

# 2018 Quality Report



Le Bonheur  
Children's Hospital

Le Bonheur Children's Hospital is committed to improving the lives of every child and family. Every day teams of professional and health care associates work to provide the highest level of care with the best possible outcomes in a family-centered environment.



We view exceptional care as a journey that requires continuous improvement at the bedside as well as critical evaluation of all our patient outcomes. With this mission in mind, Le Bonheur actively participates in national and regional organizations and registries that allow us to rapidly improve through collaboration and comparison. Le Bonheur is now part of 28 registries, databases and quality care organizations.

Since 2012, Le Bonheur Children's Hospital has been a member of "Solutions for Patient Safety." This is a national organization comprised of over 135 children's hospitals whose shared vision is "no child will ever experience serious harm while we are trying to heal them." Members are committed to putting aside competition in order to share and learn together so we can all achieve our ultimate goal. We are proud to be part of this organization, and our shared commitment impacts every aspect of care that we provide at Le Bonheur.

Quality, safety and patient outcomes are an integral part of every department and service at Le Bonheur. These efforts are coordinated, facilitated and managed by our Quality Department. A dedicated group of highly educated and trained Quality Specialists who work throughout the organization to systematically improve care alongside their clinical counterparts.

The culmination of their work, along with our medical staff, healthcare professionals and family partners, are presented in this 2018 Quality Report. 2018 was an exceptional year as we were recognized as a Top 10 Children's Hospital by the Leapfrog Group and again ranked highly by *US News & World Report* in multiple specialties including a Top 10 Pediatric Cardiology program. Internally we continued to reduce our hospital acquired infections, decrease unnecessary antibiotic use and provide, in our Emergency Services Division, nationally recognized top decile patient experience.

It has been a great year, but we know the journey is far from finished. We look forward to the challenges of 2019 and hope you find this report informative and inspiring.

Respectfully presented,

A handwritten signature in black ink that reads "Barry Gilmore". The signature is fluid and cursive, with a long horizontal line extending to the right.

Barry Gilmore, MD, MBA  
Vice President and Chief Medical Officer  
Le Bonheur Children's Hospital  
Memphis, Tennessee

## 2018 AWARDS AND RECOGNITIONS



Ranked in eight specialties in *U.S. News & World Report's* Best Children's Hospitals



College of American Pathologists Certification



American Association of Blood Banks Certification



Leapfrog Top 10 Children's Hospital



Performance Excellence Award Antibiotic Stewardship

### Notable Accomplishments:

- Introduced Harm Dashboard to Daily Safety Brief
- 449 days since last CLABSI in PICU
- Zero falls with harm events (F-I)
- Zero adverse drug events (F-I); 100% compliant with improvement roadmap
- Implemented barcode administration house-wide
- Patient and Family-Centered Care – embedded Family Partner Council members into units and departments
- Initiated project to improve experience for patients on the autism spectrum
  - Developed template for individualized care plans in electronic medical record to be customized by units
- Cardiology:
  - UNOS/CMS accreditation
- ECMO intensive program review
- Orthopaedics:
  - Campbell Foundation awarded \$1,000,000 for study of children with Cerebral Palsy (CP) to be led by Campbell Clinic Orthopaedic surgeons in collaboration with Le Bonheur
  - Set up multidisciplinary CP clinic in a partnership between Campbell Clinic and Le Bonheur
- Pediatric Surgery
  - Launched bariatric surgery program
- Pulmonology and Neonatology
  - Multidisciplinary family conference prior to trach or long term ventilation



**QUALITY  
PROGRAM**

The Le Bonheur Children's Hospital Quality Program is dedicated to improving care provided to our patients through support of service line improvement work, as well as the identification and resolution of safety, risk, quality and service issues within the organization. Two monthly meetings are strategic to the Quality Program - the Quality Council and the Safety Operations Council. As part of the Methodist Le Bonheur Healthcare System (MLH), quality reports and data are provided as requested for presentation at the system level Safety Operations Council, Senior Leaders Operational Council and Quality Committee of the Board of Directors.

## **QUALITY COUNCIL**

The Quality Council (QC) provides an overarching guidance for the Quality Program by providing active leadership and oversight for the organization's improvement initiatives. Monthly meetings serve as an opportunity for service line medical directors and other speakers to share volume and outcomes information, report on progress with quality improvement initiatives and solicit participation for approving and prioritizing initiatives. Membership includes physicians, hospital administration, extended hospital leadership, members of the Senior Leadership Council, Safety Operations Council and Family Partners Council. The format and agenda have been approved by the MLH Continuing Medical Education Department serving as a mechanism for physicians to receive CME credits.

## **SAFETY OPERATIONS COUNCIL**

The Safety Operations Council (SOC) is the operational working arm of the Quality Program. The SOC consists of operational leaders from administration, nursing, professional services and support departments. Jointly led by representatives from quality improvement and risk management, the SOC is designed to focus on operational and process issues that impact quality of care and patient safety. The SOC serves as a venue where safety issues and improvement opportunities are presented with the expectation that they will be reviewed, investigated and resolved or escalated as necessary. Issues and opportunities may be submitted by individuals, departments, and other committees. A docket system is used to keep track of council activities. Operational leaders are assigned responsibility for docket items and then engage front line staff and other subject matter experts to develop resolutions. Resolutions are then brought back to the SOC to ensure the resolution is appropriate and has no negative repercussions on other ongoing activities or patient care. When appropriate, the resolution is spread to other areas or adapted to similar situations. The long term goal is to anticipate quality and safety issues and respond proactively to prevent patient harm and ensure high quality care.

## **PHYSICIAN ADVISORY GROUP (PAG) AS PART OF THE SENIOR LEADERSHIP COUNCIL**

Physician leadership is essential to the success of the quality improvement program. Physicians are encouraged to participate in both the Quality Council and Safety Operations Council. Additionally, physicians are provided a venue to participate and share thoughts and concerns through the Physician Advisory Group that exists within the Senior Leadership Council structure.

## QUALITY DEPARTMENT

Management of the Le Bonheur's Quality Program is provided by the Quality Improvement (QI) Department which integrates Quality Improvement, Risk Management, Patient Advocate, Regulatory Readiness, Physician Quality and Data Analytics to improve care and outcomes for patients seen at Le Bonheur. This is accomplished by embedding QI project managers in service lines, working collaboratively with leaders and front line staff and employing improvement science locally and across the organization to better understand the opportunities, causes, and mitigation of real and potential harm and process failures within the care environment.

Reporting up to and working in collaboration with the Chief Medical Officer, the current QI team consists of 14 team members including Directors of Quality and Risk Management, Regulatory Program Manager, Patient Experience Coordinator/Advocate, Physician Quality Specialists, QI Project Managers and Data Analysts. Talent in the QI department includes six Master's degrees, four Six Sigma\* Black Belts, two Six Sigma Green Belts, one Six Sigma Yellow Belt, one Certified Professional in Healthcare Quality (CPHQ), two state-level Malcolm Baldrige Quality Award+ examiners (TNCPE) and one 2-time Malcolm Baldrige National Quality Award examiner.

*\*Six Sigma is an improvement methodology certification which comes in various levels of expertise with black belt being the highest.*

*+Baldrige Quality Award examiners are trained to review applications and perform on-site inspections for applicants in seven categories: Leadership, Strategy, Customers, Measurement, Workforce, Operations and Results. Applicants are assessed within each category for Approach, Deployment, Learning and Integration.*

## 2018 PHYSICIAN QUALITY

The Physician Quality Department manages the varied Pediatric Medical Staff meetings, conducts quality care reviews for the Physician Quality process and coordinates quality data for reappraisals and reappointment of the medical and surgical staff requesting pediatric privileges throughout the MLH system. The team accomplished the following in 2018:

- 2,765: Cases reviewed for quality metrics
- 474 Providers: Ongoing Professional Practice Evaluations
- 133 Providers: Focused Professional Practice Evaluations
- 103 Providers: Current Clinical Competencies
- 9: Medical Staff Committees/Meetings supported
- 15: Improvement projects submitted for Part IV MOC

According to the American Board of Pediatrics (ABP), Maintenance of Certification (MOC) is the continuous and ongoing process of lifelong learning, self-assessment and clinical improvement that board-certified pediatricians and pediatric subspecialists perform to maintain certification with the ABP. Part 4, Improving Professional Practice and Quality Improvement, is designed to assist physicians in evaluating and improving care they provide. Le Bonheur serves as a portfolio sponsor, providing support for physicians in quest of Part 4 credit. In 2018, 15 projects were submitted and received approval. Improvement projects submitted for MOC included:

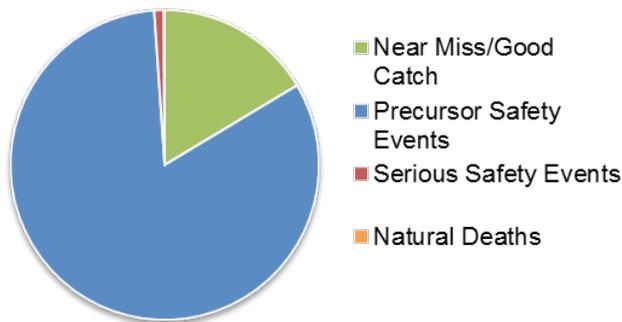
- DKA – Improving time to insulin
- Echo – Improving echo accuracy for patients with cardiomyopathy
- Ultrasound IV – Improving comfort and safety of residents for placing ultrasound guided IVs for difficult sticks
- Seizures – Reduction of admissions for first time seizure patients and reduction of CT scans
- Improving evaluation/management of adolescents with functional neurological disorders

## 2018 RISK MANAGEMENT

The Risk Management Department is responsible for the clinical risk management program and proactive risk assessment with the overall objective of promoting patient safety, enhancing quality of care and minimizing loss to protect assets of the facility. Review and analysis of all events reported through Safeguard, significant event investigations, root cause analyses and action plans are facilitated through the risk management program.

In an effort to improve the culture of safety, staff and physicians are encouraged to report all types of events. This is important in understanding and improving care processes.

### 2018 Events Reviewed



### 3,863 Total Events Reviewed

- 3 Natural Deaths
- 39 Serious Safety Events
- 633 Near Miss/ Good Catch Events
- 3188 Precursor Safety Events

99.5 percent of events were recognized and reported by staff and physician through the reporting process.



**ELIMINATING  
PREVENTABLE  
HARM**

## **CHILDREN'S HOSPITALS' SOLUTIONS FOR PATIENT SAFETY NATIONAL COLLABORATIVE (CHSPS)**

Patient safety is a priority. Le Bonheur has been a member of the national Children's Hospitals' Solutions for Patient Safety Network since 2012. With a mission to eliminate preventable harm, work is accomplished through implementation of prevention bundles established by the network for a number of harm events. A culture shift was noted in 2018 with increased engagement from and understanding by the medical staff related to potentially preventable harm events with an open exchange of ideas and a preventative mindset.

### **Notable Achievements in 2018:**

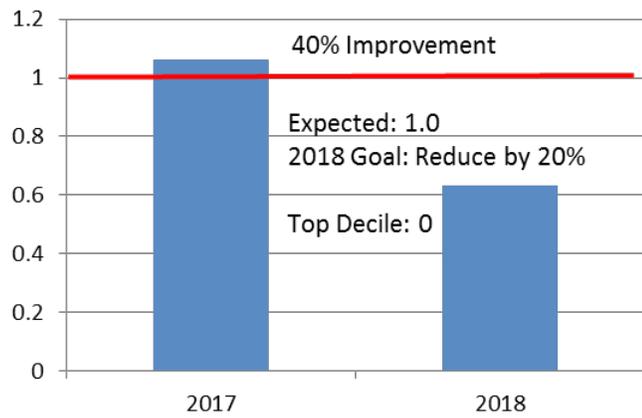
- Pediatric Intensive Care Unit went 446 days and counting without a Central Line Associated Blood Stream Infection (CLABSI)
- Neonatal Intensive Care Unit went 209 days without a CLABSI
- Falls with Harm and Adverse Drug Events (F and greater) remain zero
- Participated as a Pioneer hospital for non-CVL VTE
  - Pioneer hospitals volunteer to test prevention and improvement tactics under evaluation for inclusion in prevention bundles.
- Recognized in SPS SHINE (Sharing Hospitals' Innovations for Network Engagement) Report in July 2018 as best practice for Falls Prevention
- Presented "High Reliability Journey" on national SPS Network webinar
- Developed baselines for Ventilator Associated Events and Unplanned Extubations for reporting to SPS in 2019
- Presented "Serious Safety Event Review Process" to CHAT Quality Collaborative group (state level Solutions for Patient Safety)
- Presented "VTE Best Practice" to CHAT

