2016
Department of Pediatric Surgery
Research Annual Report
Dear Friends and Colleagues,

This has been an exciting and productive year for Children’s of Alabama and the Pediatric Surgical Subspecialties. This research report details these accomplishments by division. Significant contributions have been made by our faculty toward the improvement of care in children with surgical disease whether this is through research, teaching, national leadership positions or contributions to global health. Our faculty have successfully obtained more than $1.5 million in research funding and have produced many important peer-reviewed publications.

The research projects and publications described below have a significant impact on how we care for our pediatric patients, and these efforts from each division should be commended. We hope to continue to build on the successes of this research in an effort to improve the clinical care for our patients.

Sincerely,

Mike K. Chen, MD
Farley Endowed Chair
Professor of Surgery
Surgeon-in-Chief, Children’s of Alabama
Director, Division of Pediatric Surgery
Department of Surgery
UAB School of Medicine
The Pediatric Surgical Subspecialties at Children’s of Alabama are comprised of 10 subspecialty divisions, each with specific interests and focus on education, research and excellent clinical care. The highlights and accomplishments of each division and its faculty in 2016 will be detailed.

**Pediatric Surgical Subspecialties**

1. Pediatric Cardiovascular Surgery
2. Pediatric Dentistry
3. Pediatric General Surgery
4. Pediatric Neurosurgery
5. Pediatric Ophthalmology
6. Pediatric Oral/Maxillofacial Surgery
7. Pediatric Orthopedic Surgery
8. Pediatric Otolaryngology
9. Pediatric Plastic Surgery
10. Pediatric Urology
The Division of Pediatric Surgery engages in a broad range of research evaluating basic science in pediatric oncology and necrotizing enterocolitis, clinical outcomes research and technology research to improve provider communications and patient-focused data collection. This division has garnered more than $550,000 in grant funding to support the research mission.

Solid tumors make up about 30 percent of all pediatric cancers. Dr. Elizabeth Beierle’s research efforts are focused on signal transduction pathways in pediatric solid tumors and utilizing patient-derived xenograft models of pediatric solid tumors to study innovative therapies. Currently, her lab is evaluating the utility of a novel rexinoid therapy, 9-cisUAB30, for the treatment of pediatric neuroblastoma and high-risk pediatric medulloblastoma. This therapy has shown promise in patient-derived xenograft models, and they are expanding their evaluation of this compound into pediatric renal and hepatic malignancies. In addition to her basic science research, Dr. Beierle has been involved in the utilization of the National Cancer Database to evaluate outcomes and disparities in pediatric cancer outcomes. Her published manuscripts have involved evaluation of outcomes in pediatric nasopharyngeal carcinoma, pediatric head and neck melanoma, thyroid cancer and ovarian malignancies.

Obesity is a complex problem, and Dr. Mike Chen is the local PI for an NIH funded prospective observational study: Teen-Longitudinal Assessment of Bariatric Surgery (Teen-LABS) to collect and better understand the implication of bariatric surgery on teenagers.

Necrotizing enterocolitis is the second most common cause of morbidity in premature infants. Dr. Colin Martin leads a laboratory and clinical effort, as surgical director of the Georgeson Center for Advanced Intestinal Rehabilitation, focused on improving outcomes in pediatric patients with necrotizing enterocolitis and short bowel syndrome. The focus is to investigate the role of innate immunity in intestinal diseases of prematurity. Specifically, they are interested in how the environment shapes developing B cell populations that are needed for antibody-mediated intestinal homeostasis. The overall goal is to develop novel vaccine strategies that can protect neonates at risk for intestinal diseases.

Trauma is the most common cause of mortality and morbidity in the U.S. pediatric population. Dr. Rob Russell has particular interests in traumatic coagulopathy that has a significant affect on outcomes following severe pediatric trauma. His specific interests include characterizing changes in the endothelial microenvironment leading to coagulopathy and utilization of viscoelastic testing to further evaluate coagulopathy and changing resuscitation strategies. In addition, he has interests in massive transfusion in pediatric patients and recently published a study characterizing massive transfusion in pediatric patients from the National Trauma Data Bank (NTDB). Finally, he has significant interest in characterizing and improving clinical outcomes by evaluating large clinical databases (National Surgical Quality Improvement Project-Pediatrics [NSQIP-P] and NTDB).

