hospital-acquired infections (HAI) are preventable, occur at an annual cost of $28-45 billion (Spruce 2014), and have a devastating effect on morbidity and mortality, it is ethically and morally imperative that we prevent them.

Reduction of the SIR for colon surgery is greatly aligned with the hospital’s priority goals for quality improvement. The mission of Middlesex Health is, “to provide the safest, highest quality healthcare, and the best experience possible for our community.” Elimination of preventable HAIs achieves all three pillars of the mission: patient safety, highest level of quality, and is inarguably the best experience for the patient. A colon surgery SIR of 1.0 or less was approved by the Board of Directors as a priority strategic goal and considered by leaders to be an achievable goal in context with our practice of the principles of High Reliability.

The measures utilized for the prevention, identification, and reduction of HAIs are a combination of outcome and process measures. The surgical site infection (SSI) ratio is a required quality outcome measure of the Centers for Medicare and Medicaid Services (CMS). Infections are reported by all hospitals via the National Safety Healthcare Network (NHSN) of the Centers for Disease Control and Prevention (CDC). The NHSN is an Internet-based surveillance system through which hospitals submit data on HAIs to meet mandatory reporting requirements to CMS. The cases are risk-adjusted, and the patient-specific predicted number of infections is compared to actual infections, expressed as a ratio. The process measures used to take a deeper dive for causative factors of a colon infection ratio in excess of 1.0 may include antibiotic selection and...
as the means of achieving sustained core body temperatures of greater than 36°C perioperatively. Fahrenheit vs. Celsius), and maintaining appropriate core body temperatures. The decision was use of temperature probes by Anesthesia; standardizing methods of monitoring (body site and achieving reliable perioperative forced air active warming; ensuring accurate and consistent use of temperature probes by Anesthesia; standardizing methods of monitoring (body site and Fahrenheit vs. Celsius), and maintaining appropriate core body temperatures. The decision was made to implement the guidelines of the AORN and Surgical Care Improvement Project (SCIP) as the means of achieving sustained core body temperatures of greater than 36°C perioperatively.

One of the top recommended best practices for SSI prevention includes maintaining perioperative normothermia (Spruce, 2014). Surgical patients are at risk for unplanned hypothermia, as the regulatory mechanism that regulates core body temperature is altered during surgery by anesthetic agents and environmental factors that promote heat loss (Conner 2016). Research shows a threefold increase in SSI frequency in patients undergoing colorectal surgery that experience unplanned hypothermia, compared to patients maintaining normothermia. The Association of periOperative Registered Nurses (AORN) identifies the prevention of hypothermia as one of the top 10 patient safety concerns.

A review of the old operations and procedures was performed through records review; compilation of patient perioperative body temperature; a study of ambient operative room temperatures over time to establish mean room temperatures; direct visualization of end-to-end processes; and interviews with nursing, anesthesia, and bioengineering. Our study revealed the hospital to have outdated procedures, inadequate awareness of best practice guidelines, inappropriate use of temperature probes intraoperatively, and extreme variation in practice. A high level summary of old processes is as follows:

- Preoperative forced air active warming device usage was optional and often the device was not activated at the request of the patient.
- Patients, once in the OR, may not have the warming device activated for up to 45 minutes.
- OR ambient room temperatures were collected hourly over a 12 month period; the mean temperature fell below the recommended AORN range of 67-72°F.
- Patient temperature monitoring data collected revealed a significant percentage of cases where patient temperatures were recorded in the hypothermic range (<36°C) with some temperatures as low as 19°C. This did not seem possible. Further investigation revealed that the temperature probes used by anesthesia take a significant amount of time (20-30 minutes) to “warm up” or equilibrate to accurate temperature; further, the probes are extremely dependent upon positioning, and the slightest adjustment can make the reading jump several degrees.

Tables 1 through 4 display the old operations for maintenance of normothermia. Evidence supports the conclusion that processes and practice failed to measure and support effectively core body temperatures above 36°C, placing patients at risk for postoperative surgical site infections.

New operations and procedures focused on standardizing ambient room temperatures; achieving reliable perioperative forced air active warming; ensuring accurate and consistent use of temperature probes by Anesthesia; standardizing methods of monitoring (body site and Fahrenheit vs. Celsius), and maintaining appropriate core body temperatures. The decision was made to implement the guidelines of the AORN and Surgical Care Improvement Project (SCIP) as the means of achieving sustained core body temperatures of greater than 36°C perioperatively.

Timing, appropriate hair removal, appropriate skin preps, and maintenance of normothermia (Tanner, 2016). The hospital audited the four above named process measures and found high percentages of performance with most measures, with the exception of normothermia.

The aim is to standardize the methods used to monitor perioperative temperature (body site and Fahrenheit vs. Celsius) and reduce instances of perioperative hypothermia by 75% in one year.

A formal improvement team was created, comprising experts from general surgery, anesthesia, infection control, surgical nursing, engineering, bioengineering, and quality. The team utilized a Plan Do Study Adjust (PDSA) cycle. The following new operations and procedures were implemented:

- Methods of obtaining temperature were established throughout the perioperative period, including the route, timing, units (Fahrenheit or Celsius), and documentation.
- A policy and procedure based on current guidelines for perioperative warming and temperature monitoring was developed. All staff were trained.
- OR room temperature was controlled through a centralized and non-adjustable thermostat to bring temperatures within recommended range.
- Procedure requirement was established to warm every pre-operative colorectal surgical patient unless contraindicated and educate on the benefits of warming therapy.
- Requirement to dress every pre-operative colorectal surgical patient in a warming gown.
- In-service was provided for anesthesia by manufacturers clinical support team on the manufacturer recommendations for appropriate use of the temperature monitoring probe.
- Redundancy was built into temperature monitoring software that prompts providers to review and validate potentially erroneous or hypothermic temperature readings.

**Results**

The colon surgery SIR for the hospital was decreased from a baseline of 2.185 for calendar year 2016 to a SIR of 0.221 by close of 2017 through multiple procedural changes aimed at maintaining normothermia throughout the perioperative period (see exhibits).

The hospital achieved excellence in outcomes through the use of data obtained from both a state and national reference database. The data was essential to the identification of an unacceptable colon SIR, study of old processes, implementation of best practice guidelines, elimination of variation in targeted processes, and validation of significant improvement in outcomes.

**Sustaining the Gain**

As with all quality improvement initiatives, the goal, ultimately, is to sustain the improvement and, where possible, improve further. Improvements made in 2016 resulted in an SIR of only 0.221, well under both goal of 1.0 and prior SIR of 2.185. We experienced, however, an increase over 2018, ending the year with a SIR of 1.208 (still half of the original problem ratio, but just over goal). Our Task Force has reconvened. Reinstated compliance audits show normothermia compliance decreased from the 2017 rate of 73% to a 40% rate in 2018, which correlates with the SIR increase for the same time period. Erosion and unsustainability are often causative factors of loss of gain. We are currently looking to additional forced function methodologies that have higher reliability; stronger ongoing auditing of process measures; and are confident we will see improvement by Q2
of 2019. The PDSA cycle rarely results in perfect compliance the first time of an improvement initiative launch. The hospital concludes that our success is demonstrated in 2017; and that our failure in 2018 has taught us the importance of re-auditing process measures long after success is achieved. In the words of Winston Churchill, “Success is not final, failure is not fatal: it is the courage to continue that counts.”

**Update, June 2019**

Following submission of this report in March of 2019 and actions described above, Middlesex Health has experienced 6 consecutive months with 0 postoperative colon infections.

