

Safety, standardization lower CLABSI rates

Hospital reduces central line infection rate by 65 percent

Standardized practice and new safety measures have reduced hospital-wide central line-associated bloodstream infection rates at Le Bonheur Children's by 65 percent from 2011 to 2012.

The improvements have helped protect children in the hospital's Pediatric Intensive Care Unit and Cardiovascular Intensive Care Unit from central line-associated bloodstream infections for more than one year. Other inpatient units saw additional reductions in infections.

Infectious Disease Specialist Steve Buckingham, MD, says many things contribute to the reduction in CLABSIs, the most important being a culture change.

"At one time, CLABSIs were considered unfortunate but inevitable in seriously ill patients. Today, attitudes are different, and hospital-acquired infections, including CLABSIs, are largely considered both unacceptable and preventable. This cultural change has been gradually instilled through the ongoing, 'behind-the-scenes' interventions of our Quality Improvement and Infection Prevention departments and through the determined efforts of medical staff and other hospital leaders to eliminate this problem," Buckingham said.

The hospital had a 1.03 CLABSI rate for 2012 (central line per 1,000 line days); Le Bonheur's PICU and CVICU achieved a rate of 0.44 against a national benchmark of 1.85.

Le Bonheur physicians and clinicians attribute much of the success in CLABSI reduction to a handful of standardized practices and measures, including:



Le Bonheur has instituted standardized practices and new safety measures to reduce hospital-wide central line-associated bloodstream infection rates by 65 percent from 2011 to 2012.

- Initiated daily line real-time insertion checklist
- Initiated daily line assessment with measurements and reporting mechanism
- Standardized line care
- Daily line necessity review
- Reinforced pristine dressings
- Root cause analysis and event timelines for all CLABSIs
- Antibiotic Stewardship Program
- Standardized "scrubbing the hub" at each use with 70 percent alcohol

iMRI contributes to decreased returns to OR in brain tumor surgeries

Le Bonheur Children's intra-operative MRI (iMRI) is credited with helping neurosurgeons reduce returns to the operating room for residual tumor by 84 percent in two years. The iMRI, which can provide structural brain images without moving the patient from the surgical table, opened in the hospital's neuro-surgical suite in February 2011.

Rates improved from a baseline of 6.98 per 100 cases in 2010 to 1.29 per 100 cases in 2012.

Le Bonheur is home to the nation's largest pediatric surgical brain tumor program. The program — a partnership between Le Bonheur and St. Jude Children's Research Hospital — has grown 48 percent in the past two years. In 2012, 155 children underwent brain tumor surgery at Le Bonheur.

"iMRI is an invaluable tool for me," said Paul Klimo, chief of the Division of Pediatric Neurosurgery at Le Bonheur Children's and the University of Tennessee Health Science Center. "We are now able to leave the OR with the knowledge of whether a tumor



Neurosurgeon Paul Klimo, MD, reviews images while the patient is still in the operating room. The iMRI allows surgeons to collect scans without moving the patient from the surgical table during surgery, ensuring that the optimum position is maintained.

was completely resected or not. If not, then it is because what remained was deemed unresectable. Almost all of my tumor operations are done using it. I've also used it to demonstrate complete resection of arteriovenous malformation (AVM) and in tumor biopsies."

In 2012, 47 percent of Le Bonheur's brain tumor surgeries were performed using iMRI — and none of those surgeries required returns to the OR for residual tumor. In addition, the iMRI also eliminates the need, in many cases, for additional sedation or additional surgeries.

Dr. Klimo and Chairman of the Department of Neurosurgery Rick Boop, MD, also attributes

Le Bonheur's high level of care to the brain tumor team — from caregivers in the pre-operative area to those in the new Neurosurgical Intensive Care Unit.

"Dr. Boop and I couldn't do what we do in the OR without having a great team outside the OR," Klimo said. "That extends to our colleagues at St. Jude [Children's Research Hospital] — radiologists, medical oncologists, radiation oncologists," Klimo said.