Finally, improvements in provider and team communication are of utmost importance in our shifting health care environment. Vince Mortellaro, MD, is creating technologic applications to improve health care provider communication. He is expanding this interest to include applications that will enable providers to collect essential health information from patients surrounding certain diagnoses.
Significant Publications


Pediatric General Surgery Awards/Recognition/Leadership

Dr. Elizabeth Beierle was named the Charles D. McCrary Endowed Professor in Pediatric Surgery and was named among the 2016 “Women Who Shape the State.” She has also been named as the chair-elect of the American Academy of Pediatrics Surgical Section Program Committee.

Dr. Colin Martin was named an Outstanding Young Alumnus from Carson-Newman University. He was also elected as an Executive Council Counselor for the Association of Academic Surgery for 2017–2019.

Dr. Rob Russell was appointed as the Young Surgeon Representative to the Pediatric Surgery Advisory Council of the American College of Surgeons and a member of the Trauma Committee for the American Pediatric Surgical Association.
The Division of Pediatric Neurosurgery continues to perform a wide array of clinical research, publishing many important peer-reviewed publications and obtaining more than $300,000 in grant funding for research. Specifically, head of the Division of Pediatric Neurosurgery is one of the founding members of the Hydrocephalus Clinical Research Network and is the leading enrolling institution in this network. Dr. Curtis Rozzelle, the principal investigator for Children’s of Alabama, has a specific research interest in hydrocephalus and socioeconomic issues surrounding this diagnosis.

Dr. Brandon Rocque has a specific research interest in improving the patient and family experience in the pediatric neurosurgery clinic. Parental distress can play a large role in child’s response to medical treatment. Therefore, he is studying the level of distress in families with newly diagnosed neurosurgical pathology and assessing their psychosocial risk factors. The goal is to provide the psychosocial support that is needed to maximize a family’s engagement with medical treatment and optimize outcomes. In addition, he is using an electronic patient-reported outcomes platform in the spina bifida clinic to administer a transition readiness assessment and will be developing electronic transition education materials to aid with the move from the pediatric clinic to adult care.

### Significant Publications


### Pediatric Neurosurgery Awards/Recognition/Leadership

Dr. Curtis Rozzelle was named the president-elect of the Neurosurgical Society of Alabama.

Dr. Brandon Rocque was appointed to the American Association of Neurological Surgeons Membership Committee, the Scientific Education & Advisory Board of the Chiari/Syringomyelia Foundation and the CURE Hydrocephalus International Advisory Board.
The Department of Oral and Maxillofacial Surgery has $1.3M in direct grant funding and $373K in Indirect funding for a combined total of $1.7M. The majority of this funding is attributable to support from NIH. Number of investigators within the division have interest in temporomandibular joint disease (TMJ) and are studying different elements of the disease process. Dr. Mohammad Hassan is studying biomarkers to improve early detection by isolating RNA from TMJ fluid. Dr. Patrick Louis is evaluating treatments for TMJ dysfunction in several clinical projects: A comparison of arthroscopy versus modified condylotomy, an evaluation of the Biomet TMJ Replacement System and outcomes of TMJ arthroplasty using prosthetic devices.

Dr. Amjad Javed is interested in the Runx2 gene and its effects over the molecular regulation/synthesis and degeneration of TMJ and growth plate cartilage. This is being studied with inducible tissue-specific models to delete Runx2 gene in proliferative and differentiated chondrocytes. In addition, he is evaluating the osteoblast role in homing and progression of cancer metastasis to bone. They are testing if suppression of Runx2 in osteoblasts alters the bone microenvironment to actively promote and support tumor cell homing, survival and growth at new bone sites. Finally, he is studying the role of Runx2 controlled osteoblast signals in regulating marrow adipogenesis and energy homeostasis.

