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2014

Research Annual Report FY2014

Children's Mercy Hospital

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Dear Friends and Colleagues,

It is our pleasure to share with you the Children's Mercy Kansas City Fiscal Year 2014 Annual Research Report. Our researchers, health care professionals and our nearly 7,000 employees across our academic pediatric medical system continue to embrace the truth that scientific discovery and knowledge creation are central to our core mission of improving the health and well being of our patients and families by delivering the very best pediatric care. And Children's Mercy is uniquely positioned to advance pediatric medicine to the next level because of the long-standing and devoted support of the community.

As reflected by the information contained within this report, this past year was one of continued growth of our academic research enterprise at Children's Mercy. This was driven by initiation of a visionary Research Strategic Plan, a fully integrated component of the hospital's new strategic plan which demonstrates that biomedical research remains as a mission-centric priority for Children's Mercy.

Annual reports don't typically make for great reading material. This year, we've chosen to provide a shorter Annual Research Report, featuring just two of our key initiatives. First is the development of four research areas of emphasis, a strategy which we will use to provide a more nimble structure to our research enterprise and to focus our continued institutional investment in research.

Second, in collaboration with the University of Kansas Medical Center, Children's Mercy took decisive steps toward creating a single Department of Pediatrics which is intended to serve the clinical, educational and research needs of children in our region. This strategic partnership will dramatically improve our ability to link basic, translational and clinical research in pediatrics and, thereby, leverage the success of our two institutions in attracting and retaining the best and brightest minds in pediatric medical research to Kansas City.

We urge you to visit the new Children's Mercy research website (childrensmercy.org/research) to learn more about our research enterprise and the accomplishments of our dedicated scientists and clinicians who make this work possible.

We hope that you will take a few moments to read through this report, reflect on it, and most importantly, share in the celebration of success as we work together to continue the evolution of Children's Mercy as a world-class institution for pediatric research. As our research enterprise expands, we will ensure that the patients we are privileged to care for and those beyond the boundaries of our institution will benefit from the very best that new discoveries and knowledge can provide. Thank you for embarking with us on this remarkable journey that will advance pediatric health care across the globe.



Mark R. ...
Gregory J. ...



During FY2014, Children's Mercy Kansas City embarked on a new, ambitious Research Strategic Plan. In addition to building institutional infrastructure to support research, four strategic research areas of emphasis were defined to provide thematic focal points for continued development of the Children's Mercy Research Enterprise.

We hope you feel as proud as we are grateful. Your contributions helped make possible the following accomplishments within each of our research pillars.



Clinical Pharmacology and Therapeutic Innovation

The Division of Clinical Pharmacology and Therapeutic Innovation, under the direction of J. Steven Leeder, PharmD, PhD, is driven by the concept of “integrated research” in which clinical questions related to variability in drug response are first identified at the patient level. These patient-derived problems are used to guide the development of a specific project or program, which involves identification and application of the most appropriate research tools to answer the clinical question.

Participation of the CPTI Experimental Therapeutics

Program in Pediatric Cancer in four national networks (POETIC, NMTRC, TACL and COG) enabled patients from Missouri, Kansas and in neighboring states to have access to more than 30 early phase clinical trials in 2013. With active support from the National Institutes of Health, the program led a

national trial of hydroxyurea for sickle cell disease as part of the NICHD Pediatric Trials Network.

In addition, the Experimental Therapeutics Program is actively pursuing pediatric sarcoma drug discovery and re-formulation. The Clinical Toxicology program, a member of the national Network of Pediatric Environmental Health Specialized Units,

was awarded an Environmental Education Grant by the Environmental Protection Agency (EPA).

Finally, through strategic research collaborations with the Institute for Advancing Medical

Innovation, the University of Kansas Cancer Center, and Orbis Biosciences, CPTI faculty are working to develop new, innovative formulations of critical drugs that are suitable for the treatment of childhood cancers and other pediatric diseases.