WILLIAMS, MD, NAMED SURGEON IN CHIEF



Mark Williams, MD, FAAP, FACS

Pediatric Urologist Mark Williams, MD, FAAP, FACS, has been named the new surgeon in chief for Le Bonheur Children's Hospital. Williams has practiced at Le Bonheur since 2002 and also serves as the hospital's chief of Pediatric Urology.

"Dr. Williams is a well-respected surgeon and division chief," said Le Bonheur President and CEO Meri Armour. "His thoughtful and personable approach will guide this hospital and our surgical program to best meet the needs of our patients."

Surgeon in chief is a newly created position at Le Bonheur. Williams will represent surgical interests and participate in strategic planning efforts for the hospital. He also will serve on the executive committee of the UT Le Bonheur Pediatric Specialists board.

"Dr. Williams will help Le Bonheur plan for future growth and work to ensure a continued high level of quality care for surgical patients," said Jon McCullers, MD, Le Bonheur pediatrician in chief and chair of the University of Tennessee Health Science Center (UTHSC) Department of Pediatrics.

Le Bonheur performs more than 13,000 surgeries each year.

Williams serves as associate professor within the Department of Urology at UTHSC. He is program director of the pediatric urology fellowship program for UTHSC and a faculty member of St. Jude Children's Research Hospital.

Williams graduated from the Medical College of Georgia and completed fellowship training in pediatric urology at UTHSC and Le Bonheur.

"Le Bonheur has many talented surgeons in many different fields. I look forward to working with them to advance the patient care, research and fellowship training of the hospital," Williams said.

Physicians work to establish best practices for patient safety

Children's hospital collaborative works to improve care

Le Bonheur physicians are developing best practices that will improve patient safety at the hospital and in other hospitals across the country.

Physician leaders, and their nursing and ancillary colleagues, are focused on reducing hospital acquired conditions in nine key areas, including:

- Adverse drug events
- Catheter-associated urinary tract infections
- Central line-associated blood stream infections
- Injuries from falls and immobility
- Pressure ulcers
- Venous thromboembolism
- Ventilator-associated pneumonia
- Surgical site infections
- Serious safety events

As part of the Ohio Children's Hospitals' Solutions for Patient Safety (OCHSPS) Foundation, the physician leaders are able to share data and identify best practices to prevent hospital-acquired conditions. Leaders can then modify Le Bonheur's task bundles to improve safety for patients.

"We want to give the best care possible to our patients and families. It is our intent to return them home happy and healed," said Cynthia Cross, MD, who serves as the physician co-leader at preventing injuries from falls. "Working with other children's hospitals will help us learn from the successes and shortcomings of children's hospitals on a great scale."



Hospitalist Cynthia Cross, MD, is one of the physician leaders at Le Bonheur leading groups focused on reducing hospital-acquired conditions.

I am excited about this opportunity for us all to become even better by working together."

OCHSPS started as eight pediatric hospitals working to decrease hospital-acquired conditions. The group received a Centers for Medicare and Medicaid Services' Hospital Engagement grant to expand the effort across the country. Le Bonheur hopes to reduce hospital-acquired conditions by 20 percent and preventable readmissions by 10 percent in 2013.

Le Bonheur is also working alongside other Tennessee children's hospitals to address quality issues.

"The most important thing we can do is no harm," said Le Bonheur President Meri Armour. "The work we're doing will hopefully take away all harm."

Study examines functional connectivity in TSC patients

Preliminary findings of a recent Le Bonheur study suggest functional brain connectivity analysis could be used to predict which Tuberous Sclerosis Complex (TSC) patients are likely to develop autism spectrum disorder (ASD). The study's preliminary findings have been accepted for publication in the *Journal of Pediatric Neurology*.

"Because we can't see any physical differences in MRI images between children with Tuberous Sclerosis and Autism and children with Tuberous Sclerosis without Autism, we looked for differences in the way different parts of the brains of children in the two groups are interconnected functionally, that is, in what patterns they are wired together," said Andrew C. Papanicolaou, PhD, co-director of the Neuroscience Institute.

Using magnetoencephalography (MEG), researchers examined functional brain connectivity of TSC patients in three groups: TSC patients with ASD, TSC patients with no signs of ASD and typically developing children. Analyses so far suggest that patterns of resting brain activation, in the form of connectivity networks, may possess the characteristics of neurophysiological markers that could differentiate between typically developing children, TSC, and TSC/ASD patients.

