

Visit DOTmed at: Arab Health 2010, Jan. 25-29, Dubai, UAE, Booth #2A50

JANUARY 2010

DOTmedbusinessSM

Market Intelligence on New and Used Equipment & Parts from www.DOTmed.com

NEWS

CHILDREN'S HEALTH ISSUE

- X-ray Tube and Image Intensifiers
- Equipment for the Smallest Patients
- Children's Hospitals
- Medicated Generation
- RF Shielding

CHILDREN'S HOSPITALS



Making Way for New Research and Advanced Pediatric Medicine

A major illness is a scary enough proposition for an adult, but for a sick child who may be too young to fully understand what is happening, it can be especially hard. In this regard, children's hospitals serve several functions, including specialty medical center, research organization and supportive community for families in need. Here are some up-and-coming children's hospitals that excel in these areas, whether advancing disciplines like pediatric neurosurgery, racing for a cure for type 1 diabetes, gaining a greater understanding of autism, or by build-

ing idyllic sanctuaries that captivate the imaginations and calm the nerves of adults and children alike.

Castle of Care

Sanford Children's Hospital in Sioux Falls, S.D., is a freestanding pediatric center and "Castle of Care" that just opened its doors in early 2009. The facility takes its name from the hospital's architectural design and interior, which is all tailored to look like a medieval castle, complete with towers, thrones, tapestries and almost 4,000 square feet of murals depicting fairytale lands. There is also a large "fireplace" in the great

hall that creates the illusion of fire with child-safe water vapor diffused with red lighting. On every floor of this 5-story, 146-bed pediatric hospital is a different theme played out in the décor, from floor to ceiling and in murals in every child's room. Wards like "The land of Nez" and "The Enchanted Forest" promote a playful, non-threatening atmosphere that can mean a little less stress and potentially faster healing for patients.

"Over the last 20 years, we've talked about what we need to provide for the children in our community," says Jan Haugen-Rogers, vice president of Sanford Children's Hospital. "We knew it



By Kathy Mahdoubi

was a once-in-a-lifetime opportunity—a foundation for the future. We thought about our core services and what the future holds and we wanted to strategize and do it right the first time. Health, hope, healing and strength became the theme, and we thought, ‘What’s a building that is timeless from an architectural standpoint that would truly withstand all time – what about a castle?’”

A lot more than just design is happening at this hospital. About 65 percent of the patient population at Sanford Children’s is under age 5, with a slightly older age group receiving care in the state’s only dedicated oncology program. Also

under Sanford’s roof are both neonatal and pediatric intensive care units and a full radiology department, complete with hybrid PET/CT system. More than 60 physicians work in more than 20 pediatric subspecialties, ranging from orthopedic surgery to endocrinology and cardiology to genetics. Haugen-Rogers says there could even be some potential for proton therapy in the future.

The gift that keeps on giving

All this was made possible by donations from the community, including a generous \$16 million gift from Dennis “Denny” Sanford, a prominent businessman and philanthropist in the region. This gift pales in comparison to Sanford’s even more generous gift of \$400 million, which will fund a number of programs involved in the larger Sanford Health System. Sanford Health is the largest integrated health network in the area and home to several research programs, including the Sanford Project, which is all about finding a cure for type 1 diabetes – within the benefactor’s lifetime. This is Sanford Children’s flagship research program.

Ruth Krystopolski is vice president of growth and development for Sanford Health and has overseen this project since its inception. Sanford wanted his funding to go toward a cure, but it was up to a team of experts and researchers to determine the target and trajectory of the research.

“First we had to identify and select a disease focus, and we needed something that we could find a potential cure for within Mr. Sanford’s lifetime,” says Krystopolski.

Researchers looked at incidence rates and funding models and narrowed down disease processes and then wrote full white papers on all potential contenders. With diabetes mellitus presently affecting an estimated 500,000 to 1 million Americans, and with more children at risk of developing this disease than most other chronic illnesses, it stood out from all the rest as one of the most serious and potentially the most curable pediatric diseases. In June of 2008, it was announced by the expert advisory panel that type 1 diabetes would be the focus of the Project.

Now that the project is underway, the Sanford Children’s Hospital is recruiting leaders in diabetes research and is getting ready to move research operations into a separate 300,000 square foot facility early next spring.

“There is a lot of energy and time being spent doing background on experimental and translational research in both in vivo and clinical models and pharmacology,” says Krystopolski.