## CENTRAL LINE ASSOCIATED BLOOD STREAM INFECTION (CLABSI)

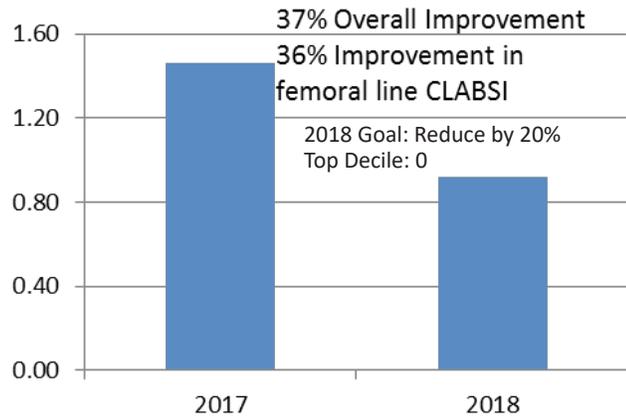
### 2018 Key Improvement Focus

- Improved documentation of line necessity transitioning to physician documentation
- Encouraged use of mid-line and extended-dwell catheters as appropriate options
- Implemented reporting number of lines at Daily Safety Briefs including when blood cultures are drawn to facilitate timely event review
- Implemented daily CHG treatments
- Improved process for dressing changes
- Decreased femoral line use with 18 percent reduction in related CLABSI
- Replaced T-connector product with no associated CLABSI since change
- Implemented protocol for blood culture draws in PICU

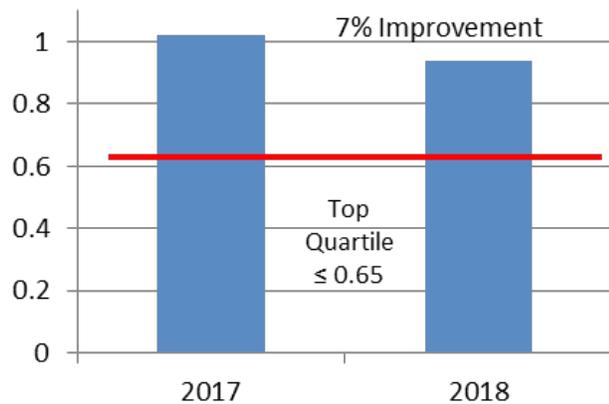
**Central Line Associated Blood Stream Standardized Infection Ratio**



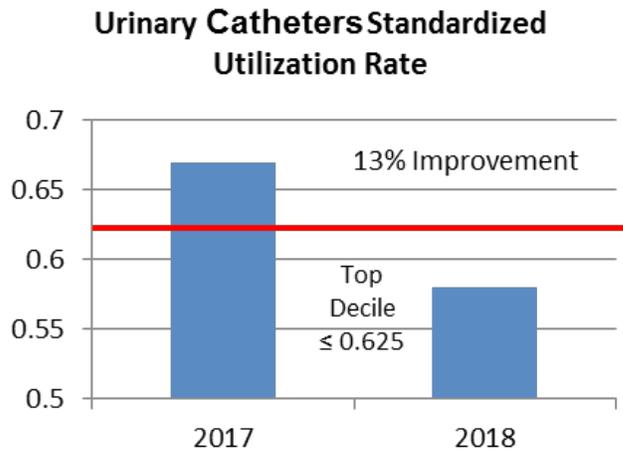
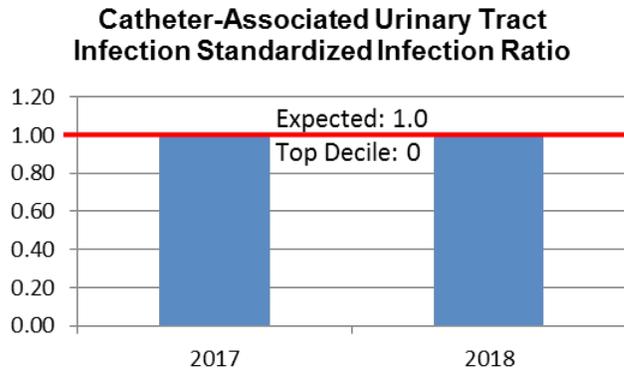
**Central Line Associated Blood Stream Infection Rate per 1000 Line Days**



**Central Line Standardized Utilization Rate**



## URINARY TRACT INFECTION (UTI)



### 2018 Key Improvement Focus

- Consistent use of nurse driven removal protocol
- Implemented reporting number of lines at Daily Safety Briefs
- Increased focus on catheter removal when no longer medically necessary
- Implemented Shriners Hospital's practice for burn patients

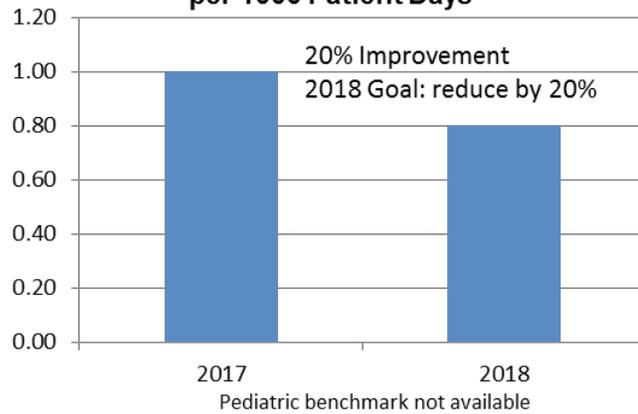


## VENOUS THROMBOEMBOLISM (VTE)

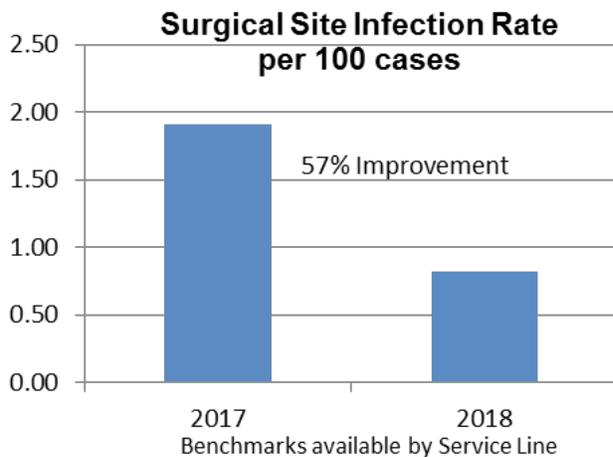
### 2018 Key Improvement Focus

- Interdisciplinary conversations to standardize line placement procedures tailored to individual patient need
- Increased focus on line necessity with removal as soon as no longer medically necessary
- Improved bundle compliance
- Improved use of SCDs with zero post-op VTEs
- Zero events in patients 14 years and older

**Venous Thromboembolism Event Rate per 1000 Patient Days**



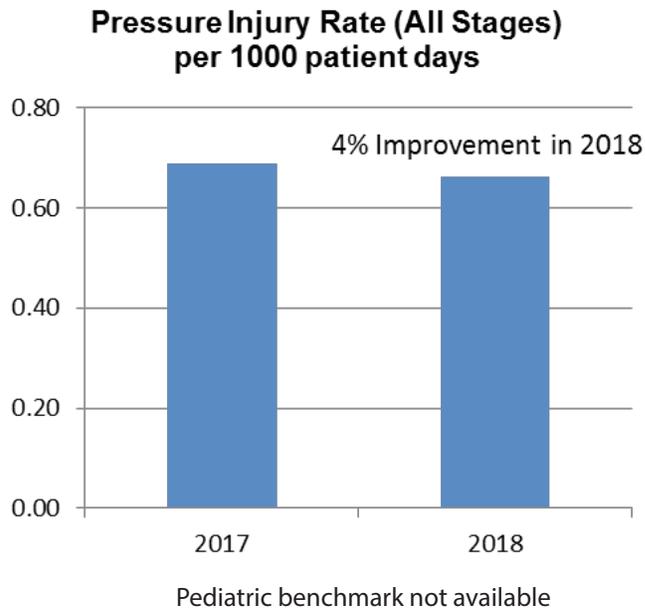
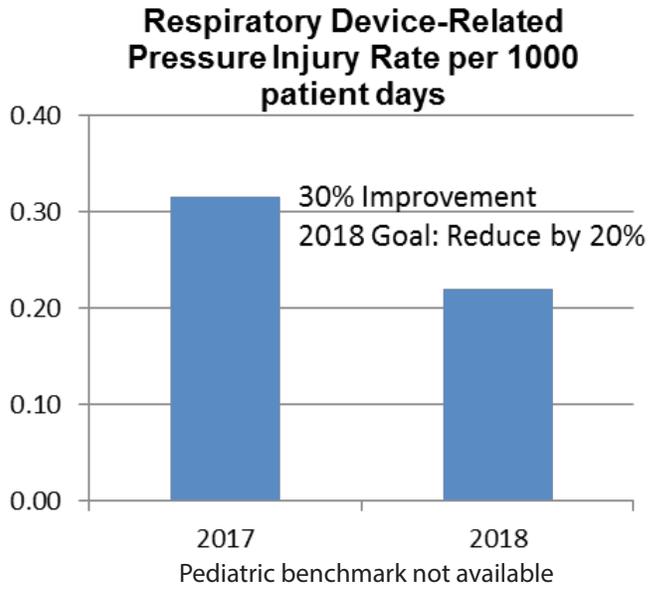
## SURGICAL SITE INFECTION



### 2018 Key Improvement Focus

- Improved electronic pre-op checklist to ensure bathing for all patients prior to surgery
- Implemented pre-op CHG treatments for eligible patients
- Improved communication with surgeons

## PRESSURE INJURY



### 2018 Key Improvement Focus

- Enhanced ET tubing policy to require two caregivers for repositioning
- Implemented random audits to ensure proper placement and use of skin barriers and equipment
- Performed Apparent Cause Analysis on each event with sharing of lessons learned
- Participated in CHSPS Respiratory Device Pressure Injury collaborative

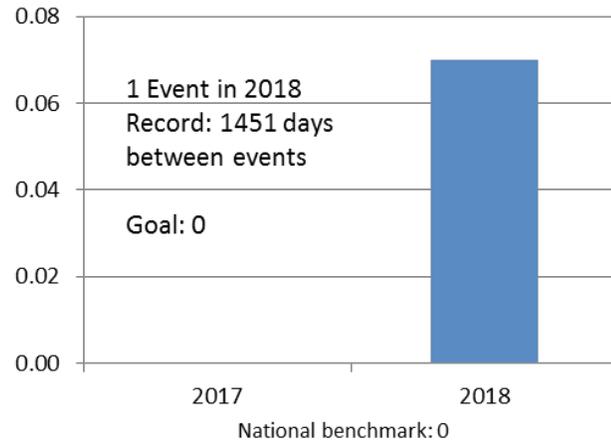


## VENTILATOR ASSOCIATED PNEUMONIA

### 2018 Key Improvement Focus

- Developed process to proactively identify and assess high-risk patients
- Improved bundle compliance to 92.6 percent
- Developed committee and process for transition to Ventilator Associated Events (VAE)
- Developed VAE surveillance process
- Performed Apparent Cause Analysis on each actual and near miss event
- 857 Days since last event

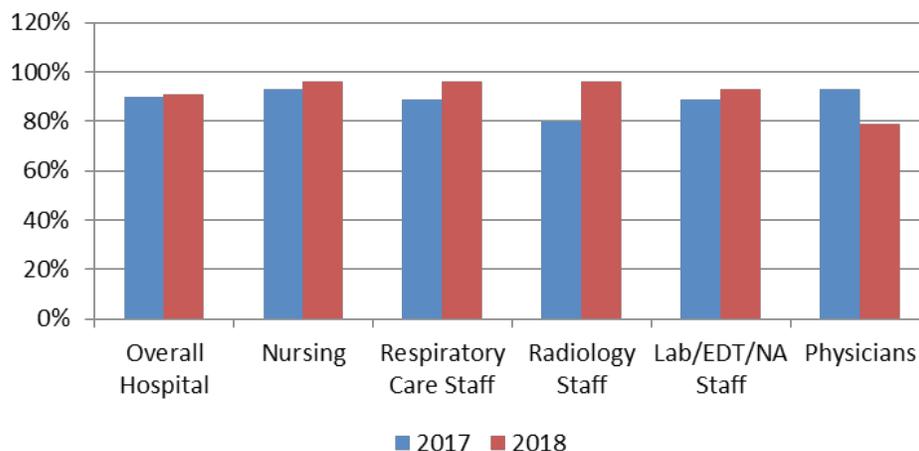
Ventilator Associated Pneumonia Rate per 1000 Vent Days



## HAND HYGIENE

Consistent performance of correct hand hygiene can help reduce hospital acquired infections. Four disciplines demonstrated improvement in hand hygiene compliance in 2018, impacting the overall hospital compliance results. The importance of proper hand hygiene and tools for how to speak up for safety were included in the "Safety Starts With Me" error prevention training that is part of our High Reliability Journey.