Roosbeh Rezaie, PhD, Asim F. Choudhri, MD, James W. Wheless, MD, Katherine Van Poppel, MD, and Nancy R. Clanton, PhD, also of the Neuroscience Institute, were part of the research team.

Study identifies genetic connections in 15q Duplication Syndrome

A new study published in the March issue of *Autism Research* from the University of Tennessee Health Science Center (UTHSC) and Le Bonheur researchers is making the genetic connections between autism and Chromosome 15q Duplication Syndrome (Dup15q).

The Memphis researchers determined that the maternally derived or inherited duplications of the region inclusive of the *UBE3A* gene (also known as the Angelman/Prader-Willi syndrome locus) are sufficient to produce a phenotype on the autism spectrum in all ten maternal duplication subjects. (N. Urraca, J. Cleary, V. Brewer, E.K. Pivnick, K. McVicar, R. L. Thibert, N.C. Schanen, C. Esmer, D. Lamport, L.T. Reiter. "The Interstitial Duplication 15q11.2-q13 Syndrome Includes Autism, Mild Facial Anomalies and a Characteristic EEG Signature." *Autism Res.* 2013 Mar 14.)

The number of subjects was too small to determine if parental duplications do not cause autism. The team assembled the largest single cohort of interstitial 15q duplication subjects for phenotype/genotype analysis of the autism component of the syndrome.

Chromosome 15q Duplication Syndrome (Dup15q) results from duplications of chromosome 15q11-q13. Duplications that are maternal in origin often result in developmental problems. The larger 15q duplication syndrome, which includes individuals with *idic15*, manifests itself in a wide range of developmental disabilities including autism spectrum disorders; motor, cognitive and speech/language delays; and seizure disorders among others. While there



Lawrence T. Reiter, PhD

is no specific treatment plan, therapies are available to address or manage symptoms.

Previous research suggests that as many as 1,000 genes may contribute to autism phenotypes, but as much as 1-3 percent of all autism spectrum disorder cases may be a result of 15q11-q13 duplication alone.

The researchers also found through EEG evaluations a pattern that looks like the type of signal you see when individuals take GABA promoting drugs (benzodiazepines). The lead researcher on this study, Lawrence T. Reiter, PhD, says this signal gives clinicians a clue about what types of anti-seizure medication may be most useful in children with 15q duplications.

Reiter says genetic testing can help families connect to resources, like the Dup15q Alliance. Reiter is an associate professor in the Department of Neurology with an adjunct appointment in Pediatrics at UTHSC.

"If a pediatrician suspects autism due to hypotonia and developmental delay, I highly recommend they order an arrayCGH test. Duplication 15q is the second most common duplication in autism. The test will help families in future treatments specific to this sub-type of autism," he said.

Nora Urraca, MD, PhD, was the lead author on the study. Neurologist Kathryn McVicar, MD, and Geneticist Eniko K. Pivnick, MD, were part of the research team. The study was funded by the Herbert and Mary Shainberg Neuroscience Fund.

Short Scripts

Children's Foundation of Memphis gives \$4 million for research

The Children's Foundation of Memphis (CFOM) has donated \$4 million to Le Bonheur to fund research support and infrastructure in the hospital's Children's Foundation Research Institute (CFRI). The group has pledged \$4 million, with \$2 million designated as a challenge grant intended to encourage matching gifts from other groups.

The Children's Foundation's gift will provide for infrastructure and support for newly recruited physician scientists, new equipment and technology, and grant support for junior faculty and young investigators. The funds will be combined with research funding commitments from Le Bonheur and the University of Tennessee Health Science Center (UTHSC).

The Children's Foundation Research Institute was established in 1994 by CFOM, Le Bonheur and UTHSC. Established in 1982, the Children's Foundation promotes the health and well-being of children in the Memphis area through clinical research.

Spentzas named PICU director

Thomas Spentzas, MD, is the new medical director of the Pediatric Intensive Care Unit (PICU) at Le Bonheur. He has been an attending physician in the unit since 2004. Spentzas is an associate professor of Pediatrics and Preventive Medicine at the University of Tennessee of Health Science Center (UTHSC).