**References**

CMS, Hospital Compare Accessed via the Web @


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**Exhibit 1 - SIR**

| Middlesex Health | Connecticut |

### OLD OPERATIONS

#### Table 1 - Preop temperature monitoring and control process

1. Patient temperature is taken using a temporal thermometer and recorded in °F before patient goes to operating room.
2. If temp is not >= 96.8°F, temperature is taken again at unspecified intervals after initiation of forced air active warming device.
3. All patients are set up with forced air active warming devices when they change out of their street clothes (some repeat patients refuse them),
4. Forced air active warming devices get turned on in pre-op (unless patient refuses or diaphoretic/ temp). They sometimes use “ambient” air if patient feels too warm.

#### Table 2 - Intraoperative temperature monitoring and control process. Most patients come in wearing a forced air active warming device. It is not running during transport.

1. Warm cloth blankets are placed on the patient upon arrival to the OR.
2. Anesthesia is induced and patient temps (esophageal probe) are sent to the EMR every five minutes in C°.
3. After induction, prepping and draping, the forced air active warming device is turned on.
4. Anesthesia reports that warmed fluids and additional warm blankets around head may be used intra-operatively if patient dips into hypothermia. (PACU staff do not believe warm fluids are used.)
5. Forced air active warming device gets turned off after surgery is complete and they are ready to move the patient off the OR table.
6. Ambient room temperatures fell below the recommended range.
7. Some rooms had locally controlled thermostats and other did not.
8. Most patients come in with wearing a forced air active warming device. It is not running during transport.
Table 3 - Post-operative temperature monitoring and control process
1. Forced air active warming devices are turned on when patient arrives in PACU.
2. Temporal temperature is taken and recorded in °F.
3. Forced air active warming devices may get turned off upon patient request, or if patient is normothermic, diaphoretic, or febrile.
4. If initial arrival temp is >96.8°F, then temperature is repeated every 1-2 hours.
5. If initial arrival temp is <96.8°F, rewarming options are utilized and temperatures are repeated every 15 minutes until >96.8°F. Warming options include forced air active warming devices, warm blankets, warming the fluids with the warming device, wrapping the head.
6. Discharge temperature must be >96.8°F.

Table 4 - Median OR Room Temperatures °F - Date collected Oct. 20, 2015-Oct. 19, 2016

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Results

For more information, contact Claire M. Davis, BSN, RN, BHA, MHA, CPHQ, FNAHQ, Director of Quality, Middlesex Health, at (860) 358-6337.
Within two years of participating in the National Surgical Quality Improvement Program (NSQIP) through the American College of Surgeons, data results indicated a higher than expected occurrence of postoperative pneumonia (PNA) within 30 days of surgery compared to national benchmarks. Additionally, evaluation of quality data from Enterprise Performance Systems, Inc. (EPSi) identified a high rate of PNA for all hospital inpatients, indicating the issue was not isolated to just surgical patients.

A multi-disciplinary group of united engaged clinicians from surgery, medicine, nursing, anesthesia, speech pathology, respiratory and quality met monthly to identify components of a pneumonia-prevention initiative for use within perioperative departments and on all inpatient units.

With the use of continued data monitoring, the overall PNA rates from 2016 through 2018 have seen a 36% reduction.

Data analysis highlighted that nearly 50% of the identified PNA cases involved aspiration. A literature search heightened awareness regarding the clinical and financial implications of PNA and endorsed best practices. A gap analysis within the hospital identified inconsistent implementation of recommended interventions and a lack of sufficient documentation.

Reducing PNA occurrences aligns with the organizational values of integrity, safety, caring and excellence, and an overarching Balanced Scorecard Initiative to reduce all hospital-acquired infections by 11%. Reducing PNA invariably impacts length of stay, morbidity, mortality, and readmissions. Although not factored as a clinical priority initially, the realized reduction in overall PNA has resulted in nearly $1.3 million savings since the initiative began in 2016.

The multidisciplinary group convened in 2016, and composed a list of initiative components addressing patient education, respiratory interventions, oral health, ambulation, and pain control. A comprehensive oral health assessment (OHA) guideline addressed recommended practices with appropriate interventions for higher-risk patients. The OHA was embedded within the electronic medical record (EMR). Oral care products for high-risk vented and non-vented patients were purchased for use on all inpatient units. Broad clinician and staff education was provided using

live and online education sessions over the course of 3 months. Nursing drafted and deployed a monthly unit-based audit tool to monitor compliance with all identified interventions and documentation. An acronym (see page 43) was approved to provide patients, families, and staff education regarding the various respiratory interventions. This respiratory initiative has been discussed at regional Quality Improvement Committee meetings on a quarterly schedule.

When initially discussing the various components of the respiratory initiative, most clinicians and staff believed compliance was at or near 90%. Data from the gap analysis provided clarity, and surprising realization of a compliance level barely 20%. Without focused and regular monitoring, it was not possible to understand where the deficits and opportunities for improvement were. Comparison of audits also identified variability among inpatient units, not just with practice but also with documentation. The incentive spirometers lacked standardization with the ones in use across the system, limiting staff understanding and limited effective patient education. Ambulation frequency and distances were documented in nursing notes, as opposed to dedicated fields within the EMR, hindering effective monitoring. Many patients ate meals in bed, as opposed to up in a bedside chair, or sitting up as recommended. Oral care was inconsistent and nursing lacked appropriate resources and supplies.

The incentive spirometer units were standardized with those already in use across the health system, allowing consistent patient and staff education. A staff nurse developed a bilingual patient education pamphlet for inpatient use. Ambulation distances, in 50 foot increments, were marked on each inpatient unit, allowing patients, family, and staff a better understanding of ambulation interventions, such as daily OHA assessment and intervention documentation, were added to daily huddle discussions. High-risk patients were identified so all staff, not just point-clinicians, were aware. Nursing Grand Rounds in 2017 hosted a well-respected nurse leader to further emphasize and extol the importance of pneumonia prevention.

ACSF NSQIP provides nationally risk-adjusted and benchmarked reports quarterly and on-demand, providing hospital leaders accurate and actionable results to inform and provide clear feedback to clinicians and staff. While NSQIP only provides a selective sampling of patient data, EPSi provides a more comprehensive list of patients. Use of both data sets has enabled our hospital to better understand our areas of risk, identify actionable interventions, and realize a better than expected improvement in reducing pneumonia occurrences.
For more information, contact Andrew Metzger, MD, Medical Director, Midstate Medical Center, at (203) 694-8304, or Mary Beland, MSN, RN, CNOR, ASC, NSQIP, Surgical Clinical Reviewer Manager, Midstate Medical Center, at (203) 694-8342.
The standard of care for acute ischemic stroke is the administration of IV tissue plasminogen activator (tPA), which is medically indicated for treatment of acute ischemic stroke within the first 4.5 hours after onset of symptoms. Prior to tPA administration, a patient must have a CAT scan negative for hemorrhage and an evaluation by the attending ED physician, including an NIH stroke scale, performed. Multiple studies have shown that the sooner the IV tPA is administered, the better the outcome for the patient. The motto for acute stroke care is “Time Is Brain,” which reflects the fact that 1.9 million brain cells are lost for every minute of delayed care. Thus The Joint Commission has set national goals for door-to-needle time, i.e. the time from when the patient arrives at the ED to when the IV tPA is started.

At Danbury Hospital, performance improvement goals were set in the beginning of the calendar year for 75% of patients to receive IV tPA within 60 minutes of ED arrival and a secondary goal for 50% of patients to receive IV tPA within 45 minutes of patient arrival. As part of this initiative, we began looking at all components of the door-to-needle process to find opportunities for improvement. Using the data, we have made changes to the process on how the patient is evaluated and treated in the first minutes after arrival to the ED; this has significantly reduced our door-to-needle times, which correlates with better clinical outcome (less disability).