Percent Hand Hygiene Compliance  
Higher is Better





No Detergent

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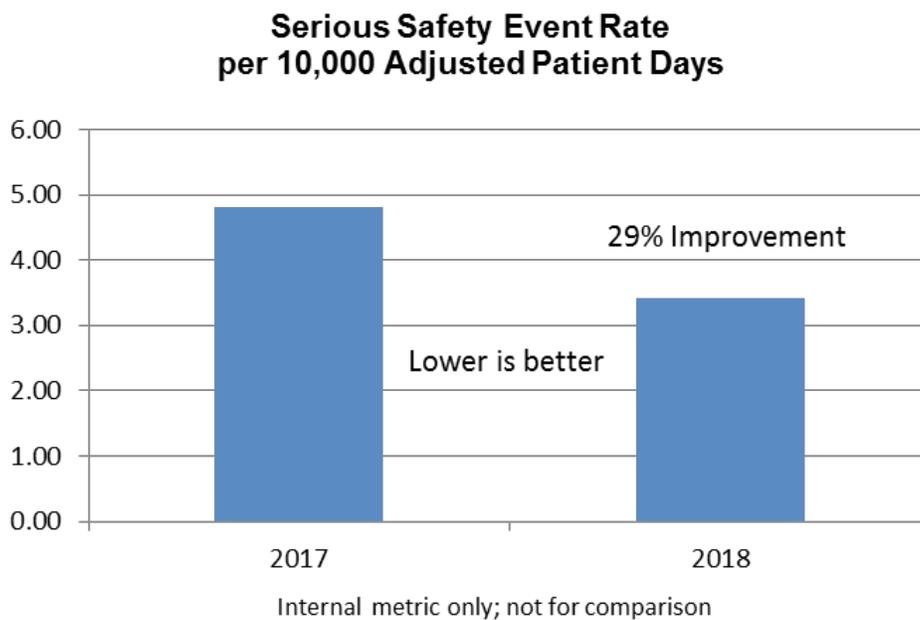
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**HIGH  
RELIABILITY  
JOURNEY**

Creating a culture of safety through high reliability was the next step in the CHSPS roadmap for eliminating preventable harm. Methodist Le Bonheur Healthcare (MLH) partnered with the Healthcare Performance Improvement (HPI) consulting firm to bring that work to the entire MLH system.

The Serious Safety Event rate was introduced and results were evaluated retrospectively back to 2013. In 2017, potentially preventable hospital acquired conditions including CLABSI, CAUTI, VAP and PI among others and AHRQ safety indicators were added to the events being reviewed. Each data point contains the most recent 12 months data. The 12 months ending December 2018 were 29 percent lower than the 12 months ending December 2017.





**The following High Reliability activities were accomplished in 2018:**

- Completed error prevention training (Safety Starts with Me) for all associates and physicians
  - 2,617 associates and 513 physicians trained
- Implemented “Rounding to Influence” for all leaders attending Administrative Operations Council
  - 15 topics reviewed with 2,047 associates
- Conducted Root Cause Analysis (RCA) workshops for all leaders
- Introduced safety coaches
  - 112 safety coaches trained including 31 residents
  - Coaching topics mirror “Rounding to Influence:” 175 coaching opportunities, 39 “good catches” identified and 45 safety stories collected
- Established on-going training schedule for new associates and physicians
- Developed mechanism to connect tones and tools of Safety Starts with Me training more strongly with the MLH Power of One Unfreeze concepts for new associates and physicians
- Introduced Learning Boards; awaiting a template from the system steering committee
- Introduced “Just Culture” with all leaders attending training and sharing concepts with staff
- Reliability Implementation and Sustainability Index (RISI<sup>SM</sup>) – Internal/External Assessment by HPI

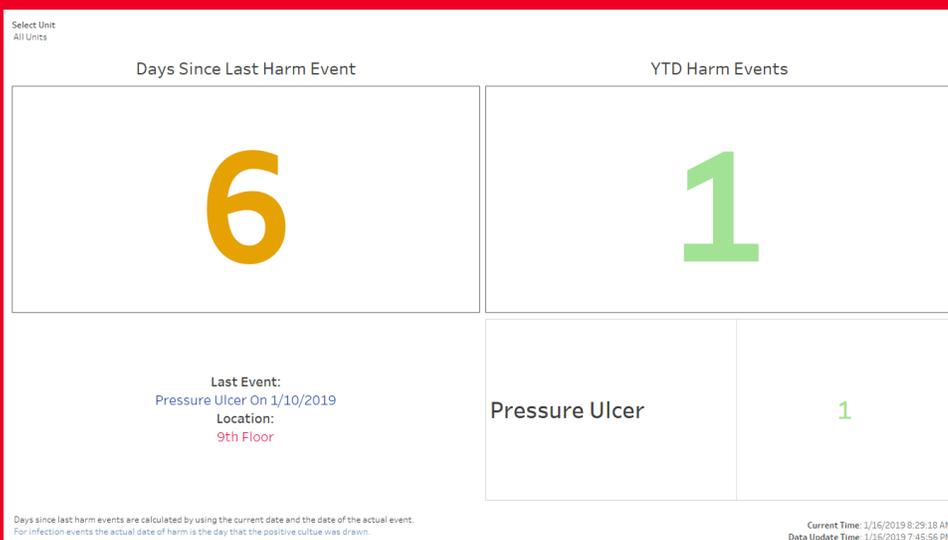
Daily Safety Briefings (DSB) began at Le Bonheur in 2015 as the first step in embracing high reliability. Run by the Administrator on Call, the DSB occurs every day including weekends and holidays. A review of the process in November 2018 by our HPI partners resulted in the following observation included in the RISI<sup>SM</sup> Assessment:

“The daily safety briefing is exceptional in generating situational awareness and focus on safety and operational status. Reports are very succinct and appropriately focused. Follow up issues are both generated and reported back.”

## 2018 INNOVATIONS

Transforming data into useable information that is available to leaders to share with front line staff was a focus in 2018. Following are some related accomplishments:

- Implemented use of Redcap to capture data at the bedside to feed bundle compliance results
- Developed system-wide Hand Hygiene SharePoint site for capturing and reporting audit information to all hospitals by unit and discipline
- Developed Access Database to capture various data for dashboard reporting
- Purchased and implemented a Tableau server in order to provide user friendly access to unit specific harm events with patient level detail
- Developed a feed from Access/RedCap databases to Tableau, a data visualization software package providing updates every 10 minutes and one location to find associated information
- Implemented reporting of harm events via Harms Dashboard in Daily Safety Brief, Unit Huddles, Daily Bulletin emails and associate elevator bay screens
- Created dashboard for CLABSI Taskforce providing one place to find essential information for understanding current state and developing plans for improvement
- Developed data collection tools for Regulatory Readiness and Environmental Safety Rounds - both adopted system-wide
- Implemented real-time graphs on the Le Bonheur website for transparency and public reporting
- Developed "Key Cards" for engaging families in infection preventive strategies
- Developed SharePoint site for review and trending of pediatric and adult safety indicators
- Developed capability for predictive analysis of harm events and associated points
- Developed proactive process for capturing more real-time information related to positive blood cultures



A combination of the Harms Dashboard and CLABSI Taskforce dashboard have been combined at the system level to create the Daily Operating System Tool, a unit level management tool that will roll out first quarter 2019.

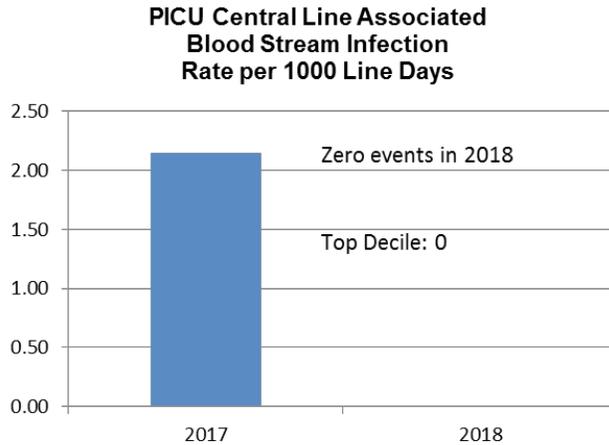


**SERVICE  
LINES**

## CRITICAL CARE

The Le Bonheur Critical Care Department is the only tertiary/quaternary critical care program in the region, providing critical care management for Le Bonheur's eight nationally ranked programs of distinction.

The Critical Care Department includes three specialized areas. The Pediatric Intensive Care Unit (PICU) is a 20-bed unit for critically ill patients with large patient rooms to accommodate and provide privacy for family members. The Neurosurgery Intensive Care Unit (Neuro ICU) has four patient rooms with staff providing expert care specific to neurosurgery, neurooncology, neurotrauma and epilepsy patients. The Intermediate Care Unit (IMCU) is a 12-bed unit specializing in the care of technology-dependent children including neurocognitive rehabilitation and playgroups for long-term mechanically ventilated patients.

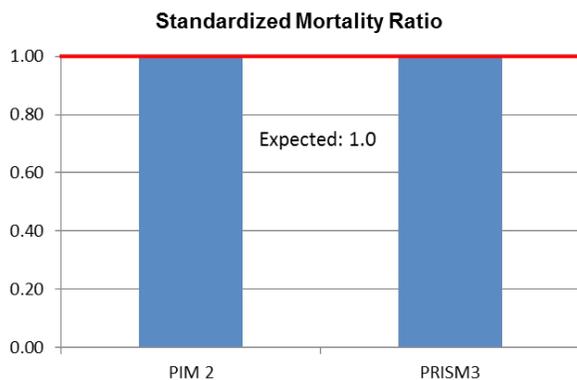
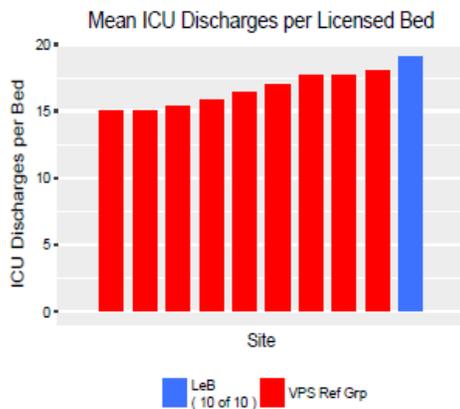
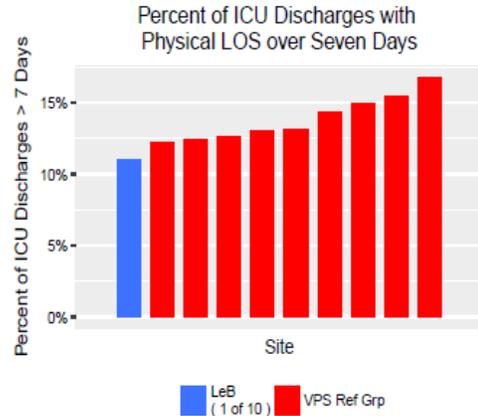
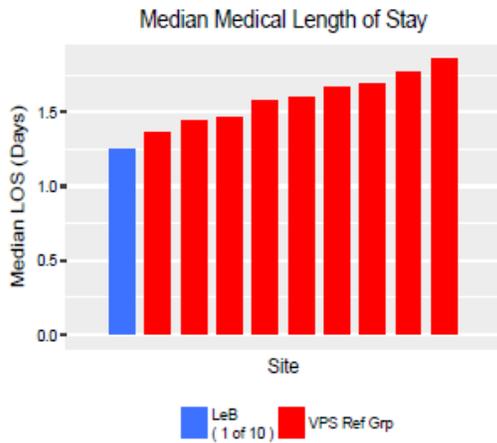


Unit	Days since last CLABSI as of 12/31/18
PICU	446
Neuro ICU	119
IMCU	137

In 2018, the PICU reached the milestone of 1 year without a central line associated blood stream infection (CLABSI). A common hospital-acquired condition (HAC), the PICU team focused on consistent application of known prevention tactics and reducing risk to patients by removing lines as soon as they were deemed no longer medically necessary. The Neuro ICU and IMCU are both greater than 100 days since last CLABSI.



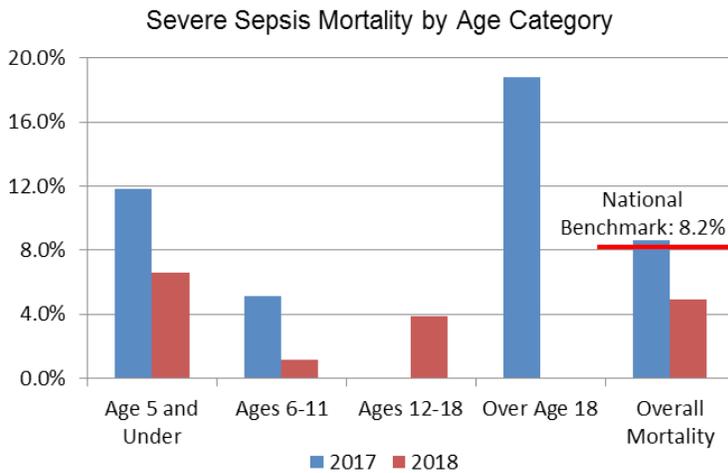
Compared to the Virtual PICU Database (VPS) Reference Group, Le Bonheur has the lowest median medical length of stay and the lowest percentage of length of stay greater than seven days while having the highest mean ICU discharges per licensed bed.



The Standardized Mortality Ratio (SMR) is the ratio between the observed number of deaths in a population to the number of deaths expected.

Compared to other hospitals in the VPS database, the Le Bonheur SMR is as expected.

In 2018, Le Bonheur joined the Bright STAR Collaborative, a multi-center project to develop blood culture improvement guidelines and diagnostic stewardship for antibiotic use reduction in critically ill children. Results are expected late summer 2019.



