

DEPARTMENT OF SURGERY

ANNUAL REPORT

2014



**Texas Children's
Hospital®**

DEPARTMENT OF SURGERY
ANNUAL REPORT 2014

Welcome

Letter from the Surgeon-in-Chief	2
Texas Children's Hospital and Baylor College of Medicine	3

Department of Surgery

Overview	4
Research Seed Grants	6
Outcomes and Impact Service	9
Advanced Practice Provider Program	9
International Reach	11
Multidisciplinary Teams	12

Surgical Divisions

Congenital Heart Surgery	13
Dental	18
Neurosurgery	21
Ophthalmology	26
Orthopaedics	32
Otolaryngology	36
Pediatric and Adolescent Gynecology	40
Pediatric General Surgery	44
Plastic Surgery	50
Transplant Services	55
Urology	61

Department of Surgery Services

Inpatient Services	66
Operating Room and Perioperative Services	69
Trauma Services and the Center for Childhood Injury Prevention	71

Department of Pediatric Anesthesiology

Locations

Texas Children's Pavilion for Women	83
Texas Children's Hospital West Campus	87
Texas Children's Hospital The Woodlands	90

Medical Staff Directory

Referrals

Texas Children's Hospital and Baylor College of Medicine

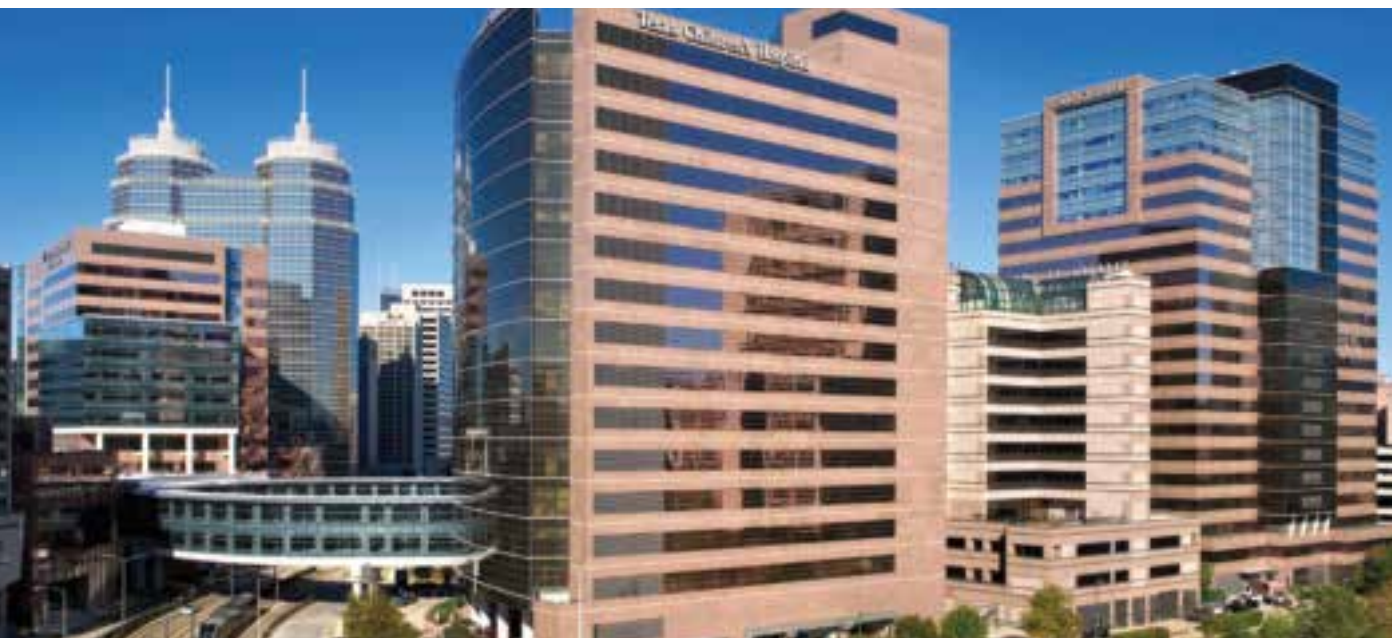
Texas Children's operates Texas Children's Hospital, Texas Children's Health Plan, the nation's first health maintenance organization (HMO) created just for children, and Texas Children's Pediatrics, the nation's largest primary pediatric care network with over 50 offices and care centers throughout the greater Houston community.

Texas Children's Hospital's main campus is located near downtown Houston in the Texas Medical Center, the largest medical center in the world. The main campus includes 650 inpatient beds, the Clinical Care Center for outpatient visits, the Feigin Center for pediatric research and Texas Children's Pavilion for Women. To serve the rapidly growing population in West Houston, Texas Children's Hospital West Campus opened in 2011 as a community hospital and clinic and contains ICU beds, inpatient beds, an emergency center, surgical suites and more than 20 subspecialty clinics. In 2017, we will open our second community hospital, Texas Children's Hospital The Woodlands.

Texas Children's mission is to create a healthier future for children and women throughout our global community by leading in patient care, education and research. Renowned worldwide for our expertise and breakthrough developments in clinical care and research, Texas Children's Hospital was recently ranked #4 among top children's hospitals in the nation and was ranked in all 10 pediatric subspecialties in *U.S. News & World Report's* list of America's Best Children's Hospitals.

Texas Children's Hospital is affiliated with Baylor College of Medicine in the areas of pediatrics, pediatric surgery, and obstetrics and gynecology. Baylor is ranked by *U.S. News & World Report* as one of the nation's top 25 medical schools for research. Currently and throughout our 60-year partnership, Texas Children's Hospital serves as Baylor's primary pediatric training site, and Baylor faculty are the division chiefs and staff physicians of Texas Children's patient care centers. The collaboration between Texas Children's Hospital and Baylor is one of the top 10 such partnerships for pediatric research funding from the National Institutes of Health.

More than 1,500 board-certified pediatricians, pediatric subspecialists, pediatric surgical subspecialists and dentists – offering the highest level of pediatric care in more than 40 subspecialties, programs and services – practice at Texas Children's with a support staff in excess of 10,500.





Department of Surgery

The Department of Surgery at Texas Children's Hospital represents a dedicated team of pediatric-focused surgeons from nine surgical divisions: Congenital Heart Surgery, Dental, Neurosurgery, Ophthalmology, Orthopaedics, Otolaryngology, Pediatric General Surgery, Plastic Surgery and Urology. In conjunction with our partners in Anesthesiology, Pediatric and Adolescent Gynecology, and Transplant Services, we have 80 full-time surgeons who are full-time Baylor College of Medicine faculty and more than 600 Texas Children's Hospital and Baylor College of Medicine employees focused on ensuring children get the care they need.

Our team's tireless efforts are evident in our more than 25,300 operating room cases and over 135,000 outpatient visits completed in 2014, our external research funding, and our countless articles and presentations given nationally and internationally each year.

We are dedicated to meeting our mission with five community health centers and two Texas Children's Hospital locations. Additionally, we take great pride in caring for children at other hospitals in the Houston area and from all 50 states and nearly 60 countries around the globe. When parents want the very best for their child, we are humbled that they make Texas Children's Hospital their choice. It is an honor to care for these children and a responsibility we do not take lightly.

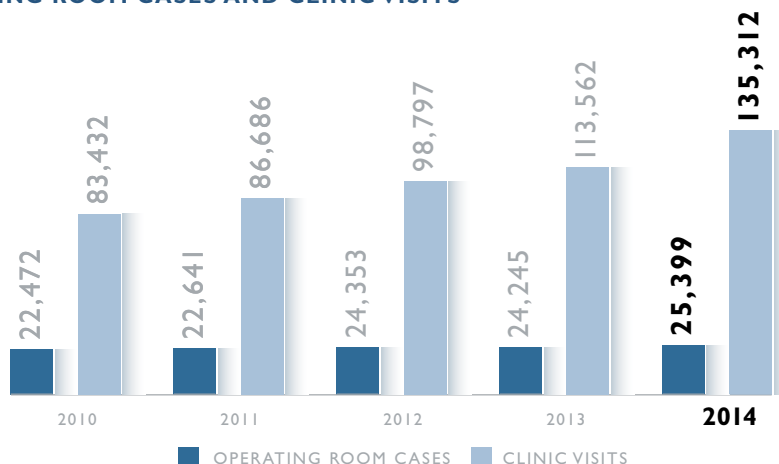
DEPARTMENT OF SURGERY OVERVIEW

SURGICAL DIVISION	CLINIC VISITS	OPERATING ROOM CASES
Congenital Heart Surgery	1,676	928
Dental	3,458	988
Neurosurgery	6,588	886
Ophthalmology	20,214	1,457
Orthopaedics	35,673	2,574
Otolaryngology	24,917	8,754
Pediatric and Adolescent Gynecology*	7,442	237
Pediatric General Surgery	11,809	5,792
Plastic Surgery	8,043	1,437
Urology	15,492	2,346
TOTAL	135,312	25,399

*Pediatric and Adolescent Gynecology is a division of Obstetrics and Gynecology.

OPERATING ROOM CASES AND CLINIC VISITS

by year



Operating room cases are defined as cases when operating room staff and supplies are used. Cases with multiple procedures count as one case and are attributed to the service line of the primary surgeon. Operating room case volumes include procedures performed by Texas Children's Hospital, Baylor College of Medicine and private practice physicians at Texas Children's Hospital locations. Clinic visits include outpatient visits by Texas Children's Hospital and Baylor College of Medicine faculty only.

Department of Surgery Research Seed Grants

The Texas Children's Hospital Department of Surgery awarded seed grants to surgeons and researchers to advance critical research efforts within the department. Nearly \$275,000 in funding was issued to the following research projects:

CONGENITAL HEART SURGERY: IKI ADACHI, M.D.

Pediatric Myocardial Alterations in Response to Ventricular Assist Devices

Heart failure is the leading cause of death in the United States. The etiological factors of heart failure differ between children and adults. In children, dilated cardiomyopathy is the most common indication for heart transplant. However, pediatric cardiac transplant candidates have the highest wait list mortality risk compared to other solid organ transplantations. The use of ventricular assist devices (VAD) has had the single greatest impact in reducing pediatric wait list mortality. In both adults and children who have received VAD support, instances of recovery of native cardiac function allowing weaning from the device have been observed. It has been established that VAD support induces reverse modeling of the failing myocardium. The pediatric myocardium promises theoretical advantages for recovery over the adult myocardium due to its greater abundance of cardiac progenitor cells, which promote myocardial regeneration. While reverse remodeling has been extensively studied in the adult population, there is a remarkable paucity of these studies with children. Given the inherent limitations with heart transplantation and the higher potential of cardiac recovery in children, the investigators feel it is crucial to develop a new therapeutic strategy in an effort to induce cardiac recovery with a VAD.

With this study, the investigators intend to build on the data from a previous pilot study. In the pilot study, four patients with a median support duration of less than two weeks were included. In this study, investigators intend to analyze paired samples (one pre-VAD and one post-VAD sample) from 25 patients with a much longer support duration. Parameters of interest include genetic profiles and proteomics, with a specific focus on the molecular changes that occur during VAD support. With this study, we intend to confirm that the pediatric myocardium behaves differently than the adult myocardium when subjected to mechanical support.

CONGENITAL HEART SURGERY: CARLOS MERY, M.D.

Development of a Novel Open Fetal Cardiac Surgical Intervention for Creation of an Atrial Septal Defect in Patients with Hypoplastic Left Heart Syndrome and an Intact or Highly Restrictive Atrial Septum

Hypoplastic left heart syndrome (HLHS) is characterized by a significant underdevelopment of left heart structures. Despite dramatic improvements in the survival of patients with HLHS over the last three decades, the subset of patients with an intact or highly restrictive atrial septum (RAS) continues to have a dismal prognosis. In these patients, the lack of adequate pulmonary venous drainage leads to left atrial and pulmonary venous hypertension in utero with consequent inadequate development of pulmonary venous structures. Furthermore, these patients become critically ill in the neonatal period due to inadequate return of oxygenated blood from the lungs. Multiple strategies have been attempted including emergent surgical and catheter-based procedures after birth and, most recently, fetal catheter interventions in an attempt to create an adequate atrial septal defect (ASD) for left atrial decompression. The results of the current techniques are suboptimal, and patients with HLHS/RAS continue to have a poor prognosis.

The goal of this project is to develop a safe, reliable and effective technique to create a large, long-lasting ASD in utero for HLHS/RAS patients. The investigators will develop and test different surgical and hybrid (combined surgical and catheter-based) techniques in an animal model to create an interatrial communication. If successful, these techniques may translate into better long-term outcomes for these patients by improving the decompression of the left atrium at earlier stages of gestation. This project would also open doors to a new field of open fetal cardiac surgical intervention.

OPHTHALMOLOGY: MOHAMED HUSSEIN, M.D.

Exploring the Role of the Choroid and the Autonomic Innervation in the Development of Retinopathy of Prematurity

Retinopathy of prematurity (ROP) is a major health problem. A significant number of children are rendered blind or visually impaired as a consequence of this disorder. Although multiple modifiable risk factors for ROP have been identified, ROP remains, for the most part, a nonpreventable disease. The main focus in improving the outcome of ROP is a strategy of timely screening, early recognition of severe ROP and, when needed, early treatment with laser or intravitreal anti-vascular endothelial growth factor, such as bevacizumab.

The choroid, a major source of blood supply to the outer retina is regulated by the autonomic nervous system (ANS). The choroid may potentially play an important role in the development of ROP. Premature infants are known to suffer a major deficit in ANS activity. The more premature the neonate is, the more likely that the ANS will be dysfunctional. Unlike the retinal vasculature that is largely autoregulated, the choroidal perfusion is largely controlled via the ANS. Accordingly, the greatest impact of the lack of proper innervation in premature infants is expected to be on choroidal perfusion. The choroid develops at an earlier age than the retina, and choroidal perfusion supplies a major portion of the retinal nutrition until the retina is completely vascularized. The peripheral retina, which lacks retinal vasculature in extremely premature infants, is expected to receive its entire blood supply from the choroid. The defective ANS activity in premature infants is expected to lead to dysregulation of the choroidal perfusion, which may adversely affect the blood supply to the peripheral retina, possibly resulting in peripheral retina hypoxia and ROP development. The investigators have found that ANS agents, caffeine and dopamine, used in the NICU for premature infants, may adversely affect the outcome for ROP. The aim of this research is to further evaluate the role of ANS drugs and the choroidal perfusion in the development of ROP. In this study, investigators will use optical coherence tomography to measure the choroidal perfusion in premature infants. They will be correlating the perfusion of the choroid with the severity of the ROP and with the ANS activity as detected by the heart rate variability. The effect of the ANS imbalance and the effect of various ANS drugs on the choroidal perfusion in animal models will also be studied.

OPHTHALMOLOGY: LINGUN KONG, M.D.

Intravitreal Polymer Nanoparticle Drug Delivery System for Treatment of Retinopathy of Prematurity

Retinopathy of prematurity (ROP) is a disorder of abnormal growth of the vessels in the inner layer of the eyes in low-birth-weight preterm infants that can lead to blindness. To address long- and short-term effects on neurological and other organ development, there is a need to develop a new drug delivery system that can reduce the systemic absorption of anti vascular endothelial growth

factor (VEGF) drug. The long-term goal of the proposed research is to develop an injectable and biodegradable delivery vehicle for anti-VEGF drugs such as bevacizumab that increases retention of the drug in the vitreous space and retinal tissue while minimizing absorption of the drug in the bloodstream. The objective of the study is to evaluate the pharmacokinetics, tissue localization and efficacy of two poly (lactic-co-glycolic acid) nanoparticle (PLGA NP) formulations. One NP preparation will have bevacizumab conjugated to the PLGA NP surface, and the second NP formulation will have bevacizumab encapsulated internally. This innovative dual delivery system approach is designed to deliver an initial high-level therapeutic dosage followed by a slow release maintenance dosage. The central hypothesis is that intravitreal NP delivery of bevacizumab will result in greater drug retention and therapeutic efficacy against ROP and will have minimal systemic absorption.

PEDIATRIC GENERAL SURGERY: SANJEEV VASUDEVAN, M.D.

A “Pan-Omic” Analysis of Vascular Invasion in Pediatric Solid Tumors

The main purpose of this study is to delineate pathways involved in vascular invasion and metastasis in the more common pediatric solid tumors, neuroblastoma and hepatoblastoma. Recent studies have shown that both of these types of cancers have the fewest genomic mutations of all cancers that have been studied to date. It is generally accepted that pediatric malignancies have the fewest somatic mutations. Due to this, the focus has turned to alterations in RNA expression and epigenetic manipulation of the genome with methylation and microRNAs. A landmark paper was recently published that brought light to tumor heterogeneity. Taking a random piece of tumor and studying this will not represent every aspect of these tumors. Our hypothesis is that the tumor cells that invade the blood vessels, spread to the circulation and implant in other organs such as the lung, bone and brain have distinct genetic characteristics compared to the more differentiated and complacent cells sitting in the tumor stroma. If the investigators in this study are able to delineate the activated or inhibited pathways involved with vascular invasion and metastasis, then they can target those pathways to prevent dissemination of the disease. Preventing tumor dissemination with targeted therapy and using conventional chemotherapy and surgery to control the primary tumor will inevitably result in cure for these very high-risk children.

PLASTIC SURGERY: EDWARD BUCHANAN, M.D.

Psychometric Assessment of the Medical Interview in the Pediatric Population

When the patient or family of a patient is seen by a medical provider, they participate in a medical interview. This medical interview is the cornerstone of any patient/practitioner interaction. Traditionally, the medical interview has consisted of three components: 1) Creating an interpersonal relationship; 2) Exchanging information; and 3) Facilitating medical-decision making. These components guide the medical interview and significantly contribute to the success of any patient encounter.

To date, research on the effectiveness of the medical interview, especially in the pediatric setting, has been significantly limited. Given the recent interest in and need for patient-centered care and outcomes measures, understanding the effectiveness of the medical interview process is an important and worthy entity to investigate. If this interaction can be understood more thoroughly, it can be adjusted or modified depending on the patient experience. The components of the medical interview can be analyzed critically and the practitioner can be given feedback on his or her strengths and weaknesses. This will allow for a more informed practitioner as well as an

empowered patient. This will be particularly helpful in today's health care environment in which physician extenders are being more utilized. Many of these professionals do not receive the same amount of training prior to starting in the clinical world. Much of their training is characterized as "on-the-job" training. With a tool that can help access the strengths and weaknesses of one of the most important parts of the clinical experience, we can improve upon the care given to our patients and advance the mission of the hospital.

Outcomes and Impact Service

The focus of the work in the Outcomes and Impact Service at Texas Children's Hospital is to measure clinical outcomes that matter to patients and the impact of care on the quality of life and functional status of our patients over time. Our ultimate goal is to deliver the highest value of health care to the patient.

By tracking outcomes, we learn about what happens to our patients, and we also learn about our performance as a health care delivery organization. We know we must continue to strive toward excellence in care delivery. In addition to providing statistics, we strive to engage patients and families in a conversation about the choices they face that will impact their health.

Our team includes outcomes nurses dedicated to different clinical specialties, computer programmers, data architects and specialists, and a statistician who works closely with clinical and administrative teams to measure, improve and share our outcomes. The goals of our service are to:

- Track and improve our clinical outcomes
- Understand the impact of those outcomes on the lives of our patients and families over time
- Make our outcomes data available in a form accessible by the general public
- Partner with patients and families in understanding outcomes data
- Help patients and families know what questions to ask when seeking medical treatment

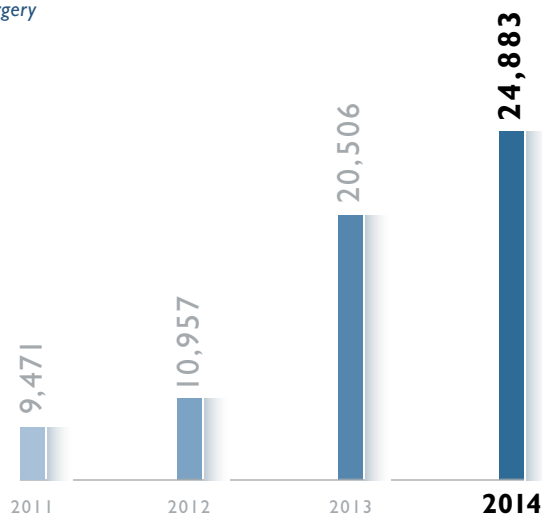
For more information, please visit texaschildrens.org/outcomes-and-impact-service.

Advanced Practice Provider Program

The Advanced Practice Provider (APP) Program at Texas Children's Hospital includes more than 330 APPs such as nurse practitioners, nurse anesthetists and physician assistants (PAs) across 35 departments. APPs are involved in all stages of care, from the emergency room to inpatient and outpatient care and from clinics to the operating room in Texas Children's Hospital locations across Houston. Within the Department of Surgery, the APP program has grown from eight APPs to 55 APPs in the past three years.

The contributions of APPs to the Department of Surgery and its patients are realized on a day-to-day basis. In 2014:

- More than 24,800 outpatient clinic visits were conducted, an 18 percent increase over 2013.
- APPs stood as the surgical first assistants in over 3,000 procedures and operating room cases.
- Outpatient visits with APPs increased to more than 20 percent in the Urology, Orthopaedics and Neurosurgery divisions and more than 30 percent in Otolaryngology and Congenital Heart Surgery.

OUTPATIENT APP CLINIC VISITS*in the Department of Surgery*

In 2014, 18% of clinic visits were with advanced practice providers.

APPs are the leaders of many clinical programs. For example, in Orthopaedics, PAs staff the Fracture Clinic, and in Urology, PAs manage voiding dysfunction cases. The Neurosurgery Department now has a Surgery APP managing the Traumatic Brain Injury Clinic, and all surgery divisions are expanding the role of their APP into the inpatient area.

Now in its second year, the Pediatric Surgery Physician Assistant Fellowship is a 12-month didactic and clinical program designed to extensively train PAs to become leaders in all areas of pediatric surgery. The fellowship program provides a unique opportunity for the fellows to gain hands-on



2014 Pediatric Physician Assistant Fellows: (L-R) Caitlin Justus, P.A.-C.; Cassie Mueller, P.A.-C.; Lesley Davies, P.A.-C.; Jackie Guarino, P.A.-C.

experience among the full spectrum of pediatric surgical subspecialties including Congenital Heart Surgery, Dental, Pediatric General Surgery, Neurosurgery, Orthopaedics, Otolaryngology, Plastic Surgery and Urology, as well as Trauma Services.

At the conclusion of the first year of the fellowship program, all of the fellows were offered, and accepted, positions at Texas Children's Hospital. The fellows and the divisions they were hired into are as follows: Lesley Davies, M.P.A.S., P.A.-C., Plastic Surgery; Jackie Guarino, M.P.A.S., P.A.-C., Urology; Caitlin Justus, M.P.A.S., P.A.-C., Texas Children's Hospital West Campus surgical hospitalist; and Cassie Mueller, M.P.A.S., P.A.-C., Trauma Services.

The fellowship program has been highlighted by the American Academy of Physician Assistants on four occasions in the last year as the most innovative fellowship program in the country. In 2014, there were 57 applicants for a total of six fellowship positions in the 2015 fellowship year. For more information, please visit texaschildrens.org/surgeryfellow.

International Reach

The Department of Surgery is committed to sharing our knowledge anywhere in the world pediatric surgery expertise is needed. Our surgeons regularly travel to give of their time in many underserved areas. This is just one way our team extends our mission of providing care for children.

In 2014, our surgeons continued to demonstrate their commitment to international patients through surgical trips to Mexico, Guatemala, Russia, Tanzania, Malawi and Botswana. Texas Children's Hospital also entered into a formal agreement with ABC Hospital in Mexico City to provide consulting and training for their congenital heart surgery program.



Weekly tele-rounds with our partners in Mexico.

Multidisciplinary Teams

Like many 7-year-olds, Taylor Honea was an active child. When she began to complain about pain in her right shin and foot, doctors assumed it was simply growing pains. But when the pain began to slow down her daily routine, her parents, Lori and Brody Honea, knew something was wrong. By winter 2013, the pain grew unbearable and the Honea family turned to their local hospital for answers. A full-body MRI revealed a tumor the size of a basketball growing in Taylor's tiny pelvic area. Her severe shin pain was caused by the part of the tumor that was resting on her sciatic nerve.

Taylor was immediately transferred to Texas Children's Hospital to undergo surgery by a multidisciplinary team of experts including oncologists, general surgeons, neurosurgeons, plastic surgeons and urologists, who all worked together on one of the most complex cases the hospital had seen. Together, they performed three extensive surgeries, totaling nearly 70 hours in the operating room to remove the tumor, extract the cancerous cells and preserve as many nerve endings as possible.

Taylor spent more than three months in pre-operative and post-operative care at Texas Children's Hospital and even celebrated her 8th birthday there. One month after surgery, she began walking again, and as of April 2015, she remains cancer free with no recurring signs of the tumor.



(L-R) Lori Honea; Andrew Jea, M.D., F.A.A.N.S., F.A.C.S., F.A.A.P.; Taylor Honea; Sanjeev A. Vasudevan, M.D.; Brody Honea



Congenital Heart Surgery

The Congenital Heart Surgery Division provides individualized and comprehensive surgical care for all aspects of pediatric and adult congenital heart disease. We are experienced in the rarest of cases such as ectopia cordis and other infrequently seen conditions. Texas Children's Heart Center performs over 900 surgical procedures annually with outcomes among the best in the nation. Additionally, the Heart Center is consistently ranked among the top pediatric cardiology and heart surgery programs in the nation by *U.S. News & World Report*.

We treat children of all ages, including preterm and low-birth-weight newborns, and we personalize treatments and procedures that best suit the situation of each child and family. This tailored approach includes cardiopulmonary bypass and neuroprotection strategies focused on the patient's condition and needs, helping to achieve optimal functional outcomes. The center's Heart, Lung and Heart-Lung Transplant Programs, among the nation's largest and most successful, are also part of the Congenital Heart Surgery Division.