Dr. Leeder holds the Marion Merrell Dow/Missouri Endowed Chair in Pediatric Clinical Pharmacology. Established by forward-thinking donors, endowed chairs provide ongoing financial support for research and education and are of strategic importance to elevate the hospital's academic profile and stature as a national leader in clinical care. The Missouri Endowed Chairs stand as an important example of the success made possible through match challenge programs that engage and inspire other philanthropists and attract the best and brightest physician-scientists to Kansas City.

J. Steven Leeder, PharmD, PhD

Genomic Medicine

Led by Stephen Kingsmore, MB, BAO, ChB, DSc, FRCPath, the Children's Mercy Center for Pediatric Genomic Medicine is the only such program housed in a free-standing children's medical center in the United States.

During the past year, Dr. Kingsmore and his colleagues successfully launched a novel genomic analysis technique (TaGSCAN – Targeted Gene Sequencing and Custom Analysis) that provides rapid and cost-effective DNA-based diagnosis of hundreds of hereditary diseases.

Coupled with STAT-Seq, another new gene-based diagnostic test developed by the Center for Pediatric Genomic Medicine, Dr. Kingsmore and his collaborators at Children's Mercy were able to accurately determine the etiology in approximately one-third of neonates and children with previously undiagnosed neurodevelopmental conditions. This work is supported by grants from the Marion Merrell Dow Donor Advised Fund, the Claire Giannini Fund, a \$1 million grant from the William T. Kemper Foundation, a \$5 million grant from the Eunice Kennedy Shriver National Institute of Child Health and Human Development and the National Human Genome Research Institute. Dr. Kingsmore and his team were awarded a five-year, \$6 million grant from the National Institutes of Health to further develop STAT-Seq and determine its benefits in 500 babies from the Children's Mercy Hospital Neonatal Intensive Care Unit.

On May 22, 2014, friends, family, colleagues, and donors gathered to celebrate Dr. Kingsmore and the formal investiture of the Dee Lyons/ Missouri Endowed Chair in Pediatric Genomic Medicine made possible by the generous support and leadership of Fred and Dee Lyons. "Children's Mercy is starting to become a national leader in pediatric genomic medicine," said Dr. Kingsmore. "This honor allows our team to develop further research initiatives and, ultimately, improve outcomes and quality of life of children with pediatric genetic diseases."

A portrait of Stephen Kingsmore, a middle-aged man with short grey hair and glasses, wearing a white dress shirt and a blue and black striped tie. He is smiling slightly and looking directly at the camera. The background is a blurred blue.

Stephen Kingsmore, MB,
BAO, ChB, DSc, FRCPath

Health Services and Outcomes

FY14 saw the establishment of the Children's Mercy Center for Health Services and Outcomes Research with the recruitment of Kathy Goggin, PhD, the Ernest L. Glasscock Endowed Chair in Pediatric Education and Research and Director of this new center.

The center has created multidisciplinary teams in high-impact areas (e.g., pediatric obesity, genomic medicine) to provide the structure and focus necessary to design and conduct research to determine the impact of translational research conducted by investigators at Children's Mercy. Additionally, the center has developed new, and bolstered existing relationships with faith and community-based organizations in Kansas City for the purpose of fostering broad engagement in the research process and to ensure that research focused on improving care in the community is having the desired impact to improve the lives of children and those that care for them.

We also had the pleasure of celebrating Dr. Goggin and the formal investiture of the Ernest L. Glasscock Endowed Chair in Pediatric Education and Research made possible by the generous support of Dr. Ernest Glasscock, who was a long-time friend of Children's Mercy. "Children's Mercy is focused on discovering new methods for enhancing the patient-care experience and promoting the best possible treatment outcomes," Dr. Goggin said. "This (gift) will allow us to gather further knowledge by regularly measuring our performance and to continue to support our commitment to maintaining a high standard of care for all patients, regardless of racial, ethnic or economic background."