In 2018, overall severe sepsis mortality decreased by 42 percent with the most significant reduction in the 6 to 11 years age category. Improvements led by physicians and the Decision Support team included the following:

- Continued development and implementation of age specific alert criteria
- Increased general awareness of severe sepsis
- Developed nursing assessments on alerts
- Increased use of “bundled” approach to care including use and timing of antibiotics, oxygen and fluids.
- Implemented severe sepsis assessments in the ED

## **EXTRACORPOREAL MEMBRANE OXYGENATION (ECMO) SERVICE**

After critical illness, children face many challenges in returning to daily life.

Standardizing Therapies after ECMO (STEp) is a program for Le Bonheur ECMO survivors ensuring that they receive the therapies and referrals necessary after such severe critical illness. It is a multidisciplinary collaboration, with participation from Critical Care, Neuropsychology, Neurology and Developmental Pediatrics. Additionally, patients receive services from audiology and speech, occupational and physical therapies.

Standardization of Therapies after ECMO protocol (STEp)

Part 1: Eight STEp consults prior to discharge

- Ensuring Audiology, PT, OT, Neurology and other appropriate consults
- Discharge letter to PCP and copy to parents

Part 2: Neuropsychology evaluation

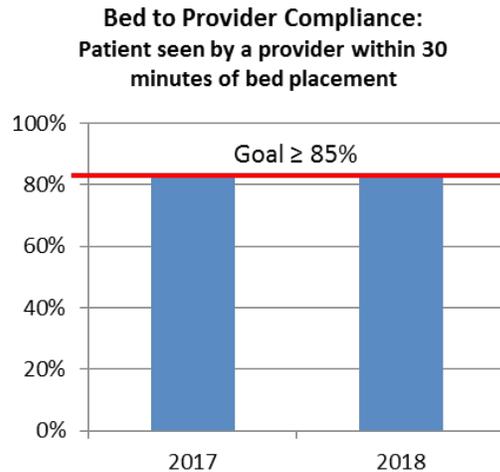
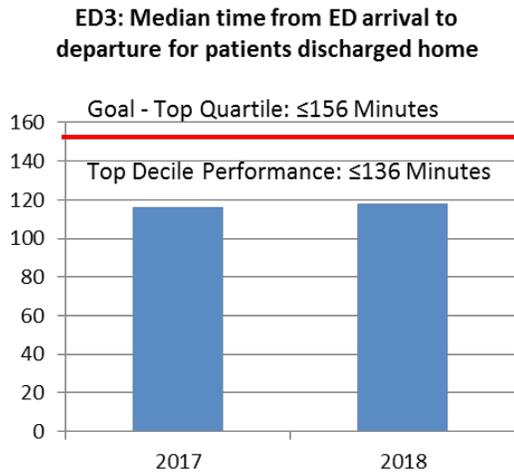
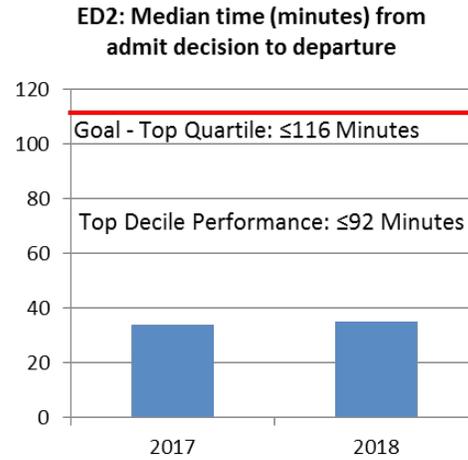
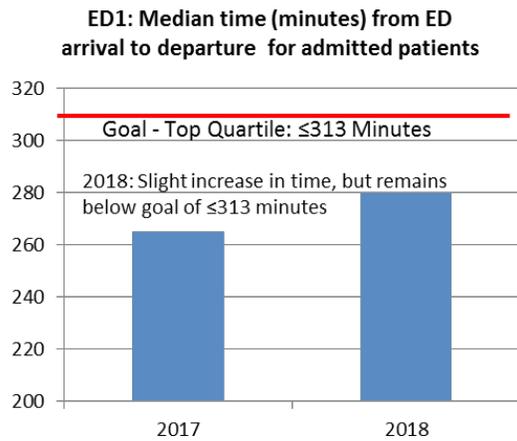
- Age-based follow-up schedule
- Greater deficits expected as patients grow older

Findings:

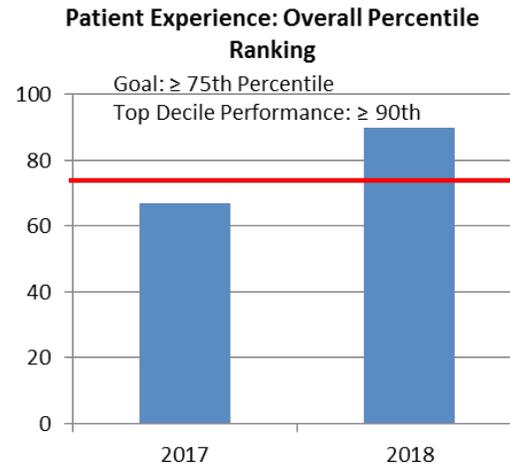
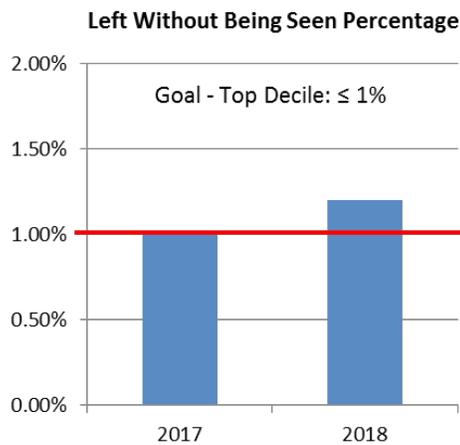
- Missed opportunities for better care post ECMO
- Studies showed significant deficits post ECMO
- Greater focus on ensuring optimal development post ECMO
- Increased uptake of post-discharge services

## EMERGENCY MEDICINE

Le Bonheur's Emergency Department (ED) provided care for more than 98,000 children in 2018. Critical to the ability to care for that large number of patients is the efficient flow of patients through the department. Provided here are the 2018 results for four ED efficiency measurements.



A consequence of long wait times during high volume seasons is the number of patients who come to the ED but choose not to wait for a variety of reasons. This is tracked by calculating the percentage of patients who leave without being seen (LWBS). Knowing that some patients will come to the ED even though the needed care is not emergent, Le Bonheur strives to keep the LWBS rate less than one percent of the total ED volume.



The experiences patients and their families have in the ED play a role both in their willingness to return and their willingness to recommend our ED to others. In 2018, Le Bonheur's ED ranked in the 90th percentile or the top 10 percent of hospitals in the National Research Corporation database, the third party vendor who administers our surveys. This is a 34 percent improvement from 2017.

### 2018 Notable Accomplishments:

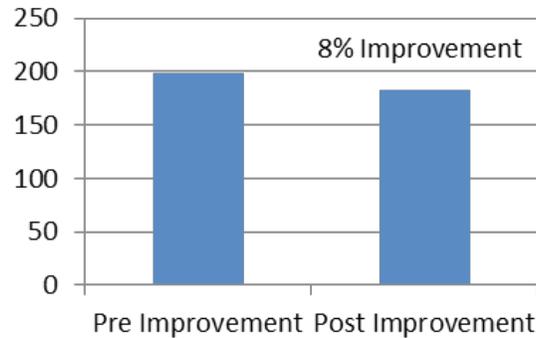
- Implemented a standardized pathway for asthma patients to decrease admissions and length of stay
- Implemented a standardized pathway for patients with first time seizures
- Implemented a process to decrease prescription call backs by working with Medicaid and pharmacists to ensure prescriptions would be filled



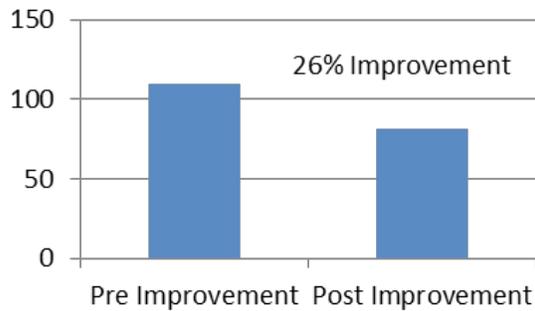
## ENDOCRINOLOGY

In an effort to improve care for patients in Diabetic Ketoacidosis (DKA) presenting to the Emergency Department (ED), the Endocrinology Department embarked on a project to improve processes to reduce time to care. The overall result was an eight percent reduction in ED length of stay. Improvements in the four key process steps are shown below.

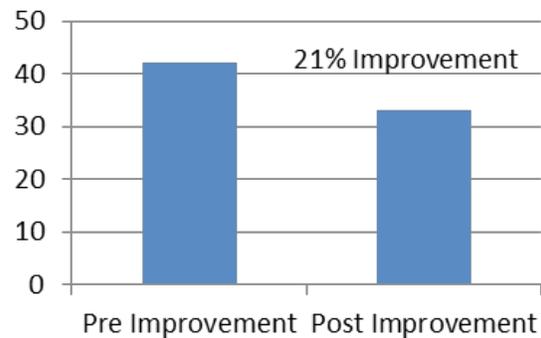
**Median ED Length of Stay  
(in minutes)**



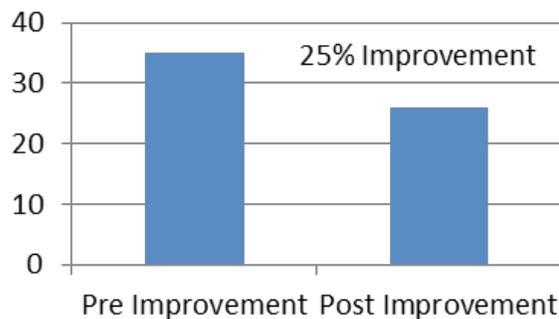
**Patient Arrival to Insulin Start  
time  
(in minutes)**



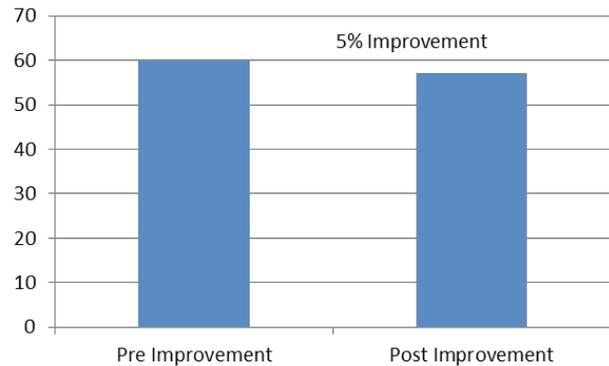
**Patient Arrival to I-STAT Result  
(in minutes)**



**I-STAT Result to Insulin Order  
(in minutes)**



**Insulin Order to Insulin Start  
(in minutes)**



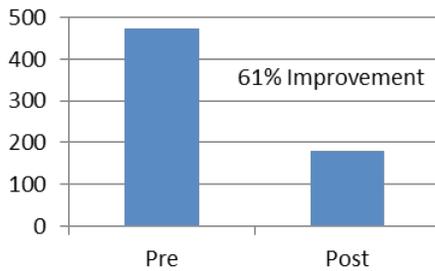


## GASTROENTEROLOGY

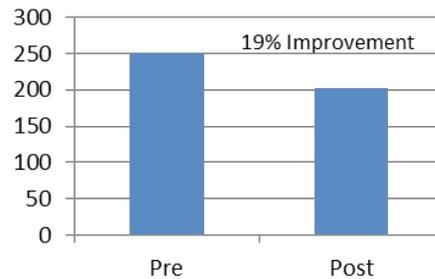


In 2018, the Gastroenterology Department embarked on an improvement effort to reduce time from patient admission to administration of Golytely to relieve constipation. The process was analyzed in two phases and resulted in the implementation of two standardized processes with the following results:

**Time from Admission to Order Placement for Golytely (in minutes)**

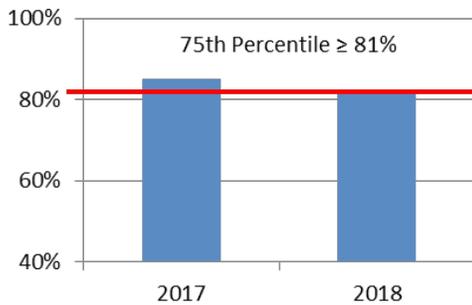


**Time from Order Placement to Administration of Golytely (in minutes)**

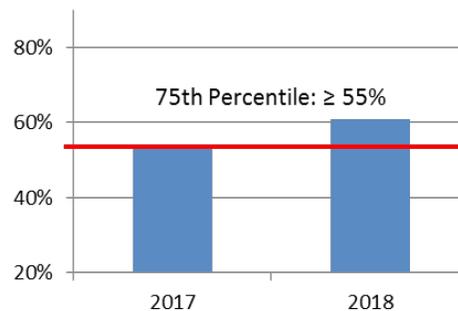


Crohn's disease and ulcerative colitis are two common types of inflammatory bowel disease. Complications may lead to malnutrition impacting growth and quality of life. The goal of the Improve Care Network (ICN) hospitals is to assist patients in achieving clinical remission with proper treatment and support. Compared with the ICN hospitals, Le Bonheur is better than the network goal for each of four metrics highlighted below.