TEXAS CHILDREN'S HOSPITAL BECOMES AN ACCREDITED PEDIATRIC HEART FAILURE INSTITUTE



Texas Children's Hospital has earned the designation of Accredited Pediatric Heart Failure Institute from the Healthcare Accreditation Colloquium (HAC). According to HAC, Texas Children's Hospital is one of the broadest ranging comprehensive heart failure programs in the U.S. Not only do we care for the sickest children daily, we remain committed to breakthrough research that has the potential to change medicine.

Since 1995, Charles D. Fraser, Jr., M.D., and the Congenital Heart Team have performed more than **13,600 operations** on children and adults with congenital heart disease.

CORONARY ARTERY ANOMALIES ARE THE FOCUS OF HOSPITAL CONFERENCE

In December 2014, Texas Children's Hospital hosted its second national conference about congenital coronary anomalies. The conference focused on clinical evaluation and treatment of coronary artery anomalies.

Coronary artery anomalies occur when a coronary artery rises from the wrong location on the aorta. Children and young adults with this condition can die suddenly, especially during or just after exercise. The condition is the second-leading cause of sudden cardiac death in children and young adults.

Diagnosing this condition can be challenging because many individuals with the condition have no symptoms. Those individuals who do have symptoms mostly complain of chest pain, palpitations, dizziness or fainting during or just after exercise.

"How to best treat a child or young adult with a coronary artery anomaly is a subject of debate in the medical community," said Carlos Mery, M.D., surgical director of the Coronary Anomalies Program, who organized the conference with the program's medical director, Silvana Molossi, M.D., Ph.D. "Most physicians agree that surgery is necessary for patients who show evidence of decreased blood flow to the heart tissue. But how to treat those patients who have no physical complaints and who show no evidence of reduced blood flow to the heart is unclear."

During the conference, doctors from institutions such as Lucille Packard, Boston Children's Hospital and Children's Hospital of Philadelphia discussed the most-appropriate imaging and surgical techniques, identification of risk factors, various management strategies based on available evidence, and how to best counsel patients and families about treatment and exercise.

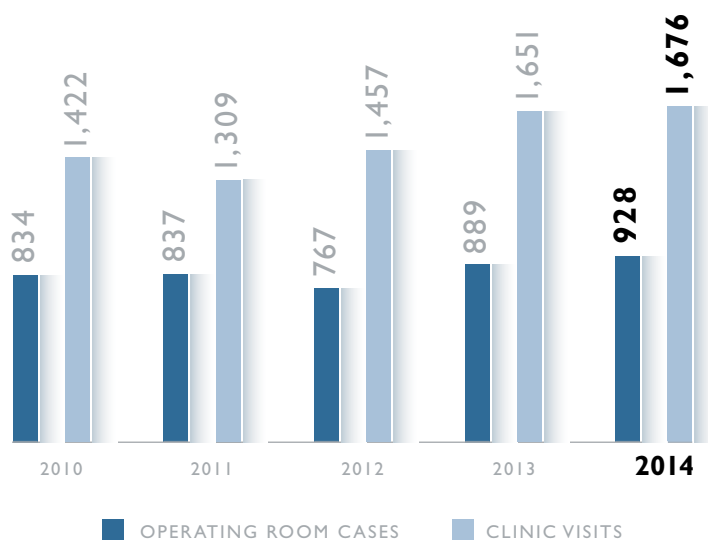
OUTCOMES OF PATIENTS WITH ANOMALOUS AORTIC ORIGIN OF A CORONARY ARTERY

The program began tracking outcomes in December 2012 and as of February 2015 has recorded:

Total patients	90
Surgery treatment	29
Mortality	0
Complications	2

CONGENITAL HEART SURGERY OPERATING ROOM CASES AND CLINIC VISITS

by year



Total operating room volumes include heart and lung transplantations. Operating room case volumes and clinic visits include procedures and outpatient visits completed by physicians at Texas Children's Hospital surgical locations.

MORTALITY RATE BY RACHS-I CLASSIFICATION IN 2014

Primary procedure	Number of procedures	Number of discharge mortalities	% Mortality	STS national benchmark
Total for Risk Category 1	99	0	0.0%	0.3%
Total for Risk Category 2	223	0	0.0%	0.9%
Total for Risk Category 3	206	0	0.0%	3.6%
Total for Risk Category 4	59	2	3.4%	6.3%
Total for Risk Category 5-6	22	4	18.2%	15.0%
Grand total	609	6	<1.0%	3.2%

The Risk Adjustment in Congenital Heart Surgery (RACHS-I)¹ categorization is a widely used risk stratification model to analyze outcomes in congenital heart surgery. The most common surgeries for congenital heart defects are stratified into six risk categories. Surgeries with higher risk are placed in higher categories with category six representing congenital heart surgeries associated with the greatest risk.

For questions or more information about our outcome data or processes, please contact Kathy Carberry, R.N., M.P.H., director of Texas Children's Outcomes and Impact Service at kecarber@texaschildrens.org.

Overall risk-adjusted hospital mortality rate for our program in 2014 was less than 1.0%². Data collected by the Society of Thoracic Surgeons (STS) shows the national hospital discharge mortality rate at 3.2%³.

¹ Jenkins, KJ, Gauvreau K, Newburger JW, et al., Consensus-based method for risk adjustment for surgery for congenital heart disease. J Thorac Cardiovasc Surg. 2002; 123:110-8.

² 007-RACHS-I Index Surg CHD Volume.

³ Society of Thoracic Surgeons Data Harvest Report published May 2014.

CHARLES D. FRASER, JR., M.D., is surgeon-in-chief, co-director of Texas Children's Heart Center and chief of the Division of Congenital Heart Surgery at Texas Children's Hospital. His academic appointments include professor of Surgery in the Michael E. DeBakey Department of Surgery (tenured) at Baylor College of Medicine, professor of Pediatrics at Baylor College of Medicine and adjunct professor of Bioengineering at Rice University. Dr. Fraser holds the Clayton Chair in Surgery and the Donovan Chair in Congenital Heart Surgery at Texas Children's Hospital. Dr. Fraser has a clinical appointment at the Texas Heart Institute where, he serves as director of the Adult Congenital Heart Surgery Program.

Dr. Fraser's extensive education began as an undergraduate at the University of Texas at Austin, where he graduated with honors in mathematics. He received his medical degree with honors from the University of Texas Medical Branch at Galveston. His residency and fellowship training



took place at The John Hopkins Hospital in Maryland. He completed additional fellowship training in congenital heart surgery at the Royal Children's Hospital in Melbourne, Australia. After joining the faculty at Cleveland Clinic, Dr. Fraser was recruited to Texas Children's Hospital in July of 1995 to establish a dedicated pediatric congenital heart surgery program.

To view more Congenital Heart Surgery Division biographies, visit texaschildrens.org/heart.



Dental

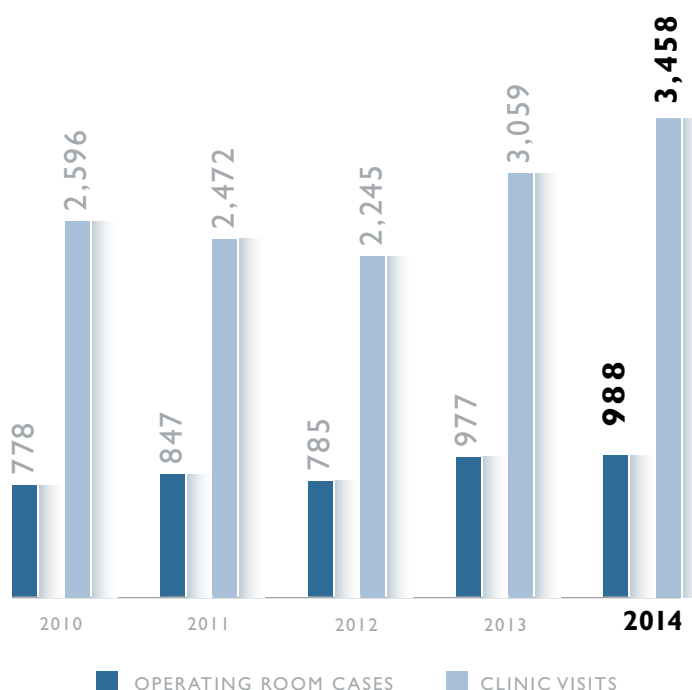
The Dental Division at Texas Children's Hospital performs more than 3,400 procedures each year to ensure patients with special needs or complex medical diagnoses receive the dental care they need. In collaboration with Texas Children's Nephrology service, Neuroscience Center, Heart Center and Cancer Center, we treat dental patients as outpatients, inpatients or in the operating room. With expertise in a full range of procedures, our team coordinates each patient's care with his or her pediatric subspecialists.

Sometimes dental treatment, such as removal of teeth or replacement of fillings, is needed before surgery or anesthesia can take place or other health care needs can be addressed. Orthodontia is provided for children with congenital craniofacial anomalies and/or cleft palates. In addition, we ensure that the annual dental needs, such as prophylaxis or fillings, of children with special needs are met.

The Dental Division participates in the multidisciplinary Craniofacial Clinic to address genetic abnormalities of the face and head. This collaborative effort brings together experts from Dermatology, Genetics, Neurosurgery, Otolaryngology, Plastic Surgery, Radiology and Speech Therapy.

DENTAL OPERATING ROOM CASES AND CLINIC VISITS

by year

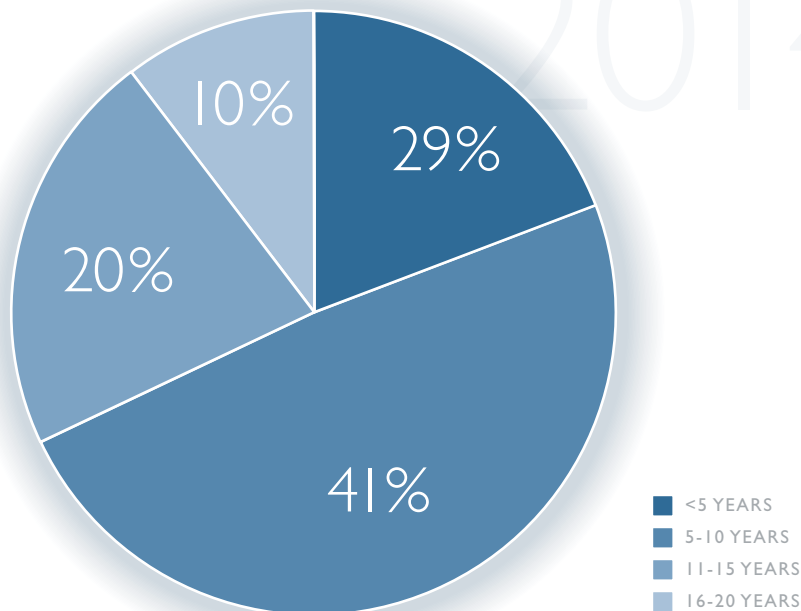


Operating room case volumes include procedures performed by Texas Children's Hospital, Baylor College of Medicine and private practice physicians at Texas Children's Hospital surgical locations. Clinic visits include outpatient visits by Texas Children's Hospital and Baylor College of Medicine faculty only.

Texas Children's Hospital has partnered with the University of Texas Health Science Center at Houston School of Dentistry to give dental residents an opportunity to experience pediatric dentistry. Each semester, two residents have the opportunity for a pediatric rotation at Texas Children's where they will learn how dental care impacts many childhood health conditions.

DENTAL OPERATING ROOM PATIENTS

by age



Visit texaschildrens.org/dental for more information.

A. BRUCE CARTER, D.D.S., is chief of the Dental Division and Dental Clinic at Texas Children's Hospital. He received his doctorate of Dental Surgery at the University of Texas Health Science Center at Houston, where he also received his Pedodontic Certificate. After a solo practice and teaching at his alma mater, he joined Texas Children's Hospital as the Dental Clinic chief in 1984.



He is member of the American Board of Pediatric Dentistry Diplomates, the Greater Houston Dental Society, the Texas Dental Association, the American Dental Association and the American Academy of Pediatric Dentistry. In conjunction with a grant from the National Institutes of Health, Dr. Carter studied and published several articles on the oral manifestations and health of pediatric HIV patients.

To view more Dental Division biographies, visit texaschildrens.org/dental.



Neurosurgery

The Neurosurgery Division at Texas Children's Hospital, part of the hospital's Neuroscience Center, is one of the most dynamic and experienced pediatric neurosurgery programs in the nation. Consistently ranked by *U.S. News & World Report* as a leader in neurology and neurosurgery, we complete more than 880 surgical procedures each year to address a broad range of neurological disorders in infants, children and young adults.

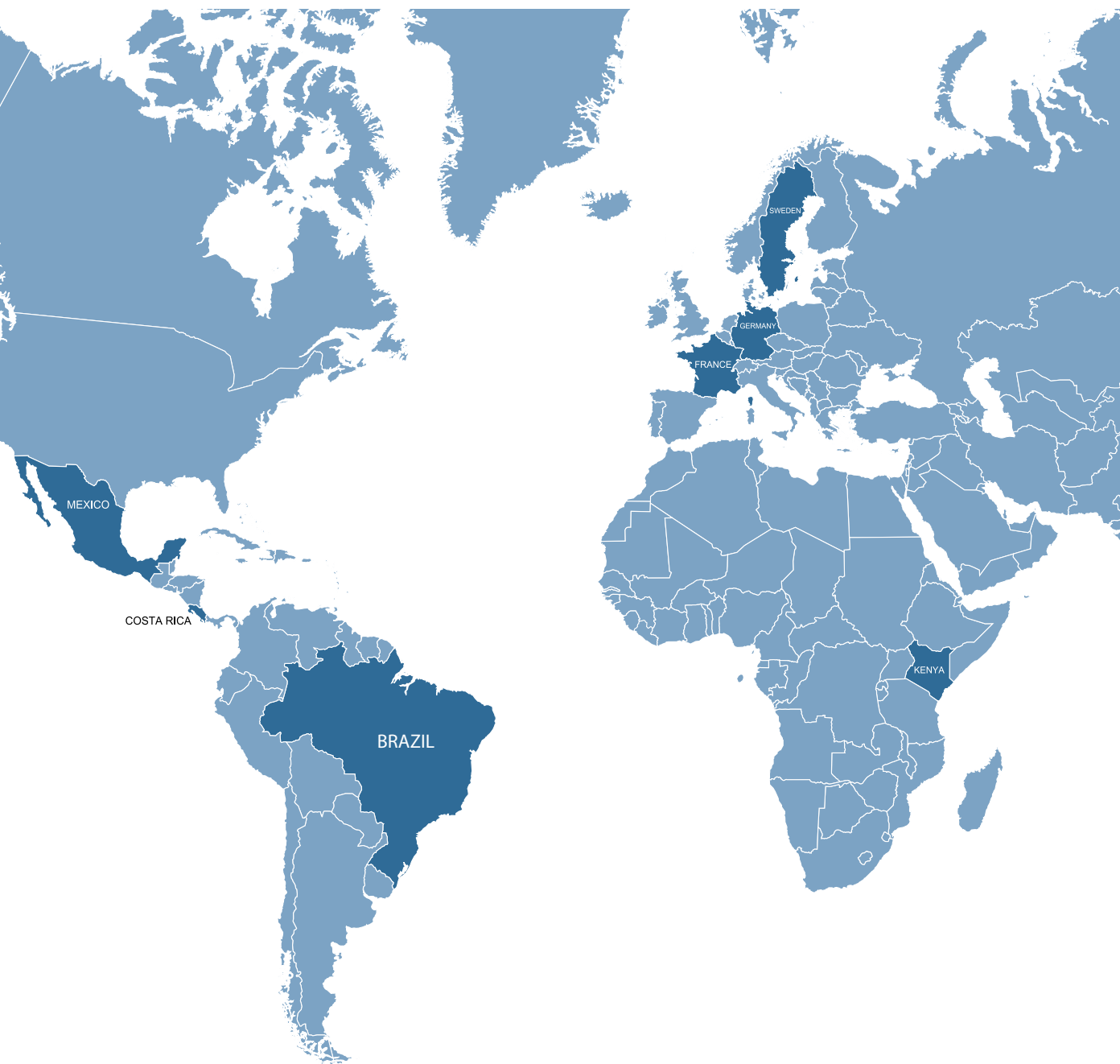
Six board-certified pediatric neurosurgeon-scientists provide surgical treatment of neurological diseases and conditions, including tumors or malformations in the brain, spine and peripheral nervous system; epilepsy; and hydrocephalus. We are committed to discovering groundbreaking diagnosis and treatment approaches and to training the next generation of neurosurgeons.

A team of nurse practitioners, registered nurses, and administrative and research staff works together in support of the neurosurgeons, further ensuring our patients with complex conditions receive the exceptional care and attention they deserve.

GLOBAL IMPACT

As worldwide leaders in the field of neurosurgery, many physicians at Texas Children's Hospital are invited to present and mentor at facilities around the world. Daniel Curry, M.D., director of Surgical Epilepsy and Functional Neurosurgery, presented to fellow physicians and surgeons in Germany, Sweden, France, Brazil and Costa Rica about MRI-guided laser ablation, disconnective and ablative surgery, as well as deep brain stimulation for dystonia.

Other physicians extending their influence internationally include Sandi Lam, M.D., M.B.A., director of Craniofacial Surgery, who spent two weeks in Kijabe, Kenya performing surgical interventions. William Whitehead, M.D., M.P.H., director of the Clinical Research and Outcomes Program, spoke on the neurosurgical point-of-view on hydrocephalus and fetal myelomeningocele closure to maternal fetal medicine specialists in Monterrey, Mexico.



NEURO-SPINE PROGRAM FORGES AHEAD

The Neuro-Spine Program at Texas Children's Hospital, a unique offering for a pediatric institution, sees over 1,300 patients on an annual basis with complexities involving the minimally invasive surgical treatment of spine disorders, including scoliosis, kyphosis, spondylolisthesis, trauma and tumors. Andrew Jea, M.D., F.A.A.N.S., F.A.C.S., F.A.A.P., educational program director of the Neuro-Spine Program, has collaborated with spinal surgeons across the country, earning the distinct honor of the first pediatric neurosurgeon inducted into the Scoliosis Research Society.

\$1.8 MILLION RESEARCH GRANT RECEIVED TO STUDY HYDROCEPHALUS

The Patient-Centered Outcomes Research Institute (PCORI) awarded a \$1.8 million grant to William Whitehead, M.D., to study ventriculoperitoneal shunt placement in pediatric patients with hydrocephalus. Dr. Whitehead and his research team will work with the Hydrocephalus Clinical Research Network and the Hydrocephalus Association to conduct the multi-site study. The three-year randomized controlled trial will determine which shunt entry site results in the lowest rate of shunt failure.

The study is one of 46 proposals PCORI approved for funding to advance the field of comparative clinical effectiveness research providing patients, health care providers and other clinical decision-makers with information that will help them make better informed choices. Dr. Whitehead's study and other projects approved for funding by PCORI were selected from 490 applications through a highly competitive review process.

In 2014, the Patient-Centered Outcomes Research Institute (PCORI) awarded a \$1.8 million contract to Dr. William Whitehead to study ventriculoperitoneal shunt placement in pediatric patients with hydrocephalus.

NEW NEUROSCIENCE CENTER TO TREAT COMMON AND COMPLEX DISORDERS

In 2014, Texas Children's Hospital unveiled branding of the Neuroscience Center, a comprehensive destination for children suffering from the most common neurological conditions, such as epilepsy and muscular dystrophy, to more complex and rare disorders like Lissencephaly and Rett Syndrome. Expert teams of neurologists and neurosurgeons partner with the more than 200 researchers and scientists from the Texas Children's Hospital Jan and Dan Duncan Neurological Research Institute® (NRI) to deliver the complete continuum of care. The NRI is home to eight core laboratories, over 70,000 square feet of lab space solely dedicated to neurological research. Utilizing the synergy of all three teams has led to a more robust and expert team providing neurological and neurosurgical care. For more information, visit texaschildrens.org/neuroscience.

CONTINUED EXCELLENCE IN LASER ABLATION SURGERY

In August 2014, Texas Children's Hospital celebrated its fourth anniversary of the MRI-guided laser ablation procedure for epilepsy, a groundbreaking procedure led by Angus Wilfong, M.D., medical director of the Comprehensive Epilepsy Program, and Daniel Curry, M.D., director of Surgical Epilepsy and Functional Neurosurgery. Since its inception in 2010, over 60 procedures have been completed, with several more planned. As a result of the extensive exposure and rarity of this procedure, patients have traveled to Texas Children's Hospital from 15 states and five countries

around the world, as far away as Australia. Additionally, the hospital’s Epilepsy Monitoring Unit has grown from a six- to a 12-bed, wireless unit, increasing patient capacity and adding potential candidates for the laser ablation procedure.

QUALITY IMPROVEMENT FOCUS

Quality improvement tracking and methods have been brought to the forefront to ensure continued excellence in the Neurosurgery Division. Thomas Luerksen, M.D., F.A.C.S., F.A.A.P., serves dual roles as chief of Neurosurgery Division and chief quality officer for Surgery. As a result, in an effort to reduce the complex, instrumented spine infection rate in pediatric patients, a standardized protocol was developed and implemented, as published in the June 2014 *Journal of Neurosurgery* at the American College of Surgeons National Surgical Quality Improvement Meeting. After introducing this comprehensive protocol, the 12-week post-procedure infection rate decreased from 5.8 percent to 2.2 percent. Additional improved surgical outcomes are outlined below.

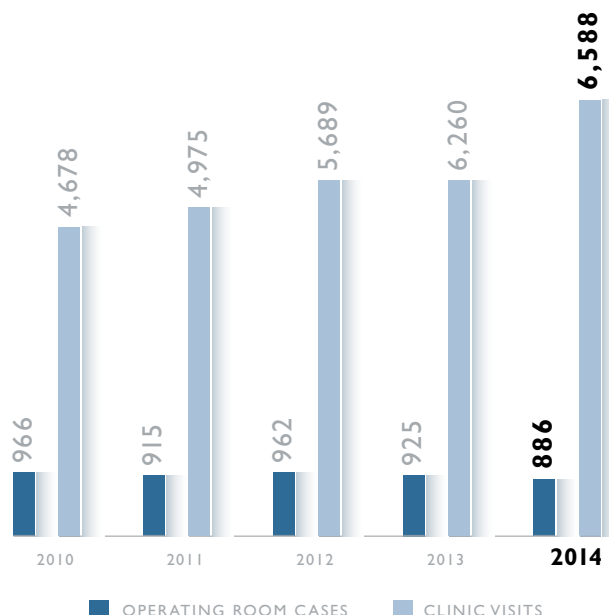
	2014 Goal	2014 Actual
Neurosurgical shunt infection rate	< 5%	2%
Craniotomy ⁴ complications ⁵	< 5%	0.9%
Postoperative cerebral-spinal fluid leak ⁶	< 5%	1.1%

⁴Craniotomy for tumor, vascular, trauma, ICH, and craniofacial reconstruction.
⁵Arterial injury, change in neuromonitoring that persists through procedure, unplanned transfusion of blood products, intraoperative CPR or death.
⁶Laminectomy, spinal instrumentation, repair of congenital malformation.



NEUROSURGERY OPERATING ROOM CASES AND CLINIC VISITS

by year



Operating room cases and clinic visits include procedures and outpatient visits completed by physicians at Texas Children's Hospital surgical locations.

THOMAS G. LUERSSEN, M.D., F.A.C.S., F.A.A.P., is chief of Neurosurgery and chief quality officer for Surgery at Texas Children's Hospital. He is also professor of Neurological Surgery and director of the Pediatric Neurosurgery Program in the Department of Neurosurgery at Baylor College of Medicine. Dr. Luerssen attended medical school at Indiana University and completed his residency in neurosurgery at Indiana University Medical Center. He completed fellowship training at Children's Hospital of Philadelphia and then joined the faculty at the University of California San Diego. His clinical and research focus was traumatic brain injury in childhood.

Later, Dr. Luerssen returned to Indiana University and spent 18 years as director of the Pediatric Neurosurgery Service at the James Whitcomb Riley Hospital for Children. In 2006, he was recruited to Texas Children's Hospital to be chief of Neurosurgery and was named chief quality officer for Surgery in 2009. Dr. Luerssen is the past chairman of the Joint Section on Pediatric Neurological Surgery of the American Association of Neurological Surgeons and Congress of Neurological Surgeons and past president of the American Society of Pediatric Neurosurgeons. He has also held the positions of director, vice chair and chair of the examination committee for the American Board of Pediatric Neurological Surgery.



To view more Neurosurgery Division biographies, visit texaschildrens.org/neurosurgery.



Ophthalmology

The Ophthalmology Division at Texas Children's Hospital provides the highest quality surgical care for anomalies, disorders and injuries of the eyes. Since its inception, the Ophthalmology Division has grown into one of the premier pediatric ophthalmology surgery programs in the nation with exceptional expertise, depth and quality of services and patient volumes.

The division has eight full-time ophthalmologists, one full-time optometrist and three part-time ophthalmologists. Dedicated subspecialists are available for the treatment of strabismus (misaligned eyes), eyelid and facial anomalies, retinal disorders including retinoblastoma and retinopathy of prematurity, glaucoma, cataracts and neuro-ophthalmological disorders. Surgical management of strabismus is provided for adults as well as children. Services are available in four locations, including Texas Children's Hospital, Texas Children's Hospital West Campus, Texas Children's Health Center Cy-Fair and Texas Children's Health Center The Woodlands.

NEURO-OPHTHALMOLOGY SERVICE EXPANDS

Pediatric Neuro-Ophthalmology Services have been expanded through the recruitment of new faculty and support staff to provide care for children with any disorder that can damage the optic nerve such as a brain tumor, hydrocephalus, inherited disorders or trauma. Specifically, neuro-ophthalmologists treat neurologic diseases that affect vision and peripheral vision, ocular movements and eye alignment, pupillary and eyelid abnormalities.