Dr. Paul Burn is one of those leading researchers heading up the Project. Burn is an M.D. and professor of pediatrics at the University of South Dakota Medical Center and is also senior vice president of research and development for the Juvenile Diabetes Foundation. His work with Sanford Children’s Hospital and the Sanford Project is focusing on the regeneration of beta cells — the cells involved in the production of insulin — as well as the immune response that triggers the disease.

“Sanford’s research into beta cell regeneration is just getting started,” says Dr. Burn. “Our hope is that we can take what we learn to the patients, because we feel like we have a unique opportunity to translate that to an underutilized and relatively stable patient population.”

Regeneration for the new generation

Type 1 diabetes is usually diagnosed in children from birth up to the first two decades of life. In this autoimmune disease, the immune systems of diabetes patients mistake pancreatic beta cells as a foreign threat, and begin destroying those cells. If all the beta cells are destroyed, the body is no longer able to produce insulin to regulate blood sugar levels.

“Injecting insulin is not really a cure for the disease,” says Burn. “You are just replacing what the body can no longer provide for itself. If you want to interfere with that disease process you have to moderate the immune system so that the immune system no longer attacks those beta cells.”

Dr. Burn and his growing team of researchers are getting a jump-start on the Project—and the cure—by researching a novel pharmaceutical approach to beta cell regeneration using the pill-form of already FDA-cleared

drugs, namely a protein called GOP-1 and gastrin, both of which are currently used for other indications.

“Those two drugs have been shown to endogenously elevate two factors that are responsible for regenerating beta cells and may be having an effect on the immune system, as well,” says Dr. Burn.

In March of 2010, Sanford Children’s will prepare the investigational new drug and apply with the FDA to begin clinical trials. If successful, Sanford Children’s could be on the fast track to a cure. If all goes well, the treatment might one day also be applied to type 2 diabetes sufferers.

“That is our big hope at the present time,” says Dr. Burn. “Because we are using already-approved drugs, should our trial be successful, physicians could immediately start using those drugs to treat patients, whereas it can take 15 years and \$1 billion to go through the entire drug development process. We should be in position to give the whole field a jump-start.”

The first trial is modest, including about 56 patients who will be given a combination of those two drugs or a placebo for one year. These young patients are coming into the trial newly diagnosed and fresh out of the doctor’s office. This is what Krystopolski refers to as research that goes “from bench to bedside” and can be seen in real patient results. These children have most likely already lost 90 percent of their beta cells, but are still at an optimal stage for beta cell regeneration. Burn says that it may be more difficult for adults to regenerate the cells or moderate the immune system with the same success. The results of the first trial will be analyzed and evaluated and should be presented by the end of the second year.

Guiding pediatric neurosurgery

At the Montreal Children’s Hospital at the McGill University Health Center in Canada, some new technology is taking this 105-year-old children’s hospital to new heights. The institution has already built a name with its work in genetic diseases, cardiology and pediatric surgery, but it is now carving out a space for image-guided pediatric neurosurgery.

The pediatric in-patient rooms at Sanford Children’s Hospital incorporate the castle theme along with art by regional artists.



Dr. Jean-Pierre Farmer is chief of the newly created Department of Pediatric Surgery at the hospital and has overseen the recent overhaul of the hospital’s OR to make room for some very advanced technology: a new Philips Achieva 3.0T X-series MRI system combined with BrainLAB’s BrainSUITE iMRI intraoperative platform. With the high-field MRI scanner, digital intraoperative navigation system and custom OR components, neurosurgeons at Montreal Children’s are able to conduct image-guided neurosurgery with cutting-edge precision. The new MR/OR is already in operation and is being used predominately for brain tumor resection and surgical treatment for epilepsy.

Since the early 1990s, neurosurgeons have been performing various forms of image-guided neurosurgery. Usually brain scans are taken the night before or sometime prior to surgery and those scans are used to map out the surgical plan, but “occasional retraction and brain shifts” can happen during the operation, requiring reevaluation.

“That is the reason for introducing intraoperative MRI—to be able to update the system when you critically need it,” says Dr. Farmer. “The accuracy is very, very good. If you have been able to do functional MRI fiber tracking on the patient before, you are able to fuse images with this new information and update your scan.”

Dr. Farmer says Intraoperative MRI is also great with ear, nose and throat surgeries and orthopedic surgeries, and can be particularly helpful in spinal cord surgeries, assuring that surgeons are not dissecting too much or too little of this critical anatomy. The use of MR is also picking up for pediatric facilities, as frequent use of CT may be too risky for this patient population.

“There is now a trend in pediatrics for using MR rather than CT,” says Farmer. “There is some concern about cumulative radiation dose from repeated CT scans.”