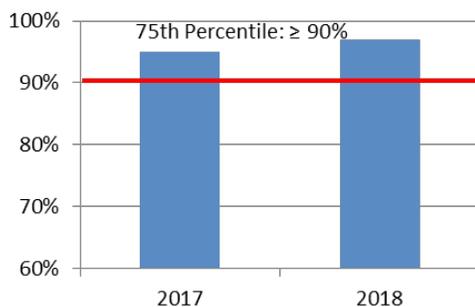
**Percentage of Patients in Clinical Remission (Improve Care Network)**



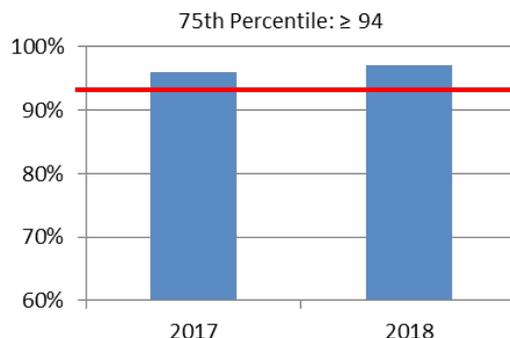
**Percentage of Patients with Sustained Clinical Remission (Improve Care Network)**



**Percentage of Patients with Satisfactory Nutritional Status (Improve Care Now)**



**Percentage of Patients with Satisfactory Growth Status**



### **Notable Accomplishments:**

- Published a “Quick Reference Guide to Crohn’s Disease and Ulcerative Colitis” for newly diagnosed patients and their families
- Provided annual inflammatory bowel disease education to local families in collaboration with Crohn’s Colitis Foundation
- Accomplished first steps in developing an Inflammatory Bowel Disease clinic by screening patients and identifying key personnel
- Met and surpassed nationally recognized goals of clinical remission for patients with Crohn’s disease and ulcerative colitis
- Met goal of reducing the number of patients on chronic steroids and maintaining appropriate nutritional and growth goals for patients with Crohn’s disease and ulcerative colitis
- Created a community medication infusion center for patients requiring more intensive therapy allowing patients to combine infusions and clinic visits with physician evaluation at each infusion

### **National Committees:**

- NSAPGHAN Clinical Care and Quality meeting, Nutrition Committee, Research Committee
- ASPEN Education and Professional Development Committee
- American Academy of Pediatrics Committee on Nutrition
- AGA Chair of Obesity, Metabolism & Nutrition Committee
- Medical Advisory Board, Alagille Syndrome Alliance
- Scientific Advisory Board, PSC Partners Seeking a Cure
- Scientific Advisory Board, Abetalipoproteinemia Patient Support Group



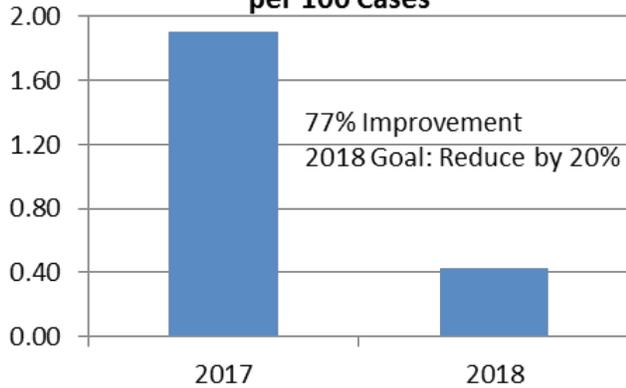
## HEART INSTITUTE



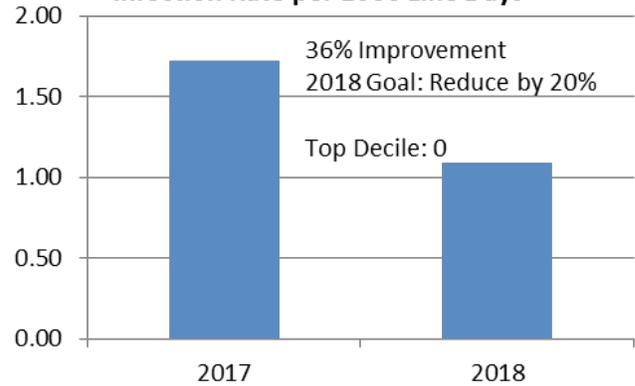
Nationally recognized as a top pediatric cardiology and heart surgery program, the Heart Institute provides care for patients with congenital heart defects from before birth through adulthood.

The Le Bonheur Heart Institute is the only pediatric heart program in the Southeast to earn a "Top 10" designation in the latest *U.S. News & World Report's* "Best Children's Hospitals" list. Surgical outcomes consistently earn the highest possible three-star rating from The Society of Thoracic Surgeons (STS).

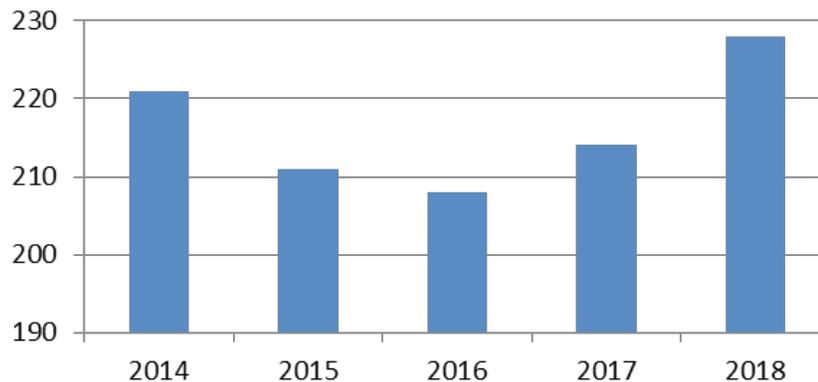
**Cardiothoracic Surgical Site Infections per 100 Cases**

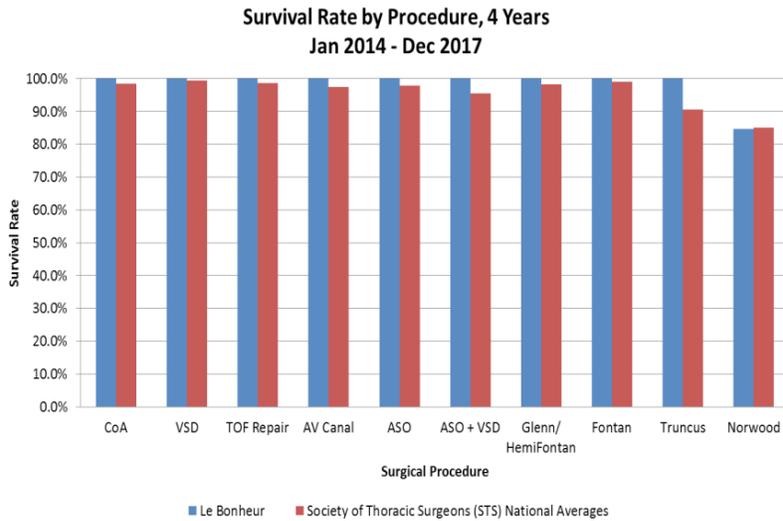


**Central Line Associated Blood Stream Infection Rate per 1000 Line Days**



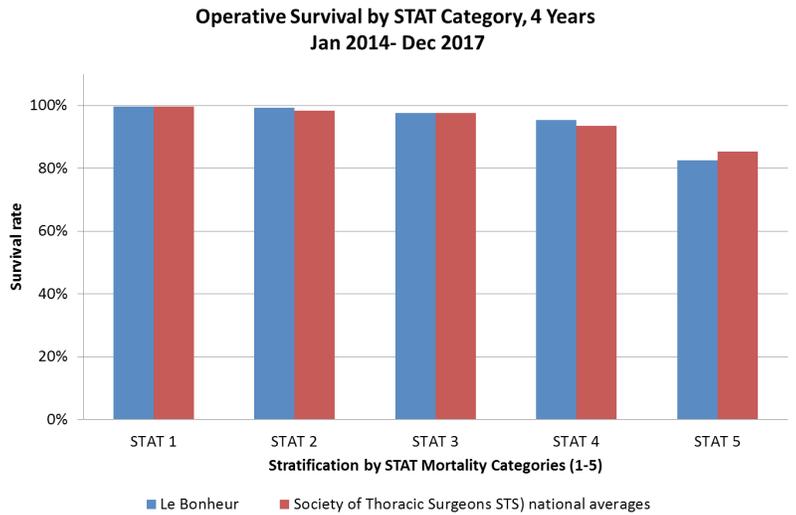
**Pump Case Volumes**





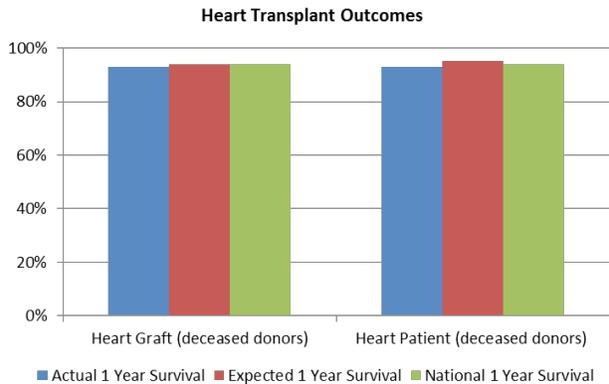
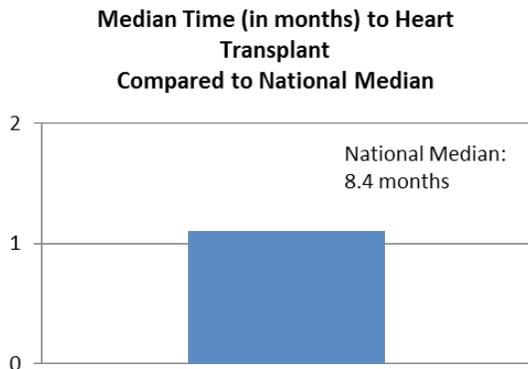
Survival rates for certain procedures are reported in multi-year increments by the STS. Le Bonheur demonstrates 100 percent survival at four years for all procedures except the most complex where Le Bonheur is not statistically different from the STS cohort group.

Likewise, the operative survival rate by STAT category is comparable to national averages across all categories with the biggest difference in the most complex category: STAT 5.



## Heart Transplant Program

Since opening in October 2016, Le Bonheur has conducted 23 heart transplants through December 2018.

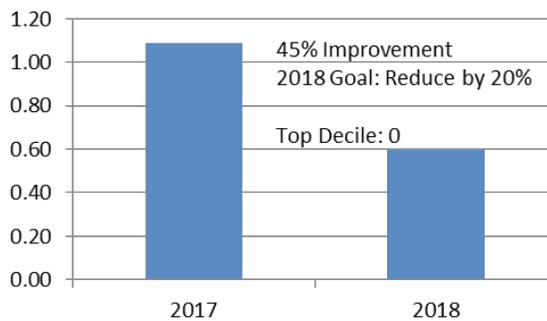


## NEONATOLOGY

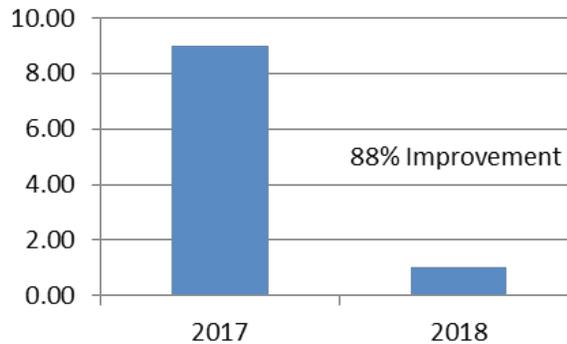


Le Bonheur's Neonatal Intensive Care Unit (NICU) is a Level IV unit equipped to care for the most acute and complex neonates. Premature babies in the unit are admitted with a birthweight from less than 750 grams to over 2500 grams with intricate diagnosis and comorbidities. Able to accommodate 60 patients, the rooms were designed with space for parents to remain with their newborns at all times. In addition to board-certified physicians and nurses, the comprehensive care team includes lactation consultants, in-unit pharmacists, a board certified music therapist, physical therapists and parent mentors.

**NICU Central Line Associated Blood Stream Infection Rate per 1000 Line Days**



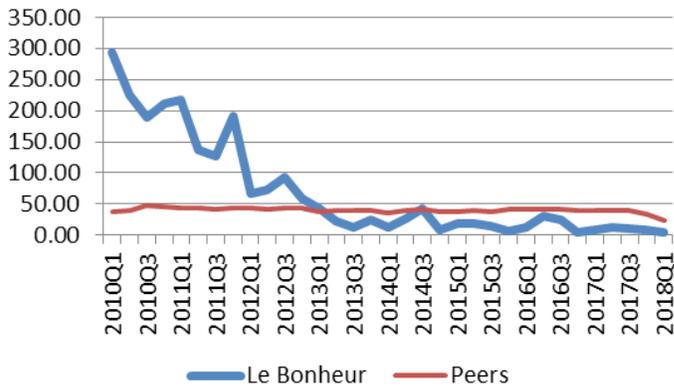
**Number of Patients with Necrotizing Enterocolitis -Not Present on Admission-**



Necrotizing enterocolitis (NEC) is one of the most common serious intestinal diseases among premature babies and can be a hospital-acquired condition. In 2018, an 88 percent improvement was demonstrated through earlier identification and treatment.



