Small Patients, Big Technology: Leading Children’s Hospitals Are Transforming Pediatric Care with Telemedicine

This is Part III of a three-part series on telemedicine in care delivery. For more on telemedicine, see the May and June issues of Industry Edge.

By Audrey Doyle

Children’s health problems—from autism and depression to chronic illnesses and life-threatening diseases—are on the rise in the United States. And so is the number of pediatric hospitals and health systems that are turning to telemedicine to help diagnose, treat and monitor these issues.

Through telemedicine, these facilities are extending the reach of their expertise into other hospitals, specialty clinics and the homes of patients in their communities and beyond. In doing so, they’re facilitating access to safe, high-quality care, filling physician shortages, enhancing collaboration among clinicians—and greatly improving the pediatric patient experience in the process.

Three key factors are converging to make pediatrics a healthy market for telemedicine. First, the child population is growing. According to the U.S. Census Bureau, in 2014 there were 73.6 million children age 0 to 17 in the United States; that figure is expected to reach 74.1 million by 2020 and nearly 80 million by 2050. Second, the number of pediatric medical and surgical specialists and subspecialists is continuing to drop; and third, the number of primary care pediatricians approaching retirement age is continuing to rise, according to the American Academy of Pediatrics (AAP). As a result, experts say, the demand for pediatric physicians and specialists far outstrips the supply, and will continue to do so for the foreseeable future.

This demand is creating an opportunity for pediatric hospitals and health systems to utilize telemedicine to address the multifaceted health care requirements of children. Some programs today fill a need for specialist consultations, newborn health screenings, ongoing remote monitoring of health status and progress, and follow-up appointments. Others cater to children with behavioral, emotional and mental health issues. Here we take a look at how the telemedicine programs and services available at two leading children’s hospitals are transforming the practice of pediatrics by helping to provide children with high-quality, coordinated care that is patient- and family-centered, easily accessible and delivered in a timely manner.

Boston Children’s Hospital Focuses on Consultations, Patient Care

Improving the patient experience through telemedicine is a goal of Boston Children’s Hospital (BCH), which has a broad portfolio of telemedicine initiatives.

One of these is hospital-to-hospital consultations. Through its TeleConnect and TeleConsult programs, BCH shares its pediatric expertise with clinicians in emergency rooms and inpatient settings at three community hospitals in Massachusetts. The programs are part of the Comprehensive Pediatric Acute Care Telemedicine (ComPACT) Network, which BCH developed in 2012 through partnerships with the Departments of Medicine, Anesthesia and Critical Care at BCH and at the community hospitals.
Through these programs, clinicians in the community hospitals use real-time, secure, high-definition videoconferencing technology to receive consultations and diagnoses on a variety of health conditions from BCH specialists, who interact with the clinicians via an iPad, laptop or dedicated telemedicine workstation located on the intensive care unit (ICU) floor.

Typically, the specialists are asked to assist in critical ICU or emergency situations. As an example, Jean Mixer, Vice President of Strategy and Vice President of Digital Health at BCH, recounted a case in which clinicians at South Shore Hospital in South Weymouth, Mass., contacted BCH for assistance with a toddler who had arrived in their ER in severe respiratory distress. The child had aspirated several bits of a pretzel into his lungs, and the pretzel bits needed to be removed by a pediatric surgeon or cardiothoracic surgeon using a special bronchoscope that wasn’t available at the community hospital.

Because this occurred during a snowstorm, transporting the child immediately to BCH wasn’t feasible. Therefore, the local emergency team, which included BCH-trained physicians, had to manage the child’s ventilation with the remote support of BCH’s critical care physicians for several hours until a medical transport crew arrived.

After the child’s airway was secured and a breathing tube was inserted, the emergency team connected with BCH ICU specialists through TeleConnect. According to Mixer, the specialists could see the child, see the patient monitors and advise the team on how to adjust ventilator settings in real time so that they could stabilize the child while they waited for the transport crew. “The clinicians who worked on this case believe the child wouldn’t have survived to lead a healthy life if we hadn’t been able to provide this support,” Mixer said.

