IT ALL BEGINS WITH A CHILD
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A MESSAGE FROM THE PRESIDENT

It all begins with a child—a child who is sick or injured. Our researchers have seen these children and are driven by their insatiable curiosity to discover new and better ways to make these children better today and healthier tomorrow.

As one of the first members of ACRI during its early development, I was pleased to contribute to its work to develop research-enabled discoveries into knowledge that spawns the development of new treatments and their eventual transformation into novel, accepted standards for providing care to infants, children and adolescents. As ACRI President, I have the unique privilege of not only preserving our duty to children, but also continuing to advance the stature of Arkansas Children’s as one of the nation’s leading academic pediatric medical centers.

On behalf of ACRI, I am pleased to introduce you to the work of several of our researchers. Our cross-disciplinary teams of physicians, biomedical scientists and health care practitioners continue to work cooperatively to achieve a brighter future for the children of our state and beyond. As we celebrate our recent successes, let us all be reminded that much remains to be done and that a child is waiting.

Gregory L. Kearns, PharmD, PhD, FCP, FAAP
President, Arkansas Children’s Research Institute
Senior Vice President and Chief Research Officer, Arkansas Children’s
Ross and Mary Whipple Family Distinguished Research Scientist
Professor of Pediatrics, University of Arkansas for Medical Sciences
OUR CURIOSITY LEADS US TO DISCOVERY

We foster a culture of curiosity that inspires researchers to question, seek and discover.
Boosting Infant Immune Systems
A child’s gut immune system develops over time, and the infant’s diet is the earliest factor impacting this system. Since breast-fed infants appear to have advanced immune system development compared to formula-fed infants, Dr. Laxmi Yeruva (pictured right) is learning which dietary factors in breastmilk provide an advantage in terms of immune function. These discoveries can lead to improved infant formula by adding components that are unique to breastmilk or that modify the gut microbiota to help boost the immune system in infants.
Identifying Long-Term Effects of Early-Life Chemical Exposures
The effects of exposure to environmental pollutants are well defined for adults, but in children, the effects are understudied, and any long-term effects are unclear. As the developing immune system may be even more sensitive than that of an adult to chemical toxicity, Dr. Sarah Blossom is testing whether early-life exposure to toxic chemicals causes long-term genetic alterations in the immune system leading to the development of autoimmunity in children. If her hypothesis is confirmed, it would support the idea that early-life exposure to chemicals at levels previously thought safe can trigger autoimmune disease in adulthood or even in childhood.

Finding Causes of Autism
Discovering underlying causes for autism spectrum disorder will help reveal keys to treatments for children. In her ACRI laboratory, Dr. Shannon Rose studies energy production by cells to determine possible relationships to abnormalities associated with autism. Identifying the differences is crucial to uncovering practical options to further investigate as treatments for autism.

Exploring Asthma Exacerbations and the Common Cold
Wheezing, coughing and trouble breathing for children with asthma are heightened when their bodies react to rhinovirus, the foremost cause of the common cold. Dr. Joshua Kennedy is evaluating the immune mechanisms to rhinovirus that enhance allergic responses and lead to viral-induced exacerbations of asthma. By defining these mechanisms, his research aims to discover novel therapeutic targets that can be used to improve quality of life for children diagnosed with asthma.

“My hope is that through research, we can positively impact the health and wellness of the roughly 20% of children suffering from chronic health conditions such as asthma, diabetes and autism spectrum disorders in the same way that research has led to tremendous improvements in outcomes of children with cancers and babies born prematurely.”

- Shannon Rose, PhD
Assistant Professor, Department of Pediatrics,
UAMS College of Medicine

Discovering Origins of Obesity and Metabolic Disease
As the prevalence of obesity has increased, the rate of overweight during pregnancy has as well. A pregnant mother’s health affects her child’s long-term health, and Arkansas Children’s Nutrition Center researcher Dr. Kartik Shankar is studying the origins of obesity and metabolic diseases by examining the biology of the placenta. By discovering the biological source of the association between the pregnant mother’s health and that of her baby, he is identifying novel opportunities for effective interventions to improve the lifelong health of the newborn.
Centering on Pediatric Research Excellence

The National Institutes of Health (NIH) sponsors Centers of Biomedical Research Excellence (COBRE) grant awards to create unique, world-class research environments for young faculty who are identified as the next generation of excellence in research. ACRI has received two of these prestigious COBRE awards to establish the Center for Childhood Obesity Prevention and the Center for Translational Pediatric Research at ACRI. These two COBRE grants are the largest NIH grant awards ever to ACRI.
Center for Translational Pediatric Research
The Center for Translational Pediatric Research uses state-of-the-art technology and a systems biology approach to study how pediatric diseases develop, with the ultimate goal of identifying points in the intersection of disease and development that will produce targets for therapeutic intervention and the development of new treatments for children. Led by Dr. Alan Tackett, the Center’s research focuses on pediatric blood disorders, infant brain development in obese mothers, immune system development in breast-fed infants, and pediatric chronic kidney disease.