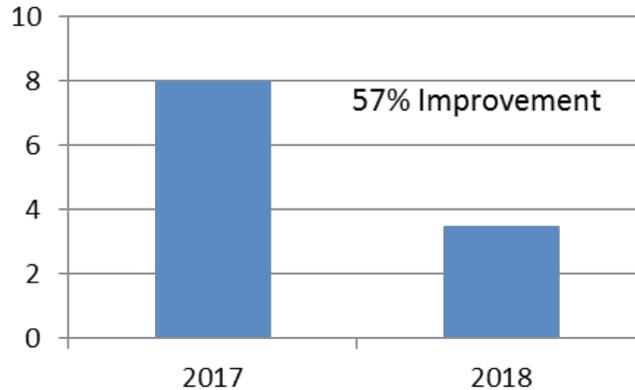
**NICU Antimicrobial Stewardship  
Broad-Spectrum Days of Therapy in NICU per  
1000 NICU Patient Days  
(meropenem, piperacillin-tazobactam,  
cefepime)**



Work continued on improving the NICU Antimicrobial Stewardship program. Days of therapy were further reduced with specific guidelines for NEC patients. The resulting 96 percent improvement from the beginning of the project received the MLH Performance Excellence Award in 2018.

The purpose of newborn screening is to test for certain harmful or potentially fatal disorders that are not otherwise apparent at birth. The process was improved so as to reduce the need for repeat specimen collections.

**Improve Newborn Screening Process  
Reduce Percentage of Unsatisfactory  
Specimens**



**2018 Improvement Initiatives:**

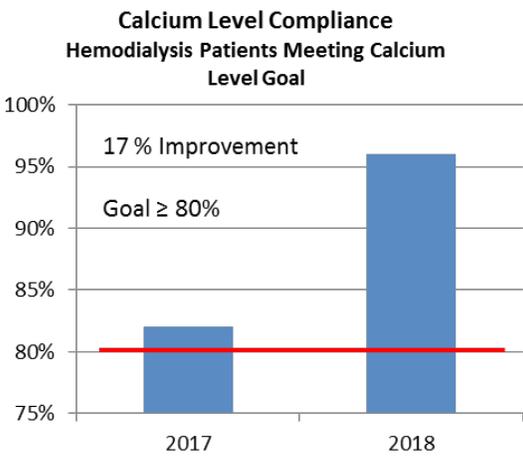
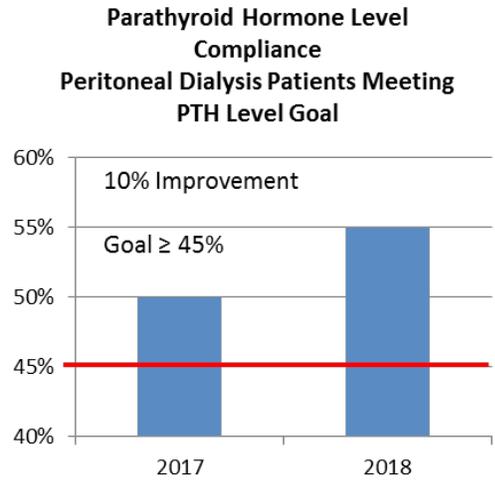
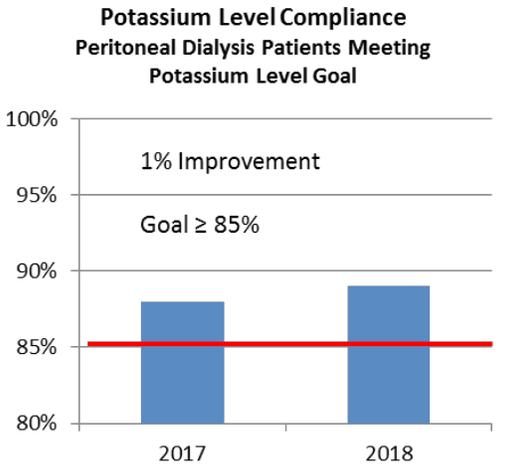
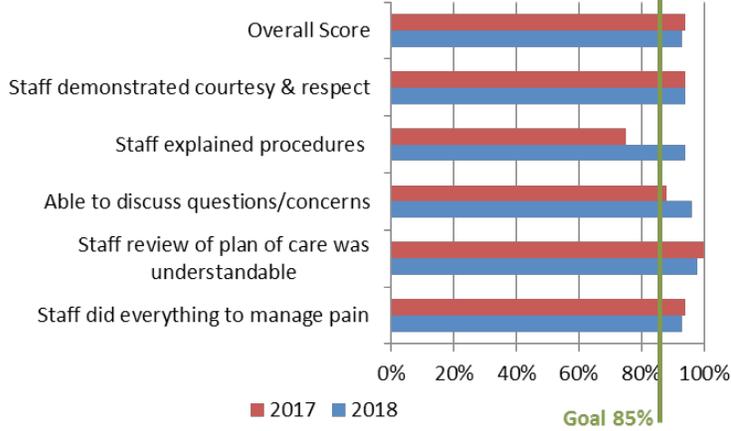
- Reduced sensory stimulation to reduce extra stress on the patient during transport with the Pedi-Flite team, which monitors the patient’s temperature and blood pressure prior to and post transport. Noise management in the neonatal unit is continued during the patient’s hospitalization.
- Introduced music therapy services for babies ready for musical stimulation. Simple, live, soft lullabies provide developmentally appropriate stimulation for older babies working on cognitive functioning, developmental and motor skills and normalizes the hospital environment through music.

## NEPHROLOGY



The Dialysis Program provides care for patients in an outpatient setting limiting the amount of direct care and guidance available to patients. Ensuring that patients fully understand their care plan is important in helping them to self-manage their health until dialysis is no longer necessary.

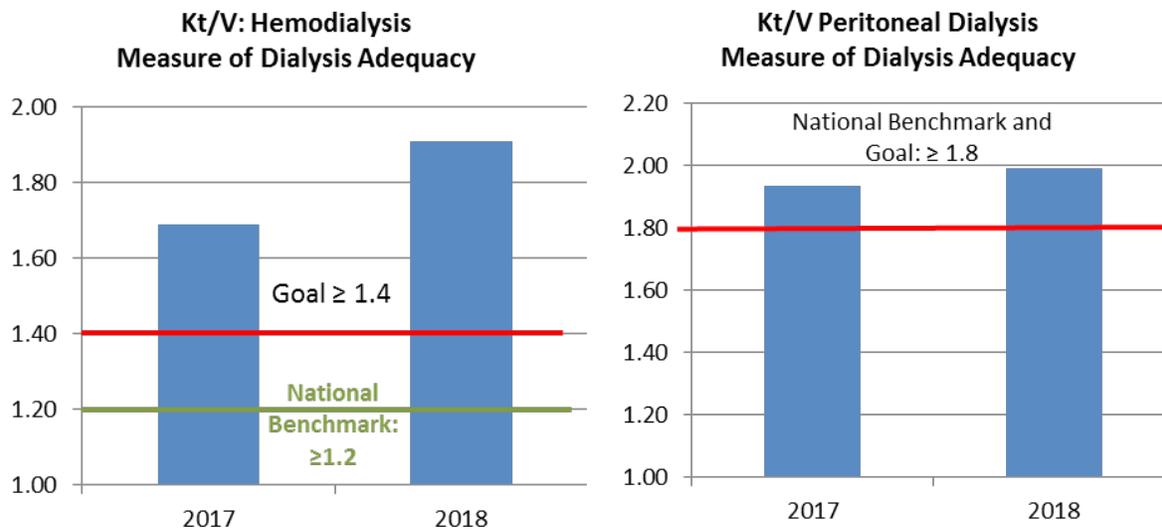
In 2018, the patient experience survey demonstrated a nine percent improvement in how often patients and families were able to discuss questions or concerns with staff and a 25 percent improvement in how often the staff explained procedures.



Three metrics related to mineral and bone management and impacted by patient diet and compliance with their care plans showed improvement in 2018.



Adequacy of the dialysis process for removal of urea from the blood is established by Kt/V, a calculation including dialyzer clearance of urea and time and volume of distribution of urea approximately equal to a patient's total body water. Improvements were noted in 2018 for both Hemodialysis and Peritoneal Dialysis patients with both measures outperforming the national benchmarks.



**Notable Accomplishment:**

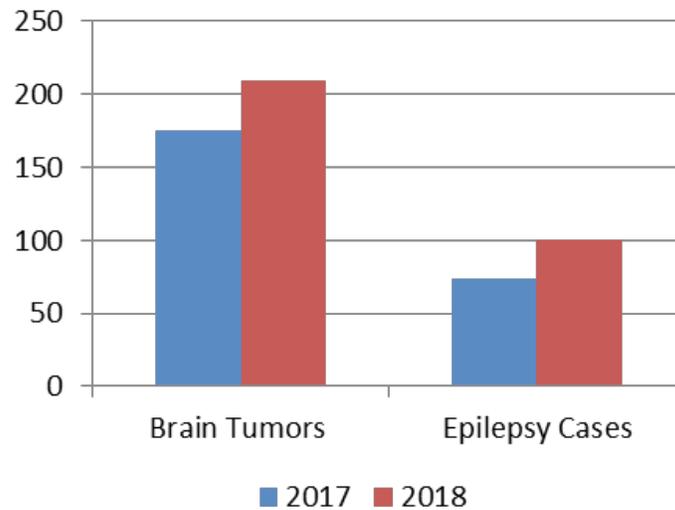
- The Dialysis Program achieved zero CLABSIs in 2018

## NEUROSCIENCE INSTITUTE



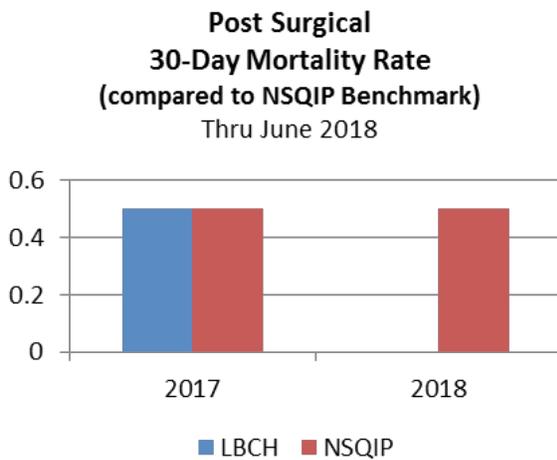
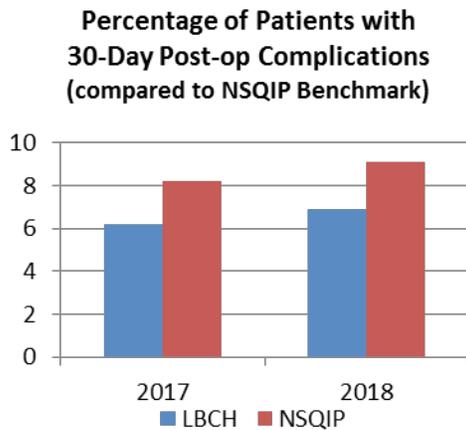
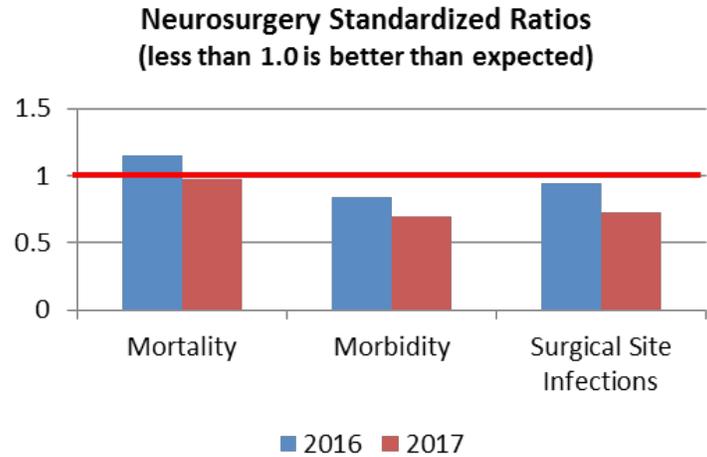
Neurosurgery volumes continue to grow for all cases with significant growth in epilepsy and brain tumor surgical cases. Le Bonheur continues to perform brain tumor surgeries in partnership with St. Jude and Semmes Murphey and maintains the largest case volumes when compared to other pediatric hospitals.

### Surgical Volumes



As part of the American College of Surgeons National Quality Improvement Program – Pediatrics (NSQIP) Le Bonheur is able to evaluate outcomes and processes for improvement opportunities and compare results against other children’s hospitals.

The Neurosurgery Standardized Ratios for Mortality, Morbidity and Surgical Site Infections are all less (better) than the expected National Standard of 1.0.