According to Dr. Mark Waltzman, Chief of Pediatrics at South Shore Hospital, the direct link that TeleConnect provided between the hospital’s ER and BCH’s pediatric ICU allowed for improved assessment of the child over traditional telephone-only communication. “For critically ill patients, the result is a safer transition from the community to subspecialty care, improved outcomes and a decrease in overall medical costs,” he added.

Another consultation program at BCH is Tele-ROP. Babies born at or before 30 weeks gestation or weighing 3.3 lbs. or less must be screened for retinopathy of prematurity (ROP), a main cause of blindness that can be treated with laser therapy or medication if diagnosed early enough. Due to a shortage of available ophthalmologists, Massachusetts hospitals often ask BCH specialists to perform ROP screenings, but even for nearby hospitals, the screenings can take the specialists at least half a day to perform due to travel time and scheduling issues.

With Tele-ROP, the test is performed by a nurse in the community hospital’s neonatal ICU (NICU). After numbing and dilating the baby’s eyes with special drops, the nurse places the tip of a digital wand camera on the eyes and takes a video of the retinas. The nurse reviews the video and saves images that are transmitted to a secure server and accessed by BCH specialists to determine whether the baby is developing ROP. If so, the baby is transferred to BCH’s NICU or to a NICU staffed by BCH-affiliated specialists for further evaluation and treatment.

The Tele-ROP program provides numerous benefits. The baby doesn’t have to endure the extreme discomfort of a manual exam, which involves opening the eyes with a speculum and moving the eyes with a probe. Instead of being transferred to BCH for the screening, the baby remains at the community hospital, which allows the family to be close to the baby. The specialists can diagnose more cases in less time and remotely track each baby’s progress through screenings done at least weekly while the baby is in the NICU. And the local hospitals are able to retain their NICU status and services.

Furthermore, said Dr. David Hunter, Ophthalmologist-in-Chief and Richard M. Robb Chair at BCH, with traditional manual exams only the ophthalmologist can see the pathology. “With telemedicine, everyone can see the images, so we have better documentation of the exam and the entire care team can be involved in following the baby’s eye condition. It has been a great experience being able to offer this win-win solution to so many families.”

In addition to providing consultations for patients at community hospitals, BCH has made great strides in the use of telemedicine to deliver care to its own patients. For instance, the hospital’s CAPE (Critical Care, Anesthesia, Perioperative Extension & Home Ventilation) Program helps children on ventilators receive as much care at home as possible and avoid hospital and ICU admissions. To do this, the CAPE team makes several hundred home visits per year to children throughout New England who have diseases that make them dependent on chronic mechanical ventilation, such as cystic fibrosis, muscular dystrophy or pulmonary fibrosis.

As an adjunct to this care, the team uses Web-based, high-definition videoconferencing to securely meet with families and children in between scheduled visits. This enables them to provide more targeted advice and address any immediate health issues while increasing efficiency and productivity.
It also allows them to intervene in emergency situations. "Usually if a home-ventilated child goes into distress, the child will have to be transported to their local ER, which could be followed by a stay in the ICU," said Mixer. Through telemedicine, the CAPE team can remotely assess the child's condition and advise an on-site respiratory therapist on making appropriate ventilator adjustments to stabilize the child. "This dramatically reduces stress on the child and the family," Mixer said.

Thus far, results of this program have been promising: "Early data suggest that the use of telemedicine has avoided acute interventions such as ER or in-patient admissions in about 10% of virtual encounters," said Mixer.

In another example of delivering care to patients at home, staff in BCH’s Neurology Department and Brain Injury Center use telemedicine to provide home-based follow-up care and education to children diagnosed with a concussion. Using a computer or tablet with Internet access and a Web camera, the parents and child participate in the visit with a member of the care team, completing longitudinal cognitive evaluations or engaging in educational activities. This reduces the need to travel back and forth for clinic visits, which in the days and weeks after a concussion can increase the patient’s cognitive stimulation and worsen symptoms.