Center for Childhood Obesity Prevention
Established in 2016, the multidisciplinary Center for Childhood Obesity Prevention, led by Dr. Judith Weber, will strengthen ACRI’s obesity research capacity and create mentoring pathways for emerging scientists who will focus on pediatric obesity. This new center at ACRI will also serve as an anchor for the development of a comprehensive pediatric obesity program at Arkansas Children’s Hospital and will enable Dr. Weber and her colleagues to better understand the origins of pediatric obesity and lead to the development of interventions focused both on preventing and reducing associated complications such as hypertension and diabetes.
Mother’s Metabolic Health and the Development of Her Baby

Children of obese women have a higher risk of becoming obese themselves. At the ACNC’s Physical Activity Core Laboratory, Dr. Elisabet Børshøj (pictured left) provides an intervention of individualized, structured physical activity for obese pregnant women. By studying exercise during pregnancy, she will discover its impact on the mother’s metabolic health and the development of her baby.
Arkansas Children’s Nutrition Center
The Arkansas Children’s Nutrition Center (ACNC) is one of six National Human Nutrition Centers funded through and cooperating with the USDA-Agricultural Research Service. The ACNC is a major research center of the Arkansas Children’s research enterprise and is funded by the USDA-ARS as part of the Human Nutrition Research Centers program. The ACNC’s mission is to conduct cutting-edge research to understand how maternal-child nutrition and physical activity optimize health and development. Under the leadership of Dr. Sean Adams, ACNC Director, and Dr. Aline Andres, Associate Director for Clinical Research, (both pictured right) the ACNC uses state-of-the-art procedures, equipment and facilities to determine how early-life exposures to dietary factors, physical activity and obesity can affect physiology (including brain and behavior), bone, body fat and body composition, metabolic organs and gastrointestinal tract, cardiovascular system, and others.

“By their nature, scientists are driven by an innate curiosity to know what makes things ‘tick.’ What is fun about being a scientist on the Arkansas Children’s campus is that one can satisfy this curiosity while, at the same time, advancing knowledge that helps kids and families thrive.”

- Sean Adams, PhD
Director, Arkansas Children’s Nutrition Center
Professor and Section Chief, Developmental Nutrition,
Department of Pediatrics, UAMS College of Medicine
WE TRANSFORM DISCOVERY TO CARE

Scientific discoveries lead us to new and better ways to care for children.
Providing Novel Treatment Options to Children with Cancer
The pediatric cancer component of the Experimental Therapeutics Program at Arkansas Children’s Hospital provides treatment options with novel (unproven) agents for children with cancer that traditional treatment has failed. Through consortium trials and other collaborations, the program provides multidisciplinary care for children in Arkansas and surrounding states.

Dr. Kathleen Neville and Autumn (both pictured left) share a hug at a recent clinic visit. Through the program, Dr. Kathleen Neville and her colleagues have been empowered to help patients like Autumn to respond beyond even the highest of expectations for treatment.
Diagnosing Acetaminophen Liver Injury
Acetaminophen is the most commonly used drug for the treatment of pain and fever. Acetaminophen overdose, however, can cause severe liver injury and death. Dr. Laura James is developing a new clinical diagnostic test that will help clinicians better detect acetaminophen liver injury.

Developing Treatments for Food Allergy
An estimated 5% of children in the US have a food allergy, and its prevalence is rising without a known cause and with no FDA-approved treatment yet available. At ACRI, Dr. Stacie Jones leads the Arkansas Center for Food Allergy Research, one of seven nationwide clinical sites of the NIH-funded Center for Food Allergy Research network, to develop immunotherapy approaches to treat food allergy. Among its accomplishments to date, Dr. Jones and her network colleagues have demonstrated the clinical benefit of egg oral immunotherapy for treating egg allergy and have identified the most promising routes, doses and durations of egg and peanut immunotherapies for further study.