Texas Children's Hospital is home to two of only 20 pediatric neuro-ophthalmologists in the U.S.: Jane Edmond, M.D., and Veeral Shah, M.D., Ph.D. Neuro-ophthalmologists are highly skilled, completing fellowships in neuro-ophthalmology as well as pediatric ophthalmology and strabismus. They are supported at Texas Children's Hospital by the best diagnostic equipment and techniques available and through collaboration with Neurology, Neurosurgery, Genetics, Endocrinology and Rheumatology.

Optical coherence tomography (OCT) is a noninvasive imaging test that uses light waves to take detailed cross-section pictures of the optic nerve and retina and is vital in assessing the optic nerve in patients with multiple sclerosis.

New, state-of-the-art diagnostic equipment at Texas Children's Hospital will aid in the diagnosis and treatment of neuro-ophthalmic and retinal diseases. Diagnostic equipment includes optical coherence tomography (OCT) and electroretinography (ERG).

OCT is a noninvasive imaging test that uses light waves to take detailed cross-section pictures of the optic nerve and retina. This instrument is vital in assessing the optic nerve in patients with multiple sclerosis and will be utilized in an upcoming multicenter prospective trial studying the impact of neurofibromatosis-related optic pathway tumors in patients.

ERG is an electrophysiologic test that assesses the function of the retina, utilizing electrodes placed on the cornea and exposing the eye to different levels of light. ERGs are utilized to evaluate disorders of the retina, particularly inherited (hereditary) retinal degenerations and acquired disorders of the retina, aiding in making a diagnosis and prognosticating the vision outcome and possible treatment options. In many cases, young children cannot cooperate for the testing and, ideally, are studied in the operating room under sedation. Texas Children's Hospital is the only facility in Houston with the capability to perform sedated ERGs.



EXPANSION OF OCULOPLASTIC SERVICE

In 2013, the Ophthalmology Division established a new Oculoplastic Clinic exclusively for pediatric patients. This service provides access to comprehensive evaluation, treatment and correction of congenital abnormalities of the eyelids, tear ducts and eye sockets. The clinic is staffed by board-certified oculoplastic surgeons with expertise in the management of complex oculoplastic disorders that affect children, in coordination with pediatric specialists in Ophthalmology, Neurosurgery, Plastic Surgery, Anesthesia and other subspecialties as needed. The Oculoplastics Clinic has been so successful that in 2014 it expanded to offer services at Texas Children's Hospital West Campus.

EXPANSION OF VITREORETINAL SERVICE

In 2014, the Ophthalmology Division expanded services for children with vitreoretinal disorders or "back-of-the-eye" disorders, including genetic vitreoretinal conditions such as retinopathy of prematurity. These new services are directed by Tim Stout, M.D., Ph.D., chairman of the Department of Ophthalmology at Baylor College of Medicine.

AN AMERICAN ACADEMY OF OPHTHALMOLOGY CLINICAL MODULE

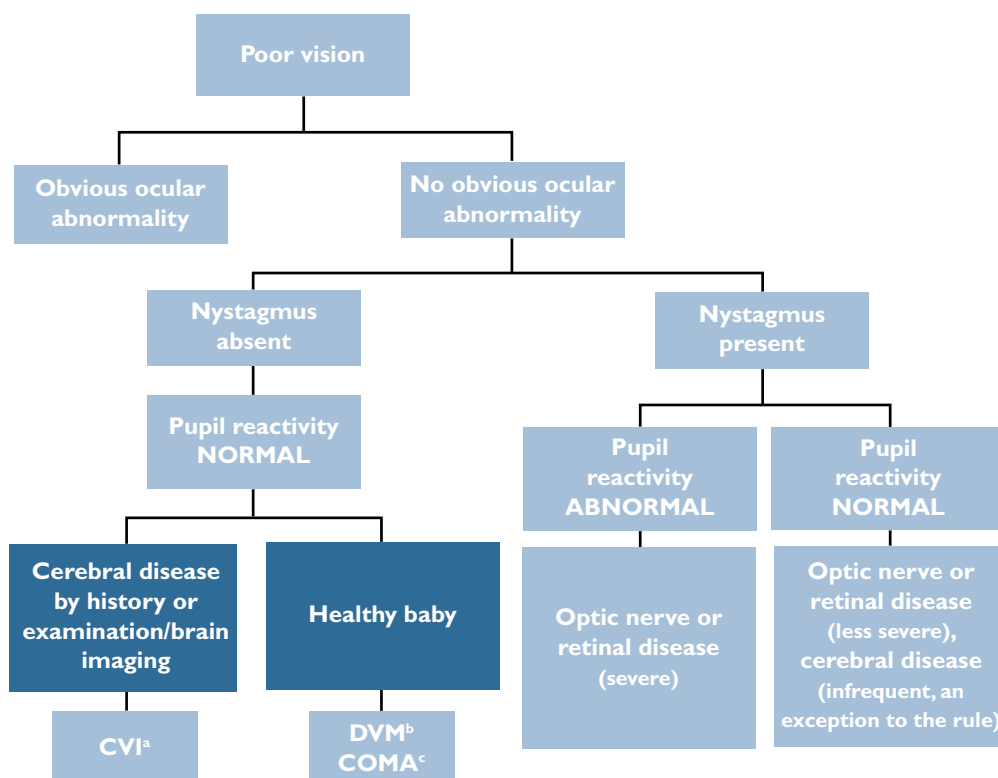
In many cases, an early diagnosis is key for physicians to provide meaningful treatment to patients. For many ophthalmologic conditions, providing an early diagnosis is imperative to retain as much sight as possible in pediatric patients. Jane Edmond, M.D., is a pediatric neuro-ophthalmologist at Texas Children's Hospital. This past year she wrote a clinical education module, "Why can't my baby see?" for the American Academy of Ophthalmology publication *Focal Points*.

In this module, Dr. Edmond outlines the milestones in the development of an infant's vision and discusses signs of abnormal vision and causes of visual impairment. She also shows an algorithm for the evaluation, diagnosis and management of the visually impaired infant.

In the module's conclusion, Dr. Edmond suggests that making the accurate diagnosis requires:

1) targeted history taking; 2) assessment for the presence or absence of nystagmus; 3) the quality of the pupillary light responses; and 4) a careful examination of the retina and optic nerve.

AN AMERICAN ACADEMY OF OPHTHALMOLOGY CLINICAL MODULE



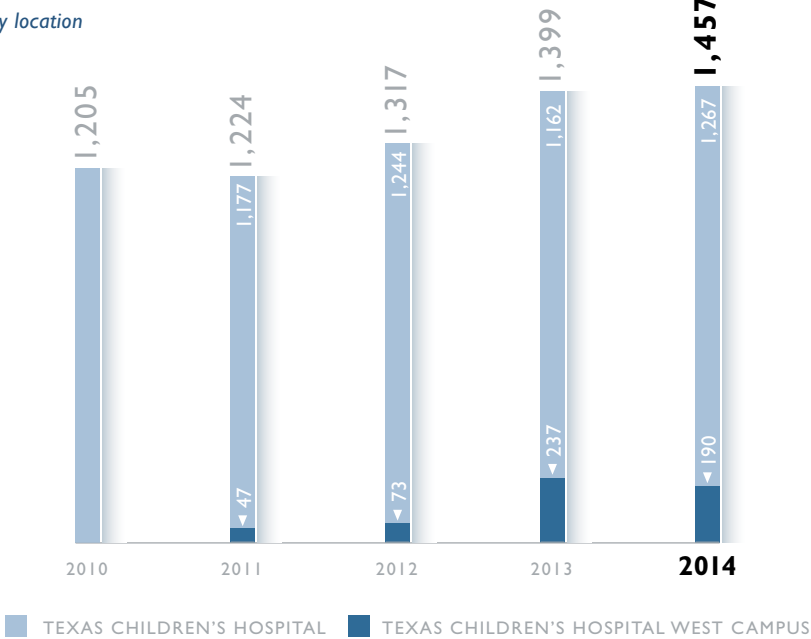
^aCVI Cerebral vision impairment

^bDVM Delayed visual maturation

^cCOMA Congenital ocular motor apraxia

OPHTHALMOLOGY OPERATING ROOM CASES

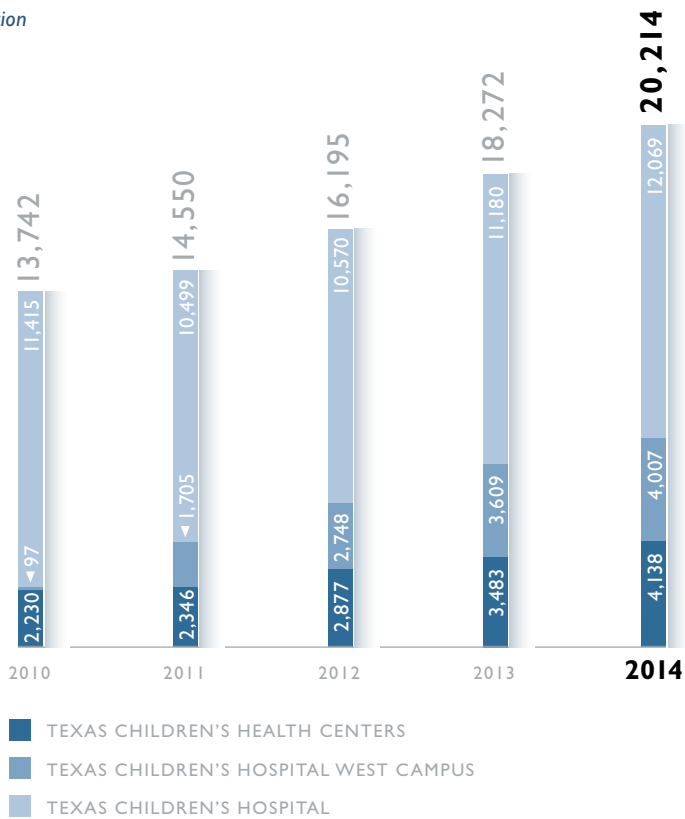
by year by location



Operating room case volumes include procedures performed by Texas Children's Hospital, Baylor College of Medicine and private practice physicians at Texas Children's Hospital surgical locations.

OPHTHALMOLOGY CLINIC VISITS

by year by location



Clinic visits include outpatient visits by Texas Children's Hospital and Baylor College of Medicine faculty only.

DAVID K. COATS, M.D., is chief of Ophthalmology at Texas Children's Hospital and professor of Ophthalmology and Pediatrics at Baylor College of Medicine. He received his medical degree from Texas Tech University School of Medicine in 1987, followed by an internship in South



Carolina and residency at the Storm Eye Institute at the Medical University of South Carolina. He completed a fellowship in pediatric ophthalmology and adult strabismus at Indiana University in Indianapolis in 1994 and joined the staff at Baylor College of Medicine in 1996. Dr. Coats is immediate past president of the Texas Ophthalmologic Association.

To view more Ophthalmology Division biographies, visit texaschildrens.org/ophthalmology.



Orthopaedics

The Orthopaedics Division at Texas Children's Hospital has extensive expertise in the treatment of all types of bone, neuromuscular and spine disorders and injuries. Consistently ranked by *U.S. News & World Report* as a leading orthopaedic center for children, we treat a variety of orthopaedic injuries and conditions, from minor fractures to complex problems. Close to 50 percent of the surgical procedures completed in Texas Children's Hospital Level I Trauma Center in 2014 were related to Orthopaedics.

Our surgeons work closely with experienced advanced practice providers (APPs) in order to give the highest level of patient care in the clinic and operating rooms. These APPs receive six months of pediatric orthopaedic-specific training at Texas Children's and are closely supervised by Orthopaedics Division faculty. Additionally, a high-tech digital imaging system allows instant consultation with a physician when needed. Our comprehensive support team also includes physical and occupational therapists, orthopaedic technicians, social workers and child life specialists.

CLUBFOOT CLINIC

The Clubfoot Clinic opened in September 2014 and includes three orthopaedic surgeons, an orthotist, a nursing team and several social workers. The clinic allows families to receive complete and total care in one visit, from a physician visit to being fitted for braces. It allows families to connect with and provide support for one another. Additionally, the Clubfoot Clinic will provide consultation to pregnant women whose ultrasound has detected clubfoot in their unborn infant. Surgeons who led the effort to establish the Clubfoot Clinic include Howard R. Epps, M.D.; Jaclyn F. Hill, M.D.; and Kevin S. Horowitz, M.D.

INTERNATIONAL PROGRAM FOR PEDIATRIC DEFORMITY CORRECTION AND LIMB RECONSTRUCTION

The International Program for Pediatric Deformity Correction and Limb Reconstruction was established in spring of 2014. This clinic provides comprehensive care to infants, children and young adults with complex orthopaedic disorders of the lower limbs. Conditions treated in the clinic include congenital deficiencies (short/missing leg bones); leg length differences; Blount's disease; and angular deformities from growth arrest, trauma or infection. The International Program for Pediatric Deformity Correction and Limb Reconstruction is led and staffed by Howard R. Epps, M.D.; Jaclyn F. Hill, M.D.; and Vinitha R. Shenava, M.D.

THREE-DIMENSIONAL PRINTING HELPS DOCTORS PERFORM SURGERIES

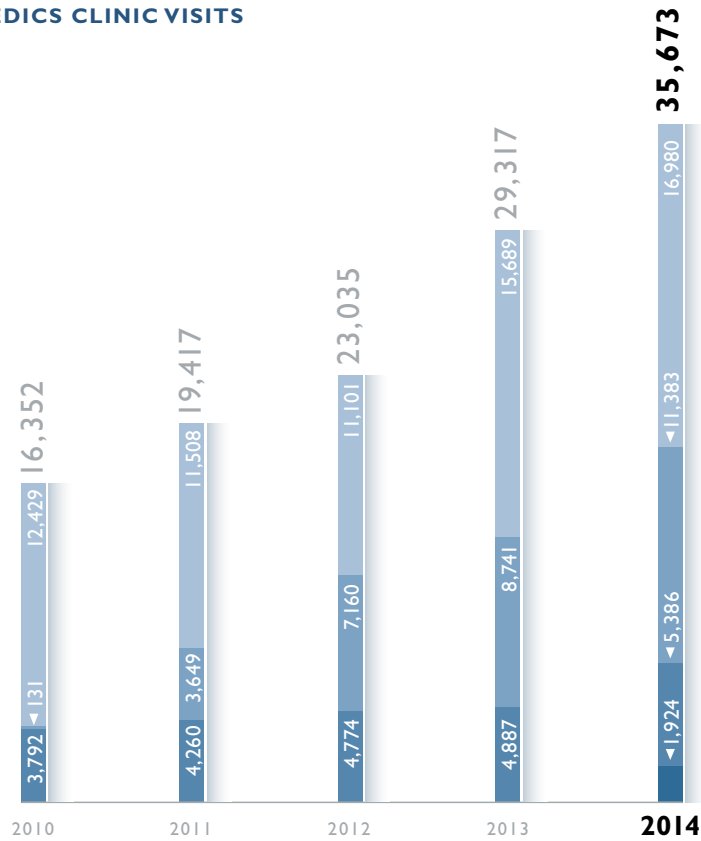
A 3-D printer is used by the Orthopaedics Division for complex bone surgeries, such as hip deformity correction and femoral surgery to correct Perthes disease. The use of the 3-D model enhances physician understanding of complex anatomy, improves the patient's understanding of their own anatomy and the procedure they are about to undergo, and increases the precision of the surgery.

The use of the 3-D model enhances physician understanding of complex anatomy, improves the patient's understanding of their own anatomy and the procedure they are about to undergo, and increases the precision of the surgery.

The 3-D printer builds its models off of patient's CT scans. The surgeons use the model beforehand in mock surgery, to determine how items should be placed before the patient enters the operating room. This results in a quicker operation and speedier recovery.

Texas Children's Hospital plans to prove the need for these models to insurance companies, which will allow the hospital to purchase a more advanced version of the printer to produce models that are more likely to feel like parts of the real human body. The Orthopaedics Division works in partnership with Cardiovascular Imaging, Musculoskeletal Imaging and Radiology at Texas Children's Hospital to produce orthopaedic 3-D models.

ORTHOPAEDICS CLINIC VISITS
by year



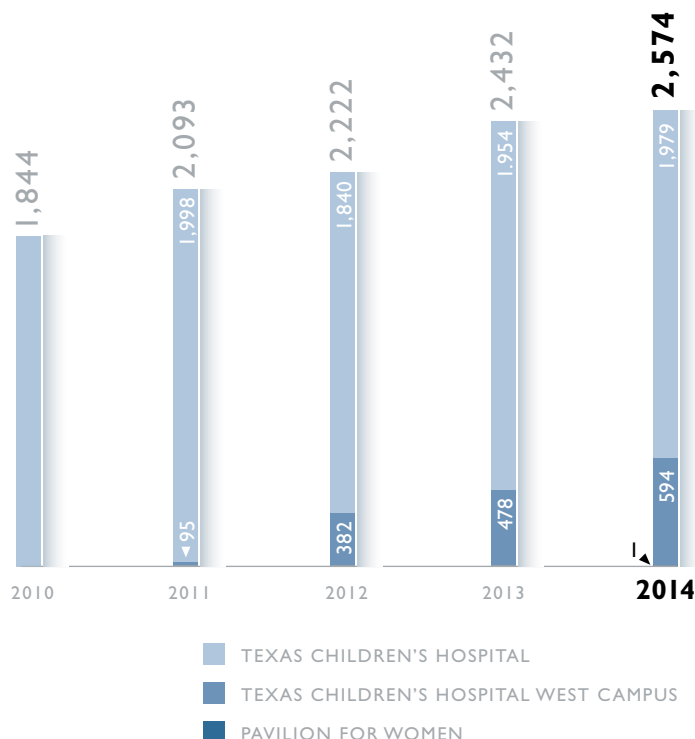
- TEXAS CHILDREN'S PEDIATRICS (Pearland/Kirby/Atascocita locations)
- TEXAS CHILDREN'S HEALTH CENTERS
- TEXAS CHILDREN'S HOSPITAL WEST CAMPUS
- TEXAS CHILDREN'S HOSPITAL

Clinic visits include outpatient visits by Texas Children's Hospital and Baylor College of Medicine faculty only.



ORTHOPAEDICS OPERATING ROOM CASES

by year



Operating room case volumes include procedures performed by Texas Children's Hospital, Baylor College of Medicine and private practice physicians at Texas Children's Hospital surgical locations.

WILLIAM A. PHILLIPS, M.D., is chief of Orthopaedics at Texas Children's Hospital and professor of Orthopaedic Surgery and Pediatrics at Baylor College of Medicine. He graduated from Notre Dame and received his medical degree from the University of Chicago Pritzker



School of Medicine. Dr. Phillips is a member of the American Academy of Orthopaedic Surgeons (Fellow), American Academy of Pediatrics (Fellow), American Orthopaedic Association, Scoliosis Research Society (Fellow), Pediatric Orthopaedic Society of North America and the American College of Surgeons. Dr. Phillips travels around the country lecturing on back problems in children and other orthopaedic issues.

To view more Orthopaedics Division biographies, visit texaschildrens.org/orthopaedics.



Otolaryngology

The Otolaryngology Division at Texas Children's Hospital provides advanced surgical and medical care for the entire spectrum of ear, nose, throat, and head and neck diseases and disorders. Clinical services are provided at Texas Children's Hospital, Texas Children's Hospital West Campus and Texas Children's Health Centers. In addition to caring for patients with complex conditions, the fellowship-trained physicians in the division also provide care for children in the community with common pediatric otolaryngology conditions such as middle ear disease and tonsil and adenoid disease. State-of-the-art audiology, along with speech diagnostic and therapeutic services, are also offered.

In 2014, the Otolaryngology Division welcomed a new chief and two physicians:

- Ellis Arjmand, M.D., M.M.M., Ph.D., joined Texas Children's Hospital as chief of Otolaryngology. In addition to his role as chief, Dr. Arjmand will act as the director of Practice Standards and Faculty Development for the Department of Surgery at Texas Children's Hospital and professor of Otolaryngology and Pediatrics at Baylor College of Medicine. Dr. Arjmand comes with an abundance of leadership experience from his former roles at Cincinnati Children's Hospital, which included director of the Ear and Hearing Center and Pediatric Cochlear Implant Program, medical director of the Liberty Campus of Cincinnati Children's Hospital, chair of the hospital's peer review committee and professor of Otolaryngology for the University of Cincinnati College of Medicine. In addition to medical training, Dr. Arjmand holds a master of medical management degree from Carnegie Mellon University in Pittsburgh. He hopes to advance the Otolaryngology Division at Texas Children's Hospital to improve patient care and lead the surgical staff in reaching their career goals.
- Matthew S. Sitton, M.D., obtained his medical degree from the University of Mississippi Medical Center in 2008 and completed his otolaryngology residency at the Medical College of Wisconsin in 2013. He completed his pediatric otolaryngology fellowship training with Baylor College of Medicine at Texas Children's Hospital. Dr. Sitton joined the Otolaryngology Division at Texas Children's Hospital and the Baylor faculty as assistant professor in July 2014. His clinical interests include congenital and acquired neck masses, vascular anomalies and cochlear implantation.
- Karina T. Cañadas, M.D., obtained her medical degree from Georgetown University School of Medicine in 2007 and completed her otolaryngology residency at the Yale University School of Medicine in 2013. She completed her pediatric otolaryngology fellowship training with Baylor College of Medicine at Texas Children's Hospital. Dr. Cañadas joined the Otolaryngology Division at Texas Children's Hospital and the Baylor faculty as assistant professor in September 2014. Her clinical interests include airway reconstruction, head and neck masses, and vascular anomalies.



VOCAL FOLD RESEARCH

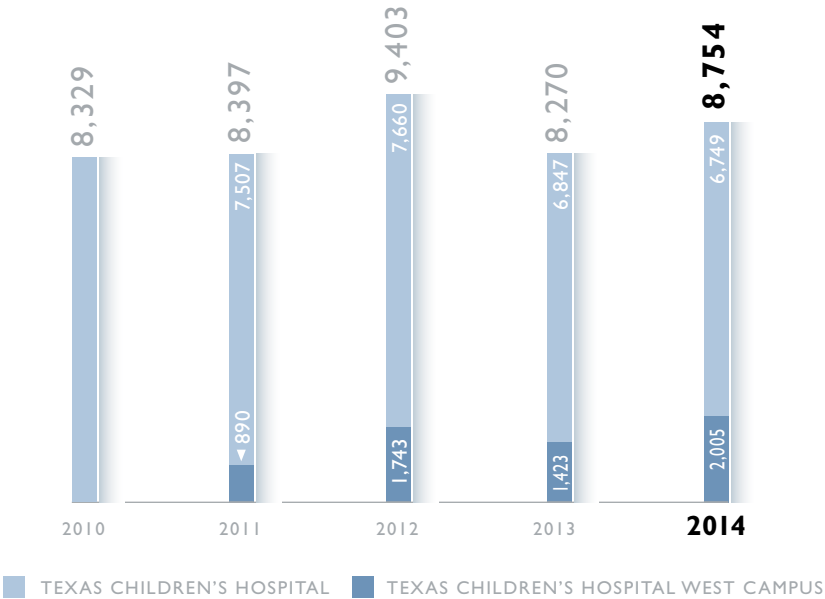
In 2014, vocal fold research at the Otolaryngology Division began to focus around the evaluation of pediatric vocal fold nodules and the assessment of vocal fold function in the pediatric cardiovascular care unit using ultrasounds. Multiple studies, led by Julina Ongkasuwan, M.D., F.A.A.P., aimed to determine if ultrasound can be used as a noninvasive means of identifying vocal fold nodules and to see if transcervical laryngeal ultrasound is as accurate as flexible nasolaryngoscopy in the identification of vocal fold paralysis in neonates after congenital heart surgery. Preliminary findings suggest that vocal fold nodules can be identified using transcervical laryngeal ultrasound. It appears that transcervical laryngeal ultrasound can accurately identify vocal fold mobility issues in the patient population with fewer swings in blood pressure, pulse and oxygenation. Statistical analysis of the data is still being performed.

COCHLEAR IMPLANT RESEARCH

Little data is available on outcomes in implant recipients where the native language spoken in the home is different from that spoken by members of the cochlear implant (CI) team. This prompted a study this year of cochlear implants, led by Robert A. Williamson, M.D., who will retrospectively analyze and compare CI recipients from non-native English-speaking (NNES) households to CI recipients from English-speaking households, and to statistically analyze outcomes from patients with similar clinical characteristics. A secondary goal will be to implement a longitudinal, prospective database and ongoing analysis of outcomes in CI patients from NNES households in order to optimize outcomes in this growing population. This research study is supported by funding from the Texas Children’s Hospital Auxiliary.

OTOLARYNGOLOGY OPERATING ROOM CASES

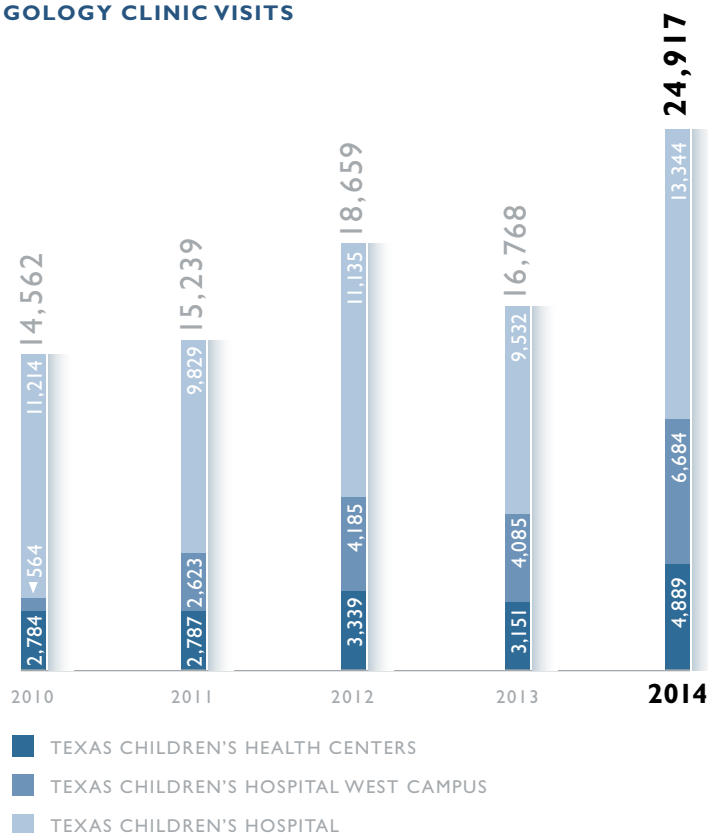
by year



Operating room case volumes include procedures performed by Texas Children’s Hospital, Baylor College of Medicine and private practice physicians at Texas Children’s Hospital surgical locations.