The American Stroke Association and The Joint Commission have set standards to qualify as a designated Stroke Center. Discussions are ongoing about EMS triaging acute stroke patients to stroke centers that have shown through data the ability to treat these patients quickly and safely. We wish to continue being a recognized primary stroke center, which requires ongoing quality improvement initiatives to ensure transparent data that is commensurate with being a stroke center. Our stroke performance improvement committee set stretch goals that are recommended by these national bodies, for 75% of patients to receive IV tPA within 60 minutes of ED arrival and a secondary goal for 50% of patients to receive IV tPA within 45 minutes of patient arrival. To achieve these goals, we needed to examine our processes on a detailed level through the use of data.

Danbury Hospital set aggressive standards for quality and expects accreditation by The Joint Commission. Our data show we are performing at the highest levels compared to similar hospitals and national data. The stroke program and core team reports to the stroke performance improvement committee. We then report up to senior leadership and present at quarterly leadership retreats.

We monitor The Joint Commission’s 10 required inpatient and outpatient core measures, door-to-needle puncture for mechanical thrombectomy cases, and recovery level utilizing the Modified Rankin Score 30-45 days post discharge for patients who received IV tPA or mechanical thrombectomy. In addition, we track turnaround time for labs, CAT scan completion and interpretation, and time for the ED physician and neurology to respond to the stroke alert. Following National Institute of Neurological Disorders and Stroke (NINDS) and American Stroke Association guidelines, we broke down the processes that are involved in a patient receiving IV tPA into individual components and found the following opportunities for improvement: the time from arrival to ED to evaluation by the attending physician, the time from arrival to CAT scan performed, and the time from ordering tPA to administration of IV tPA. By making improvements to the individual processes, the goal was to decrease the overall door-to-needle time.

Prior to the roll-out of our new initiatives, stroke patients arriving via EMS or triage were brought to a resuscitation room for evaluation by the ED physician, followed by a work-up including labs and diagnostic imaging. If tPA was indicated, the ED attending would place the order electronically and the medication would be prepared in the hospital pharmacy (approx. 15 minutes from the ED). Either an ED technician would need to pick up the tPA from the pharmacy or a pharmacy technician would deliver the medication to the ED nurse. Our data indicated longer order to administration times when tPA was mixed in the pharmacy given their procedures and proximity to the ED.

After reviewing the data with the Stroke Performance Improvement Committee, the ED attending physicians agreed to have EMS bring potential stroke patients, identified in the
field by EMS using a standardized stroke scale, directly to the area outside the resuscitation rooms, where they would do a rapid assessment of ABC’s. If medically stable, the patient goes straight to CAT scan. Once imaging is completed, they return to a patient care room for a more extensive evaluation including bloodwork, NIH stroke scale, and administration of IV tPA if indicated. The collaboration with EMS and adding an overhead page in the ED to notify staff of a stroke alert once identified has decreased our door-to-doctor time from an average of 6.6 minutes to 2.5 minutes.

A multispecialist RN, specially trained to handle emergencies within the hospital, is now part of the immediate response team for ED stroke alerts. The multispecialist facilitates the care of the stroke patient, including mixing and administering IV tPA at the bedside, once eligibility for tPA administration is determined. They work collaboratively with the ED nurse to ensure timely patient care.

Following initiation of the new procedures, the door to CAT scan time has decreased from an average of 12.3 to 11.4 minutes. The IV tPA order to administration time has decreased from an average of 24 minutes to 13 minutes. This has led to faster door-to-needle times, and a larger percentage of patients meeting our competitive door-to-needle goals. Prior to the rollout of the new procedures, 40.9% of patients received IV tPA within 45 minutes of ED arrival and 68% within 60 minutes. Post interventions, 46.7% of patients received IV tPA within 45 minutes of ED arrival and 80% of patients within 60 minutes.

Our current results show that 80% of patients received IV tPA within 60 minutes of ED arrival and 47% within 45 minutes. The American Heart Association/American Stroke Association has set competitive public goals to receive recognition through Get with The Guidelines. The current benchmarks for award recognition are as follows: The Stroke Honor Roll-Elite goal is for at least 75% of patients to receive IV tPA within 60 minutes of arrival. Stroke Honor Roll-Elite Plus status is achieved with at least 75% of patients to receive IV tPA within 60 minutes of arrival AND at least 50% of patients receiving IV tPA within 45 minutes. We will continue to use data to improve processes and increase efficiency to provide the best possible outcomes for our stroke patients.

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Norwalk Hospital has improved the integration of care for patients receiving joint replacement surgery by implementing a Total Joint Replacement Destination Center of Excellence. Our goal was to improve key program metrics: length of stay, discharge home, and patient satisfaction. To accomplish this, we needed to reduce complication rates, blood transfusion rates, and develop a culture of mobility and wellness in our inpatient joint replacement program. We engaged a vendor team to initiate a gap analysis and engage with us in designing and implementing a new program in 2012. Our first step was to create a physician-led engaged team with ownership, vision, and execution to improve the targeted metrics. We partnered with our vendor and our information technology department to implement a performance dashboard with benchmark data to drive our program goals and enhancements. Five years later, in 2017, our program achieved 75th percentile ranking amongst a database of 300 top-performing hospitals in six key performance metrics: discharge home, length of stay, readmissions, blood transfusions, distance walked, and overall satisfaction. Our program has sustained this high performance level through data transparency and team engagement.

Our pursuit of a Destination Center of Excellence was fueled by feedback from our hospital’s chief nursing officer, who underwent bilateral total knee replacements at our hospital in 2011. Our CNO’s observation about her care experience was that our team delivered top caliber care. However, the experience was overshadowed by fragmented gaps in cohesiveness between care teams. The CNO challenged us to present a plan for creating a comprehensive program. This is when we learned about our vendor and the Destination Centers of Excellence created by orthopedic surgeon, Marshall Steele, MD. We decided to implement one at our hospital with data transparency, an engaged team, and the patient experience serving as key program pillars.

This program is aligned with Norwalk Hospital’s organizational goals for quality, demanding robust protocols for reducing SSI, blood transfusion, complication, VTE, and readmission rates. These metrics are focal points of our data dashboard and directly impact patient satisfaction, a key indicator of quality care. This program became a vehicle to shift our hospital’s culture towards nurse-driven mobility and the well-patient model.

There are multiple measures of patient care that we monitor for this program; these are detailed on our data dashboard (see page 47). Each quarter, our data is extracted and validated by the vendor’s professional analyst team. Outliers are investigated by the orthopedic program coordinator through an individual chart audit to identify trends. Press Ganey patient satisfaction survey scores are uploaded into the dashboard. ChimeData is reported during quarterly dashboard data reviews conducted with the surgeons, the Performance Improvement Team (PIT), leadership, and key stakeholders. The data dashboard and ChimeData provide transparency and validity in reporting that has been driving key performance improvements since 2012.

Prior to implementing our Destination Center, what we offered our patients was a “service,” not a “program.” Our patient satisfaction scores were not optimal. The vast majority of our patients were discharged to extended care facilities, and LOS was higher than the national average. Surgeons followed varying protocols based upon preference. Patients had no expectation of what would happen after surgery or how to prepare for it. The staff spent valuable resources managing individual patients without a guiding structure. The patient experience was fragmented; it varied by day of the week and clinician at the helm.

Our overarching operational goal was to create a cohesive patient experience; to achieve this goal required multiple steps:

1. A dedicated, multidisciplinary care team was established, producing leaders for our specialized OR, anesthesia, PA, therapy, and nursing teams. These team members were the architects and steadfast owners of the new program. A sense of pride and commitment was instilled that continues in the current program.

2. Surgeons set aside personal preference to formulate standardized care pathways. This required consensus on surgical dressings, medications, precautions, and equipment. Focusing on the details opened team dialogue that had not previously existed. The team evolved and questioned the reasoning behind every aspect of the patients’ care. If evidence did not support an intervention, we returned to the drawing board. Our team met weekly and critically analyzed every step of our care pathway. We reviewed literature and queried other hospitals on best practices. We developed robust protocols for SSI prevention, pre-operative medications, and blood utilization. Collaboration with other hospitals who had implemented similar programs opened our eyes to other ways to approach shared challenges. To this day, we continue to reach out to other hospitals in this same manner to maintain program excellence.