“At ACRI, we have the potential to transform the health of children through discovery and innovation, and change lives – though creativity, teamwork and daring to breathe new life into old problems.”

- Stacie M. Jones, MD
Chief of Pediatric Allergy and Immunology, Arkansas Children’s Hospital
Dr. and Mrs. Leeman King Endowed Chair in Pediatric Allergy
Professor, Department of Pediatrics, UAMS College of Medicine
WE IMPROVE CHILDREN’S SAFETY AND HEALTH OUTCOMES

Scientific discoveries lead us to new and better ways to care for children.
Improving Outcomes of Critical Care Patients

Pediatric critical care patients have a high risk of experiencing delirium; however, there are many avoidable causes that can be targeted to decrease delirium and improve patient outcomes. The research of Dr. Katherine Irby (pictured right) seeks to reduce the frequency and duration of delirium for children discharged from the ICU by improving pain control, duration of intubation, decreased exposure to delirium-causing medications, improved sleep, and increased parent involvement in patient care. Her findings aim to develop a strategy to decrease the prevalence of delirium and to improve patient outcomes and quality of life.
Helping Teens Control Asthma
We are working with children, their families, and health providers to find the best strategies for managing asthma. As teens with asthma are often poorly equipped to self-manage their asthma as they bridge to adulthood, thus putting them at increased risk of poor outcomes, Dr. Tamara Perry is testing a smartphone application to help them better adhere to their asthma action plan and improve self-management. In her preliminary studies, teens frequently used the application and had improvement in asthma control.

Ensuring Babies Sleep Safely
Of the state’s potentially reviewable infant deaths from 2010 to 2015, 94% are related to sleeping environment and practices, such as incorrect placement, co-sleeping and improper sleeping surface. Adoption of safe sleep recommendations among teen mothers in rural, poor, Southern states is low. Dr. Mary Aitken and colleagues are testing a community-based educational intervention for teen mothers to ensure newborns are sleeping safely at night and nap time, focusing on maternal and other intergenerational influences in response to the intervention.

“Much of what really determines a child’s health occurs outside the medical setting. Community-based and applied research helps us better understand how to impact those factors—through studying how to implement evidence-based strategies, engaging families in finding solutions to health problems, or testing novel methods like mobile health interventions to guide health decision making. It’s exciting to see research at work where children live, attend school, and play.”

- Mary Aitken, MD, MPH
  Director, Injury Prevention Center, Arkansas Children’s Hospital
  Belinda H. and Robert L. Shults Endowed Chair in Injury Prevention
  Professor and Section Chief, Center for Applied Research and Evaluation, Vice Chair for Research, Department of Pediatrics,
  UAMS College of Medicine
THE PATH TO THE FUTURE

We envision a future in which all children grow up to be happy and healthy. We will continue our work until this vision becomes reality.
The Path to the Future

While this annual report provides a historical summary of the wonderful, important work done by our research faculty and staff, its real utility is to provide a glimpse of the foundation that will propel us forward to a critical future: one in which all the children that we remain privileged to serve and those beyond our borders can truly be not only better today, but also healthier tomorrow.

Mahatma Gandhi understood that the future depends on what takes place now. Today the Arkansas Children’s Research Institute works diligently to help create a safe, healthy future for our children. We endeavor tirelessly to catalyze the efforts of the entire research enterprise which exists throughout all the programs and places that comprise Arkansas Children’s. We will achieve success through our continued support of existing researchers and programs within ACRI and through careful, calculated programmatic expansion of the exemplary science which daily emanates from the Research Institute and the Arkansas Children’s Nutrition Center. We will remain faithful to pursue discovery and rapidly translate it to improved ways to diagnose and treat conditions that afflict infants, children and adolescents.

We want to sincerely thank the scientists, clinical investigators and research staff striving for a better future for children, the leaders of Arkansas Children’s whose tireless support enables our work to move forward, and the members of our community whose generosity makes the creation of an excellent future possible for our children. The vibrancy of ACRI will continue through our collective efforts as we faithfully pursue our collective vision.

“The future depends on what you do today”
- Mahatma Gandhi
“We must keep dreaming, discovering, and transforming what we find into knowledge that those caring for our children can use both today and tomorrow. The children are waiting and depend upon our success.”

- Dr. Gregory Kearns
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