OTOLARYNGOLOGY CLINIC VISITS

by year



Clinic visits include outpatient visits by Texas Children's Hospital and Baylor College of Medicine faculty only.

ELLIS M. ARJMAND, M.D., M.M.M., PH.D., is chief of Otolaryngology at Texas Children's Hospital, and he holds the Bobby Alford Endowed Chair in Pediatric Otolaryngology at Baylor College of Medicine. Dr.Arjmand joined the Baylor faculty as professor and chief of the Pediatric Otolaryngology Division in 2014 following academic appointments at Cincinnati Children's Hospital and the Children's Hospital of Pittsburgh. He obtained his medical degree and Ph.D. at Northwestern University in Chicago, and a master's degree in medical management from

Carnegie Mellon University in Pittsburgh. He completed his residency and fellowship training at Washington University in St. Louis. Dr.Arjmand's clinical interests include pediatric ear disease, congenital and acquired hearing loss, airway disorders and sinus disease. He is nationally known for his research on pediatric hearing loss and for his expertise in the areas of health economics and health care quality improvement



To view more Otolaryngology Division biographies, visit texaschildrens.org/otolaryngology.



Pediatric and Adolescent Gynecology

One of the few established programs for surgical treatment of pediatric and adolescent gynecologic disorders in the United States and the only program in Texas, the Pediatric and Adolescent Gynecology Division at Texas Children's Hospital is committed to providing the highest level of clinical care, research and education. Part of the Obstetrics and Gynecology Department at Baylor College of Medicine and Texas Children's Hospital, we offer personalized treatment for common and rare gynecological problems in patients ranging from newborns to 21-year-olds. Specialties include vaginal trauma, congenital anomalies, and adnexal cysts or masses. Additionally, we operate one of the few fellowship programs in the United States and Canada for pediatric and adolescent gynecology.

As an international referral center, the Pediatric and Adolescent Gynecology Division treats a large population of young women with congenital anomalies of the Müllerian ducts, which result in malformation of the uterus and/or vagina. Depending on the disorder, surgical and nonsurgical treatments as well as counseling are offered to help patients and their families cope with the diagnosis and possible future fertility issues.

ASSESSING MALIGNANCY IN PEDIATRIC OVARIAN TUMORS

Ovarian cancer is rare in the pediatric population, accounting for only 1 percent of childhood tumors. However, incidental findings of ovarian lesions are not infrequent, and it is important to thoroughly evaluate these patients to identify any malignant potential. This is crucial since there is a 10 percent risk of malignant potential in patients with ovarian masses.

Evaluation of these lesions often occurs through the use of pelvic ultrasounds and laboratory testing. Stratifying patients with a high risk of malignancy is important as treatment strategies will differ based on the etiology. Patients with high suspicion of malignant disease typically undergo an oophorectomy to remove the affected ovary. Patients with benign disease, however, are often offered a less-invasive option of an ovarian sparing surgery. With the purported benefits of ovarian sparing surgery on future fertility, it is the preferred operation for pediatric patients with suspected benign lesions amenable to this approach. Thus, it is of increasing interest to the surgeon to accurately determine features indicative of malignancy to determine the appropriate population to offer ovarian sparing surgery.

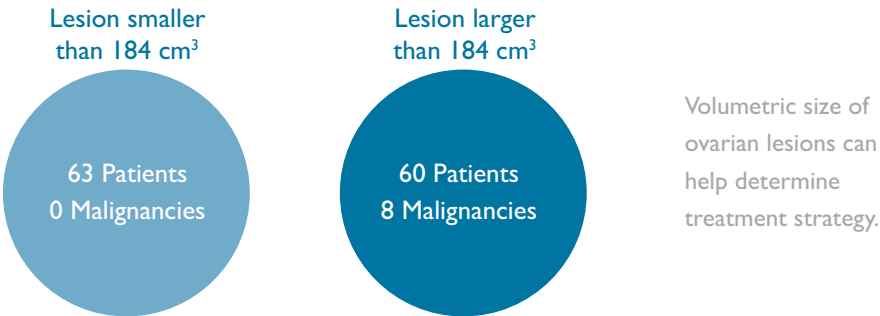
Historically, ovarian features associated with and predictive of malignancy include elevated tumor markers on laboratory testing and sonographic features of lesion complexity, hypervascularity and maximum lesion diameter. However, using only one dimensional measurement to define a three-dimensional lesion may not accurately describe the lesion. We sought to evaluate adolescent patients with ovarian lesions and to review the utility of preoperative sonographic measurement of ovarian volumes to screen for malignancy to avoid unnecessary oophorectomies⁷.

⁷PI Abbas, SC Elder, AR Mehollin-Ray, R Braverman, ME Lopez, JA Francis, JE Dietrich. Ovarian Lesion Volumes as a Screening Tool for Malignancy in Pediatric Ovarian Tumors. American Society of Reproductive Medicine (ASRM), Honolulu, HI October 18-22, 2014.



RETROSPECTIVE CHART REVIEW OF 123 PATIENTS WITH OVARIAN DISEASE

median age 13.7 years



RESULTS

The study found that 76 patients had right-sided lesions, and only one patient had bilateral disease. The rate of malignancy in our cohort was 6.5 percent.

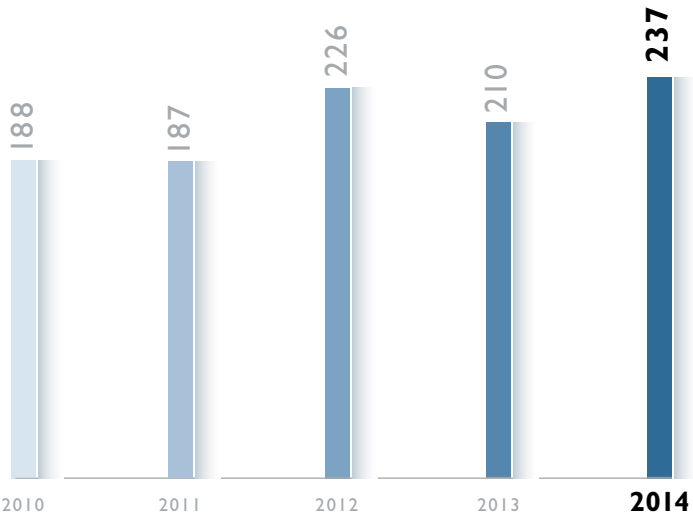
Of the 123 patients, a majority were diagnosed with benign disease, mostly functional cysts or mature teratomas, and underwent an ovarian sparing surgery. The remaining 30 patients underwent an oophorectomy; however, only eight were ultimately diagnosed with malignancy, most commonly sex cord stromal tumor. Thus, 22 patients, or 73 percent of patients, had an oophorectomy for benign disease. Hypervascularity was poorly documented in our patient cohort.

CONCLUSION

Ovarian lesion volume measurements may better define a lesion than a one-dimensional measurement. Although more data are required to correlate tumor markers to ovarian lesion volumes to screen for malignancy, our study suggests that ovarian volumes should be used as an additional tool to screen for malignancy and to identify candidates for ovarian sparing surgery.

PEDIATRIC AND ADOLESCENT GYNECOLOGY OPERATING ROOM CASES

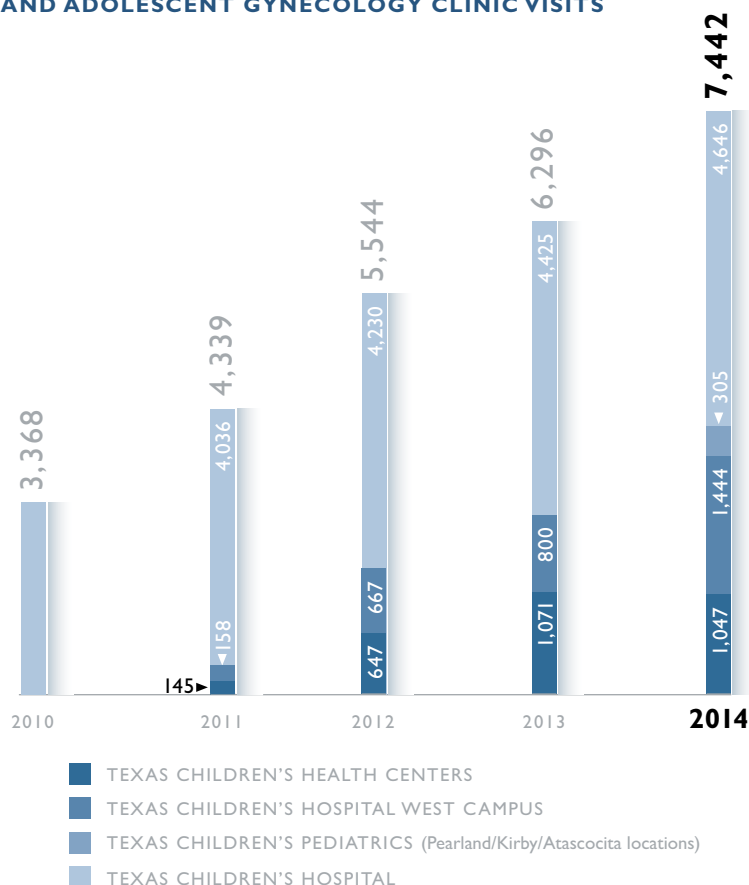
by year



Operating room case volume includes procedures performed by Texas Children’s Hospital, Baylor College of Medicine and private practice physicians at Texas Children’s Hospital surgical locations.

PEDIATRIC AND ADOLESCENT GYNECOLOGY CLINIC VISITS

by year



Clinic visits include outpatient visits by Texas Children's Hospital and Baylor College of Medicine faculty only.

JENNIFER E. DIETRICH, M.D., M.SC., is chief of Pediatric and Adolescent Gynecology at Texas Children's Hospital and an associate professor in the Department of Obstetrics and Gynecology and the Department of Pediatrics at Baylor College of Medicine. She is also director of the Pediatric and Adolescent Gynecology Division, the fellowship director for Pediatric and Adolescent Gynecology and the CME director for the Department of Obstetrics and Gynecology at Baylor. She obtained her medical degree from the Medical College of Wisconsin in Milwaukee and completed her residency in obstetrics and gynecology at Baylor. She went on to complete



fellowship training in pediatric and adolescent gynecology at the University of Louisville in Kentucky. During her fellowship, she also obtained a master's degree in public health and clinical investigation. Dr. Dietrich is currently on the editorial board of the *Journal of Pediatric and Adolescent Gynecology* and was recently elected to the Board of the North American Society for Pediatric and Adolescent Gynecology.

To view more Pediatric and Adolescent Gynecology Division biographies, visit texaschildrens.org/pediatric-and-adolescent-gynecology.



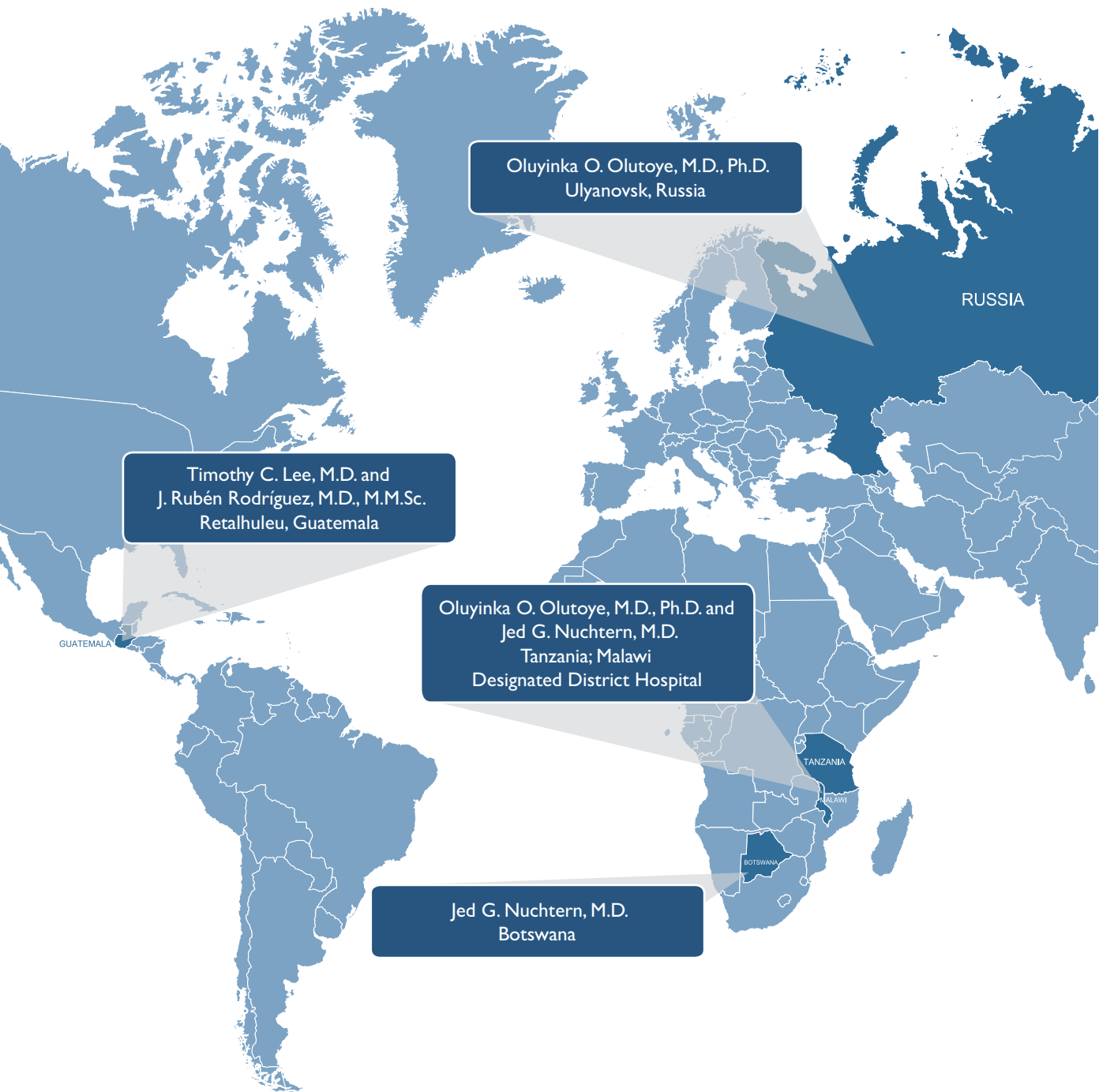
Pediatric General Surgery

The Pediatric General Surgery Division at Texas Children's Hospital has the depth of expertise and specialization to provide optimal care across the surgical spectrum — from the most routine cases to the most rare and complex. Each child receives personalized care from the physician most suited to the case, ensuring the best possible outcomes. The range of surgical procedures performed by the division include fetal surgery, abdominal and thoracic surgery, pediatric surgical oncology, minimally invasive surgery including laparoscopic and thorascoscopic diagnosis and treatment, endocrine and biliary surgery, and adolescent bariatric surgery. Our research programs are supported by the National Institutes of Health (NIH), private foundations, Texas Children's Hospital and Baylor College of Medicine.

GLOBAL SURGERY OUTREACH

The surgeons of the Pediatric General Surgery Division strive to bring the excellent patient care available at Texas Children's Hospital to children around the world. Oluyinka Olutoye, M.D., Ph.D., leads the surgical activities for the Texas Children's Global Health Initiative. He has also coauthored a publication in the *Journal of Surgical Education* titled, "Integrating Global Health into Surgery Residency in the United States."

Faculty, with support from the Texas Children's Hospital and private foundations, have traveled to three continents for surgical outreach in the last year.



Pediatric Surgery Clinical Research

STREAMLINING APPENDICITIS CARE

The Pediatric Surgery Clinical Research and Outcomes Program is led by Monica Lopez, M.D. The team is composed of faculty investigators, J. Rubén Rodríguez, M.D., M.M.Sc.; Timothy Lee, M.D.; and Mary Brandt, M.D., as well as research fellows and a clinical research nurse. Over the past year, in conjunction with the Texas Children’s Evidence-Based Outcomes Center and Outcomes and Impact Service, our team has developed and evaluated evidence-based protocols for the management of children with appendicitis.

The team standardized broad-spectrum antibiotic monotherapy, the use of clinical discharge criteria and guidelines for antibiotic treatment duration in cases of advanced appendicitis. These initiatives have led to decreased resource utilization and costs and, most importantly, improved patient outcomes. Additionally, the creation of a patient and family education pamphlet has helped set expectations and shorten length of hospital stay. Future research directions include the implementation of clinical decision support tools and comparative effectiveness clinical trials.

APPENDICITIS CARE *at Texas Children’s Hospital*

Data analysis has led the Pediatric Surgery Clinical Research and Outcomes Program to develop and evaluate evidence-based protocols for the management of children with appendicitis. These simple changes provided the following results:

Reduced simple appendectomy postoperative length of stay	↓	36%
Reduced average variable direct costs for simple appendectomies	↓	19%
Increased postoperative simple order set adoption rates	↑	36%
Increased postoperative complex order set adoption rates	↑	9%
Increased percentage of patients receiving recommended antibiotic (Piperacillin) as first antibiotic	↑	53%

Texas Children's Hospital West Campus Pediatric General Surgery

Charles W. Hartin, Jr., M.D., has joined the Pediatric General Surgery faculty to provide dedicated surgical coverage to West Campus. Dr. Hartin, together with Allen Milewicz, M.D., M.B.A., chief of Community Surgery and chief surgical officer at West Campus, will provide coverage of clinics and the operating room at West Campus. Dr. Hartin is a recent graduate of the Pediatric Surgery Residency Program at Baylor College of Medicine and the General Surgery Residency Program at State University of New York at Buffalo. He received his medical degree from the University of Alabama School of Medicine. Dr. Hartin has specialized training and interest in pediatric minimally invasive surgery.

In 2015, Drs. Milewicz and Hartin will begin to see patients at Texas Children's Specialty Care Kingwood Glen as well.

Surgical Oncology Program

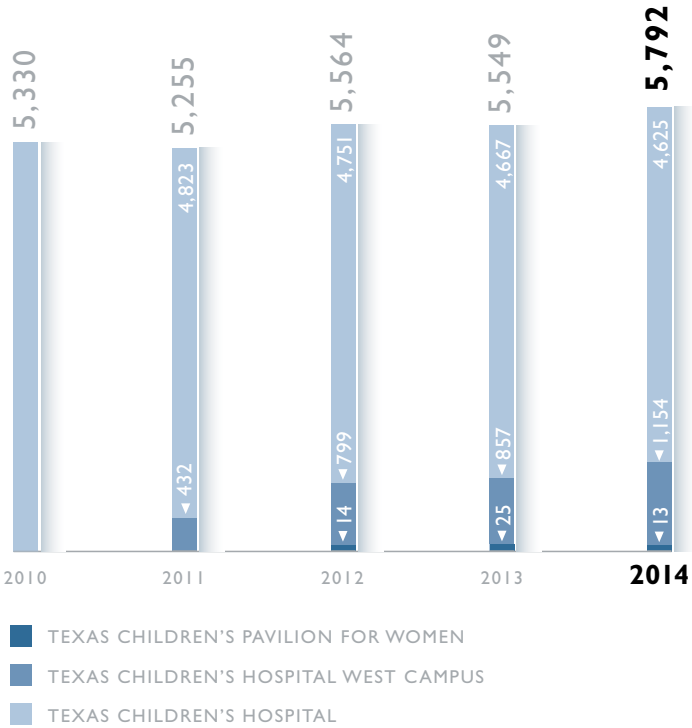
Partnering with Texas Children's Cancer Center, one of the largest pediatric cancer centers in the country, the Surgical Oncology Program within the Pediatric General Surgery Division performs more than 500 operations annually for children with solid tumors. Jed Nuchtern, M.D., (team lead); Sanjeev Vasudevan, M.D.; and Bindu Naik-Mathuria, M.D., have extensive experience in pediatric surgical oncology. Because of the volume of patients and the dedication of these surgeons to this particular population, we are able to achieve outcomes among the best in the nation.

Pediatric Surgical Oncology has an active research program. Drs. Nuchtern and Vasudevan are studying neuroblastoma in their own basic science labs. They are also engaged in clinical research on neuroblastoma, Wilm's tumors and hepatoblastoma, as well as leading a multidisciplinary study with Oncology, Radiology and Pathology to determine how the number of cycles of chemotherapy prior to surgery affects patient outcomes.



PEDIATRIC GENERAL SURGERY OPERATING ROOM CASES

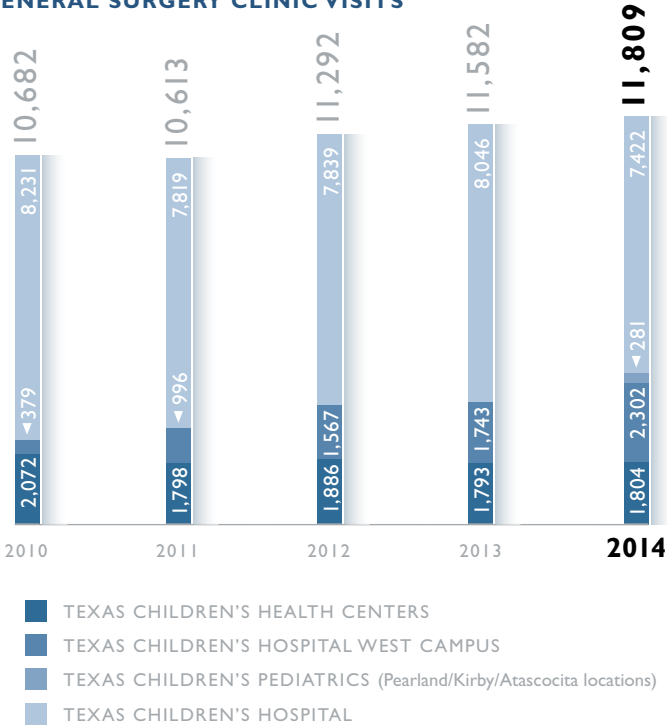
by year



Operating room case volumes include procedures performed by Texas Children's Hospital, Baylor College of Medicine and private practice physicians at Texas Children's Hospital surgical locations.

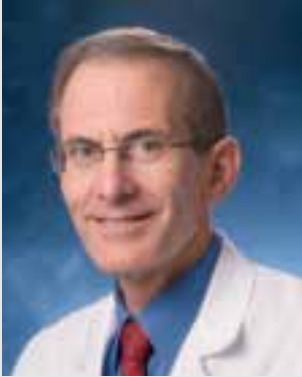
PEDIATRIC GENERAL SURGERY CLINIC VISITS

by year



Clinic visits include outpatient visits by Texas Children's Hospital and Baylor College of Medicine faculty only.

JED G. NUCHTERN, M.D., is chief of Pediatric General Surgery at Texas Children's Hospital and professor of Surgery and Pediatrics at Baylor College of Medicine. He is also director of the Pediatric Surgery Residency Program at Baylor. A graduate of Princeton University, Dr. Nuchtern received his medical degree from Harvard Medical School. He completed his general surgery training at the University of Washington and a research fellowship at the National Institutes of Health. He received advanced training in pediatric surgery at Baylor. In addition to a clinical focus on surgical oncology and general pediatric surgery, Dr. Nuchtern conducts a basic



research program that focuses on molecular target discovery in neuroblastoma, a pediatric cancer. Dr. Nuchtern is a fellow of the American Academy of Pediatrics and the American College of Surgeons (ACS). He is a member of the ACS Commission on Cancer and the Children's Oncology Group, national consortia of pediatric oncology clinicians and research professionals.

To view more Pediatric General Surgery Division biographies, visit texaschildrens.org/pediatric-surgery.



Plastic Surgery

In 2014, the Plastic Surgery Division at Texas Children's Hospital grew to six full-time plastic surgeons, making it the largest group of pediatric plastic surgeons in the United States at a children's hospital. The division specializes in surgical treatment of injuries or disorders that prevent children from functioning fully or looking and feeling their best. We provide comprehensive care to pediatric patients with complex surgical needs at Texas Children's Hospital and Texas Children's Hospital West Campus. The team includes orthodontists with whom we collaborate on surgical treatment and on orthodontia for children with congenital craniofacial anomalies and/or cleft palate. Our innovative surgical techniques and therapy in the treatment of cleft lip and cleft palate draw patients from across the nation with deformities ranging from mildly disfiguring to extremely complex.

Several new Plastic Surgery Clinics have opened at Texas Children's Health Centers around Houston. In addition to seeing patients at Texas Children's Hospital in the Texas Medical Center, David Khechoyan, M.D., Laura Monson, M.D., and Edward Buchanan, M.D., see patients at Texas Children's Health Center Sugar Land, and Edward Lee, M.D., sees patients at Texas Children's Health Center The Woodlands.

In 2013, the Plastic Surgery Division established the Baron Hardy Chair and The Samuel Stal Chair in Plastic Surgery. Larry Hollier, Jr., M.D., F.A.C.S., chief of Plastic Surgery, was named the Baron Hardy Chair in 2014. Also in 2014, Smile Train – the largest cleft lip and palate charity in the world – named Dr. Hollier chairman of the Smile Train Medical Advisory Board. In his role as chairman of the medical advisory board, Dr. Hollier supervises a group of physicians and health care providers assembled from countries around the world to ensure Smile Train provides the safest care for these children.

NEW PHYSICIAN MITCHEL SERUYA, M.D.