Montreal Children’s is the first hospital in Canada and the first pediatric hospital to bring a 3T magnet into the OR. To complete the set-up, the OR was brought into the radiology department, where sliding doors connect the MR system to the OR and the iMRI docking table serves as both an OR surgical table and MRI couch. The whole interlocking system maintains sterile conditions fit for surgery.

The high-field MRI is multipurpose. When not in use during surgery, the Achieva is being used by researchers studying autism and cerebral palsy.

Farmer says that the new image-guided neurosurgery system is just a sign of what’s to come. That’s not the only developing news for the future though. The children’s hospital is going to be moving into new a home within four years’ time.

“This project is a glimpse into the future,” says Dr. Farmer. “About 70 percent of this will be moved into the new facility.”

The new location will help the hospital build a bridge with the McGill University Health Center to better utilize the resources there. Upon completion, Montreal Children’s will gain access to a new cancer pavilion and radiation oncology department, as well as a women’s health pavilion, where babies can be delivered on site.

America’s next top pediatric research hospital

Children’s Healthcare of Atlanta is also moving up in the area of pediatric research. The Atlanta, GA-based institu-

tion has been working to enhance its research for several years and has built a strategic enterprise of researchers from collaborating institutions, including nearby Emory University and Georgia Institute of Technology.

brand new research building, and \$5 million of that will be going to develop Children’s Marcus Autism Center.”

Children’s already has the Aflac Cancer Center (yes, sponsored by the insurance provider Aflac), but will also be focusing on the development of seven new research centers—in immunology and vaccines, transplant immunology, engineering and translational research, cystic fibrosis, developmental lung biology, cardiovascular biology and endothelial cell biology. In addition to grants from the community, Children’s has also received \$12 million from the National Institutes of Health to drive the hospital’s next generation of research.

“We have a plan to become a top-ten research institute by 2018,” says

Spearman. “This funding will really enable us to be able to do that. We already have a number of research strengths and will be reorganizing our pediatric focus areas. It’s a very exciting time.”

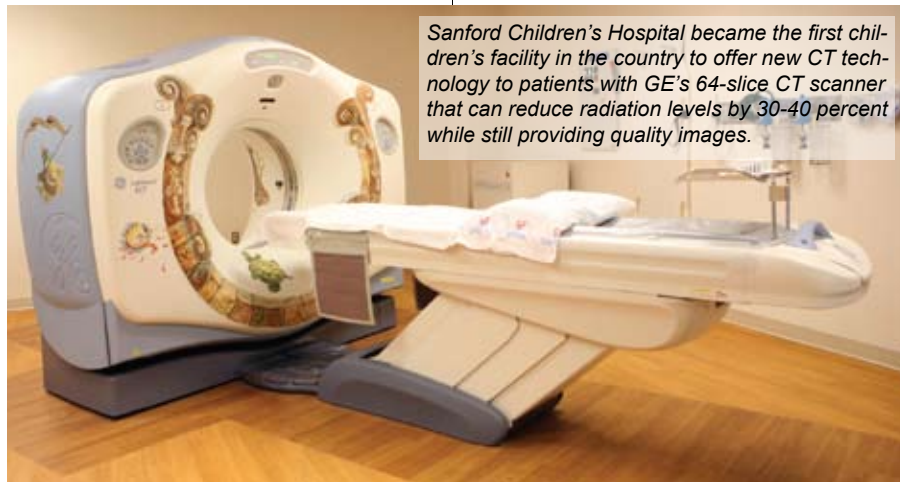
The Marcus Autism Center is also being staged for future research. “That element is still at an early stage, but we have a very, very strong commitment,” says Spearman. “We know that the incidence of autism is increasing. The Center will be a place to learn more about autism and what causes it.”

Additional research centers will be focusing on pediatric neurosciences, and clinical and translational research, and other organizations, like the Center for Drug Discovery and Outcomes and Wellness Research Center, will be sure to take Children’s to the next level as a competitive pediatric institution.

Into the future

The Sanford Children’s Hospital, Montreal Children’s Hospital and Children’s Healthcare of Atlanta all represent a new wave in pediatric facilities, from design and function to research and treatment. Innovative architecture, advanced technology and a commitment to exploring and finding new ways to treat—and cure—pediatric disease is what it’s all about.

● **Online:** dotmed.com/dm11078



Sanford Children’s Hospital became the first children’s facility in the country to offer new CT technology to patients with GE’s 64-slice CT scanner that can reduce radiation levels by 30-40 percent while still providing quality images.



Dr. Paul Burn, Chair/Director of the Sanford Project, works in his lab at Sanford Research/USD in Sioux Falls, SD.