Finally, this new center is developing important strategic research collaborations with institutions in the Kansas City metropolitan area (e.g., Saint Luke's Hospital Mid-America Heart Institute, University of Missouri-Kansas City and University of Kansas), throughout the United States (e.g., Boston Children's Hospital, University of California San Diego, University of Washington and Yale University) and across the globe (e.g., University of Paris Nanterre, Kenya Medical Research Institute and University of Capetown).

Kathy Goggin, PhD

Innovations in Health Care Delivery

With direction and leadership provided by David H. Westbrook, Senior Vice President for Strategy and Innovation, Children's Mercy has initiated a program designed to develop information, resources and products that have the potential to improve the scope and quality of health care delivery to infants, children and adolescents in our region and beyond.

The past year saw the development of two highly significant innovations.

Susan Abdel-Rahman, PharmD, a Professor of Pediatrics and member of the Children's Mercy Division of Pediatric Pharmacology and Therapeutic Innovation, received a U.S. patent for the Mercy TAPE, a device that costs pennies to manufacture and can reliably estimate body weight in any infant, child or adolescent. With support from the National Institutes of Health, the Food and Drug Administration and the

Research at Children's Mercy is taking many forms, from innovative tests that can diagnose genetic illnesses more quickly than ever before, to evidence-based delivery-of-care models that increase patient satisfaction and outcomes. Children's Mercy supporters touch every clinical study, every published paper and every child whose life is changed as a result of that research.

World Health Organization, Dr. Abdel-Rahman has validated the accuracy of the Mercy TAPE in pediatric patients on four continents.

In December 2013, Laura Fitzmaurice, MD, Professor of Pediatrics and Children's Mercy Chief Medical Information Officer, received notification the Patient-Centered Outcomes Research Institute (PCORI) had awarded almost \$7 million to support the Greater Plains Collaborative, led by Russ Waitman, PhD, at Kansas University Medical Center. The

Collaborative represents a new network of 10 leading medical centers in seven states committed to a shared vision of improving health care delivery through the use of medical informatics to drive the adoption of evidence-based practices. Dr. Fitzmaurice will lead this initiative at Children's Mercy, the only children's hospital included in the Greater Plains Collaborative.



Susan Abdel-Rahman, PharmD

Awards



FELLOWSHIP AWARD

Ryan Funk, PharmD, PhD

"Methotrexate Activity and Disposition in Synoviocytes Isolated from Patients with Juvenile Idiopathic Arthritis"

Sandhya Ramlogan, MBChB

"Validation of Echocardiographic Measurements of Ovine Ventricular Function and Volume in the Intra-Operative Milieu"

Jamie Rosterman, DO

"Randomized Crossover of Neurally Adjusted Ventilatory Assist in Infants"

Valentina Shakhnovich, MD

"PXR expression in Small Bowel Tissue of Pediatric Patients with CD"

Jonathan Wagner, DO

"Pharmacokinetics of Pravastatin and Simvastatin Pediatric Dyslipidemia Patients; Clinical Impact of Genetic Variation in Statin Disposition"

KATHARINE B. RICHARDSON AWARD

R. Scott Duncan, PhD

"Regulation of Toll-Like Receptor Signaling During CMV Exposure of Astrocytes"

MARION MERRELL DOW CLINICAL SCHOLARS AWARD

Jennifer Goldman, MD

"Variation of Bioactivation and Detoxification of Trimethoprim in Children"

Craig Freisen, MD

"The Effect of Obesity on the Pharmacokinetics of Pantoprazole in Children and Adolescents"

PAUL HENSON ENDOWMENT CLINICAL SCHOLAR AWARD

Christina Ciaccio, MD

"The Impact of Dietary Fatty Acids on the Development of Food Sensitization"

YOUNG INVESTIGATOR AWARDS IN CLINICAL/TRANSLATIONAL RESEARCH

Neil Mardis, DO

"Cartilage Damage Determined by 3Tesla MRI Analysis in a Pediatric Population with Acute ACL Injuries"