Dr. Seruya is an internationally recognized expert in pediatric hand and microsurgery, along with cleft and craniofacial surgery. Dr. Seruya was recruited from the Royal Children's Hospital Melbourne, where he completed two fellowships in cleft and craniofacial surgery, as well as pediatric hand and microsurgery. Both fellowships included dedicated training in the treatment of craniosynostosis, cleft lip and palate, vascular anomalies, ear deformities, cerebral palsy, congenital hand anomalies, facial palsy, neonatal brachial plexus palsy and traumatic hand deformities. Dr. Seruya completed his residency in Plastic and Reconstructive Surgery at Georgetown University in Washington, D.C. As a member of the Peripheral Nerve and Cerebral Palsy multidisciplinary clinics at Texas Children's Hospital, Dr. Seruya strives to provide the highest quality of care in a patient-centered fashion.

Dr. Mitchel Seruya's first day at Texas Children's Hospital was eventful. He was called into the Emergency Center to repair the severed hand of a child involved in a lawnmower accident. Using his microvascular surgery experience, he was able to reattach the hand, making it functional again.

HAND CLINIC AT TEXAS CHILDREN'S HOSPITAL WEST CAMPUS

With the arrival of Dr. Seruya, the Plastic Surgery Division established its first Hand and Microvascular Surgery Clinic at Texas Children's Hospital West Campus. The clinic treats patients with congenital hand and upper extremity deformities, traumatic hand injuries, as well as acquired hand and upper extremity ailments. The team, led by Dr. Seruya and orthopaedic surgeon Thomas R. Hunt III, M.D., includes a multidisciplinary group of hand surgeons, nurses, medical assistants and occupational therapists, including certified hand therapist Tara Haas, O.T.R., M.S.O.T, C.H.T. The clinic offers leading-edge technology to patients with hand and upper extremity problems developed at birth or as a result of a trauma or infection that has left the hand and upper extremity unusable. Anomalies treated include cerebral palsy, syndactyly and arthrogryposis. Other services provided at the clinic are microvascular surgery and distraction lengthening.

BRACHIAL PLEXUS/PERIPHERAL NERVE CLINIC

Mitchel Seruya, M.D., and Talia Collier, M.D., are co-directors of the new Brachial Plexus/Peripheral Nerve Clinic at Texas Children's Hospital. The Brachial Plexus/Peripheral Nerve Clinic treats patients with disorders and injuries of the peripheral nervous system including birth brachial plexus palsy, traumatic neuropathy, toxic neuropathy and inflammatory neuropathy. The multidisciplinary clinic consists of Plastic Surgery, Physical Medicine and Rehabilitation, Neurology, Orthopaedics, Neurosurgery and other ancillary services.

CLEFT LIP AND PALATE OUTCOMES STUDY

To further the Plastic Surgery Division's outcomes studies, Laura Monson, M.D., plastic surgeon and 2012-2013 Texas Children's Hospital Auxiliary Fellowship recipient, began to study the short- and long-term outcomes of patients with cleft lip and palate, as well as further her expertise in clinical research through formal postgraduate training. The study, funded through the fellowship, tracks clinical and quality-of-life data that will enable our team to know how patients are affected by a cleft lip and palate beyond physical measurements.

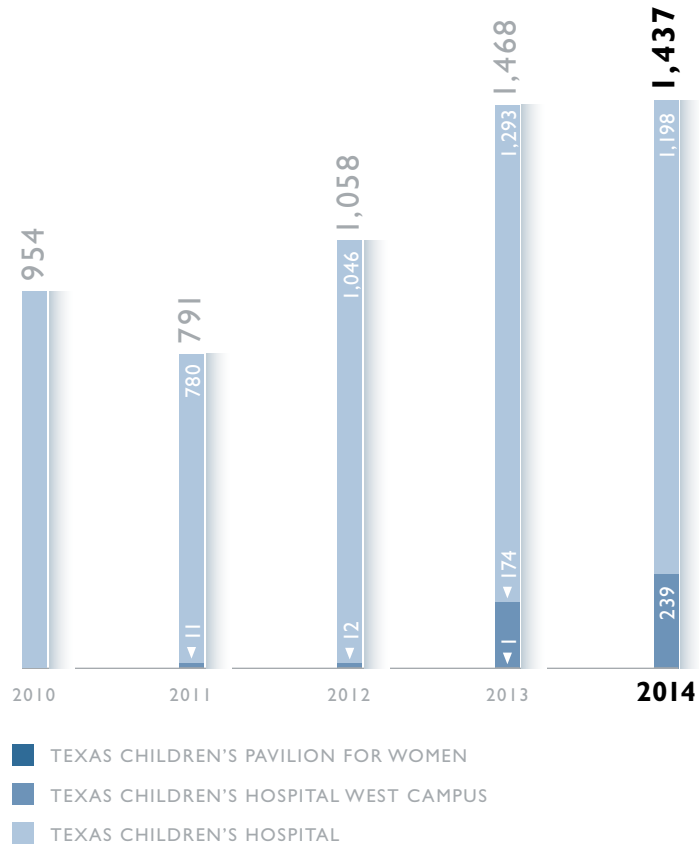
The outcomes program tracks volume of office visits, postoperative use of pain medicine, fistula and velopharyngeal insufficiency volume, postoperative lengths of stay and a quality-of-life study. The study has already produced a change in the type of postoperative pain medicine administered. Tylenol® with codeine has been replaced by a combination of hydrocodone and acetaminophen to reduce drowsiness and has improved the ability of postoperative patients to drink fluids. Since September 2013, there has been a slight decrease in the overall length of stay.

As of October 2014, 104 patients between the ages of 11 and 18 are enrolled in the quality-of-life outcomes study. This portion of the study begins with two sets of National Institutes of Health validated questionnaires that measure domains such as anxiety, depression, peer relationships, coping, stigma and self-image. Depending on the questionnaire results, patients considered at-risk will be referred to a psychologist, and a customized plan of care will be created for each patient. All patients will have a follow-up visit in one year. Some patients took the questionnaire and went on to attend Texas Children's Hospital's camp for cleft lip and palate patients called Camp Keep Smiling. These patients are being re-consented and evaluated for scores that may have improved by attending camp and meeting other children with cleft issues.

CAMP KEEP SMILING

In 2014, Laura Monson, M.D., the principal investigator for the quality-of-life study, and Christina Hernandez, R.N., of the Outcomes and Impact Service, discovered that many patients between ages 10 and 16 with cleft lip and palate had never met a peer with the same facial difference. These patients shared struggles with multiple surgeries, peer relationships, bullying and insecurities. Camp Keep Smiling was introduced at no cost to patients as a way to bring cleft lip and palate patients together. The camp was launched in March 2014 with 35 patients, and a second session was held in September 2014 with 40 patients. Activities at Camp Keep Smiling include canoeing, archery, paintball, rockwall climbing, swimming, campfires and other team-building activities. Feedback from patients and parents has been overwhelmingly positive, and the camp will continue to run on an annual basis as a supplement to the Cleft Lip and Palate Program at Texas Children's Hospital.

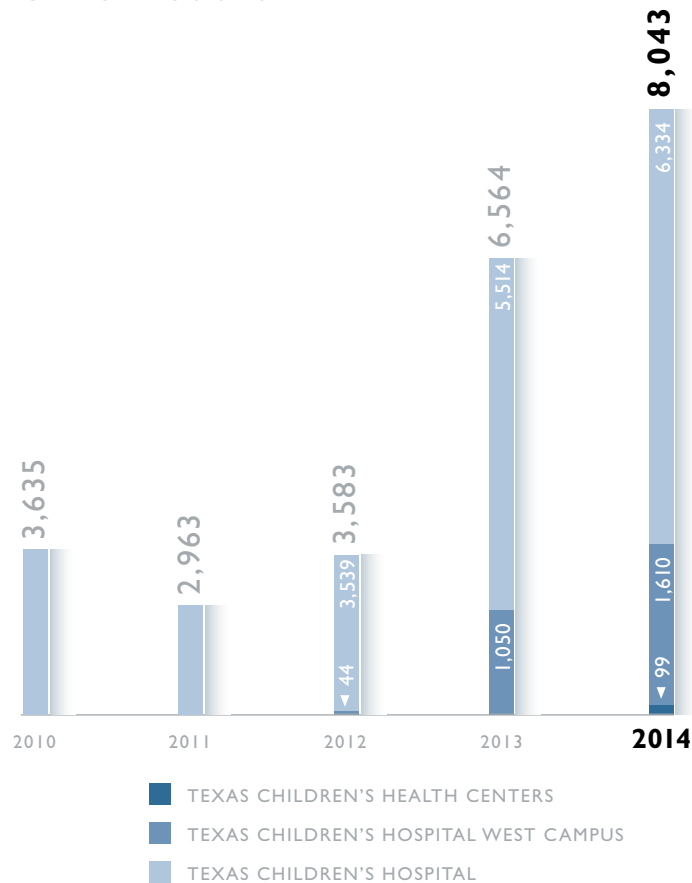
PLASTIC SURGERY OPERATING ROOM CASES by year



Operating room case volumes include procedures performed by Texas Children's Hospital, Baylor College of Medicine and private practice physicians at Texas Children's Hospital surgical locations.



PLASTIC SURGERY CLINIC VISITS
by year



Clinic visits include outpatient visits by Texas Children's Hospital and Baylor College of Medicine faculty only.

LARRY H. HOLLIER, JR., M.D., F.A.C.S., is chief of Plastic Surgery at Texas Children's Hospital. He is also professor and chief of the division of Plastic and Reconstructive Surgery at Baylor College of Medicine. He earned his medical degree from Tulane University and completed his plastic surgery residency at the University of Texas Southwestern Medical Center in Dallas, where he remained for fellowships in hand and microvascular surgery. He also completed a fellowship in craniofacial surgery at New York University Medical Center. Dr. Hollier specializes in pediatric craniofacial surgery, hand surgery, facial fractures, cranial vault remodeling and midfacial and mandibular distraction. He has authored more than 200 articles in scholarly and professional publications as well as 37 book chapters. Dr. Hollier is the chairman of the medical advisory board of Smile Train, the largest charity in the world devoted to cleft care. In 2014, he was named surgical director of the Operating Rooms and surgical director of Patient Experience at Texas Children's Hospital, as well as Baron Hardy Chair.



To view more Plastic Surgery Division biographies, visit texaschildrens.org/plasticsurgery.



Transplant Services

One of the most active and comprehensive pediatric transplantation programs in the nation, Transplant Services at Texas Children's Hospital provides complex, multifaceted medical and surgical care for newborns to young adults in need of heart, kidney, liver and lung transplants.

Our staff provides customized attention through all aspects of the transplant process, from initial referral to hospitalization and long-term outpatient management. Our pediatric transplant coordinators work closely with patients, families and referring physicians to ensure the evaluation process is convenient and efficient.

The pediatric transplant landscape is complex and highly regulated. To meet requirements and to ensure the best possible care, Texas Children's Hospital has made a significant investment by adding 13 employees to Transplant Services in the areas of quality, clinical staffing and leadership.

In 2014, Texas Children's Hospital completed 95 solid organ transplants and continues to be one of the largest transplant programs in the U.S. The hospital is also home to the most active heart and lung transplant programs in the country, with 32 heart transplants and 16 lung transplants last year.

TRANSPLANT SYMPOSIUM

Transplant Services at Texas Children's Hospital sponsored its first symposium in 2014 with 120 health care professionals in attendance. The daylong educational forum opened with a talk by Jordan Peterson, an 11-year-old who received a double lung transplant at Texas Children's Hospital in June 2013. Jordan was born with cystic fibrosis and had been on a lung transplant list for more than eight months in 2012. After his transplant, he is back to playing hockey and football.

Speakers discussed issues that transplant teams wrestle with daily, including ethics on harvest and allocation, quality improvement, best practices and the importance of transitioning pediatric patients to adult services. The medical and surgical directors of each transplant service highlighted statistics on organ allocation and organ-specific outcomes.

WORLD TRANSPLANT GAMES COME TO HOUSTON

Texas Children's Hospital was a lead sponsor of the Transplant Games of America held in July 2014 in Houston. Team Texas consisted of 300 participants, patients and donors from across the state, including many former Texas Children's Hospital patients, who took part in athletic competition and raised awareness for organ donation. The team had 450 registered supporters. Team Texas brought home 104 medals with 63 gold, 26 silver and 15 bronze.

The games bring together transplant patients, donors and families from all over the country to create awareness of how organ donation changes lives. Forty-four teams and thousands of participants competed for gold this year. The Transplant Games of America takes place every two years in a different host city.

IMMUNOSUPPRESSION WITHDRAWAL IN STABLE LIVER TRANSPLANT RECIPIENTS

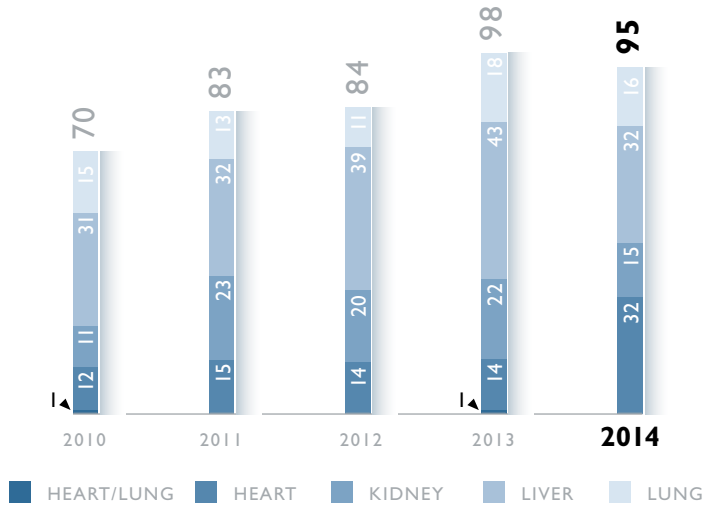
The Texas Children's Liver Transplant Program participated in the Immunosuppression Withdrawal in Stable Pediatric Liver Transplant Recipients (iWITH) clinical trial in 2014. This National Institutes of Health-sponsored trial is designed to assess whether carefully selected pediatric liver transplant recipients may be able to stop taking immunosuppressive medications without experiencing rejection of their transplanted organ. The current understanding is that these medications need to be taken for life, and while they are highly effective at preventing rejection, they carry their own risks and side effects that make minimization or cessation an attractive goal. Over the course of the four-year study, Texas Children's Hospital will help lead the way in this research that may change the way we approach pediatric transplantation.

LIVING DONOR PROCEDURE

In 2014, Texas Children's Hospital partnered with CHI St. Luke's Health Baylor College of Medicine Medical Center to provide living donation surgery as part of our Kidney Transplant Program. Both preoperative and postoperative care for the adult donor were provided at CHI St. Luke's Health Baylor College of Medicine Medical Center and the kidney transplant for the child was performed at Texas Children's Hospital. This joint venture provides the best possible care for all patients, both pediatric and adult.

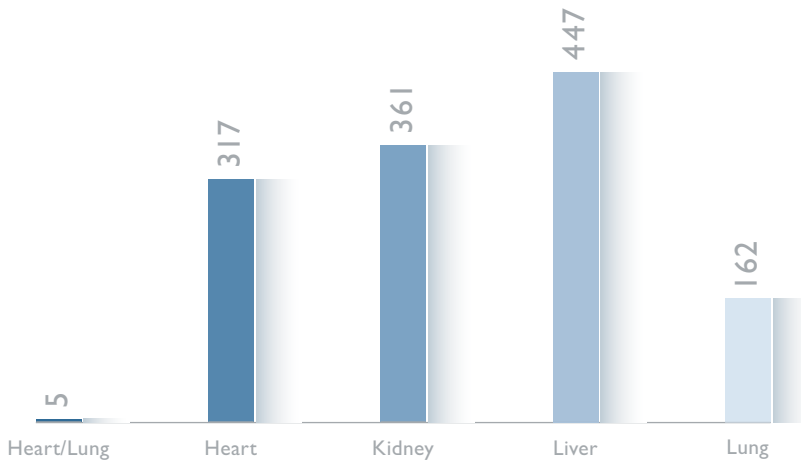


TRANSPLANTATIONS⁸
by organ by year



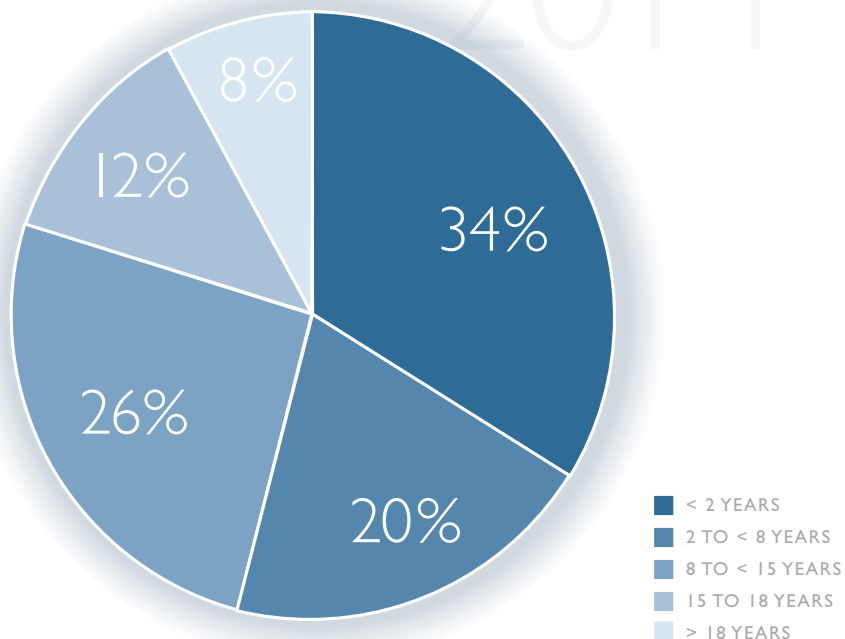
Operating room case volumes include procedures performed by Texas Children’s Hospital and Baylor College of Medicine physicians at Texas Children’s Hospital surgical locations. Of the 15 kidney transplantations completed in 2014, 8 were living donors and 7 were deceased donors.

TOTAL NUMBER OF TRANSPLANTS⁸
at Texas Children’s Hospital

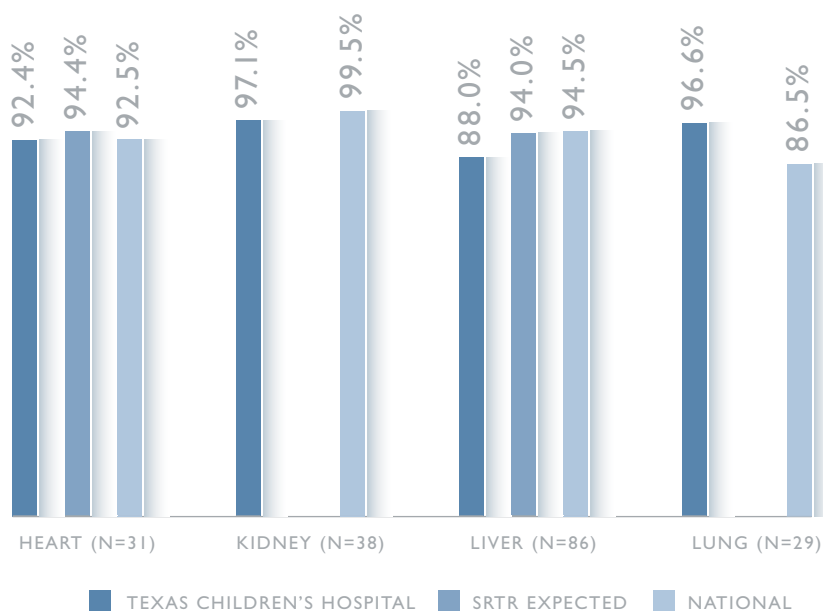


Year of first transplants at Texas Children’s Hospital by organ: Heart 1984; Kidney 1988; Liver 1988; Lung 2002; Heart/Lung 2005.

⁸As of December 31, 2014.

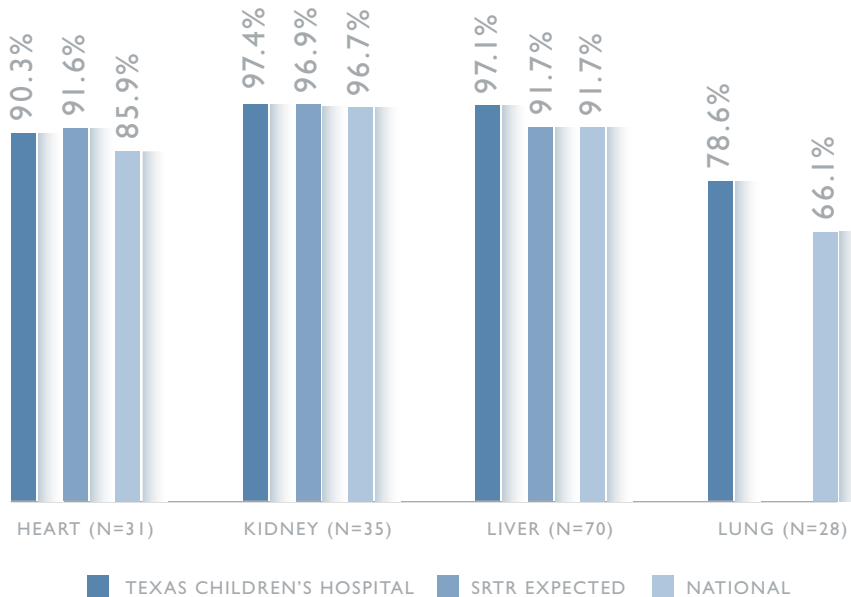
TRANSPLANTATIONS*by patient age***ONE-YEAR PEDIATRIC TRANSPLANT PATIENT SURVIVAL RATES^{9, 10}**

Transplant occurred between 7/1/2011 and 12/31/2013. Pediatric age < 18.

⁹Scientific Registry of Transplant Recipients (SRTR). Program Specific Reports. Table II - www.srtr.org.¹⁰Per the Scientific Registry of Transplant Recipients (SRTR), there are too few events to calculate statistically powerful expected patient survival values for pediatric kidney and lung recipients.

THREE-YEAR PEDIATRIC TRANSPLANT PATIENT SURVIVAL RATES^{11, 12}

Transplant occurred between 1/1/2009 and 6/30/2011. Pediatric age < 18.



¹¹Scientific Registry of Transplant Recipients (SRTR). Program Specific Reports. Table 11 – www.srtr.org.

¹²Per the Scientific Registry of Transplant Recipients (SRTR), there are too few events in kidney and lung to calculate statistically powerful expected patient survival values for pediatric kidney and lung recipients.

JOHN A. GOSS, M.D., is the medical director of Transplant Services at Texas Children's Hospital and surgical director of Liver Transplantation at Texas Children's Hospital, St. Luke's Episcopal Hospital and the Michael E. DeBakey Veterans Affairs Medical Center. He is also professor of Surgery and chief of the Division of Abdominal Transplantation at Baylor College of Medicine. He received his medical degree from Creighton University in Omaha and completed his residency in general surgery at the Barnes Hospital at the Washington University School of Medicine Surgical Program. Subsequently, Dr. Goss completed a two-year multi-organ transplant fellowship in the Division of Liver and Pancreas Transplantation at the University Of California School of Medicine in Los Angeles, where he was appointed assistant professor. He has been awarded the American Surgical Career Development Award, an American Liver Foundation Award and a Juvenile Diabetes Foundation Award for his efforts and leadership in transplantation. Throughout his career, Dr. Goss has performed more than 1,000 transplantation procedures.



To view more Transplant Services biographies, visit texaschildrens.org/transplant.



Urology

As one of the largest groups of fellowship-trained pediatric urologists in the United States, our physicians provide comprehensive evaluation, diagnosis, treatment and follow-up care to infants, children, adolescents and young adults with congenital and acquired disorders of the genitourinary tract.

We provide the highest quality of surgical services for all genitourinary conditions and have specialized focus on minimally invasive, robotic and laparoscopic surgical techniques, including extremely delicate procedures in newborns and infants; anorectal malformations; urological conditions caused by neurological problems such as spina bifida; and management of stone disease.

The Urology Division at Texas Children's Hospital provides care for complex disorders requiring extensive surgical reconstruction including disorders of sex development (intersex), bladder exstrophy, genital reconstruction and complete urinary reconstruction. As part of the Minimally Invasive Surgery Program, we have state-of-the-art treatment modalities for endoscopy, laparoscopic surgery and robotic surgery.

In 2014, the Urology Division was ranked one of the top 10 best programs in the United States, according to *U.S. News & World Report*.

NEW PHYSICIAN: PATRICIO GARGOLLO, M.D.

In 2014, the Urology Division welcomed Patricio Gargollo, M.D., an internationally recognized expert in complex urogenital reconstruction, robotic surgery and minimally invasive surgery in pediatric patients. Dr. Gargollo was recruited from the University of Texas Southwestern Medical Center in Dallas, where he was the director of Urology Robotic and Minimally Invasive Surgery. At Texas Children's Hospital, he leads the Complex Urogenital Reconstruction Program and Urology Robotic and Minimally Invasive Surgery Program. In addition, he leads the pediatric urology component of Texas Children's multidisciplinary Spina Bifida, Gender Medicine and Anorectal Malformation Clinics. He completed his entire training and fellowship in the Harvard Medical School System, which includes Harvard Medical School, Massachusetts General Hospital and Boston Children's Hospital. He will continue his research in complex pediatric urological disorders and treatments as an associate professor at Baylor College of Medicine.

COMPLEX UROGENITAL RECONSTRUCTION

Since his arrival, Dr. Gargollo has spearheaded a multidisciplinary program for children born with rare and complex urogenital malformations. Texas Children's Hospital is the only hospital in Texas with a program dedicated to the medical care and reconstructive surgery of children with complex urogenital malformations. The divisions at Texas Children's Hospital that contribute to this program include Pediatric General Surgery, Pediatric Gynecology, Orthopaedics, Neurosurgery, Developmental Pediatrics and Psychology.