3. A framework of program messaging was established, beginning with the simple expectation that patients should return home after surgery. To support this, the message had to begin with surgeons and their office team and remain consistent from the pre-op RNs and OR team to the care team, case managers, and PAs. We understood that it takes only one member of the team to place doubt in the patient’s mind. To establish team buy-in, we educated every staff member that came in contact with our patients. This took a significant amount of time and dedication that continues in the current program.

4. We then turned our focus to the preparation of patients and caregivers. We established a robust pre-operative education platform and made it mandatory for patients and caregivers. Initially patients did not see the value in this. With perseverance and consistent messaging this platform has become a highlight of our program as an initial touchpoint between the multidisciplinary team and the patients. We observed a direct correlation between patients and caregivers who attended pre-op class and those who returned home, had good clinical outcomes, and reported high satisfaction.
5. A cohort care unit was created, staffed exclusively by specialized team members. This program infrastructure enabled us to offer a consistent, reproducible, high-quality experience in our Destination Center.

6. We advocated to the Pharmacy and Therapeutics Committee for non-opioid pain management options and agents to minimize nausea and intraoperative bleeding. Over time, we saw these interventions decrease complications, transfusions, and days in the hospital. We shifted our focus to value, implementing interventions that were initially more costly but positively impacted our bottom line. One example is the use of Emend, a powerful anti-nausea agent used to prevent post-operative nausea and vomiting (PONV). Preventing PONV directly improved ambulation, tolerance to therapy, length of stay, and patient satisfaction.

7. We executed a culture change of nursing-driven early and frequent mobility. Our nurses embraced this program component and have owned it since program inception. This has enabled our rehabilitation team to impart more depth into discharge planning, functional safety, movement quality, and pain management. As a result, our discharge home, LOS, and readmission rates have steadily improved.

8. Our data documented the value of the patient navigator: for an eight-month period in 2014, our program was without a program coordinator/navigator. The dashboard reflected a decline in patient satisfaction scores, pre-op class attendance, and discharge home rates. For programs debating whether a navigator salary is worth the expense, our metrics are proof of this. Once the position was filled again, our program continued its steady climb in multiple performance improvement measures.

9. Our data has helped us to reduce program gaps in multiple areas:
   • Operating without a robust pre-admission testing department, we focused on improving pre-op optimization through existing channels. We partnered with surgeons to schedule surgical cases earlier, and we ramped up outreach efforts with community PCPs regarding our ERAS program and optimization objectives. Our program coordinator/navigator constantly modified pre-op education content to reduce gaps. In the absence of MRSA screening, we implemented a “nose to toes” protocol which included use of CHG wipes and nasal antiseptic for all total joint patients. This was soon rolled out to all of our orthopedic and spine patients as a means to prevent SSI. We have consequently maintained an SSI rate <1% for several years, falling below Chime Data benchmarks.
   • We have also focused on reducing PACU times, which were historically much higher than national averages. We have persevered in analyzing patient throughput barriers, modifying staffing models, and maintaining specialized anesthesia teams. This year our program achieved the national benchmark for PACU time.

These improvements are detailed in the data dashboard screens. These graphs compare our performance (orange trend line) to a vendor benchmark population of 300 participating programs nationwide (blue line). We utilize this data because it is accurate, undergoing a validation process by an orthopedic data analyst team. The data also measures real-time performance with a three month time lag, enabling us to make timely decisions. This data, partnered with Chime Data, has enabled us to make well-informed decisions. This dashboard program also offers us the capability of identifying and collaborating with other top-performing hospitals in the database; something other databases do not offer.
Upon thorough patient data review at our hospitals, one of the most significant risk factors for SSI after abdominal hysterectomy was gynecologic oncology cases with bowel involvement. To understand how to improve SSI in these patients, we retrospectively analyzed patient outcomes after bowel resection by our colorectal surgery colleagues. At our institution, rates of colon SSI in 2015 and 2016 were lower than the state and national goal. We extrapolated that unless emergent, bowel resections that were elective or semi-elective were managed with mechanical bowel preparation prior to surgery. Although it is controversial whether bowel preparation changes SSI rates, published studies have demonstrated decreased rates of abscess formation as well as ostomy formation. Cephalosporin and metronidazole for 24 hours postoperatively were also observed as standard in colorectal surgery at our institution.

The gynecologic oncology service adapted some of these practices based on these positive data from colorectal surgery. We also adopted chlorhexidine skin preparation not only preoperatively but also by the patient the night prior to surgery. In turn, SSI rates have been not only reduced but most recently, there were zero infections.

Surgical site infections (SSI) are one of the main causes of healthcare-associated infections (HAI). They occur in half a million patients every year, and these patients have a two- to 11-fold increased risk of death compared to surgical patients without a SSI. SSIs can lead to longer hospital stays, which contribute to increased costs to the healthcare system. According to AHRQ, SSIs may account for up to $7 billion annually in healthcare expenditures. As a result, the Centers for Disease Control and Prevention and the Connecticut Department of Public Health (DPH) are prioritizing SSI reduction.

In 2015, the Connecticut DPH released an HAI report detailing specific SSIs such as those after hysterectomy. In that report, our institution reported 5 SSIs after hysterectomy. According to the Connecticut DPH, this corresponded to a standardized infection ratio (SIR) of 2.05, which was in excess of the statewide SIR of 1.12. Four out of five were open cases. Three out of five of these SSIs were from combined colorectal surgery and did not have postoperative antibiotics. Patient demographics included body mass index (BMI) range between 25-45, all non-diabetics, and only 1 was a smoker.

In 2016, there were 7 SSIs reported in hysterectomy cases with a SIR of 1.77. As a result, the Centers for Disease Control and Prevention and the Connecticut Department of Public Health (DPH) are prioritizing SSI reduction.
These persistently elevated levels of SIR after abdominal hysterectomy were deemed unacceptable by our infection control department. A peer-review process was conducted to identify risk factors and explore corrective actions to eliminate or decrease SSIs for our gynecologic oncology service. As mentioned earlier, the two most significant risk factors were morbid obesity and bowel involvement in oncology cases.

The hospital leadership, practitioners, and infection control team recognized surgical site infections as a measure for patient safety and quality of care. The Joint Commission has published four National Patient Safety Goals (NPSG) that focus on healthcare associated infections. One of these is surgical site infections. The importance of addressing SSI at a national level across all hospitals led to The Joint Commission developing an implementation guide, NPSG.07.05.01: Prevention of Surgical Site Infections. The guide provides methods and processes for learning how to implement effectively best practices for reducing and preventing SSIs. These best practices were based on accredited hospitals that showed a minimum decrease in SSI rate by 30% for one surgical procedure for at least one year.

To recognize surgical site infections, preoperative and postoperative patient education for signs and symptoms of infection are crucial. Routine post-discharge surveillance, including scheduled outpatient postoperative visits for all surgeries, allow for monitoring of potential SSIs. If SSI is suspected, evaluation includes outpatient versus inpatient monitoring, cultures (wound, blood, urine), and diagnostic imaging. We initiated this project with the goals of reducing possible causes of SSI due to leakage of contaminated bowel contents during gynecologic surgeries that require colon resections.

Project purpose: Develop and implement standardized protocols for skin and vaginal preparation with chlorhexidine, preoperative antibiotics with first generation cephalosporins with appropriate repeat doses, mechanical bowel preparation, and oral and intravenous antibiotics for women undergoing colorectal resection for ovarian cancer debulking surgery.

Project goal: The goal was set at eliminating or reducing the SIR to be at or lower than the Connecticut state goal of 0.80 in 2017.

Before the project's interventions, the majority of hysterectomies were performed without skin cleansing using chlorhexidine on the day before and on the day of surgery. Combined colorectal resection cases in gynecologic oncology did not have bowel preparation and preoperative oral and intravenous antibiotics.

