

Mile High Research

Getting your blood pressure measured generally happens in a clinical setting at a doctor's office or a hospital. Doctors and nurses are trained to perform this routine task with equipment approved and designed for use in such commonplace settings. What if you're being transported from one location to another during a medical emergency and your blood pressure needs monitoring...and you just happen to be high above the ground in a fast-moving helicopter?

"Using equipment normally used in the hospital in an aircraft can make taking blood pressure problematic," says Dr. Michael Stroud of the Section of Pediatric Critical Care Medicine in the Department of Pediatrics. He explains, "The noise and motion of the helicopter and the vibration of rotors can interfere getting an accurate reading."

Dr. Stroud investigated the difficulties of blood pressure monitoring during pediatric transport during his pediatric critical care medicine fellowship at ACH. He continues this research by examining issues related to many types of medical intervention during transport of children, many who are critically ill or have experienced trauma. "We know early intervention improves the outcomes for these children," Dr. Stroud says, "but delivering ICU-level care during transport is not always the same as delivering it in the ICU." Dr. Stroud's research aims to improve monitoring techniques, protocols, and therapeutic interventions during pediatric transport to in turn improve early intervention.

Only 10% of emergency medical calls involve pediatric patients. One of these transport calls was for inter-facility transport of 3-year-old Jackson in July of 2006. Jackson had complications from a ruptured appendix and was in an adult intensive care unit at a northwest Arkansas medical center. "After 2 weeks," says his mother Amy, "he still had continuous infections and trouble with an IV." The decision was made to move Jackson for specialized care at the pediatric intensive care unit at Arkansas Children's Hospital.

The family allowed Jackson to participate in Dr. Stroud's blood pressure monitoring study during his hour-long flight by Angel One. Amy says her family understands the importance of research to children's health. "If I can help in any way, I feel part of the responsibility to go there," she adds. Jackson's stay at ACH was less than two weeks. With the help of a nurse at home, Jackson was able to start pre-school on time that fall.

With funds from the Children's University Medical Group, Dr. Stroud is continuing his research in the area of pediatric transport medicine. He is currently conducting a study of noninvasive measurement of tissue oxygenation during pediatric inter-facility. Monitoring tissue oxygenation, including cerebral oxygenation, is very important when caring for a child that is critically ill or experienced trauma. "You must ensure tissue oxygenation readings are correct," Dr. Stroud stresses, "otherwise you might as well not do them at all."

Dr. Stroud is using Near Infrared Spectroscopy (NIRS) to determine tissue oxygenation. NIRS technology reads the light reflected by tissue to determine the level of hemoglobin (the oxygen



Jackson's travels have included an Angel One flight during which he participated in a research study.

transporting substance in blood) in the targeted tissue. Dr. Stroud will determine if NIRS measurements change with altitude during transport to develop techniques to measure cerebral tissue oxygenation more accurately during flight.

"A more effective early intervention is important especially for children requiring transport," Dr. Stroud says, "and the result is they need fewer procedures at the hospital and they get out of the hospital faster." With the research of Dr. Stroud, ACHRI is dedicated to children's well-being whether it is on the ground or up in the sky.



Established in 1989, Arkansas Children's Hospital Research Institute provides an on-site research environment for faculty of the University of Arkansas for Medical Sciences working on the Arkansas Children's Hospital campus. Over 120 pediatric researchers with expertise and experience that span the breadth of medical disciplines comprise ACHRI's roster of investigators who work to fulfill its mission to improve children's health, development, and well-being through high quality research. For more information, visit <http://achri.archildrens.org>.