The Complex Urogenital Reconstruction Program treats the following urogenital conditions:

- Bladder exstrophy
- Cloacal exstrophy
- Persistent cloaca
- Persistent urogenital sinus
- Neurogenic bladder and spina bifida
- Advanced robotic assisted reconstruction
- Mitrofanoff channel/appendicovesicostomy
- Malone antegrade continence enema procedure (MACE) for fecal evacuation
- Bladder outlet procedures for urinary incontinence
- Fetal consultation for prenatally detected conditions including all of the above and hydronephrosis

ADVANCED MINIMALLY INVASIVE RECONSTRUCTIVE SURGERY

The Urology Division has established a program for advanced minimally invasive reconstructive surgery. We are the only hospital in Texas that offers bladder augmentation using bowel inter-position and techniques that decrease morbidity by using the daVinci® Si Surgical System robot. These procedures are performed for children with bladder dysfunction secondary to neurologic disease, cancer or trauma. With these procedures, we are able to shorten hospital stay and improve the child's return to their usual activities.

In 2014, the Division of Urology hosted a hands-on robotic surgery training course in partnership with Intuitive Surgical and Methodist Institute for Technology, Innovation and Education (MITIE). This is one of the few hands-on training courses in the U.S. focusing on pediatric urologic surgery.

HANDS-ON ROBOTIC SURGERY TRAINING COURSE

Texas Children's Hospital and Houston Methodist Hospital hosted the 3rd Annual Pediatric Urology Robotics Hands-On Course sponsored by Intuitive Surgical. This was the first time the national training course had been held in Houston and at the Texas Medical Center.

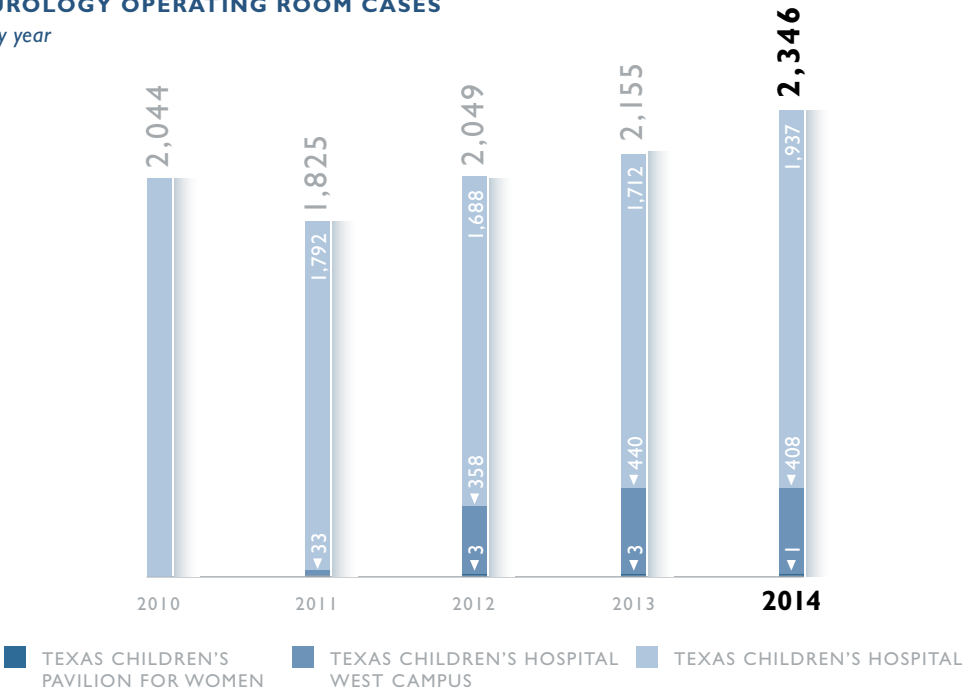
Led by faculty from Texas Children's Hospital; Baylor College of Medicine; the University of Chicago; the Methodist Institute for Technology, Innovation and Education (MITIE); Columbia University; Children's Hospital of Philadelphia; and The Ford Foundation, the course was designed to help pediatric urologists advance their skills and expand their indications for robotic pediatric urologic surgery with highly experienced leaders in the field.

VIDEOURODYNAMICS

In 2014, Texas Children's Hospital obtained its first videourodynamics equipment specifically designed to evaluate children with abnormal bladder function. This technique combines standard bladder evaluation with radiologic guidance, enabling our physicians to accurately define bladder function and activity in order to most appropriately determine the best treatments for the child.

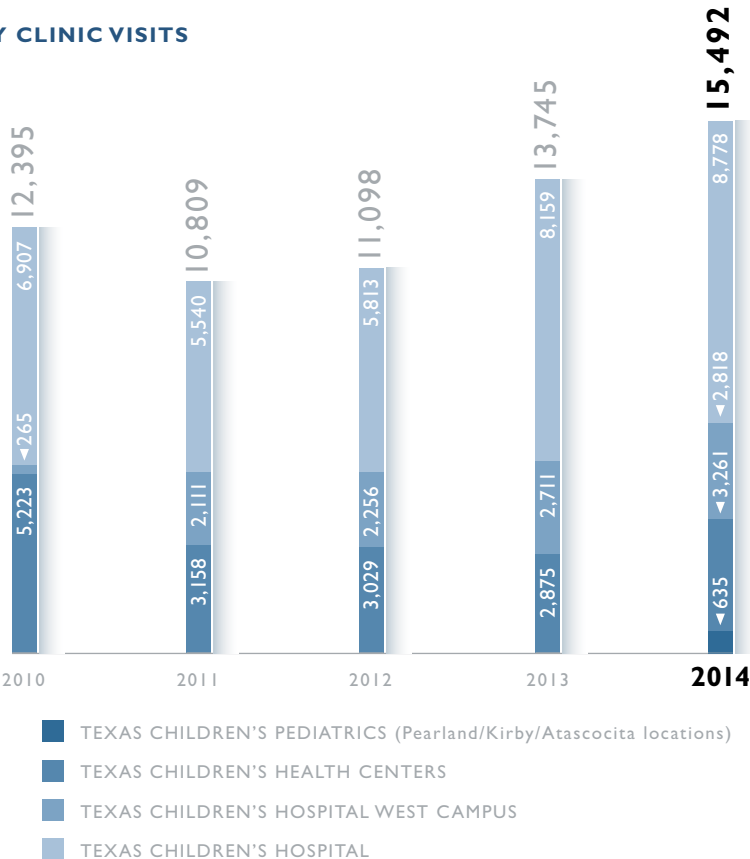


UROLOGY OPERATING ROOM CASES
by year



Operating room case volumes include procedures performed by Texas Children’s Hospital, Baylor College of Medicine and private practice physicians at Texas Children’s Hospital surgical locations.

UROLOGY CLINIC VISITS
by year



Clinic visits include outpatient visits by Texas Children’s Hospital and Baylor College of Medicine faculty only.

DAVID ROTH, M.D., is chief of Urology at Texas Children's Hospital and chief of Pediatric Urology at Baylor College of Medicine, where he is also professor of Urology and Pediatrics and serves as the Edmond T. Gonzales, Jr., M.D., Endowed Chair in Pediatric Urology. Board certified by the American Board of Urology, Dr. Roth earned his medical degree from the University of Southern California in Los Angeles. After completing his surgical residency program at Baylor, he went on to pursue specialized training in urology. He then completed a fellowship in pediatric urology surgery at Children's Hospital of Michigan in Detroit. As a prominent leader in the field of pediatric urology for nearly 30 years, Dr. Roth has distinguished himself in a variety of research, clinical and academic roles. His clinical interests include urinary tract infection and



reflux, congenital abnormalities of the genitalia and urinary tract obstruction of the newborn. His primary research is directed to improving surgical outcomes in children with urologic disease. He has authored more than 75 book chapters and publications in various academic and medical journals and is the recipient of numerous honors and awards, including his recognition and inclusion on the list of Best Doctors in America each year since 1996.

To view more Urology Division biographies, visit texaschildrens.org/urology.



Inpatient Services

Inpatient Services at Texas Children's Hospital is a place of hope for children with any medical need. A child may come to one of our units after an accident, a special diagnostic procedure or a surgical procedure. All children in our units have one thing in common – the need for specialized, pediatric-focused patient care.

ACUTE CARE SURGICAL FLOOR

The acute care surgical floor is a 36-bed surgical care unit that admits patients of all ages from infancy to adolescence. The unit receives a wide variety of postoperative surgical patients from Orthopaedics, Otolaryngology, Pediatric General Surgery, Plastic Surgery and Urology. We have four beds dedicated to trauma patients and a team of nurses that focuses solely on our trauma patient population.

CARDIOVASCULAR INTENSIVE CARE UNIT

The 21-bed Cardiovascular Intensive Care Unit (CVICU) admits newborns, infants, children and young adults with heart disease. The CVICU cares for children undergoing surgery for congenital heart disease; infants, children and adolescents with end-stage heart failure before and after heart transplantation; and children whose hearts can no longer adequately support them. We have a very busy mechanical support program that places children with failing hearts on heart pumps to take over the heart function while they are waiting for a heart transplant. Our multidisciplinary team includes cardiovascular intensivists trained in pediatric cardiology, cardiovascular anesthesiology and pediatric critical care. They work alongside our cardiac surgeons, highly specialized nurses, respiratory therapists, nurse practitioners and physician assistants to provide the best care for our patients.

PEDIATRIC INTENSIVE CARE UNIT

The Pediatric Intensive Care Unit (PICU) cares for infants and children from around the country and the world. We care for children with life-threatening infections, children who have been involved in serious accidents, and children with severe lung disease requiring extracorporeal membrane oxygenation support. The 31-bed PICU is staffed with critical care physicians, advanced practice providers, and residents and fellows training in pediatric critical care. Our medical team works seamlessly with a highly skilled multidisciplinary team of PICU nurses, respiratory therapists, pharmacists, social workers and child life specialists to care for each patient.

PROGRESSIVE CARE UNIT

The Progressive Care Unit (PCU) is a 36-bed unit that admits patients ranging in age from infancy to adulthood who require special care nursing and monitoring. Our multidisciplinary team of advanced practice providers, physician assistants, nurses, and respiratory and physical therapists care for both acute and chronic conditions. Registered nurses coordinate all nursing care provided, which includes therapies that may be directed by other disciplines with special emphasis given to respiratory, neurological and surgical disorders. Many patients depend on technological support, notably those with tracheostomies. The PCU's family-centered approach encourages parents to stay with their child and learn to care for their child in preparation for their return home.

2014

CVICU CASES WITH PIM 2 DATA¹³

YEARS	MORTALITY RATE	PIM2 ¹⁴
2012	1.93%	1.76 (0.90-3.96)
2013	2.86%	1.56 (0.80-3.46)
2014	2.12%	1.52 (0.78-3.07)

PICU CASES WITH PIM 2 DATA¹³

YEARS	MORTALITY RATE	PIM2 ¹⁴
2012	4.07%	1.11 (0.80-3.91)
2013	3.28%	1.05 (0.79-3.56)
2014	4.05%	1.08 (0.78-3.66)

LARA S. SHEKERDEMIAN, M.D., F.R.A.C.P., F.J.F.I.C.M., M.H.A., is chief of Critical Care and co-director of Texas Children's Heart Center. She also serves as the vice chair of Clinical Affairs for the Department of Pediatrics and professor of Pediatrics at Baylor College of Medicine. She graduated from Birmingham University Medical School in 1990. She was awarded her postgraduate doctoral degree for her thesis "Cardiopulmonary Interactions in Congenital Heart Disease" from the University of Birmingham in 1997. Dr. Shekerdeman trained in pediatrics and pediatric cardiology and undertook postgraduate research in London. She trained in critical care in London and Toronto. She was previously on faculty at Great Ormond Street Hospital in London and was most recently the chief of Critical Care at The Royal Children's Hospital in Melbourne.



Her research and clinical interests include extracorporeal life support, brain injury in infants and children with heart disease, and outcomes in children after admission to the intensive care unit.

For more information about the Pediatric Intensive Care Unit (PICU), visit texaschildrens.org/PICU.

¹³ Based on Fiscal Year Oct. 1-Sept. 30.

¹⁴ The nonparametric data provided are median with 25th and 75th percentile.



Operating Room and Perioperative Services

Designed for children, the Operating Room and Perioperative Services at Texas Children's Hospital provide comprehensive and specialized capabilities for surgeries ranging from routine to extremely complex. More than 25,000 procedures were completed in 26 operating rooms at four sites within Texas Children's Hospital and Texas Children's Hospital West Campus in 2014. From admission to recovery, our support team of more than 600 is driven to ensure an optimum experience for patients and physicians.

Many of the surgical suites are fully equipped and integrated with endoscopic equipment, including advanced fetoscopes. Same-floor instrument processing optimizes efficiency, patient care and safety. For specialized procedures such as fetal and heart surgery, we offer customized equipment and specially trained support staff. When children are too sick to be moved to an operating or procedure room, our mobile team, which includes a fellowship-trained pediatric anesthesiologist, travels throughout the hospital to perform bedside procedures. With the da Vinci® Si Surgical System system, urologist Chester Koh, M.D., established the hospital's first dedicated Pediatric Robotic Surgery Program. Within the first year, 158 cases were completed using the robot by divisions including Urology, Gynecology and Pediatric General Surgery. Cases included pyeloplasties, nephrectomies, ovarian cysts, lysis of adhesions, hysterectomies, mitrofanoff, ureteral re-implants and cholecystectomies.

Striving for nursing excellence, the operating rooms encourage and support nurses through certification and education. By participating in a program offered by the Association of periOperative Registered Nurses (AORN), seven nurses received their certification between September 2013 and October 2014; numerous others are scheduled for the exam. Operating room nurses from Texas Children's Pavilion for Women received the Competency and Credentialing Institute's CNOR Strong award this year. CNOR is the only accredited credentialing program for perioperative registered nurses. Texas Children's Pavilion for Women is the first women's hospital to receive this esteemed award.

Growing the current staff is just as important to these areas, as evidenced by the newly instituted Surgical Tech to Registered Nurse Transition Program. Currently the operating rooms are transitioning two surgical tech staff who recently received their R.N. licenses into operating room nurses.

With interdisciplinary communication being a top priority for quality patient care, the Perioperative Department has instituted daily morning and afternoon "huddles" to share information among the diverse team members involved in the care of all surgical patients, enabling better outcomes.

SIMULATION CENTER

Our commitment to children goes beyond equipment and expertise. To help ease the anxiety many children and their families feel before surgery, we offer a "virtual OR" simulator to help explain the surgery process. Color-coded pajamas and kid-friendly, scented anesthesia masks help children relax and feel more at ease.

This Simulation Center teaches our surgical teams how to work together in stressful situations, build teamwork and optimize patient safety. It is the only one of its kind in Houston and one of a few in the nation, and it uses the latest technology to produce a realistic clinical setting.



Trauma Services and the Center for Childhood Injury Prevention

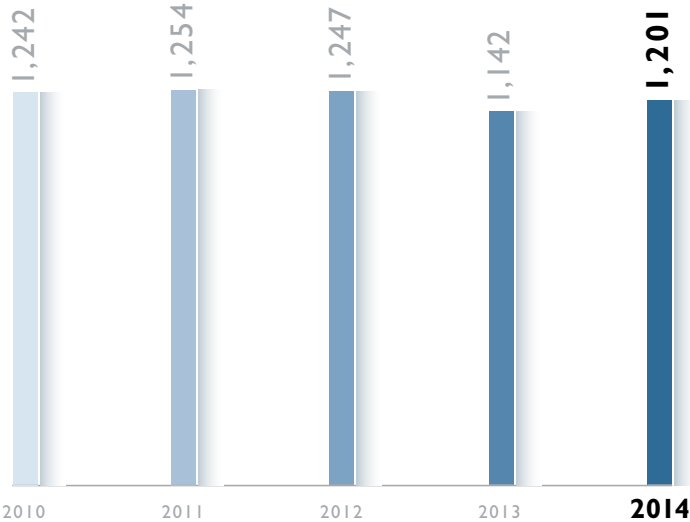
As a Level I pediatric trauma center, Texas Children's Hospital provides around-the-clock coverage to evaluate and treat more than 1,200 injured patients each year. Teamwork is vital to the rapid and decisive actions needed to treat traumatic injuries. Our group of pediatric general surgeons and surgical subspecialists; emergency medicine physicians; critical care physicians; anesthesiologists; child life specialists; social workers; rehabilitation specialists; physical, occupational and respiratory therapists; and other support staff work together effectively and efficiently when seconds matter.

Dedicated space for trauma cases is available in the Emergency Center, main operating room suite and inpatient units. Approximately 70 percent of all trauma cases come from within our catchment area, which consists of nine counties covering more than 9,500 square miles. About half of the trauma patients seen at Texas Children’s Hospital are transferred from other hospitals. The average time to accept a transfer is 15 minutes, which is well below the 30-minute threshold that is allowed by federal regulation.

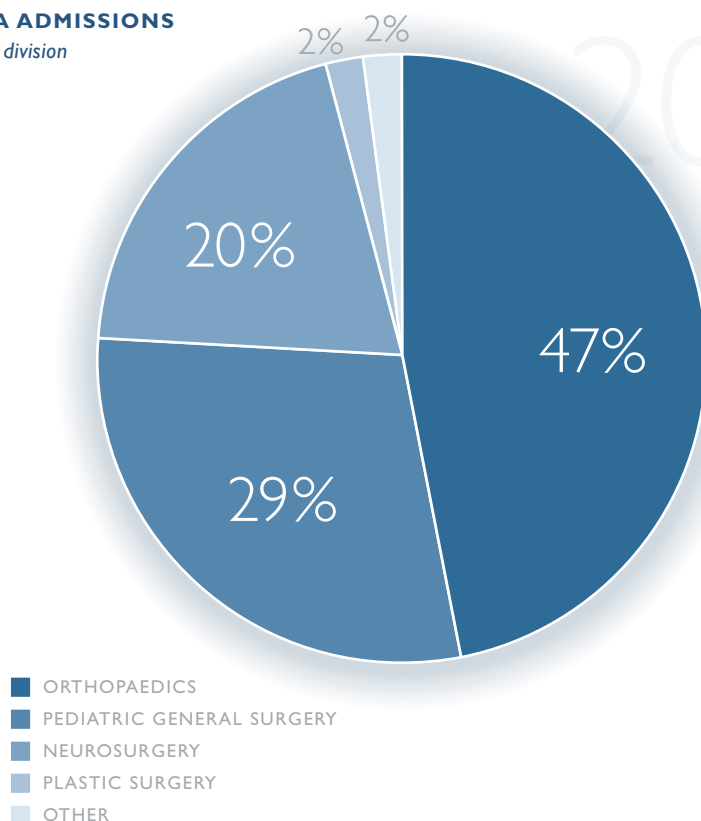
To enhance the team’s multidisciplinary performance, as well as build proficiency in trauma assessment and patient care, we partner with the Operating Room and Perioperative Services Simulation Center to conduct monthly trauma simulations. To achieve good outcomes, expert care is needed right from the time of injury. To enhance the care delivered by the team, outreach trauma and critical care simulation training education is provided for both EMTs and paramedics, which improves assessment and treatment skills. Emergency nursing education is offered to hundreds of nurses each year within the greater Houston area and around Texas. This provides trained nurses in communities around Texas and builds a pool of instructors to maintain these trained nurses in underserved areas throughout the state.

TRAUMA ADMISSIONS

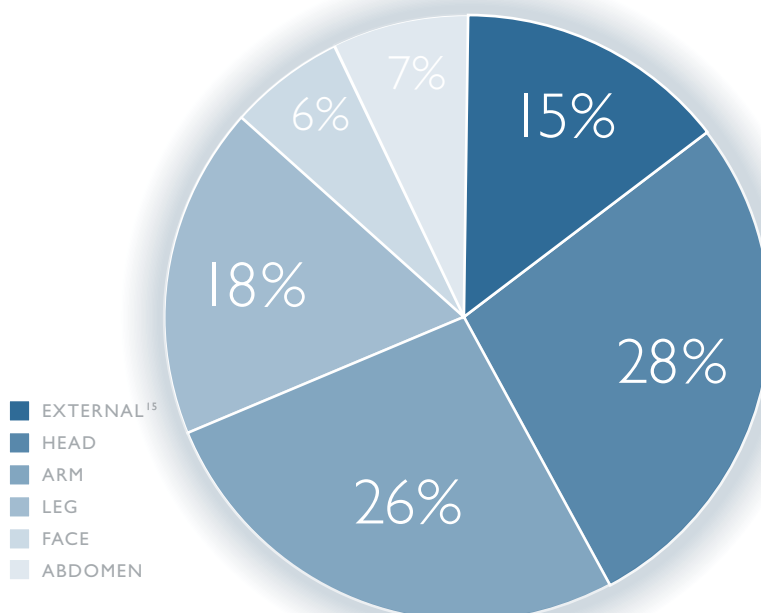
by year



Trauma admissions at Texas Children’s Hospital in the Texas Medical Center.

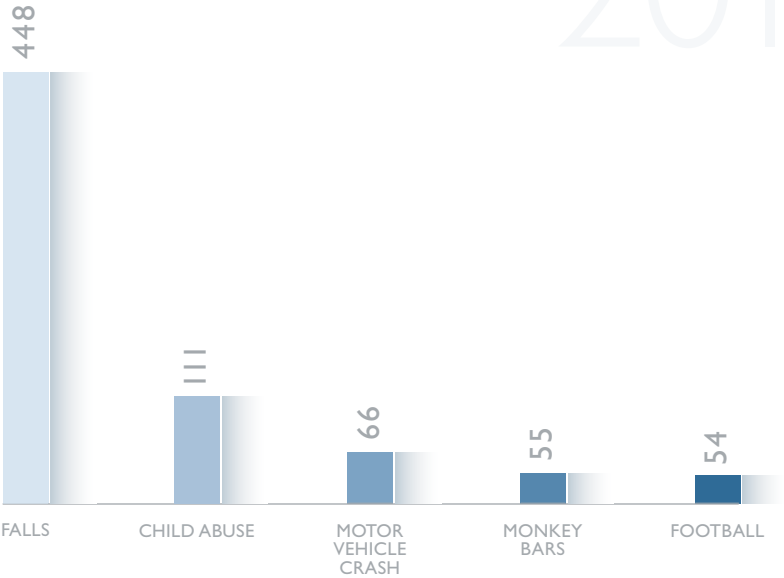
TRAUMA ADMISSIONS*by surgical division*

Other includes: Congenital Heart Surgery, Ophthalmology, Otolaryngology, Pediatric and Adolescent Gynecology, Plastic Surgery and Urology.

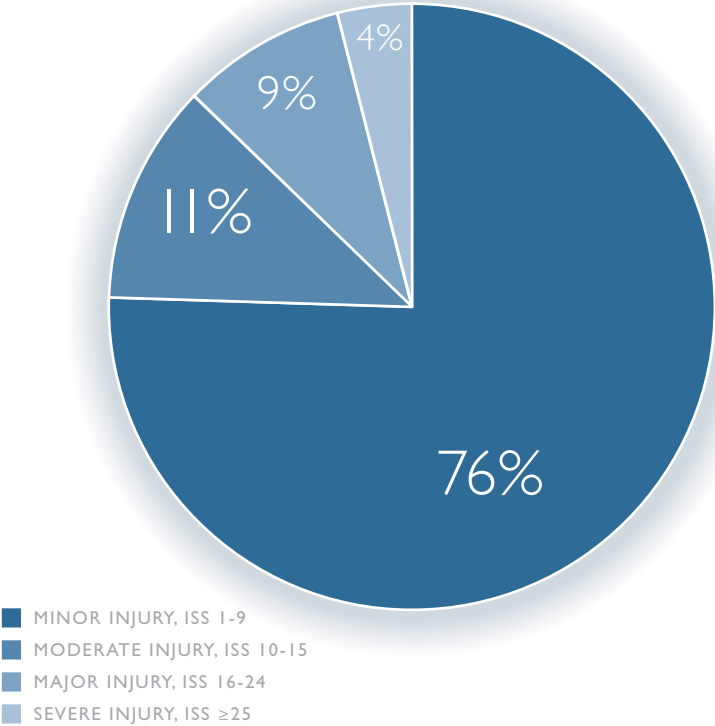
TRAUMA ADMISSIONS*by injury location*

¹⁵External encompasses skin injuries including cuts, bruises and abrasions.

TOP FIVE MECHANISMS OF INJURY



TRAUMA ADMISSIONS¹⁶ by severity
Injury Severity Scores (ISS)



¹⁶ National trauma database benchmark report 2014 (2013 data.) Data is not risk adjusted.

THE PEDIATRIC ACUTE INPATIENT REHABILITATION PROGRAM

Physical Medicine and Rehabilitation services are provided to children with traumatic injuries as part of the standard of care at Texas Children's Hospital. These services received a dramatic bolster in 2012 with the opening of our Pediatric Acute Inpatient Rehabilitation Program.

This program has significantly enhanced the care we provide to injured children. In addition to providing rehabilitation services for all inpatients, the program has eight dedicated beds for Pediatric Acute Inpatient Rehabilitation. Of these, 10 to 15 percent include patients rehabilitating following a traumatic injury. In 2014, the Pediatric Acute Inpatient Rehabilitation Program received the distinction of a three-year Commission on Accreditation of Rehabilitation Facilities (CARF) accreditation. This honor is held by only 29 centers in the United States, and Texas Children's Hospital is the only CARF-accredited pediatric acute inpatient rehabilitation program in Texas.

THE CENTER FOR CHILDHOOD INJURY PREVENTION

Pediatric injury is the number one cause of death of children in the United States. The Center for Childhood Injury Prevention educates thousands of parents and children each year on a variety of child safety topics, such as child passenger safety, safe sleep, home safety, and bike and pedestrian safety. Our injury prevention programs are supported by over \$500,000 per year in grant funds provided by Texas Department of Transportation, Kohl's®, Cincinnati Children's/ Toyota® USA and the Houston-Galveston Area Council.