The team began meeting in early 2016 to identify possible reasons for SSI after abdominal hysterectomy cases. One important component of resolution was the development and implementation of an Enhanced Recovery After Surgery (ERAS) program for gynecologic oncology and colorectal surgery. This program optimizes preoperative, intraoperative, and postoperative phases for patient recovery.

Specifically for reducing SSIs, we have implemented the following:

- Abdominal and vaginal skin preparation with chlorhexidine immediately preoperatively
- Chlorhexidine wash by patient on the night prior and on the day of surgery
- Standardized antibiotic (both oral and intravenous) prophylaxis for colorectal resection
- Preoperative antibiotics with first or second generation cephalosporin with doses repeated for blood loss estimated greater than 1,500 ml or a surgical duration more than 3 hours

The post-project outcomes for reducing surgical site infection after hysterectomy cases at our institution met the goal of at or below 0.80 SIR, most recently in 2018 as shown below. In FY 2018, there have been no reported infections in hysterectomy cases.

Data of surgical site infection rates are submitted by infection control and prevention to DPH through the National Healthcare Safety Network (NHSN). This computerized system is a Centers for Disease Control and Prevention program that tracks HAIs. The program allows for hospitals and healthcare facilities to submit information in a protected manner and provides tools to identify and address HAIs.

The DPH HAI Program staff create informative HAI Provider Reports based on submitted information. These reports provide useful data regarding rates of SSIs at an individual hospitals and facilities across the state. These data also help institutions compare themselves with other facilities of similar size or patient populations.

In these HAI Provider Reports, the rates of SSI are presented as standardized infection ratio (SIR). This is a summary statistic that can be used to track HAI over time. The lower the SIR, the better. The national baseline SIR is always 1.0. Therefore, less than 1.0 is better. SIR calculation is adjusted to consider factors that may cause SSI to be higher or lower, such as hospital size, types of patients and procedures, even medical school affiliation.

The 2015 HAI Provider Report covers data collected during 2015 and was downloaded in November 2016, so data adjusted afterwards is not reflected in that report. At our institution, SIR after abdominal hysterectomy was 2.05 compared to the state goal of 1.12.

The 2016 HAI Provider Report covers data collected during 2016 and was downloaded in May 2017. At our institution, SIR after abdominal hysterectomy was 2.24 compared to the state goal of 0.96. The 2016 SIR at our institution has been since readjusted to 1.77 according to our data.

The 2017 HAI Provider Report covers data collected during 2017 and was downloaded in August 2018. At our institution, SIR after abdominal hysterectomy was 0 compared to the state goal of 0.80. The 2017 SIR at our institution has been since readjusted to 0.55 according to our data.
STERNAL WOUND INFECTION PROJECT

Through monitoring real-time data within the cardiovascular surgery patient population, a sudden uptick in incidence of deep sternal wound (DSW) infection was noted. Over a 3-month period, a multidisciplinary team worked together using rapid cycle improvement strategies to reduce successfully the rate of DSW infection as evidenced in our data.

The impetus for our project was the sudden uptick in incidence of DSW infection within the cardiovascular surgery patient population. Supported by department leadership, a rapid cycle improvement process was undertaken with the formation of a focused interdisciplinary team including OR staff, surgeons, physician assistants, nursing, perfusion technicians, infection preventionists and nursing professional development specialists. This group was tasked with identifying potential improvements to patient care across the entire spectrum of the operative process (preoperative-perioperative-postoperative) to reduce this undesirable patient outcome.

With the health of our patients as the core principle of this project, it clearly aligned with our hospital’s healthcare delivery system, which encompasses a triple aim of better health, better care, and lower costs for our patient populations. Additionally, in aligning with our mission and core values, we view ourselves as a healing presence in the community and commit to holding ourselves accountable for the human, financial, and natural resources entrusted to our care. This sense of accountability to our patients served as the primary foundation of the project.

Several processes currently exist in our monitoring of patient care. As an active participant in the Society of Thoracic Surgeons (STS) Adult Cardiac Surgery Database, we regularly monitor our hospital performance in comparison with other like hospitals. DSW is one of the indicators we closely monitor real-time within our own data compilation and in the national reports published by STS. Another important quality indicator monitored for this project is pre-operative antibiotic administration time.

While successful until recently, longstanding policies and practices put in place to curb the incidence of DSW infection appeared to be less effective. On close examination, we found that many processes were no longer tightly followed and/or could be enhanced with newer technology and evidence-based knowledge. These processes included pre-operative patient

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<th>Table 1. Standardized Infection Ratios of Abdominal Hysterectomy</th>
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For more information, contact Ashley Moon, MD, Administrative Chief Resident OB/GYN, at (203) 739-6378.
education, pre-operative skin preparation, intra-operative practices, and post-operative wound care.

As a result of direct observations utilizing tracer methodology, team input, and review of current literature to support change, multiple innovations were made to all phases of patient care:

- **Pre-surgical optimization:** In the outpatient setting, patients were closely screened for common factors associated with DSW (i.e., uncontrolled diabetes, steroid use, and tobacco use), and were provided extensive education on modifiable risk factor reduction. Patient education materials were updated to align with changes to the pre-operative skin preparation procedure. Teach back methodology was utilized to review the importance of proper skin preparation in infection prevention.

- **Pre-Operative Care:** Based on a review of current literature and in consultation with our infection prevention team, the hospital’s procedure for pre-operative skin preparation for cardiovascular surgery was updated. All certified nursing assistants (CNA) who performed skin preparations on a frequent basis were re-educated about the updated procedure by nursing professional development specialists. The use of 4% CHG scrub both the night before surgery and the morning of surgery, proper hair clipping technique, and use of 2% CHG wipes were reviewed and emphasized. CNAs were observed for compliance in performing the skin preparation per protocol and for accurate documentation. To sustain a high level of competence with this task, it has been added to all new hire CNA orientation guidelines and to the annual competency evaluation. RNs were also notified and received education about the updated skin preparation procedure.

- **Intra-Operative Care:** A small group of OR staff was convened, and they quickly identified gaps in practice as well as suggestions for improvement based on their expert knowledge of operative processes. Areas of improvement included restricting staff movement into and out of the OR, strict adherence to proper sterile practices with skin preparation and vein harvesting procedures, and purchasing custom-length cardiopulmonary bypass machine tubing to prevent possible sterile field contamination. Anesthesia staff also performed a large role in infection prevention. On initial analysis, it was determined that the pre-operative antibiotic was routinely administered less than 30 minutes prior to incision. At the recommendation of our infection preventionists, optimal administration time is 30-60 minutes prior to incision. An immediate education plan was put in place for all anesthesiologists covering the CV OR. As our data show we were quickly able to reverse the antibiotic timing trend from less than 30 minutes to 30-60 minutes before surgical incision. Additionally, a small practice change to single use ECG cable application in the CV OR removed the challenge of cleaning and the risk of contamination.

- **Post-Operative Care:** We utilized a Plan-Do-Check-Act strategy to determine optimal sternal incision care. Comparing practices across the institution, a silver impregnated dressing that could remain in place for seven days was reported to provide optimum infection prevention. We implemented the use of this dressing applied to the midsternal incision in the CV OR. After implementing this practice change, the interdisciplinary team felt strongly that the incision should be inspected throughout the hospital stay. Since the recommendation for the silver impregnated dressing is that it remain in place 7 days for maximal benefit, the decision was made to revert back to the standard tegaderm dressing. Nursing practice regarding incisional care was reviewed and standardized across inpatient units.

While we are seeing the initial positive impact of these initiatives in our real-time data, we will continue close surveillance to ensure long term success. We will reconvene the interdisciplinary team periodically to review data and determine successes and/or where additional change might be needed. As a participant in the (STS) Adult Cardiac Surgery Database, we await the publication of data representing our post-implementation time frame.