Dr. Anthony Morlandt is evaluating aggressive odontogenic tumors with optical imaging. He plans to eventually develop a mouse model of odontogenic tumors for further study. In addition, he is evaluating the role of increased expression of certain matrix metalloproteinases (MMPs) in these gingival squamous cell cancers. By measuring these, he hopes to create a risk model to guide surgical decision-making for patients with this disease.

Dr. Dobrawa Napierala is evaluating animal models of genetic disorders affecting craniofacial development. Specifically, the results of this study will provide greater understanding of molecular pathology underlying syndromes associated with palatal clefting and lay the foundation for development of molecular therapeutic approaches. Also, Dr. Napierala is interested in the mechanisms of bone-regeneration failure in periodontal disease. This project intends to address the molecular mechanisms underlying the loss of bone regenerative potential of mesenchymal stem cells exposed to periodontal disease.

Dr. Peter Waite has a particular interest in TMJ arthritis in juvenile rheumatoid arthritis (JRA). He is currently studying the incidence of this disease and performing microassay analysis of TMJ fluid in patients with JRA. He hopes to improve the understanding of this disease in a specific group of patients and improve their outcomes. In addition, he is evaluating the epidemiology of orthognathic surgery by comparing private and academic oral/maxillofacial surgeons.

Finally, Dr. Somak Sittitavornwong is performing clinical studies evaluating outcomes of facial trauma, specifically mid-facial trauma, at UAB. He is also studying specific anatomical facial landmarks and specific operative approaches for oral/maxillofacial surgery.
The Division of Pediatric Plastic Surgery has a wide breadth of focus on specific clinical problems, global education and research involving wound healing. Dr. John Grant continues to host and educate international fellows at Children’s of Alabama. His fellow this year from Sohag, Egypt has learned from participation with the cleft and craniofacial team. In addition, they have produced seven abstracts, two manuscripts, and a step-by-step illustrated surgical atlas of the most common cleft and craniofacial procedures. They plan to distribute the surgical atlas to surgeons in developing countries. Dr. Grant has participated in several international workshops in Egypt and Ghana by giving lectures and performing live surgical demonstrations.

Dr. Tim King, new faculty this year, has research interests that include cutaneous wound healing, regenerative therapies, tissue engineering and 3-D printing. His NIH K08 grant focuses on the role of Notch2 and Notch3 in cutaneous wound healing.

**Significant Publications**


**Pediatric Plastic Surgery Awards/Recognition/Leadership**

**Dr. Tim King** was named chair-elect of the Plastic Surgery Research Council and the Program Committee Chair of the 62nd Annual Meeting of the Plastic Surgery Research Council.

**Dr. John Grant** was invited faculty at a live surgical workshop in Kumasi, Ghana, where he taught cleft and complex craniofacial surgical procedures and gave four lectures.
RESEARCH ANNUAL REPORT

Pediatric Urology

The Division of Pediatric Urology has a wide variety of research interests ranging from spina bifida outcomes, renal stone disease in pediatric patients, and advances and application of robotic surgery. Dr. David Joseph has more than $500,000 in grant funding to specifically study improving care and outcomes in the spina bifida population and to evaluate the efficacy of BOTOX® in urinary incontinence and neurogenic detrusor overactivity.

Dr. Pankaj Dangle, the newest addition to this division, has specific clinical interests in evaluating risk factors for renal stone disease in pediatric patients, spina bifida outcomes and minimally invasive robotic surgery. He has recently contributed to the American Urology Association Update series on chylous leak following urologic procedures. In addition, he is involved in a multi-center evaluation of the surgical outcomes of fellowship-trained pediatric urologists.

Significant Publications


Pediatric Urology Awards/Recognition/Leadership

Dr. David Joseph is a trustee of the American Board of Urology and the secretary/treasurer-elect of the AUA starting in March 2017. He is also the chairperson-elect of the American Academy of Pediatrics Section on Urology. In addition, he is the co-director of the 3rd World Congress on Spina Bifida Research and Care that will take place in San Diego in March 2017.