Texas Children's Hospital and our 20 community partners check more than 3,000 car seats every year and distribute more than 1,200 car seats to underserved families. Texas Children's Hospital maintains one of the largest inspection station networks in the United States. Additionally, we distributed more than 1,000 portable cribs to qualifying families so they can provide safe sleep environments for their infants.

The Center for Childhood Injury Prevention also serves as the lead for the Safe Kids Greater Houston Coalition. Through our partnerships with Safe Kids member organizations, we are able to educate thousands of children in local school districts about the importance of pedestrian safety through an annual Safe Kids program, Walk This Way. Additionally, through affiliations with Elves 'N More and the Texas Medical Association's Hard Hats for Little Heads program, we distribute approximately 3,000 helmets each year and educate many more on the importance of bicycle safety and wearing a helmet.

Drowning prevention is also an important focus of our injury prevention program. Through a network of community partners, such as the Red Cross, YMCA and the U.S. Army Corps of Engineers, we educate local families on the importance of water safety at home, at swimming pools or when near open water. Over the last two years, water safety efforts have included a partnership with Telemundo to address the higher rates of drowning in the Hispanic population. Through this partnership, a multilayered campaign was launched, consisting of Spanish-language water safety billboards in 15 underserved communities, public service announcements featuring local child safety advocates and educational materials made available through Telemundo's social media networks.

For the first time ever, Texas Children's Center for Childhood Injury Prevention received funding to educate teens on the importance of safe driving practices, specifically the dangers of impaired

driving. According to the Centers for Disease Control and Prevention, motor vehicle crashes are the leading cause of death for U.S. teens. Through the support of valuable community partners such as Texas Department of Public Safety, AgriLife and Pearland Fire Department, we have hosted three large, interactive community events focused on teens and safe driving behaviors.

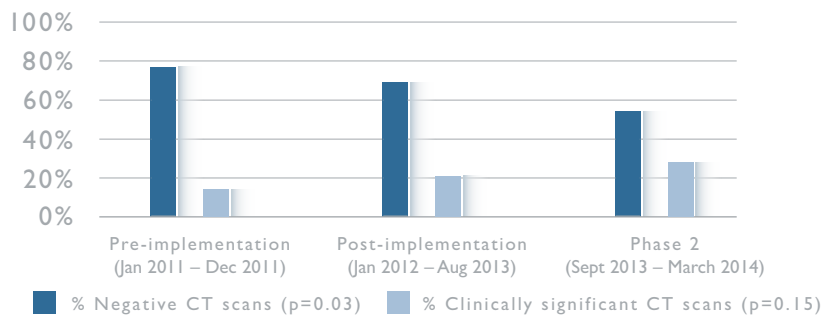
Texas Children's Center for Childhood Injury Prevention educates thousands of parents and children each year on child passenger safety, safe sleep, home safety and bicycle safety.

QUALITY IMPROVEMENT

Texas Children's Hospital's trauma team aims to continuously evaluate and improve the quality of care provided to our patients. There is a rigorous performance improvement and patient safety program that ensures review of every case and identifies opportunities for improvement in real-time. We recently completed a quality improvement initiative to decrease unnecessary radiation exposure during evaluation for possible abdominal trauma. Excess radiation from CT scans has recently been highlighted as a potential cause of radiation-induced malignancy later in life; therefore, there has been a push in the pediatric community to decrease radiation exposure. Adult trauma patients are almost universally screened by CT scan to evaluate for abdominal trauma.

Upon review of our practices, almost 80 percent of the CT scans obtained from our Emergency Center to evaluate for possible abdominal trauma were negative, and therefore unnecessary. In 2011, we created an evidence-based algorithm to evaluate children with possible abdominal injury in the Emergency Center in order to provide consistency among our multiple providers. After the Abdominal Trauma Protocol was in place for 20 months, the negative CT rate decreased, but not significantly. Therefore, the protocol was revised again, and at second evaluation a significant decrease in the negative CT rate was identified.

DECREASED UNNECESSARY CT USE IN ABDOMINAL TRAUMA EVALUATION



BINDI NAIK-MATHURIA, M.D., assumed the role of the trauma medical director in August 2014. Dr. Naik-Mathuria is a native Houstonian and a graduate of the General Surgery Program at Baylor College of Medicine. She completed her pediatric surgery fellowship at the Children's



Hospital of Los Angeles. After Texas Children's Hospital became a Level I trauma center, Dr. Naik-Mathuria was recruited back in 2011 to get the new trauma program off the ground. She served as the associate trauma medical director under the experienced leadership of David Wesson, M.D. In the interim, Dr. Naik-Mathuria completed a second fellowship in surgical critical care at Baylor. She has a strong interest in improving the process and quality of the care of trauma patients at Texas Children's Hospital.

To view more Trauma Services Division biographies, visit texaschildrens.org/trauma.



Department of Pediatric Anesthesiology

The Department of Pediatric Anesthesiology has 60 fellowship-trained pediatric anesthesiologists, making it one of the largest and most well-trained specialized departments in the United States. Our anesthesiology team also includes 20 pediatric-certified registered nurse anesthetists (CRNA) and 16 pediatric nurse practitioners. In 2014, our pediatric team completed more than 39,000 cases, from simple outpatient procedures to complicated, 12-hour-plus surgeries. In 2013, the first Pediatric Anesthesiology Subspecialty Board Certification Examination was offered. By 2015, all anesthesiologists at Texas Children's Hospital will have completed the Anesthesiology Subspecialty Board Certification exam.

Anesthesia for children and babies requires specifically designed and sized equipment, and we utilize the very latest in technology, including advanced monitors and near-infrared spectroscopy to measure brain oxygen levels.

Our goal is to ensure each child has a safe, pain-free and stress-free experience, whether in the operating room or when having procedures and tests elsewhere in the hospital, such as bedside sedation in or near patient rooms. Performing tests in patient rooms prior to surgery can reduce anxiety and stress during minor surgical procedures.

Additionally, three pediatric anesthesiologists work as part of the Cardiovascular Intensive Care Unit (CVICU) and Pediatric Intensive Care Unit (PICU) to provide specialized anesthesia services for pediatric patients with complex conditions. A new short-stay Surgical Intensive Care observation service was initiated in 2013 to provide critical care observation and treatment for 12 to 24 hours to patients undergoing extensive surgeries.

The Department of Pediatric Anesthesiology is committed to patient care, education and research. We operate one of the leading fellowship programs in the United States, providing training in general pediatric anesthesia and advanced second-year fellowship training in pediatric cardiovascular anesthesia, pediatric anesthesia education and research, and pediatric anesthesia quality and outcomes. Our active clinical and basic research programs are involved in more than 20 projects.

We are also dedicated to optimizing safety and anesthetic outcomes. On a national level, the Department of Pediatric Anesthesiology participates in the Society for Pediatric Anesthesia Wake Up Safe Project, the Congenital Cardiac Anesthesia Society Database, the Pediatric Regional Anesthesia Network and the Pediatric Sedation Research Consortium to gather and evaluate outcomes data from across the nation in order to help identify evidence-based protocols and best practices.

PEDIATRIC ANESTHESIA SCREENING SERVICE (PASS)

The PASS clinic is a comprehensive pre-anesthesia evaluation service for patients who have complicated underlying medical disease, are undergoing complex surgeries, or both.

The team of pediatric anesthesia nurse practitioners and anesthesiologists performs a comprehensive review of the patient's past medical, surgical and anesthetic history, plans for any additional testing or consultation required before surgery, devises a comprehensive plan for intraoperative anesthetic management and postoperative pain management, and makes additional recommendations for postoperative intensive care if required. This detailed plan has led to increased patient satisfaction and has dramatically reduced delays on the day of surgery because all required testing is complete.

COMPREHENSIVE PERIOPERATIVE PROTOCOL

In 2014, the Department of Pediatric Anesthesiology partnered with surgeons from Texas Children's Orthopaedics and Neurosurgery Divisions to develop a comprehensive perioperative protocol for patients with neuromuscular diseases undergoing extensive spinal fusion surgery. The protocol involves preoperative visits at two months and two weeks before surgery. At each visit, previous medical consultations are reviewed, the patient's preoperative condition is optimized, and a plan for intraoperative and postoperative care is developed. This plan is unique to each patient and involves preparing for intraoperative care, pain management, ICU admission and hospital recovery in an effort to improve patient outcomes such as pain relief, shorter hospital stay, fewer complications and overall patient satisfaction. The extended perioperative team includes medical specialists and advanced practice nurses.

ANESTHESIA SAFETY IN INFANTS AND CHILDREN

In recent years, laboratory research has raised the question of the effect of anesthesia drugs on the developing brain in neonatal animal models. There have been conflicting data in several retrospective studies in children and the research has many limitations. Dean Andropoulos, M.D., anesthesiologist-in-chief at Texas Children's Hospital, is a member of the SmartTots Scientific

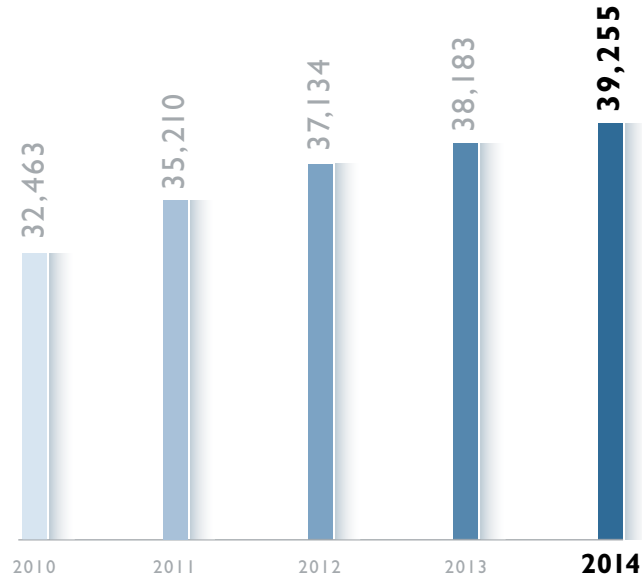
Advisory Board. SmartTots strives to fund research for anesthetic neurotoxicity and to communicate to medical professionals and the public the latest state-of-the-art information and recommendations.

PAIN RELIEF AFTER APPENDECTOMY

Appendectomy is one of the most common operations in children. In 2014, Texas Children’s Hospital completed more than 1,000 appendectomies. Pain control is often a significant problem, and a team of pediatric anesthesiologists and surgeons led by Yang Liu, M.D., reviewed¹⁷ methods of pain control in 206 children ages 7 to 17. Historically, substantial pain (pain score > four out of 10) was observed in 33 percent of patients. Dr. Liu and colleagues demonstrated that when a multi-modal approach to analgesia was used, consisting of local anesthesia injected at the surgical sites, opioids by patient-controlled analgesia, nonsteroidal anti-inflammatory agents, and a planned transition to oral acetaminophen/hydrocodone, the incidence of substantial pain was reduced to 12 percent ($p<0.001$).

DEPARTMENT OF ANESTHESIA CASES

by year

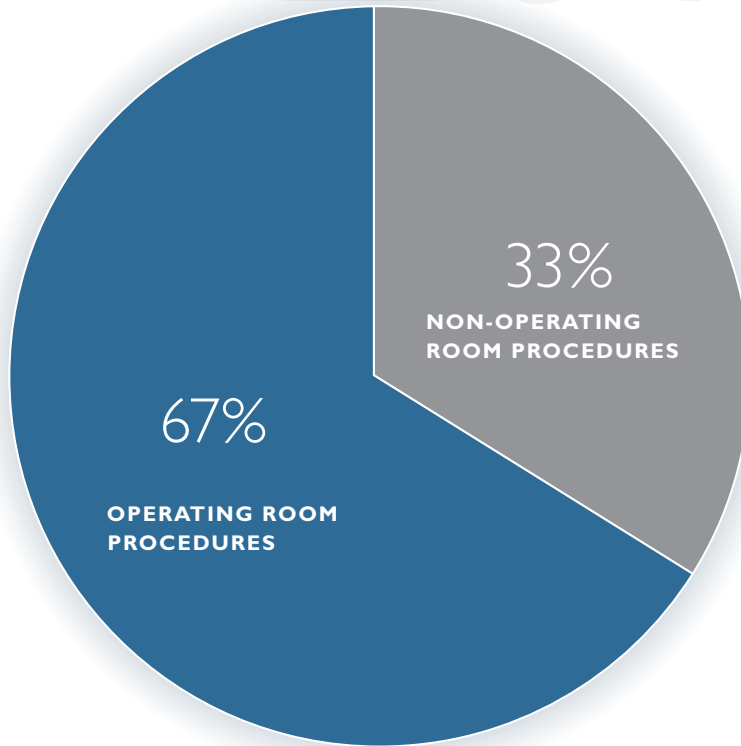


Anesthesia case volumes include anesthesia administered by Texas Children’s Hospital physicians at Texas Children’s Hospital locations.

¹⁷Liu Y, Seipel C, Lopez ME, Nuchtem JG, Brandt ML, Fallon SC, Manyang PA, Tjia IM, Baijal RG, Watcha MF. A retrospective study of multimodal analgesic treatment after laparoscopic appendectomy in children. *Paediatr Anaesth*. 2013; 23:1187-92.

DEPARTMENT OF ANESTHESIA CASES

by location



ANESTHESIA PROCEDURES IN TEXAS CHILDREN'S HOSPITAL OPERATING ROOMS

West Tower	10,896
Clinical Care Center	9,466
Congenital Heart Surgery	1,000
West Campus	4,864

SEDATION AND ANESTHESIA PROCEDURES IN OTHER TEXAS CHILDREN'S HOSPITAL AREAS

Fetal Anesthesia ¹⁸	68
Radiology	8,360
Cancer Center	1,637
(patients undergoing procedures in the Pediatric Acute Care Unit)	
Cardiac catheterization labs	1,084
Gastrointestinal procedures suite	1,818
Mobile sedation	62

¹⁸Texas Children's Hospital and Texas Children's Pavilion for Women.

DEAN B. ANDROPOULOS, M.D., M.H.C.M., is anesthesiologist-in-chief at Texas Children's Hospital, vice chair of Clinical Affairs and professor of Anesthesiology and Pediatrics at Baylor College of Medicine. He received his medical degree at the University of California at San Diego. His residencies in pediatric medicine and anesthesiology were both at the University of California at San Francisco. In addition, Dr. Andropoulos earned a Master of Science in healthcare management from the Harvard School of Public Health. His research focus is neurological monitoring, protection and outcomes in neonates undergoing complex open heart surgery,



for which he has ongoing National Institutes of Health (NIH) funding. He is the editor of two major textbooks: *Anesthesia for Congenital Heart Disease*, 2nd edition (3rd edition in preparation); and *Gregory's Pediatric Anesthesia*, 5th edition. He is also co-principal investigator at Texas Children's Heart Center for the NIH-funded Pediatric Heart Network Core Clinical Center.

To view more Department of Pediatric Anesthesiology biographies, visit texaschildrens.org/anesthesia.



Texas Children's Pavilion for Women

Texas Children's Pavilion for Women enhances Texas Children's mission to care for women, mothers and babies. As leaders in the fields of obstetrics, gynecology, and fetal and neonatal medicine, the Pavilion for Women offers continuity of care and some of the most advanced technologies and treatments available from before conception to after delivery.

TEXAS CHILDREN'S PAVILION FOR WOMEN OFFERS THE FOLLOWING SERVICES:

- Fetal intervention and perinatal surgery
- General obstetrics
- Gynecologic oncology
- Gynecology
- Maternal fetal medicine
- Maternal intensive care
- Menopause care
- Minimally invasive surgery
- Obstetric and gynecologic imaging
- Physical therapy
- Reproductive endocrinology and infertility
- Reproductive genetics and prenatal diagnosis
- Pelvic health and wellness
- Women's reproductive mental health

With a targeted high-risk obstetrics program, Texas Children's Pavilion for Women responds to the escalating need for innovation in obstetrical research, education and treatment. We ensure that the mothers and babies at Texas Children's Pavilion for Women have access to the most advanced technologies and treatments available. For more information, please visit women.texaschildrens.org.

TEXAS CHILDREN'S FETAL CENTER™

Texas Children's Fetal Center is one of only a few centers in the United States to offer the full spectrum of fetal therapies. We provide comprehensive care to meet the needs of pregnant women, including advanced diagnostic procedures and consultation to help families understand complex diagnoses and plan for the most appropriate care.

Mothers have access to fetal therapies including fetal surgery and fetal intervention. For infants in need of specialized care, Texas Children's provides access to the highest level (Level IV) Neonatal Intensive Care Unit (NICU) ranked #2 in the nation by *U.S. News & World Report*, as well as expert pediatric subspecialists.

The core staff of Texas Children's Fetal Center includes maternal-fetal medicine; fetal and pediatric surgeons; cardiology imaging; maternal/fetal medicine specialists; and specialized coordinators, all openly communicating about every aspect of the care of the fetal patient. Depending on the case, the Texas Children's Fetal Center team can request support from other divisions at Texas Children's Hospital, including anesthesiologists, fetal radiologists, fetal cardiologists, neonatologists, urologists, neurologists, pediatric surgeons, cardiovascular surgeons, neurosurgeons and genetic specialists with expertise in fetal conditions.

At Texas Children's Fetal Center, families have access to more than 40 pediatric medical and surgical subspecialists as well as a Level IV NICU.

PROCEDURES INCLUDE:

- Amniotic band resection
- Experimental fetal endotracheal occlusion (FETO) for congenital diaphragmatic hernia
- Ex-utero intrapartum treatment (EXIT)
- EXIT-to-airway for fetal neck masses
- EXIT-to-airway for congenital high airway obstruction syndrome (CHAOS)
- EXIT-to-resection for fetal lung masses
- Fetoscopic laryngoscopy and bronchoscopy for fetal airway concerns
- Fetoscopic laser photocoagulation for twin-twin transfusion syndrome (TTTS)
- Fetal shunt placement
- Fetal cardiac intervention
- Intrauterine transfusion
- Open fetal surgery for lung masses/congenital cystic adenomatoid malformation (CCAM)
- Open fetal surgery for sacrococcygeal teratoma (SCT) and vascular tumors
- Open fetal surgery for spina bifida
- Radio frequency ablation or umbilical coagulation for complicated monochorionic pregnancies

FETAL ENDOSCOPIC TRACHEAL OCCLUSION

A multidisciplinary team from Texas Children's Fetal Center has completed 12 successful in-utero fetal interventions to treat congenital diaphragmatic hernia (CDH) since 2012 and is the most active center for this innovative treatment for CDH. The minimally invasive and reversible fetoscopic tracheal occlusion procedure involves placing a small balloon into the fetus to plug the trachea. The balloon is left in place to inflate the lungs over the next several weeks and later is

removed by a similar procedure weeks before the anticipated delivery. Texas Children's Hospital is one of the few centers in the United States granted an FDA exemption to conduct this research. The intervention improves fetal lung growth as a result of successful plugging/unplugging of the trachea and can considerably alter the outcome of patients diagnosed with CDH. It is an exciting advancement and provides new hope for future CDH patients.

Twelve successful in-utero fetal interventions to treat congenital diaphragmatic hernia (CDH) have been completed since 2012, making Texas Children's Fetal Center the most active center for this innovative treatment.

MINIMALLY INVASIVE MYELOMENINGOCELE CLOSURE

The multidisciplinary team of obstetric, fetal and pediatric neurosurgeons at the Texas Children's Fetal Center recently performed the first minimally invasive fetal closure of a myelomeningocele spinal defect in the United States. Open fetal surgery for closure of spina bifida has shown significant advantages for the child relative to correction after birth. The maternal-fetal surgery team, led by Michael Belfort, M.B.B.C.H., M.D., Ph.D., and William Whitehead, M.D., M.P.H., developed the innovative technique using small ports instead of the traditional open surgery. These patients (mother and child) and subsequent patients will be followed closely to compare their outcomes with those of patients undergoing open fetal spina bifida repair.

ADULT SURGERY



The Department of Surgery collaborates with specialists at Texas Children's Pavilion for Women to provide surgical services for women. When patients need surgery that is not related to obstetrics or gynecology, William Fisher, M.D., medical director of Adult Surgery, leads procedures, such as appendectomies and also supports complex surgical cases.

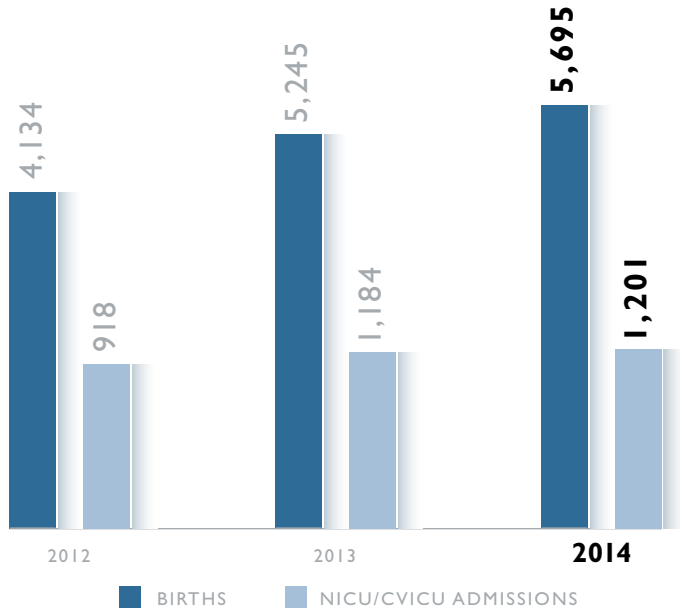
Dr. Fisher attended the University of Cincinnati College of Medicine and completed his internship at Mount Carmel Medical Center. He completed his residency at The Ohio State University College of Medicine and his fellowship at The Ohio State University College of Nursing.

ADVANCED CARE FOR NICU AND CVICU PATIENTS

With an extensive high-risk delivery population, Texas Children's Pavilion for Women experiences higher NICU and CVICU admission rates. From 2013 to 2014, deliveries have increased 8.6 percent, and admissions to the NICU or CVICU have increased by almost 1.5 percent. Also the percentage of all deliveries requiring admission to either the NICU or CVICU remains near 20 percent for both 2013 and 2014.

NUMBER OF BIRTHS AND ADMISSIONS FOR TEXAS CHILDREN'S PAVILION FOR WOMEN

by year



MICHAEL A. BELFORT, M.B.B.C.H., M.D., PH.D., is obstetrician and gynecologist-in-chief of Texas Children's Pavilion for Women and the Ernst W. Bertner chairman and professor in the Department of Obstetrics and Gynecology at Baylor College of Medicine. A nationally and internationally renowned specialist in maternal fetal medicine and fetal intervention, Dr. Belfort is board certified in obstetrics and gynecology and in maternal fetal medicine by the American Board of Obstetrics and Gynecology.

A native of South Africa, Dr. Belfort received his medical degree (M.B.B.C.H.) from the University of the Witwatersrand in Johannesburg, South Africa. He has been awarded two postgraduate research degrees, a doctorate in medicine (M.D.) from the University of Cape Town, South Africa, and a Ph.D. from the Karolinska Institute in Stockholm, Sweden. Dr. Belfort is the author/editor of several textbooks, notably *Hypertension in Pregnancy*, *Obstetric Clinical Algorithms: Management and Evidence*, *Preeclampsia: Etiology & Clinical Practice* and *Critical Care Obstetrics*, and has over 198 peer-reviewed papers.



His interest in global women's health was one of the main reasons for his move back to Houston in 2011. Under his guidance, Baylor and Texas Children's Hospital are expanding their global reach and influence on women's health care, a subject which he is passionate about.

To view more providers' biographies, visit women.texaschildrens.org/the-pavilion/find-a-physician.



Texas Children's Hospital West Campus

Texas Children's Hospital West Campus is Houston's first community hospital designed, built and staffed to exclusively care for children. This state-of-the-art 514,000 square-foot facility incorporates best practices in pediatric treatment and serves the West Houston community as the premier resource center for children. Since its opening in 2011, the West Campus has seen over 83,000 surgical clinic visits and nearly 14,000 surgical cases. Increasing demand has prompted the opening of an additional full-time operating room.

Texas Children's Hospital West Campus is also home to a 28,500-square-foot sports medicine facility that houses a 3,000-square-foot gym, two radiology suites, three casting rooms and 16 exam rooms for seamless, patient-centered service. With our comprehensive array of services, we successfully treat acute and chronic sports injuries, concussions and other conditions that affect sports performance. In addition, we help young athletes with wellness, injury prevention and return-to-play treatment plans. We have partnered with sports medicine specialists, orthopaedic surgeons, radiologists, sports-focused physical therapists, dietitians and other pediatric subspecialists to deliver the best possible care.

In 2014, Texas Children's Hospital West Campus expanded services to include a Pediatric Intensive Care Unit (PICU) and surgical operating room coverage 24 hours a day. This enabled the scope of services to broaden to include advanced laparoscopic and thorascopic procedures. In addition, the West Campus hosts the GR8 Hope Foundation Emergency Care Area, as part of The David and Mary Wolff Emergency Center. This growth project was partially funded through a \$1 million pledge from NFL quarterback Matt Schaub's and his wife Laurie's GR8 Hope Foundation.

The David and Mary Wolff Emergency Center has doubled in size and is now a 24-bed unit staffed with board-certified pediatric emergency medicine physicians. The dedicated emergency center staff is trained to provide immediate care for illnesses and injuries in children age 18 and younger. On average, more than 40,000 children visit the emergency center a year, and it will not take long for hundreds of thousands of children to benefit from this facility.

HAND AND UPPER EXTREMITY CENTER

In 2014, Texas Children's Hospital West Campus opened its Hand and Upper Extremity Clinic, which includes microsurgical capability performed by plastic surgeon Mitchel Seruya, M.D., and Thomas R. Hunt III, M.D., D.Sc. chief of Orthopaedics at Baylor College of Medicine and an authority in upper extremity sports injuries. In addition, nurses and specialized hand therapists provide services in the clinic.