**Supporting Documentation**

a. Yearly count of Deep Sternal Wound Infection (DSW) within 30 days of index procedure:

![CV Surgery Incidence of DSW](image)
b.) 2018 count of DSW within 30 days of index procedure:

Fishbone diagram as a visualization and categorization tool utilized to identify potential causes of DSW

c.) Pre-Operative antibiotic administration timing:
PREVENTING PATIENT HARM: A JOURNEY IN REDUCING CATHETER ASSOCIATED URINARY TRACT INFECTIONS

The Patient Protection and Affordable Care Act (ACA) of 2010 was the genesis of a new day for healthcare across the United States. It set forth the requirements which marked the first time that pay-for-performance measurement was a part of our sphere. Measures, which used to be driven only by improving patient outcomes and reducing harm, now had payment reduction penalties tied to them. One of the earliest measures that became a national focus and were required for reporting centered on Hospital Acquired Catheter Associated Urinary Tract Infection (CAUTI).

The Hospital for Special Care’s patient population presented challenges, specifically with patients who had neurogenic bladder conditions with long term debilitating prognoses. The Hospital for Special Care was not opposed to supporting suprapubic tube placement for some of these patients, and in some cases it would be the ideal, but the cost-benefit for putting a patient through an invasive procedure was not one that was taken lightly. When considering whether to place either suprapubic tube or indwelling catheter or nothing at all, the choice was further complicated by ensuring that patients did not suffer any skin breakdown as a result of urinary incontinence. The challenge needed to be tackled with the best interests of the patients in mind. It had been one which had been approached in many different ways over the years. How could the hospital reduce harm from infected indwelling catheters, given the complicated, long-term courses that the patients in our care faced?

In 2011, ahead of the imposed QRP requirements, the Hospital for Special Care analyzed the current situation. A proactive failure mode and effect analysis was organized to evaluate any opportunities that existed. The CDC had identified CAUTI as a top 10 leading cause of death in the United States just a few years earlier and so, whether driven by ACA or by patient safety, the analysis seemed critical. The team that assembled in 2011 worked through 2012 and identified three potential sources of continued CAUTI in the hospital population. The first was an assumption that not all indwelling catheters were medically necessary, as there were no consistent established criteria for placement. The practice was individualized by provider. The second was an assumption that not all indwelling catheters were discontinued when they were no longer medically necessary. The third was the need for a long-term indwelling catheter use review for appropriateness. The team operated on the premise that if the patient didn’t have an indwelling catheter placed at all, it could not become infected!
Working off these assumptions, the team began to research and collect established evidence-based criteria, population-specific inherent organization knowledge, and staff/provider feedback. They were able to develop, implement, and educate on criteria for appropriate placement to be reviewed before any indwelling catheter was inserted. This included nurses practicing a questioning attitude when providers were ordering indwelling catheters outside the established medically necessary purposes. The team also developed a process for daily assessment of the need for ongoing indwelling catheter placement, which included a nurse-driven protocol for removal. In addition, they accomplished the goal of developing criteria for assessing continued use and appropriateness for long-term placement. By the end of 2012 and into 2013, the team’s new roadmap was in place.

The early data showed promising results. In 2013, the total catheter days for the organization were 11,758 across all units. There were 19 total infections. Throughout 2014, the organization built awareness about CAUTI reduction efforts through a “Stop CAUTI” campaign aimed at good Foley care for the nursing assistants and utilizing the removal criteria with the nursing staff. In 2014, the total catheter days reduced by 33% to 7,858 for the year. The infections also dropped, by a smaller percentage of 21% to 15 for the year. It appeared that the Hospital for Special Care was on the right track. In 2015, the hospital began to see a sharp increase in total infections but a consistent reduction in the number of catheter days. The 2015 catheter days had further reduced to 4,774, 39% from 2014, but the infections had risen to a high of 26. A new analysis was needed to determine how this could be and what could be the next step for the cause.

In 2016, the organization set out on another proactive failure mode and effect analysis to determine what had changed and why the risk to the patients was now increasing. This time, the team identified potential areas of concern around indwelling catheter insertion, new admission discontinuation, and collection bag/hygiene care. Working off these areas, a quality improvement team formed and generated several very helpful next generation tools for continued improvement. These included a CAUTI Care Bundle focused on hand hygiene, perineal care, collection bag care, and daily need assessment to ensure early removal. In addition, a Foley Catheter Time Out and Insertion Bundle was created, which emphasized a thoughtful nursing decision to insert a Foley. The Time Out required a review of the criteria for medical necessity, a cross check with two licensed team member focused on using aseptic technique, a selection of the smallest size catheter required, and strong practice of dating and timing the bag. With all the focus in 2016, the hospital further reduced the indwelling catheter days to 1,927, a 60% reduction from the year prior and also saw a dramatic reduction in the infections reported to just 5 for all units for the entire year! This was an 80% reduction from the high in 2015.

Throughout early 2017, education was ongoing and the organization was finding compromise and norms for the newly defined processes. There was a stabilization of the indwelling catheter days and a slight increase in infections initially – 13 in 2017, a 46% increase. The end of 2017 saw the implementation of auditing and rounding by clinical leaders to ensure staff were familiar and comfortable with the new processes. Information was shared in huddles and the new protocols were healthily challenged by staff. However, once the word was spread and the staff normalized their processes the organization hit an all-time low for both catheter days and infections – just 4 infections for the entire house and 1,806 total indwelling catheter days were reported in 2018. That is on average less than 5 indwelling catheters per day for a population of 228 long-term compromised inpatients.

The hospital evaluates priority areas of focus and CAUTI will never be overlooked. Lessons learned from the past have demonstrated that continuous re-evaluation is needed and data helps to provide a key indicator when a process needs review. It’s important to note that in all of the successes that have been realized, there is always continued opportunity. With competing priorities, it is easy to lose sight of long time “wins” and wind up losing the gains once had. Data provides the early indication of old ways creeping in and provides the team with the ability to measure progress.

Preventing Patient Harm: A Journey in Reducing Catheter Associated Urinary Tract Infections Supporting Data*
In 2013, the CDC identified Clostridium difficile as 1 of the top 3 antibiotic-resistant pathogens stating: “This bacteria is an immediate public health threat that requires urgent and aggressive action.” C. diff is now the most common hospital-acquired infection, with approximately half a million Americans affected annually resulting in 15,000 to 30,000 deaths and costing more than $4.8 billion in hospitalizations. C. diff is a management challenge.

When our facility's annual incidence was elevated, Hospital for Special Care’s infection prevention and control department (IPCD) began an in depth review of its experience with C. diff infection (CDI) and initiated a quality improvement project to review and better understand practice and challenges around its diagnosis and management. Data collected included review of:

1. CDI incidence from 2012 to 2014
2. Patterns of infection (initial vs recurrent) in patients with CDI
3. Patient evaluation for work-up
4. Processes utilized to diagnose CDI
5. Treatment of CDI once diagnosed

After these data were compiled and reviewed, recommendations were formulated by the IPCD and then brought to the Infection Prevention and Control Committee (IPCC) for additional review and discussion.

Data confirmed a CDI incidence of 23 cases in 2012, 19 cases in 2013, and 18 cases in 2014. There were no cases of cross contamination transmission. However, what was also found were a number of inconsistencies with the determination of when a stool specimen should be sent for lab work-up. More than 30% of our patients either did not have clinical improvement and/or recurred after treatment with Metronidazole, the recommended first line drug as per national treatment guidelines at that time. Also, it was found that specimens were being ordered for some patients who did not meet the standard definition for investigation: 3 or more loose watery stools in 24 hours with a history of current or recent antibiotic use and no recent administration of bowel medications.