Thomas Spentzas, MD

Spentzas graduated from National Kapodistrian School of Medicine in Athens, Greece, and completed residency training in pediatrics and a fellowship in pediatric critical care at Albert Einstein Hospital, Bronx, N.Y. He earned a Master of Science in epidemiology from UTHSC. He is board certified in pediatrics and pediatric critical care. Spentzas' current research interests are in epidemiology and basic science research focusing on the role of inflammation in critical illness.

Anand comments on pain research

K.J.S. "Sunny" Anand, MD, director of Critical Care at Le Bonheur, was invited to provide editorial comments for a study recently published in the *Journal of American Medical Association (JAMA)*. The JAMA study – a randomized clinical trial – measured the benefits of administering intravenous acetaminophen,



K.J.S. "Sunny" Anand, MD

rather than morphine, to children recovering from surgery.

In his editorial (*Anand KJS. Pain panacea for opiophobia in infants? JAMA. 2013;309(2):183-184.*), Anand identifies significant weaknesses in the study design, which detract from the strength of its conclusions. He also notes a lack of attention to the potential side effects of intravenous acetaminophen, with a focus on the side effects of opioids. Anand addresses the question of whether unnecessary pain is the ultimate result for children receiving less potent medications – and cites a widespread reluctance among clinicians to treat pain in infants and children with adequately dosed opioids.

Pediatric surgeons examine postsurgical outcomes

Le Bonheur pediatric surgeons will present the results of studies that looked at ovarian tumor removal and the accuracy of a program that tracks surgical outcomes at the Pacific Association of Pediatric Surgeons annual meeting held April 7-11 in Australia.

The first Le Bonheur study examines the long-term outcomes for children and adolescents who have an ovarian tumor surgically removed. The on going study is looking at whether the patients are more likely to have problems with their ovaries, experience pain associated with menstruation or have problems becoming pregnant as a result of the surgery. Few other studies have looked at long-term outcomes for these patients. The research is being led by Le Bonheur Pediatric Surgeon Eunice Huang, MD.



Eunice Huang, MD

In another recent Le Bonheur study, pediatric surgeons reviewed hospital data to determine whether mortality measured by the American College of Surgeons National Surgical Quality Improvement Program (NSQIP) is reflective of all deaths occurring at the hospital within 30 days of an operation. Le Bonheur has contributed data to the NSQIP-Peds program, which evaluates surgical outcomes in children, since 2009. At the conference, Chief of the Division of Pediatric Surgery Max R. Langham, MD, will share that the researchers concluded that mortality within 30 days of surgery in children is uncommon, and NSQIP-Peds adequately reflects the overall postoperative mortality at Le Bonheur.



Max R. Langham, MD



2012: A banner year for Pedi-Flite, Transfer Center

Last year was monumental for Le Bonheur's Pedi-Flite and Transfer Center teams. Pedi-Flite, the hospital's air and ground transport team, experienced a 6 percent growth in volume in 2012, providing more than 2,300 transports. The Transfer Center, Le Bonheur's communication hub, also had a busy year, averaging 1,500 calls per month in 2012.

Pedi-Flite and Transfer Center teams implemented several process improvements in 2012 to be more responsive to referring physicians. Some of these changes include, a "Rapid Launch" program to decrease call-to-depart times for critically ill or injured children and a protocol for automatic acceptance of pediatric patients being referred to the Emergency Department from hospitals or pediatric practices in the Greater Memphis area. Pedi-Flite also added a third ambulance.

Grant provides newborn screening education for nurses

Le Bonheur Children's Hospital is the recipient of a \$20,000 grant to provide neonatal nurses with education about newborn screenings. Le Bonheur is one of five health care institutions to receive a grant from Baby's First Test, a Genetic Alliance project, for innovative projects aimed increasing awareness of newborn screening or implementing novel solutions to challenges in the newborn screening system.

Stacy Hines-Dowell, DNP, APNG, FNP-BC, says the funds will be used to develop newborn screening modules for Neonatal Intensive Care Unit (NICU) nurses in tertiary care facilities and for families of patients in the NICU.