OPERATING ROOM CASES AND CLINIC VISITS COMPLETED*at Texas Children's Hospital West Campus*

2014

SURGICAL DIVISION

CLINIC VISITS

OPERATING ROOM
CASES

Dental	0	1
Ophthalmology	4,007	190
Orthopaedics	11,383	594
Otolaryngology	6,684	2,005
Pediatric General Surgery	2,302	1,154
Pediatric and Adolescent Gynecology	1,444	0
Plastic Surgery	1,610	239
Urology	2,818	408
TOTAL	30,248	4,591

Operating room case volumes include procedures performed by Texas Children's Hospital, Baylor College of Medicine and private practice physicians at Texas Children's Hospital West Campus.

Clinic visits include outpatient visits by Texas Children's Hospital and Baylor College of Medicine faculty only.

ALLEN MILEWICZ, M.D., M.B.A., is chief surgical officer at West Campus, chief of Community Surgery at Texas Children's Hospital and assistant professor of Surgery and Pediatrics at Baylor College of Medicine. He is responsible for organizing the role of surgery within the community, focusing on the five Texas Children's Health Centers and Texas Children's Hospital West Campus. He received his medical degree from New York University Medical Center and completed both his internship and residency at the University of Texas Southwestern Medical Center in



Dallas. Subsequently, Dr. Milewicz completed his fellowship at the University of Oklahoma and Oklahoma City College of Pediatric Surgery. His primary focus is on the clinical practice of pediatric surgery in an educational setting. Additionally, Dr. Milewicz has extensive research experience in cardiac surgery, liver transplantation and hepatobiliary disorders. Dr. Milewicz has advanced training and extensive experience in skeletal malformations of the chest. He is board certified by the American Board of Surgery in pediatric surgery.

For more information, please visit westcampus.texaschildrens.org.

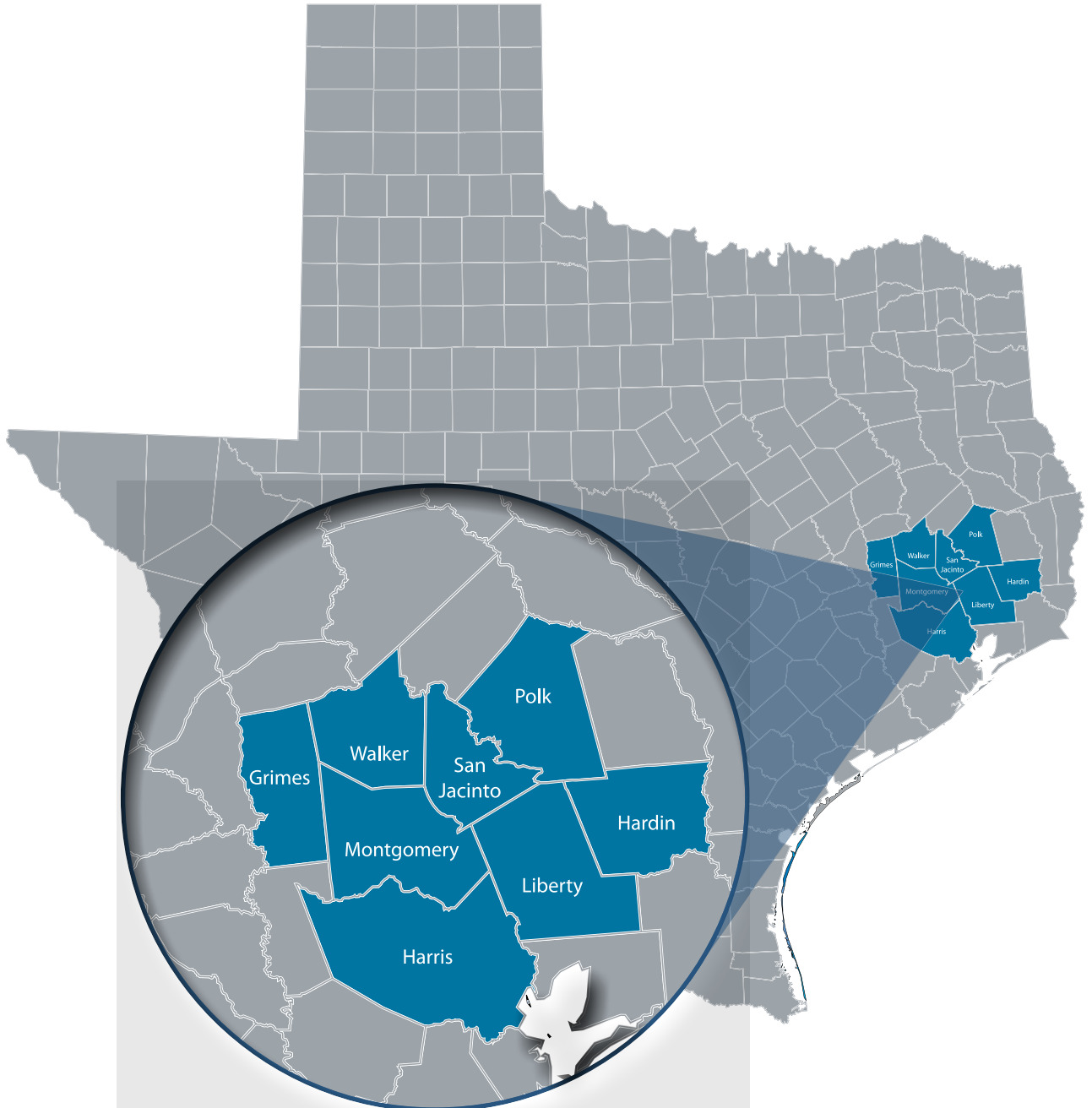


Texas Children's Hospital The Woodlands

Construction began in 2014 for Texas Children's new pediatric community hospital in The Woodlands. Slated to open in 2017, the 548,000-square-foot, state-of-the-art facility designed especially to serve children will offer inpatient and outpatient specialty pediatric care.

Texas Children's Hospital The Woodlands will provide more than 25 areas of specialty care including: Adolescent Medicine, Allergy and Immunology, Cardiology, Critical Care, Dermatology, Developmental Pediatrics, Diabetes and Endocrinology, Emergency Medicine, Gastroenterology and Nutrition, Genetics, Hematology and Oncology, Neurology, Ophthalmology, Orthopaedics, Otolaryngology, Pediatric and Adolescent Gynecology, Pediatric Anesthesiology, Pediatric Hospital Medicine, Pediatric Radiology and Pathology, Pediatric Surgery, Physical Medicine and Rehabilitation, Plastic Surgery, Psychiatry and Psychology, Rheumatology, Sports Medicine and Urology.

Hospital facilities will include 24 emergency center rooms, 74 outpatient exam rooms, five radiology rooms, four operating rooms and 30 acute care beds at opening, with plans of up to 200 beds, as well as a pediatric intensive care unit (PICU). Ample free parking will be available with 1,000 spaces planned. Along with serving families throughout The Woodlands area, Texas Children's anticipates serving families in counties throughout greater north Houston including Montgomery, Walker, Grimes, Liberty, Harris, Polk, San Jacinto and Hardin.



Department of Surgery at Texas Children's Hospital

DEPARTMENT OF SURGERY LEADERSHIP

Charles D. Fraser, Jr., M.D., *Surgeon-in-Chief*
 David E. Wesson, M.D., *Associate Surgeon-in-Chief*
 Thomas G. Luersssen, M.D., F.A.C.S., F.A.A.P.,
Chief Quality Officer
 Jed G. Nuchtern, M.D., *Director of Surgical Research*
 Larry H. Hollier, Jr., M.D., F.A.C.S., *Surgical Director*
of the Patient Experience, Surgical Director of the
Operating Rooms
 Ellis M. Arjmand M.D., M.M.M., Ph.D., *Surgical*
Director of Practice Standards and Faculty
Development
 Allen L. Milewicz, M.D., M.B.A., *Chief Surgical Officer*
at West Campus, Chief of Community Surgery
 Randall Wright, *Executive Vice President and Chief*
Operating Officer
 H. Mallory Caldwell, *Senior Vice President*
 Matthew T. Giroto, *Vice President*
 Judy Swanson, R.N., M.B.A., *Assistant Vice President,*
Perioperative Services
 Janet Winebar, R.N., *Director of Perioperative Services*
 Laura Laux Higgins, *Director of Strategy*
 Trent D. Johnson, *Director, Surgical Services*
 Ryan K. Krasnosky, M.P.A.S., P.A.-C., *Director,*
Surgical Advanced Practice Providers
 Jennifer J. Hiser, M.H.A., *Director of Transplant*
Services
 Kathy Carberry, R.N., M.P.H., *Director of Outcomes*
and Impact Service

DEPARTMENT OF ANESTHESIOLOGY

Dean B. Andropoulos, M.D., M.H.C.M.,
Anesthesiologist-In-Chief
 Stephen A. Stayer, M.D., *Associate Chief*
 Titilopemi A.O. Aina, M.D.
 Melanie J. Alo, M.D.
 Rahul G. Baijal, M.D.
 Beth M. Barraza, R.N., M.S., P.N.P.
 Sandra L. Benavides, R.N., M.S., P.N.P.
 Monique Bernstein, R.N., M.S., P.N.P.
 Sudha A. Bidani, M.D.
 Glorianne Bond, R.N., M.S., P.N.P.
 Kenneth M. Brady, M.D.
 Casey A. Brimmage, R.N., M.S., C.R.N.A.
 Katrin A. Campbell, M.D.
 Carlos J. Campos, M.D.
 Samantha Capehart, R.N.
 Lisa A. Caplan, M.D.

Nicholas P. Carling, M.D.
 Julia H. Chen, M.D.
 Hilary Cloyd, R.N.
 Camille M. Colomb, M.D.
 Michelle R. Dalton, M.D.
 Christopher Deegear, R.N.
 Erin R. Depew, R.N., M.S., C.R.N.A.
 Melissa Dominick, R.N., M.S., C.R.N.A.
 R. Blaine Easley, M.D.
 Jessica H. Emerald, R.N., M.S., P.N.P.
 Christopher R. Estrada, M.D.
 Mary A. Felberg, M.D.
 Priscilla J. Garcia, M.D.
 Nancy L. Glass, M.D.
 Chris D. Glover, M.D.
 Cheryl A. Gore, M.D.
 Michael A. Goren, M.D.
 Erin A. Gottlieb, M.D.
 Kalyani Govindan, M.D.
 Stuart R. Hall, M.D.
 Ryann Hattori, R.N., M.S., C.R.N.A.
 Katherine Hengstenberg, R.N.
 Lisa D. Heyden, M.D.
 Helena Karlberg Hippard, M.D.
 Julie Hoang, R.N., M.S., C.R.N.A.
 Paul W. Hopkins, M.D.
 Matthew D. James, M.D.
 Aimee Kakascik, D.O.
 Kathleen Kibler, B.S.
 Joanna L. Klaas, R.N., M.S., C.R.N.A.
 Constance W. LaGrone, R.N., M.S., P.N.P.
 Jessica L. Lambert, R.N., M.S., C.R.N.A.
 Sarah Laqua, R.N., M.S., C.R.N.A.
 Kate O. Lee, R.N., M.S., C.R.N.A.
 Yang Liu, M.D.
 David G. Mann, M.D.
 Peter Manyang, M.P.H.
 Melanie McKissack, M.D.
 Virginia F. McWilliams, R.N., M.S., P.N.P.
 Marcie R. Meador, R.N., M.S.
 Angela M. Medellin, R.N., M.S., P.N.P.
 Douglas J. Miller, M.D.
 Wanda C. Miller-Hance, M.D.
 Princy Mohan, R.N., M.S., P.N.P.
 Evelyn Monico, M.D.
 Emad B. Mossad, M.D.
 Pablo Motta, M.D.
 Maria M. Musick, R.N., M.S., C.R.N.A.

Kim P. Nguyen, M.D.
 Olutoyin A. Olutoye, M.D.
 Elyse C. Parchmont, R.N., M.S., C.R.N.A.
 Nihar V. Patel, M.D.
 Mary E. Piña, R.N., M.S., C.R.N.A.
 Robert W. Power, M.D.
 Krista Preisberga, M.D.
 Carlos L. Rodriguez, M.D.
 Amber P. Rogers, M.D.
 Laura W. Ryan, M.D.
 Catherine Seipel, M.D.
 Nicole M. Sevier, R.N., M.S., P.N.P.
 Amola P. Shah, R.N., M.S., C.R.N.A.
 Thomas L. Shaw, M.D.
 Kristen D. Sheehy, R.N., M.S., C.R.N.A.
 Shakeel A. Siddiqui, M.D.
 Kristen Sowers, R.N., M.S., P.N.P.
 Adam Stone, M.D.
 Cynthia Streckfus, B.S.
 Imelda M. Tjia, M.D.
 Laura Torres, M.D.
 Premal Trivedi, M.D.
 David F. Vener, M.D.
 Luigi Viola, M.D.
 Mehernoor F. Watcha, M.D.
 Tracy R. Watkins, R.N., M.S., P.N.P.
 Kenneth Wayman, M.D.
 Lauren Weaver, R.N., M.S., C.R.N.A.
 Erin Williams, M.D.
 Jamie Wingate, M.D.
 Saeed Yacoubby, R.N., M.S., C.R.N.A., D.N.P.
 Jennifer G. Yborra, R.N., M.S., P.N.P.
 David A. Young, M.D.
 Michael Zelisko, M.D.

CONGENITAL HEART SURGERY

Charles D. Fraser, Jr., M.D., *Chief*
 Jeffrey S. Heinle, M.D., *Associate Chief*
 Shaun E. Custard, M.H.A., M.B.A., F.A.C.H.E.,
Practice Administrator
 Iki Adachi, M.D.
 Nancy Benson, M.S.N., C.P.N.P.-P.C.
 Ziyad Binsalamah, M.D., *(Instructor)*
 Amy G. Hemingway, R.N., M.S.N., C.N.S.,
 C.P.N.P.-P.C.
 Lauren C. Kane, M.D.
 Kim Krauklis, R.N., N.P.-C.
 Jill LeBlanc, R.N., C.P.N.P.-A.C.
 E. Dean McKenzie, M.D.
 Carlos M. Mery, M.D.
 Tammy Pyron, R.N., C.P.N.P.-P.C.

Jenny Suh, P.A.-C.
 Amanda Taylor, P.A.-C.
 Mary Tran, P.A.-C.

DENTAL

A. Bruce Carter, D.D.S., *Chief*
 Mary D. Kana, M.B.A., *Practice Administrator*
 Esther Yang, D.D.S.

NEUROSURGERY

Thomas G. Luerssen, M.D., F.A.C.S., F.A.A.P., *Chief*
 Lorraine M. Cogan, M.S.W., *Practice Administrator*
 Brandy Berger, M.S.N., R.N., C.P.N.P.-P.C.
 Natalie Cormier, M.S.N., R.N., F.N.P.-B.C.
 Daniel J. Curry, M.D.
 Robert C. Dauser, M.D.
 Andrew H. Jea, M.D., F.A.A.N.S., F.A.C.S., F.A.A.P.
 Heidi Kerns, M.S.N., R.N., F.N.P.-B.C.
 Sandi K. Lam, M.D., M.B.A.
 Amee Moreno, M.S.N., R.N., C.P.N.P.-P.C.
 William E. Whitehead, M.D., M.P.H.

OPHTHALMOLOGY

David K. Coats, M.D., *Chief*
 Valdemar Z. Garza, *Practice Administrator*
 Amit Bhatt, M.D.
 Peter T. Chang, M.D.
 Jane C. Edmond, M.D.
 Dan S. Gombos, M.D.
 Honey H. Herce, M.D.
 Mohamed A. Hussein, M.D.
 Mary Kelinske, O.D.
 Doug Marx, M.D.
 Evelyn A. Paysse, M.D.
 Veeral S. Shah, M.D., Ph.D.
 Timothy J. Stout, M.D., Ph.D.
 Kimberly G. Yen, M.D.

ORTHOPAEDICS

William A. Phillips, M.D., *Chief*
 Binta O. Baudy, M.P.H., *Practice Administrator*
 David P. Antekieier, M.D.
 Shannon B. Antekieier, M.D.
 Tanisha George Daugherty, P.A.-C.
 Howard R. Epps, M.D.
 Susannah Ferguson, P.A.-C.
 Vincy D. George, P.A.-C.
 Frank T. Gerow, M.D.
 Darrell Hanson, M.D.
 Jaclyn F. Hill, M.D.
 Kevin S. Horowitz, M.D.

Thomas R. Hunt, III, M.D., D.Sc.
 Megan M. May, M.D.
 Scott D. McKay, M.D.
 Layne Opersteny, P.A.-C.
 Scott B. Rosenfeld, M.D.
 Janai A. Sells, P.A.-C.
 Vinitha R. Shenava, M.D.
 Lisa D. Stringer, P.A.-C.
 Joseph Trammel, P.A.-C.
 Lindsey E. White, P.A.-C.
 Opal J. Willmon, P.A.-C.

OTOLARYNGOLOGY

Ellis M. Arjmand M.D., M.M.M., Ph.D., *Chief*
 Michael Dyer, M.H.A., *Practice Administrator*
 Peggy Blum, Au.D., C.C.C.-A, *Manager, Audiology*
 James P. Carter, M.A., C.C.C.-S.L.P., *Manager, Speech Language and Learning*
 Amy Bartholomew, P.A.-C., M.M.Sc.
 Linda C. Brock, P.N.P.
 Karina T. Cañadas, M.D.
 Binoy M. Chandy, M.D.
 Ellen M. Friedman, M.D., F.A.C.S., F.A.A.P.
 Carla M. Giannoni, M.D.
 John K. Jones, M.D., F.R.C.S., F.A.C.S.
 Deidre R. Larrier, M.D.
 Mary Frances Musso, D.O.
 Julina Ongkasuwan, M.D., F.A.A.P.
 Tiffany P. Raynor, M.D.
 Erin Roper, P.A.-C.
 Kathy Shelly, P.A.-C.
 Matthew S. Sitton, M.D.
 Marcelle Sulek, M.D., F.A.A.P., F.A.C.S.
 Ronald J. Vilela, M.D.
 Jeffrey T. Vrabec, M.D.
 Robert A. Williamson, M.D.

PEDIATRIC AND ADOLESCENT GYNECOLOGY

Jennifer E. Dietrich, M.D., M.Sc., *Chief*
 Jennifer L. Bercaw-Pratt, M.D.
 Jennifer Parker Kurkowski, W.H.N.P.
 Sherrell Ogletree, F.N.P.
 Xiomara M. Santos, M.D.
 Ronald Young, M.D.

PEDIATRIC GENERAL SURGERY

Jed G. Nuchtern, M.D., *Chief*
 Paul K. Minifee, M.D., *Clinic Chief*
 Allen L. Milewicz, M.D., M.B.A., *Chief of Community Surgery*

Jag M. Grooms, M.P.A., *Practice Administrator*
 Mary L. Brandt, M.D.
 Darrell L. Cass, M.D.
 Alysha B. Diaz, P.A.-C.
 Elizabeth S. French, P.A.-C.
 Charles W. Hartin, Jr., M.D.
 Timothy C. Lee, M.D.
 Monica E. Lopez, M.D.
 Mark V. Mazziotti, M.D.
 Fabian Morice, P.A.-C.
 Bindi Naik-Mathuria, M.D.
 Oluyinka Olutoye, M.D., Ph.D.
 Jamie Ouseph, P.A.-C.
 Ashwin P. Pimpalwar, M.D.
 J. Rubén Rodríguez, M.D.
 Sarah L. Smith, P.A.-C.
 Sanjeev A. Vasudevan, M.D.
 Veronica A. Victorian, P.A.-C.
 David E. Wesson, M.D.

PLASTIC SURGERY

Larry H. Hollier, Jr., M.D., F.A.C.S., *Chief*
 Mary D. Kana, M.B.A., *Practice Administrator*
 Edward P. Buchanan, M.D.
 Kristen Daniels, P.A.-C.
 David Y. Khechoyan, M.D.
 Edward Lee, M.D.
 Laura Monson, M.D.
 Reggie Nunez, P.A.-C.
 Mitchel Seruya, M.D.
 John Wirthlin, D.D.S., M.S.D.

TRANSPLANT SERVICES

John A. Goss, M.D., *Medical Director*
 Ryan W. Himes, M.D., *Medical Director of Quality and Outcomes Management*
 Jennifer J. Hiser, M.H.A., *Director*

Heart Transplant Program

Jeffrey S. Heinle, M.D., *Surgical Director*
 William J. Dreyer, M.D., *Medical Director*
 Antonio G. Cabrera, M.D.
 Susan W. Denfield, M.D.
 Aamir Jeewa, M.D.
 E. Dean McKenzie, M.D.
 Jack F. Price, M.D.

Kidney Transplant Program

Christine A. O'Mahony, M.D., *Surgical Director*
 Eileen D. Brewer, M.D., *Medical Director*

Ewa Elenberg, M.D.
 Arundhati S. Kale, M.D.
 Mini Michael, M.D.
 Alyssa A. Riley, M.D.
 Poyyapakkam Srivaths, M.D.
 Sarah J. Swartz, M.D.
 Scott E. Wenderfer, M.D.

Liver Transplant Program

John A. Goss, M.D., *Surgical Director*
 Ryan Himes, M.D., *Medical Director*
 Beth A. Carter, M.D.
 Douglas S. Fishman, M.D.
 Donna Garner, C.P.N.P.
 Sanjiv (Sonny) Harpavat, M.D.
 Paula M. Hertel, M.D.
 Daniel H Leung, M.D.
 Kenneth Ng, D.O.

Lung Transplant Program

Jeffrey S. Heinle, M.D., *Surgical Director*
 George B. Mallory, M.D., *Medical Director*
 Shailendra Das, D.O.
 Maria C. Gazzaneo, M.D.
 Ernestina Melicoff-Portillo, M.D.
 Nicole Crews Rosipal, N.P.

UROLOGY

David R. Roth, M.D., *Chief*
 Jennifer Barrera, P.A.-C.
 Patricio Gargollo, M.D.
 Edmond T. Gonzales, Jr., M.D.
 Valencia T. Grant, M.H.A., M.S.W.
 Nicolette Janzen, M.D.
 Chester Koh, M.D.
 Joanna Marroquin, N.P.
 Jessica Schuh, P.A.-C.
 Abhishek Seth, M.D.

INPATIENT SERVICES

Critical Care

Lara S. Shekerdemian, M.D., F.R.A.C.P., F.A.A.P.,
 M.H.A., *Chief*
 Gail Parazynski, R.N., M.S.N., *Assistant Vice
 President, Nursing*

Pediatric Intensive Care Unit

Matthew Musick, M.D., *Medical Director*
 Deborah D'Ambrosio, R.N., M.S.N., N.E.-B.C.,
Assistant Director, Nursing

Shannon Holland, R.N., M.S.N., *Assistant
 Director, Nursing*

Progressive Care Unit

Fernando Stein, M.D., *Medical Director*
 Tarra Kerr, R.N., M.S.N., *Interim Assistant
 Clinical Director*

Cardiovascular Intensive Care Unit

Paul A. Checchia, M.D., F.C.C.M., F.A.C.C.,
Medical Director
 Gay N. Matthews, R.N., M.S.N., *Assistant
 Director, Nursing*

Acute Care Surgical Floor

Christina Mauk, R.N., M.S.N., *Assistant
 Director, Nursing*

OPERATING ROOM AND PERIOPERATIVE SERVICES

Judy Swanson, R.N., M.B.A., *Assistant Vice
 President, Perioperative Services*
 Janet Winebar, R.N., *Director, Perioperative Services*
 Ramon Enad, R.N., M.B.A., *Assistant Director,
 Perioperative Services, Texas Children's Hospital
 West Campus*
 Lynn A. Huffman, R.N., M.B.A., *Assistant Director,
 Operating Rooms*
 Ronald Loosle, R.N., M.B.A., *Assistant Director,
 PACU/Anesthesia*
 Nakeisha Archer, R.N., M.B.A., *Assistant Director,
 Perioperative Services, Texas Children's Pavilion
 for Women*

TRAUMA SERVICES

Bindi J. Naik-Mathuria, M.D., *Medical Director*
 Christi Reeves, *Director*
 Cher Leach, R.N., B.S.N., C.P.E.N.
 J. Rubén Rodríguez, M.D.
 Danny Rubalcava, M.D.

CENTER FOR CHILDHOOD INJURY PREVENTION

Trent Johnson, *Interim Director*
 Kristen Beckworth, M.P.H., C.H.E.S., C.P.S.T.I.,
Manager

QUALITY

Kathleen E. Carberry, R.N., M.P.H., *Director,
 Outcomes and Impact Service*



Referrals

Texas Children’s Hospital cares for patients from all 50 states and nearly 60 countries. To help meet the needs of our patients, the Department of Surgery offers same-day surgical consultation appointments for each of the following surgical divisions: Congenital Heart Surgery, Neurosurgery, Ophthalmology, Orthopaedics, Otolaryngology, Pediatric and Adolescent Gynecology, Pediatric General Surgery, Plastic Surgery and Urology.

To make an appointment for a same-day consultation call 832-TCH-APPT (832-824-2778).

For additional appointment information or to speak with a division administrator, please call:

Division	Phone Number
Congenital Heart Surgery*	832-826-2030
Dental	832-822-3200
Neurosurgery*	832-822-3950
Ophthalmology*	832-822-3230
Orthopaedics*	832-822-3100
Otolaryngology*	832-822-3250
Pediatric and Adolescent Gynecology*	832-822-3640
Pediatric General Surgery*	832-822-3135
Plastic Surgery*	832-822-3189
Urology*	832-822-3160

Visit [texaschildrens.org/refer](https://www.texaschildrens.org/refer) for more information about referring a patient. Patients and families can visit [texaschildrens.org/preparingforsurgery](https://www.texaschildrens.org/preparingforsurgery) to learn more about the surgery experience at Texas Children’s Hospital.

*Same-day appointments available



**Texas Children's
Hospital®**

Department of Surgery

6621 Fannin Street | Houston, Texas 77030

832-826-5779

texaschildrens.org/surgery

texaschildrens.org/refer