After current literature was researched, including the 2010 Society for Healthcare Epidemiology of America (SHEA) and the Infectious Diseases Society of America (IDSA) guidelines, our facility specific CDI management algorithm was drafted by the IPCD in November 2014. It included information on how to evaluate a patient, when to send a stool specimen, and how to treat a patient once appropriately diagnosed. It took the bold step of changing from Metronidazole as a first choice agent to Vancomycin because of documented treatment failures. The algorithm included a new process where the lab notified the IPCD every time a specimen was received for C. diff testing, 7 days a week. This proved useful in that it provided an opportunity to collaborate with nursing to ask why a specimen was being sent, confirmed with the lab that the specimen met their criteria for testing, and most importantly, allowed discussion to occur with the patient's provider to review information provided to them and to include them especially if they were not the clinician who gave the work-up order.

The algorithm was again reviewed at IPCC and additional input was received from the pharmacy and laboratory departments as well as the Medical Staff Peer Review Committee.

Medical Staff Executive Committee (MSEC), aware of the project and informed of other committee sign offs, was presented the algorithm where it was discussed, approved, and widely distributed for prescriber use. Nursing education was provided re: CDI incidence and the goals of the algorithm; education emphasized when a patient should have CDI considered as a diagnosis and, as such, the appropriate clinical indications to send a stool specimen for testing.

After education was provided and the algorithm was operationalized, equivalent time period comparisons were made. In November 2013 through October 2014, there were 17 cases. From November 2014 through December 2015, there were 9 cases showing an overall 53% decrease in diagnosed cases.

Data continued to be collected as did IPCD input and consultations. Monitoring of compliance with algorithm use continued, as well as review of all orders placed for work-up. There was ongoing discussion with nursing staff, prescribers, and the laboratory regarding every specimen obtained for work-up. Annual C. diff incidence from 2016 through 2018 showed a consistent decrease in diagnosed cases with 8 in 2016, 5 in 2017, and 6 in 2018.

The C. diff treatment algorithm has undergone revision since its inception to incorporate into practice most recent updates in the 2018 Clinical Practice Guidelines for CDI by SHEA and IDSA and opportunities found based on data obtained and Hospital for Special Care’s experience. Communication regarding practice and ordering patterns continues with nursing, prescribers, and laboratory staff. Data are reviewed monthly in IPCC meetings and included in the IPCD semi-annual QA reports.

Based on our awareness and use of data, there were two important changes made to our facility’s practice. First, there is a more careful assessment of stool specimens sent for work-up based on patient clinical presentation and assessment. Secondly, there was a facility change in initial treatment of CDI from Metronidazole to Vancomycin, 4 years before this was recommended in the 2018 Clinical Practice Guidelines for CDI by SHEA and IDSA.

This project exemplifies the power of collecting and analyzing data trends and sharing and discussing them with all appropriate clinical providers, combined with a multidisciplinary team effort to provide improved clinical outcomes for our patients.
PREVENTING PATIENT HARM - UTI REDUCTION

In the Long Term Acute Care (LTACH) setting, care is provided to medically complex patients who have high acuity, multiple co-morbidities, and require complex treatments. Urinary tract infections (UTIs) have always been the most common type encountered, proving to be a challenge to prevent and treat. Because of neurologic compromise, many patients have abnormal urinary bladder drainage. Reducing the number of urinary tract infections was targeted by Hospital for Special Care as a critical clinical improvement opportunity.

In 2004, the initial step in our process was to identify all current patients, as well as those going forward, who had UTIs and collect data about them including:

1. Patient name, diagnoses, and nursing unit location
2. Means by which bladder emptying occurs: normally or assisted by Foley catheter, supra-pubic (SP) catheter, intermittent straight catheter, or external catheter
3. History of formal urologic consultation
4. History of previous genitourinary (GU) work-up (diagnoses of nephrolithiasis, structural abnormalities, etc.)
5. Number of UTIs individual patients had documented over a 3, 6, and 12 month time period
6. Determination of patients with recurrent UTIs (3 or more over a 6 month time period)
7. Annual total number of UTIs by nursing unit as well as facility-wide

Once data were accumulated, the infection preventionist (IP) and infectious disease physician (ID MD) reviewed data looking for trends and patterns. This included identification of the nursing unit with the most UTIs and used this as a starting point for deeper analysis, education, and immediate corrective actions where needed. These data were presented to the Infection Prevention and Control Committee (IPCC) for discussion where formation of an IPCC subcommittee (a multidisciplinary group comprising the ID MD, IP, and representatives from laboratory, pharmacy, nursing and medical staff including a nurse practitioner with an interest in GU issues) was commissioned to do a deeper dive into data analysis and determine next steps.
After multiple subcommittee meetings, clinical issues were identified and recommendations made including:

1. Data needed to be shared with all stakeholders including medical staff and nursing at all levels
2. Education for medical and nursing staff was needed regarding how to differentiate between an actual urinary tract infection which needed treatment, from asymptomatic bacteriuria, which was quite commonly seen, and did not require treatment
3. An organized approach to the evaluation and treatment of patients with recurrent UTIs
4. Identification of a urology consultant to assist with patient evaluation and treatment requiring GU procedures such as suprapubic tube placement and kidney stone removal

Multiple meetings were held with nursing staff on all shifts to review the UTI data that had been compiled and explain the UTI reduction project and goals. This same information was shared at medical staff meetings where data were explained and discussed, and additional input was sought. Data, goals, and proposed next steps were discussed with the vice president for medical affairs and brought to the Medical Staff Executive Committee (MSEC) for their review. As a result, a urologist became part of the team.

Patients who were identified as having multiple UTIs in a 6 month period received closer review including development of clinical outcome logs for each, a follow up 6 month re-assessment to evaluate ongoing trends, and infectious disease oversight and recommendations for management.

Data review documented increased and recurrent numbers of UTIs in patients with urinary drainage devices. This prompted development by the IPCC subcommittee of a facility-specific draft document entitled Guidelines for the Management of Patients with Urinary Drainage Devices, which provided education on normal bladder function and challenges frequently encountered with drainage as well as the different types of urinary drainage devices available if clinically indicated. If an indwelling Foley catheter was documented as necessary, guidelines on how best to care for that device as well as how to assess its continued clinical need, with the goal of removal when medically feasible, were included. Specific recommendations regarding accurate diagnosis of true urinary tract infections were re-emphasized. Included were newly drafted policies on bladder catheterization, how to obtain urinary specimens correctly, with renewed emphasis on basic infection control principles such as hand hygiene and glove use. Additionally, a specific color coded GU Consultation Sheet was developed for easy re-emphasis. Included were newly drafted policies on bladder catheterization, how to obtain urinary specimens correctly, with renewed emphasis on basic infection control principles such as hand hygiene and glove use. Additionally, a specific color coded GU Consultation Sheet was developed for easy recognition of urology visits and follow ups. The guidelines were reviewed by the IPCC, medical and nursing staff, the consultant urologist, and finally the MSEC, all of whom approved its implementation. It was received enthusiastically by prescribers who saw it as a template they could follow as a reference.

UTI data continued to be tracked annually and shared with nursing and medical staff. A downward trend, as much as 50% to 75% on nursing units, was documented over time with those gains maintained. The facility’s GU practice guidelines continued to be reviewed and updated annually when new clinical insights were identified, additional updated data were obtained, and new literature was available for review.

In 2011, a second phase project was developed specifically evaluating how to reduce the number of catheter associated urinary tract infections (CAUTIs) with a focused look at Foley catheterized patients evaluating what could be done to remove more of them if medically feasible. Data obtained for this ongoing project has been shared with stakeholders and discussed at all levels, leading to a process that empowers nurses, working with medical staff, to evaluate patients for Foley removal when appropriate and medically feasible. Success is being achieved in this specific endeavor and continues as an ongoing quality improvement project to improve the clinical outcomes of the patients to whom we provide care.