**Notable Accomplishments:**

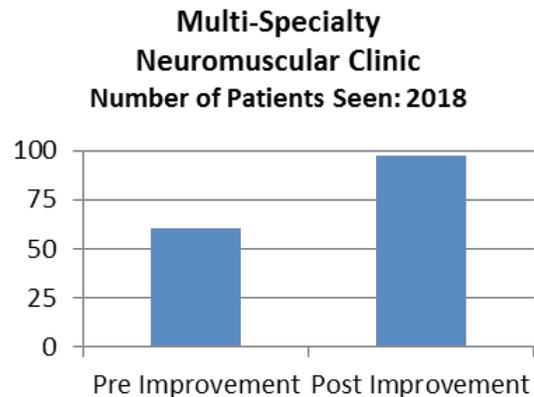
- Top 25 ranking in *U.S. News & World Report* for the third consecutive year
- EEG lab renewed its ABRET certification
- Continuation of a single institution study on the impact of a pediatric shunt surgery checklist on infection rate with demonstration of a positive correlation between use of the checklist and lower infection rates persisting four years after implementation
- Dave, P. et al. (2018) “The Preventable Shunt Revision Rate: A Multicenter Evaluation,” *Neurosurgery* 2018 Jul 6. doi: 10.1093/neuros/nyy263. Epub

## ORTHOPAEDICS



In 2018, Campbell Clinic was awarded a \$1,000,000 grant to study cerebral palsy (CP). Le Bonheur and Campbell Clinic set up a multispecialty neuromuscular clinic, which is up and running and expanding. This clinic will lead to better care in terms of screening efficiency, standardization of protocols, outcome measures and one stop care for patient convenience.

The interdisciplinary team led by orthopaedic surgeons includes a nurse practitioner, physical therapists, occupational therapists, a speech therapist, a seating and mobility specialist, an adaptive equipment specialist, a prosthetics and orthotics specialist, a social worker and a research nurse coordinator. Since opening the clinic in January, the team has focused on streamlining operations and increasing capacity. Clinical demand for the clinic is significant and is currently working with an approximate six to eight week lead time for new patients. Adding a Clinical Care Coordinator, automating the patient intake process and increasing physician clinic time have combined to increase efficiency and slightly decrease the per-patient visit time during the latter half of 2018. The clinic provided care to 23 percent more patients in the 12 clinics during the second half of 2018 due to increased clinic efficiency.



### **Notable Accomplishments:**

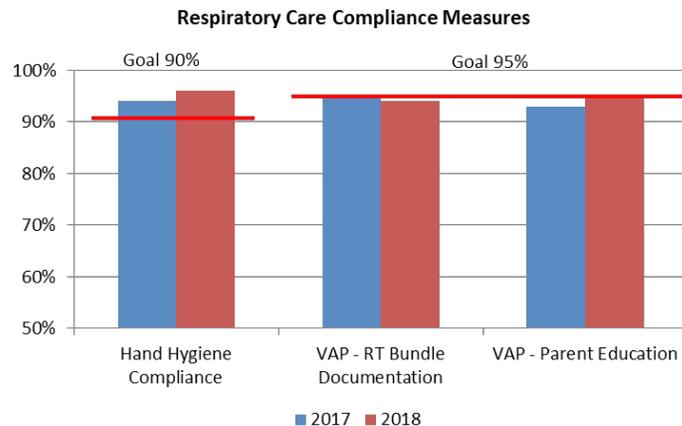
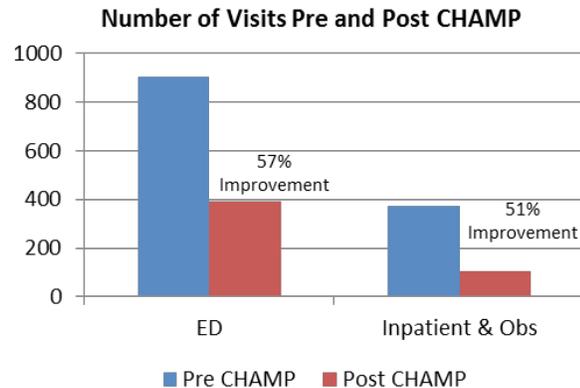
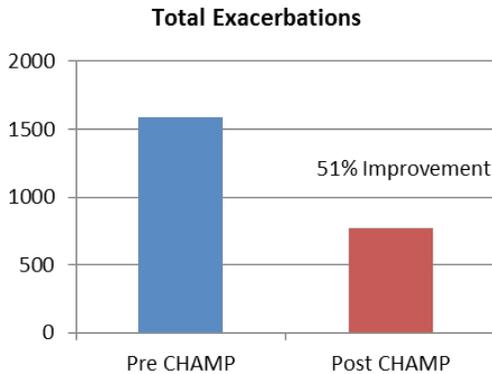
- Published paper evaluating the need for MRI in trauma patients with mild compression fractures diagnosed by CT scan
  - Collaborative effort between orthopaedics, neurosurgery and anesthesia
  - Showed that CT is very sensitive in detecting the presence or absence of a fracture in pediatric patients with mild fractures
  - While CT and MRI may disagree on the exact number of levels fractured, it did not change the treatment plan or results.
  - Sedation was often required to get MRI (29 percent) especially in younger patients which adds cost and risk. Anesthesia and sedation for MRI is around \$2000.
  - Each MRI saved is around \$6000 per scan in charges with or without sedation.
  - D.B. Franklin III, A.T. Hardaway, B. W. Sheffer, D. D. Spence, D.M. Kelly, M.S. Muhlbaue r, W.C. Warner, Jr., J.R. Sawyer. "The Role of Computed Tomography and Magnetic Resonance Imaging in the Diagnosis of Pediatric Thoracolumbar Compression Fractures." *J Pediatr Orthop*. 2018 Dec 26. doi: 10.1097/BPO.0000000000001316.

- Published a systematic review on the safety of orthopaedic implants
  - Aids in decision making between orthopaedics, trauma and radiology on which patients (all) can have MRI with orthopaedic implants in place
  - Decreased time delay for scan (no objective data)
  - Being discussed in Trauma Committee
  - Z.A. Mosher, J.R. Sawyer, D.M. Kelly. "MRI Safety with Orthopedic Implants." *Orthop Clin North Am.* 2018 Oct;49(4):455-463. doi: 10.1016/j.ocl.2018.05.010. Epub 2018 Aug 16.
  
- QI project looking at personnel factors that influence efficiency in pediatric spine surgery (accepted for publication – Spine Deformity)
  - Found anesthesia staff significantly affected time points pre-OR
  - Found surgeon affected time points intra-op. 46 minute difference in mean surgical time and 70 minute total room time between surgeons
  - Found significant time differences between surgeons even when controlled for multiple variables which are not dependent on years of experience
  - Plan to use these findings to study high/low performing teams and apply traits of high performing teams to all surgical teams
  
- Lead investigators for study looking at the need for vascular surgeon being present during surgical treatment of sternoclavicular dislocations (Clinical Awards Paper 2019 POSNA meeting)
  - Multicenter study with largest series of cases in literature (127 patients)
  - Included Boston Children's, Mercy Children's, Texas Scottish Rite, Southern Alabama, Children's Hospital of Philadelphia and Le Bonheur
  - Showed that there were no vascular injuries in any of these patients
  - Suggests that vascular surgeon may not need to be physically present (but needs to be aware of the procedure) which saves time and resources
  
- Conducted pilot study looking at temperature changes in pediatric patients for short orthopaedic procedures
  - No significant temperature drop for short (less than 30 minute) procedures
  - Warming devices not necessary or cost effective
  - Involved two local high school students as investigators (Christian Brothers and Germantown High School)
  
- Participating in Setting Scoliosis Straight Program
  - Enrolled 12 adolescent idiopathic scoliosis patients prospectively summer 2018
  - Multiple data points (OR time, curve type, levels fused, transfusion, neurologic event, 30-day and 90-day outcomes)
  - Will have surgeon specific dashboard comparing outcomes to other high volume centers
  - Goal to see where Le Bonheur stands nationwide and collaborate with high performing centers as to best practices

## PULMONOLOGY



Results through June 2018 show that the CHAMP Asthma Program continues to effectively address the needs of children with high-risk asthma living in Shelby County. Since the program's inception, the total number of exacerbations leading to hospitalizations, urgent care, emergency department, outpatient clinic and primary care visits have decreased by 51 percent. The reduction in ED visits and inpatient and observation admissions is 57 percent and 51 percent respectively.



### Notable Accomplishments:

- Participated in a multicenter Phase 2 study and a Phase 3 study for triple combination therapy for cystic fibrosis expected to provide treatment for patients without previous access to personalized treatment with the expectation of greater longevity and better quality of life
- Implemented Mental Health Screening for CF patients with appropriate follow-up
- Provided "Patient Passports" to families to assist in care provider adherence to patient specific guidelines

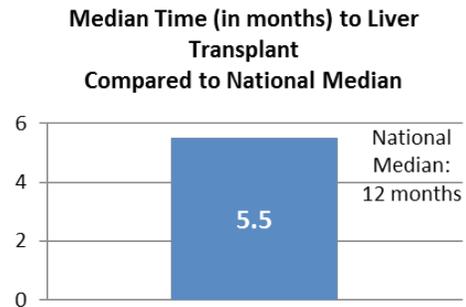
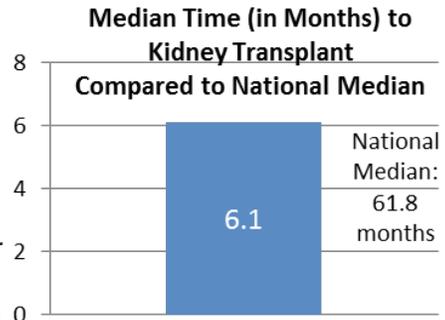
### National Committees:

- Cystic Fibrosis Foundation Committee studying food insecurity in CF

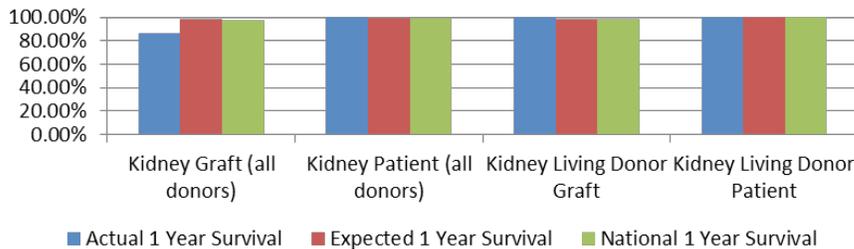
## TRANSPLANT SURGERY

12 kidney and liver transplants were performed at Le Bonheur in 2018. The two pediatric medical directors and two pediatric nurse coordinators worked closely with the nephrologists and gastroenterologists as part of a multidisciplinary transplant team. The transplants in 2018 consisted of five cadaveric kidney transplants, four live donor kidney transplants and three liver transplants. Included was the first pediatric combined liver and kidney transplant performed at Le Bonheur.

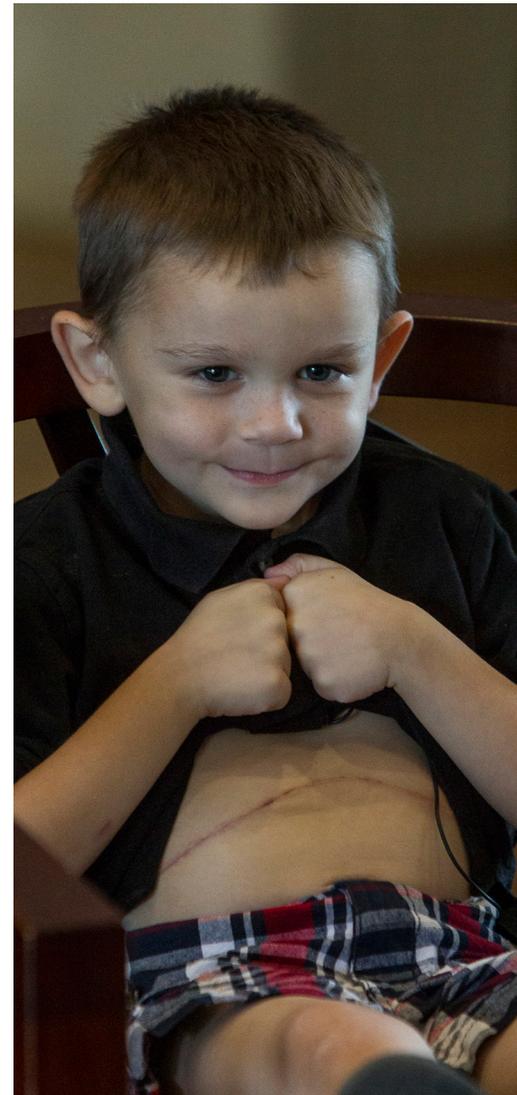
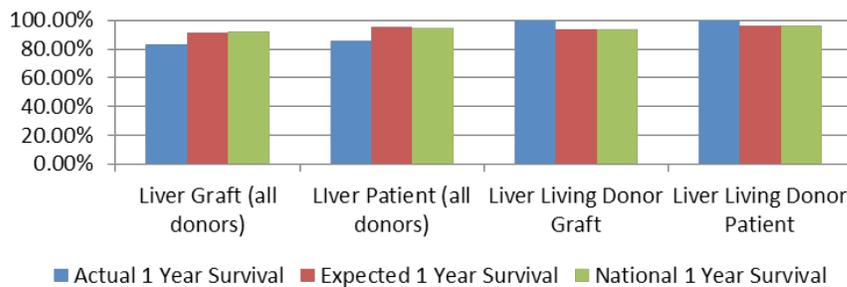
Of note, the median time (in months) to transplant is significantly better than the national median time for both types of transplants.