"Nurses in the NICUs of tertiary-level hospitals like Le Bonheur occupy a unique position in the newborn screening (NBS) process," said Hines-Dowell. "The rapid expansion of newborn screening has increased demands upon NICU nursing staff to know and be familiar with the NBS process. In addition, there is a great need for nurses to be able to provide easily understandable NBS information for families of NICU babies," Hines Dowell said.



Stacy Hines-Dowell, DNP

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Please submit comments or story ideas by calling (901) 287-6030.

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Researchers study bed alarms for nocturnal seizures

Seizures that occur during sleep are particularly concerning to parents of children with epilepsy. The risk of death can be decreased with nighttime monitoring or supervision. Several products are available that claim to reliably detect seizure activity without frequent false alarms.

Le Bonheur's Neuroscience Institute is the only center to review all three of the bed alarms on the market for home use. Two of the studies are complete, and the third is

underway. Patients in Le Bonheur's Epilepsy Monitoring Unit were enrolled in the studies.

"With all of the seizure alarms on the market, it may be difficult for families to decide which one would fit their needs. The goal of evaluating the available models is

to provide more information to families who have children with epilepsy. They should then be equipped to make an educated decision on which alarm would be best for their children," said Neurologist Stephen Fulton, MD.

The first study is "Prospective Study of 2 Bed Alarms for Detection of Nocturnal Seizures," which was published in the *Journal of Child Neurology* in October 2012. This study reviewed two models of the Medpage bed alarm. The researchers, led by Fulton, found that these products do not adequately detect nocturnal seizures.

The second study, "Prospective Study of the Emfit Movement Monitor," was accepted for publication in the *Journal of Child Neurology*. In this research, the Emfit movement monitor proved to perform better than the Medpage bed alarms. The Emfit detected 84 percent of nocturnal tonic-clonic seizures. The team, led by Kate Van Poppel, MD, added that advancements in these alarms to detect respiration or heart rate may improve the ability to detect seizure events.

The third study that is now underway involves the Smart Watch, which uses a watch-like device to detect excessive and repetitive movement and signal a family member's Android smart phone.



Neurologist James Wheless, MD, shows patient Becca Sharpe how the Smart Watch is designed to work when she has a seizure. Smart Watch is one of three seizure alarms that the Neuroscience Institute has studied in the Epilepsy Monitoring Unit.



LE BONHEUR FETAL CENTER NEARLY DOUBLES PATIENT VOLUME

The Fetal Center at Le Bonheur Children's nearly doubled its volumes in the last year. The program bridges the obstetric and pediatric subspecialty worlds to create a multidisciplinary plan of care for babies with complex congenital health issues.

Program Director Janet Tucker, MSN, RNC-OB, attributes the Fetal Center's growth in large part to the partnerships with obstetricians in the region. Most patients are co-managed with their primary obstetrician, allowing for a partnership in the development and delivery of the right care plan for families.

"When we see a patient, the referring physician receives a report from our office within 24 hours, as well as a personal phone call from the maternal fetal medicine physician to discuss findings and recommendations," said Tucker.

The program connects expectant parents to the necessary pediatric subspecialists before the child's birth. Diagnoses range from a minor anomaly that may not need intervention to those requiring close monitoring throughout the pregnancy, intricate planning for delivery and the involvement of multiple pediatric subspecialists.

The program is led by maternal fetal medicine specialists Giancarlo Mari, MD, and Jacques Samson, MD. The doctors' combined expertise includes fetal therapy, fetal intervention, twin-to-twin transfusion, fetal imaging, intra-uterine growth restriction and maternal issues like diabetes, obesity and pre-eclampsia.

"Our team is very excited about the growth of the center," said Mari. "We look forward to continuing to provide excellent care to patients in our region such that they no longer have to travel to specialized centers in other states."

The program recently began offering free classes that address the unique needs of Fetal Center families. Topics include sibling preparation, breastfeeding in the NICU and postpartum recovery while babies are in the NICU.



Fetal Center Co-Directors Giancarlo Mari, MD, and Jacques Samson, MD, see expectant mothers at Le Bonheur and work alongside obstetricians to manage the care of complex pregnancies.