Stephani Stancil, MSN, APRN

"Evaluating the Effects of Nicotine and Ethinyl Estradiol on the Metabolism of Metronidazole"

KREAMER RESEARCH EXCELLENCE AWARD

Jason Newland, MD

"Implementation of Antimicrobial Stewardship Interventions in Children's Hospitals using Benchmarking"

RESEARCH DAYS AWARD

- **Category: PYG 4 and above (Fellow)**

Sunena Argo, MD (1st Place)

"The Use of Lymphocyte Transformation for the Diagnosis of Delayed Hypersensitivity Drug Reactions to Trimethoprim/Sulfamethoxazole"

Tara Federly, MD (2nd Place)

"Food Specific IgE Levels in Children Should be Interpreted in Context of Total IgE"

- **Category: PYG 1-3 (1-4 for Med/Peds) (Resident)**

Jill Hanson, MD (1st Place)

"Ambulatory Exhaled Nitric Oxide Measurement in Children 4-7 Years of Age"

Voytek Slowik, MD (2nd Place)

"Thyroid Cancer Complicating Familial Adenomatous Polyposis: Mutation Spectrum of At-Risk Individuals"

Philanthropy and Research

Philanthropy is in our DNA and will be the building block of our future.

Our dream is to be the place where families across the globe come when they need access to the most innovative diagnostic techniques and treatments in the world, and where local families receive ever more individualized treatment right in their own backyard. Research is the key to making this dream a reality.

Sustaining research of this caliber is truly a collaborative effort, including financial support from the hospital, funding from public sources, both state and national, and through the generous support of donors. With your support and that of other community partners, we have continued to elevate our institution, advance the quality of our service and improve the capabilities of our people.

The strategic initiatives outlined here provide the framework and focus for our existing vision – to be a national and international leader for advancing pediatric health and delivering optimal health outcomes through innovation. Philanthropic support will sustain our progress while driving the possibilities of tomorrow. Philanthropic support allows us to compete for and retain top talent, invest in state-of-the-art equipment and technology and build and create the research programs that lead to more efficient and more clinically effective health care, all while preserving the quality of care for which we are widely recognized.

Thank you for all you do to transform the lives of children!





Strategic Academic Initiatives

Under the leadership of Michael Artman, MD, and Steven Stites, MD, Children's Mercy and the University of Kansas Hospital, the University of Kansas Medical Center and The University of Kansas Physicians are working to develop a single, integrated pediatric program. The new program will allow our institutions to further enhance clinical care for children, advance pediatric academic development, expand our pediatric research initiatives, and enhance our advocacy activities on behalf of children in our region. This

activity was enhanced by the development of the Children's Mercy – University of Kansas School of Medicine Child Discovery Forum led by Gregory Kearns, PharmD, PhD and Ann Davis, PhD, MPH, ABPP. This forum brings together pediatric researchers from Children's Mercy, the University of Kansas, University of Missouri-Kansas City and the Kansas City University of Medicine and Biosciences to discuss critical topics in pediatric medicine such as medication adherence, obesity, drug development and genomic medicine.



Research Expenditures FY 2013 to 2014

	FY 13	FY 14
FEDERAL	\$6,642,439	\$6,743,379
INDUSTRY	\$1,474,109	\$2,412,877
FOUNDATION AND COMMUNITY SUPPORT	\$2,317,983	\$3,371,254
OTHER REVENUE	\$0	\$235,457
TOTAL EXTERNALLY FUNDED RESEARCH	\$10,434,531	\$12,762,968
CMH FUNDED RESEARCH	\$12,478,535	\$12,276,698
TOTAL CMH RESEARCH	\$22,913,066	\$25,039,666





**Research Development and
Clinical Investigation**

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Visit our website at childrensmercy.org/research
for a more in-depth look at our research pillars.