Preventing Patient Harm - UTI Reduction

Total Urinary Tract Infections Per Year/Per Unit Cumulative Totals Jan. 2004 - Dec. 2011

For more information, contact Brenda Nurse, MD, Chief of Infectious Disease and Epidemiology, Hospital for Special Care, at (860) 827-4748.
C. DIFF INFECTION RATE REDUCTION

The incidence of hospital-acquired C. diff infections started to increase significantly in FY 2018. The rate, defined as the number of C. diff infections per 10,000 patient days, increased by 27% from 6.2 in FY 2017 to 9.8 (July 2017-March 2018).

Through detailed analysis, it was recognized that certain units had a much higher rate of infection than others, and through an audit of a large sample (23 C. diff cases) from the nursing units with the high rates, we discovered that there is significant deviation from best standards of testing practice. The data points of the audit included timeliness of testing, laxative use, presence of signs and symptoms specific to C. diff infection. The result of the analysis indicated that in many instances we were over testing for the presence of the C. diff, or not testing at the appropriate time. Findings included the following results: 38% of the patients reviewed had received a laxative within 48 hours of obtaining the C. diff sample. Another 22% had documented diarrhea upon admission but were not tested for C. diff until the third day into admission.

Using a project template called an A3, we have outlined the problem statement, the current condition, the cause analysis, countermeasures tied to the cause, and action plans.

One of the action plans included the development of a diarrhea decision tree algorithm and, in April 2018, a house-wide rollout of the algorithm was completed, including multidisciplinary education, feedback, questions and answers, staff meetings, and individual support and reinforcement. Subsequently, the C. diff rate in FYTD 2019 has decreased by 50% to 4.9. The number of cases has decreased from 4.67 cases on average per month to 2.37.

C. diff studies have demonstrated that mortality associated with C. diff has ranged from 7% to 48%, depending on the patients’ comorbidities. Hospital-acquired C. diff is associated with a significant increase in hospital costs and length of stay. On average, C. diff costs an estimated $4,100 per case. (*Apic Cost Calculator). C. diff is also one of the healthcare-acquired infections (HAI) with significant impact in quality at-risk Medicare programs and in Quality Public Reporting.

Nationwide, our healthcare system sets goals for improvement on the HAI rates in general (and C. diff in particular), based on the Standardized Infection Ratio (SIR). In 2019, one of our organizational goals is reduction of C. diff infection SIR rate by 25%.

The number of C. diff cases, C. diff rate, and C. diff SIR are used to measure and report the HAC C. diff infections regularly (monthly at the Infection Prevention, Quality Council and the patient Safety Board meeting). The number of C-diff tests performed are also monitored monthly and trended over time.

Prior to the improvement project, there was no standardized protocol for testing the presence of C. diff infections for patients with diarrhea. This led in time to unnecessary testing of patients and false positive results. About 35% of the patients in the sample population analyzed tested negative for the C. diff toxin, but positive for the antigen. These patients, although may have not been actively infected with C. diff, were often subsequently treated based on the testing.

Through the C. diff rate performance improvement project and the use of the A3 framework, we were able to determine the root causes, analyze the data, and implement several interventions including a diarrhea decision tree. The quality and infection departments went to every unit to review each unit’s C. diff data and roll out the new algorithm. Every new case of C. diff is reviewed concurrently by performance improvement, infection prevention, and managers of the unit to identify any deviations from the testing protocol; feedback is provided to the teams and individuals.

The improvement in performance will be demonstrated once the performance period for the state and national data sets will include FY 2019 data.

For more information, contact Corina Marcu, MD, Medical Director, Quality and CQO, Saint Vincent’s Medical Center, at (475) 210-5778.
YALE NEW HAVEN HOSPITAL

HEART AND VASCULAR CENTER’S REDUCTION OF DEEP STERNAL WOUND INFECTIONS IN THE ISOLATED CORONARY ARTERY BYPASS (CABG) PATIENT POPULATION

In fall 2017, the Heart and Vascular Center (HVC) quality and safety department received reports of increased incidence of deep sternal wound infections. Reports were confirmed through review of contemporary Society of Thoracic Surgeons (STS) registry data, and we convened a multidisciplinary group to reduce sternal wound infections following CABG surgery.

Engagement of key clinical and administrative leaders assisted in creating a shared benefit. Internal hospital and specific patient data along with STS reports were used to create a data story that tracked the reduction of deep sternal wound infections (mediastinitis) in the isolated CABG patient population.

The following methodology was used to implement an infection reduction project:

**Define and Measure**
- Literature review
- Partner with infection prevention
- Utilize work already in progress with orthopedics
- Obtain chief cardiothoracic (CT) surgery and HVC senior leadership support
- Review current infection data to identify themes
- Stakeholder analysis completed
- Create a shared need

**Analyze**
- Facilitated work out
- Process mapping
- Creation of an infection prevention bundle
- Order sets updated

**Improve**
- Implementation of prevention bundle
- Develop interdisciplinary team
- Engagement of front line nurses, surgeon, anesthesia
- Staff education completed
- Gap analysis and action plan
- Development process measurements and plan with real time feedback

**Control**
- Monthly review of missed cases
- Themes reviewed for next steps
- STS quarterly data
- Action and new intervention when new theme identified

Through STS registry, deep sternal wound infections post cardiac surgery, specifically coronary bypass surgery, were statistically higher than average.

From January 2017 through December 2017, a total of 6 sternal wound infections accounted for 14% of CABG morbidity. The sternal wound infection rate was at 2.6%; STS like group was at 0.6% and STS database was at 0.3%. Deep sternal wound infections are associated with substantial morbidity and higher healthcare costs.

In FY 2019, we constructed the PI Plan around the strategic framework of the Triple Aim first proposed by the Institute for Healthcare Improvement. The top priorities for 2019 are consistent with the framework of the Triple Aim. Quality and safety, which is part of the aim, includes high reliability organization (HRO) practices, hospital acquired conditions/infections (HACs/HAIs), readmissions, mortality, patient safety, and precursor safety events. SSI prevention is a subset of the overall infection rates of the hospital.

Surgical Site Infection prevention interventions target all phases of perioperative care, as well as impacting hospital-acquired infections such as central line-associated bloodstream infections (CLABSIs).

**Pre op (Pre-Admission Testing)**
- Shower with Hibiclens® liquid/or wipes
- Standardize patient instructions
- Increase stock of Hibiclens® in clinics
Inpatients

- Pre-op checklist completed
- Add CHG wipes or Hibiclens® to order set and have it pre checked
- CT surgery to order when consulted for surgery

Express Admissions Services (EAS)

- EAS nursing to use CHG wipes with all CT surgery patients prior to OR
- Standardized patient instructions

Historically, individual surgeons and teams did implement infection prevention processes, but they weren’t standardized for cardiac surgical population.

Process Improvement

- Engagement, awareness, and accountability by front-line staff to address specific interventions to prevent infection
- Infrastructure to measure bundle processes
- Attendance at faculty meetings and staff meetings to discuss metrics
- Missed opportunity report compiled monthly with individual feedback to discuss challenges and support sustainability
- JDAT report used to identify current patients with infections prior to the STS report available
- Project success has been shared with pediatrics and Bridgeport Hospital

Results

- Greater than 20% reduction in deep sternal wound infections in the CABG patient population in the first quarter (2018 STS Harvest 3 Report) post full implementation of the infection prevention bundle
- Secondary gain of reduced central line infection with bundle implementation with no CLABSSIs in the Isolated CABG population since April 2018
Results: FY 2018-December 2018:
Readmissions Due to Sternal Mediastinitis (Count)

30-Day Readmissions: Sternal Mediastinitis

2017 STS Harvest 3 Report:

2018 STS Harvest 3 Report:

For more information, contact Sandra Fillion, Performance Improvement Coordinator, Heart and Vascular, Yale New Haven Hospital, at (203) 688-5882.