**Kidney Transplant Outcomes (higher is better)**



**Liver Transplant Outcomes (higher is better)**



## TRAUMA SERVICES

Le Bonheur is a Level 1 Trauma Center, as designated and accredited by the American College of Surgeons (ACS). Part of the Pediatric Trauma Quality Improvement Program (TQIP), Le Bonheur provides care to patients from across the Mid-South. Patients by state or residence include 52 percent from Tennessee, 28 percent from Mississippi, 16 percent from Arkansas, two percent from Missouri and the remaining from other states.

As a member of TQIP, data is submitted to a national database for comparison and identification of improvement opportunities.

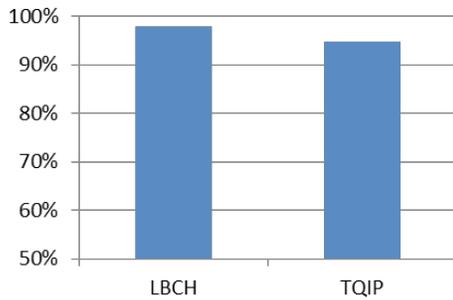
The Le Bonheur trauma mortality rate is in line with the other TQIP hospitals and, with the exception of decubitus ulcer, the selected complications are also in line with or better than TQIP.

Additionally, performance for splenic preservation and percent ICU admissions is better than TQIP.

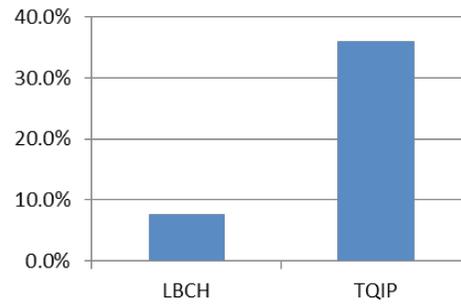
**Trauma Mortality Rate**



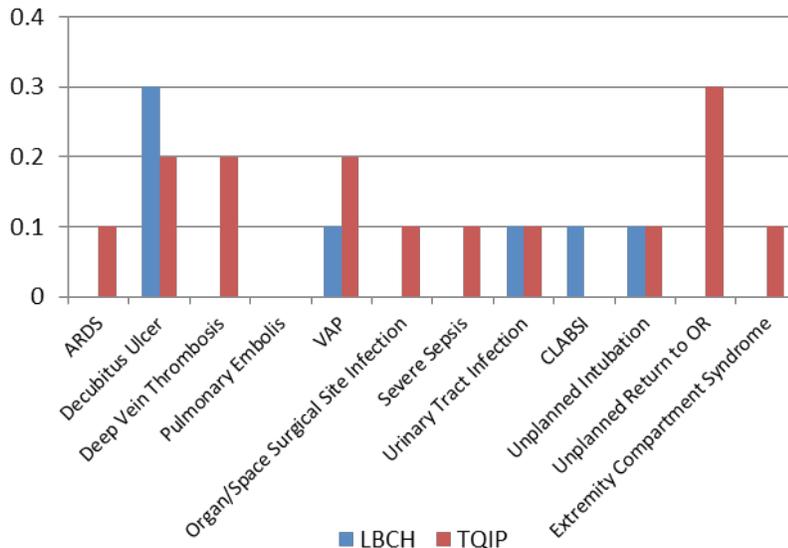
**Splenic Preservation  
(Compared to TQIP Benchmark)  
(higher is better)**



**Percent ICU Admissions  
(Compared to TQIP Benchmark)  
(lower is better)**



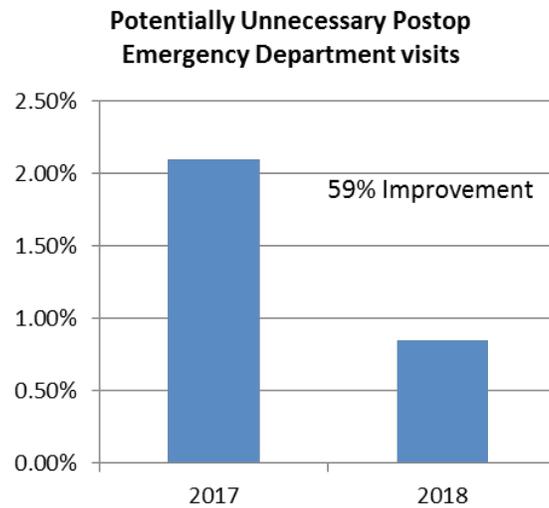
**Selected Complications  
(Compared to TQIP Benchmark)**



## UROLOGY



In 2018, analysis showed that 2.1 percent of surgical patients were coming to the Emergency Department for evaluation and possible avoidable readmission post-operatively. A multidisciplinary team identified an opportunity to improve expectations for post-op parents. Processes were developed and implemented leading to a 59 percent decrease in these post-op ED visits.



### **Notable accomplishments:**

- Implemented tracking of clinical outcomes and surgical complications to improve care
- Outpatient pediatric treatment for disorders of sexual differentiation. The clinic participates in the Disorders of Sexual Differentiation Translation Research Network (DSD-TRN).
- Nurse Practitioners participated in Facebook live Q&A session concerning bedwetting and urological problems.



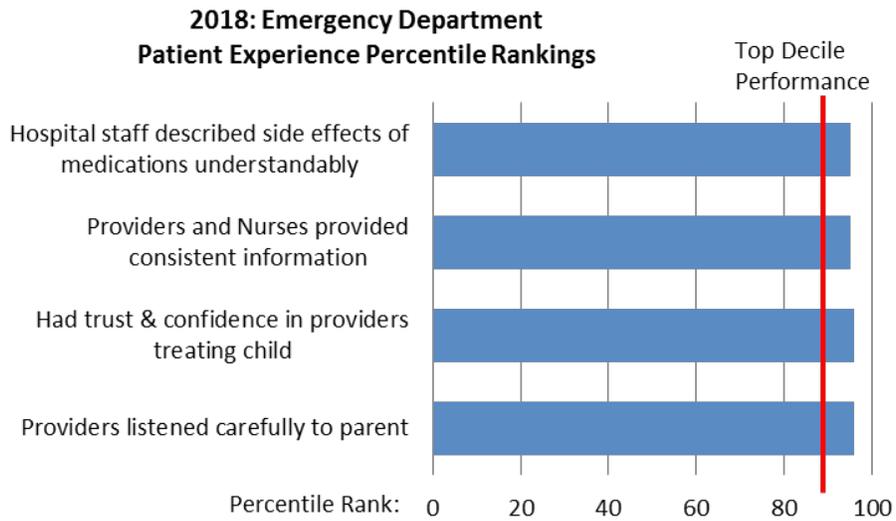


**PATIENT  
EXPERIENCE**

In 2018, the Le Bonheur Emergency Department (ED) transitioned from paper to phone surveys, increasing ED patient response rates from 5.4 percent (January –July) to 21.9 percent (August-December).

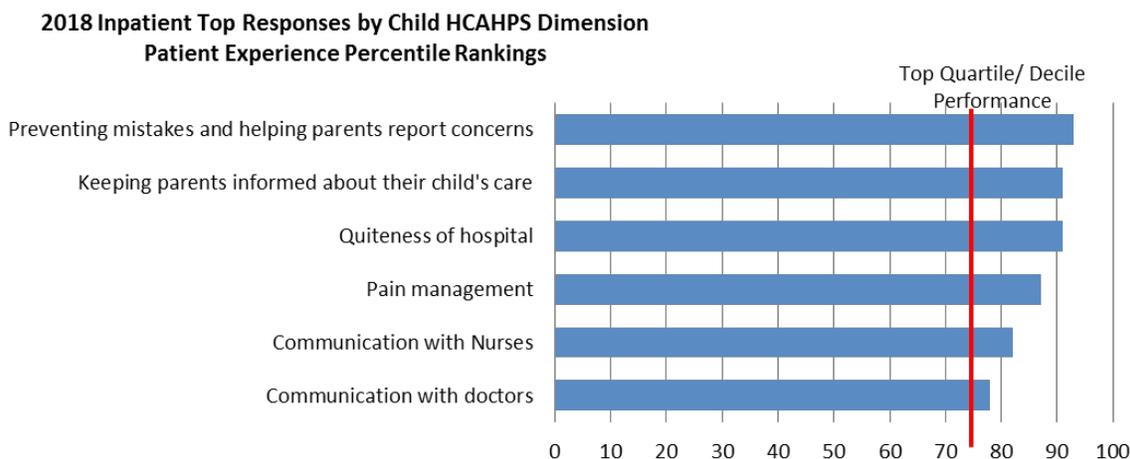
Results show 61 percent (20 out of 33) of questions at or above the 90th percentile when compared to the NRC Health Children’s Hospitals benchmark.

Top responses include:





The 2018 response rate for the inpatient (IP) survey continues to hold steady at 28 percent since the transition to phone surveys in 2016. While not yet achieving the volume of questions at the 90th percentile seen with the ED survey, the IP survey results show a 10 percent increase in the number of question reaching the 80th percentile when compared to the NRC Health Children’s Hospitals benchmark. Top responses by HCAHPS dimension include:





Overall response rates for the clinic and private practice survey is 18 percent for all age groups with the majority responding via the automated phone survey and a smaller number responding by email. More than 84,000 opportunities were provided with just over 15,300 responses. Surveys focus on providers with an opportunity to respond to nursing questions via the email survey.

In 2019, a Same Day Surgery survey will be added to the Outpatient compliment of surveys.

For all surveys, results are provided to staff and physician groups by unit and/or provider. In 2018, results were separated by attending in order to share results with corresponding resident teams. Results for attendings were provided to the Neuroscience, Cardiovascular, Hospitalist, NICU and PICU service lines.



**QUALITY  
ORGANIZATIONS**

## ACS NSQIP-PEDIATRIC

Created in 2008, the ACS (American College of Surgeons) NSQIP-Pediatric (National Surgical Quality Improvement Program) is a data-driven, risk-adjusted, outcomes-based program to measure and improve the quality of surgical care. NSQIP provides opportunities for identifying quality improvement targets, improve patient care and outcomes, and decrease institutional healthcare costs.

- “Exemplary” rankings in the following Semi-Annual Reports (SAR):
  - July 2018 SAR-All Specialties/Neurosurgery Morbidity
  - July 2018 SAR- Neurosurgery Morbidity Category
  - “Exemplary” is assigned if the hospital is a low statistical outlier or is in the first quartile of adjusted OR percentiles.
- National committees:
  - NSQIP-P Surgical National Committee participation by Surgeon Champion
  - NSQIP-P Surgical Clinical Reviewer (SCR) Advisory Committee
- Le Bonheur NSQIP-P Studies/Projects
  - OR Wound Classification Improvement
  - Antibiotic Stewardship Pilot and Collaborative
  - Support Ad Hoc efforts, Quality Improvement, PRD, Decision Support, *US News & World Report* Survey, etc.
  - SCR Mentor for St. Jude NSQIP-P SCR
- Le Bonheur NSQIP-P Published Studies/Abstracts

## REGISTRIES, DATABASES AND QUALITY ORGANIZATIONS

Partnering with other children's hospitals and improvement organizations through data submission, sharing, analysis and active participation in national and international collaboratives is a key component of the Le Bonheur quality program. Participation supports identification of best practices and provides comparative data for identifying improvement opportunities and setting goals. Listed below are some of the organizations and registries in which Le Bonheur participates.

- CHSPS: Children's Hospitals' Solutions for Patient Safety
- CHAT: Children's Hospital Alliance of Tennessee
- NHSN: National Healthcare Safety Network
- NDNQI: Press Ganey, National Database of Nursing Quality Indicators
- NSQIP: National Surgical Quality Improvement Program - Pediatric
- STS: Society of Thoracic Surgeons
- PC4: Pediatric Cardiac Critical Care Consortium
- IMPACT: Improving Pediatric and Adult Congenital Treatments
- CCISC: Congenital Cardiovascular Interventional Study Consortium
- ACPC-QNET: Adult Congenital and Pediatric Cardiology Quality Network
- IPSS: International Pediatric Stroke Study
- MDA: Neuromuscular Disease Registry
- NAPRTCS: North American Pediatric Renal Trials and Collaborative Studies
- ICN: Improve Care Now
- CHND: Children's Hospitals Neonatal Consortium
- VPICU: Virtual Pediatric Intensive Care Units Database
- ELSO: Extracorporeal Life Support Organization
- CDH: Congenital Diaphragmatic Hernia Registry
- TQIP: Trauma Quality Improvement Project
- CF: Cystic Fibrosis Registry
- PHIS-CHA: Pediatric Hospitals Information System – Children's Hospital Association
- Compare: Children's Hospital Association
- THA: Tennessee Hospital Association
- MHA: Mississippi Hospital Association
- GAMUT: The Ground Air Medical qUality Transport Database
- SRTR: Scientific Registry of Transplant Recipients
- Crimson Continuum of Care
- NRC Health: National Research Corporation

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