In addition to consultations and patient care, BCH uses telemedicine to advance child health by supporting other clinicians around the world in a number of ways. For example, its Online Second Opinion Program enables clinicians and families of children diagnosed with a rare disease—a complex congenital or cardiac condition, genetically related condition or neurological problem, for instance—to receive a second opinion on the diagnosis or treatment plan from BCH’s specialists. The child’s medical records are collected and matched with the appropriate BCH physician to review the case, diagnosis and treatment options.

Another innovative program launched by BCH is OPENPediatrics™, an open learning and global health platform developed by BCH in collaboration with many other pediatric contributors. With OPENPediatrics, doctors and nurses around the world can talk to one another, share ideas and collaborate to build a community focused on the care of critically ill children; acquire advanced training in various subspecialties; and access relevant tools, videos and summaries.

According to Mixer, clinicians embrace the use of telemedicine at BCH. "We recently surveyed our clinicians and our primary care network clinicians, and the vast majority indicated they want to have the ability to use telemedicine," she said. BCH also ran focus groups with its more complex patients and families, and when they were asked what percentage of their appointments they wanted to conduct remotely through virtual visits, their survey responses ranged from 20% to 50% on average.

“To us, this shows a strong appetite to engage on a remote basis when clinically appropriate,” Mixer said, adding that telemedicine “can work well when the child already has a treatment plan in place, BCH is already providing care, and follow-up visits are required for monitoring the child’s condition.”

As an example of a clinically appropriate use, Mixer mentioned a child in one of the patient focus groups whose chronic gastrointestinal issues require multiple appointments per year with his clinicians. Through virtual visits via his laptop, the child attends some of these appointments without having to leave school. “Children with chronic or complex disease can have up to 30 appointments per year, and telemedicine can reduce the treatment burden on the family and the child,” said Mixer. “It’s a way of interacting with the health care system that’s much more integrated into the child’s life.”

**Akron Children’s Hospital Targets Mental and Behavioral Health, Abuse**

Like BCH, Akron Children’s Hospital also is utilizing telemedicine to address the health care needs of its patients. Operational since 2012, the Center for Telehealth Service Design, part of Akron Children’s Center for Patient Experience Innovation, conducts research studies and pilots and uses the resultant data to define and launch telemedicine programs designed to improve quality, access and the patient experience.

Among the programs offered at Akron Children’s are Telepsychiatry and Tele-Evaluation of Child Abuse. Telepsychiatry provides psychiatric services to children with issues such as depression, ADHD and anxiety. Tele-Evaluation of Child Abuse is coordinated through the hospital’s Children At Risk Evaluation (CARE) Center, which provides a quiet, structured atmosphere in which to better evaluate and initiate treatment for children of suspected abuse or neglect. Both programs are funded through grants from local foundations dedicated to improving access to health care for children who need these particular services. And both come at a time when the number of children requiring this care is far greater than the number of pediatric specialists qualified to provide it.
This lack of pediatric specialists is creating a barrier to care not just in Ohio, but throughout the nation. In fact, the American Academy of Child & Adolescent Psychiatry stated earlier this year that there are approximately 8,300 practicing child and adolescent psychiatrists in the United States—and more than 15 million children and adolescents in need of their expertise. Compounding the situation is the fact that behavioral and emotional problems aren't always identified or treated properly:

As of January 2015, 11% to 20% of children suffered from a diagnosed mental or behavioral disorder, yet it was estimated that only one in eight received treatment, according to the AAP.

Statistics on child abuse and neglect are equally troublesome. According to the AAP, approximately 3 million cases of child abuse and neglect involving almost 5.5 million children are reported each year. And according to the U.S. Department of Health & Human Services, there were an estimated 679,000 substantiated cases of child abuse or neglect in the United States in 2013, including 1,520 deaths.

But as with mental health issues, identifying a victim of child abuse or neglect can be difficult: Often, a parent will bring their child to their local hospital, pediatrician or clinic, which may lack caregivers who specialize in identifying signs of abuse or neglect, resulting in inaccurate diagnoses. “This is why it’s crucial that a diagnosis be made by a child abuse pediatrician,” said Tia Buzzard, telehealth program manager at Akron Children’s. “And there's a very small number of child abuse pediatricians in this area.”

Telepsychiatry and Tele-Evaluation of Child Abuse aim to ameliorate these problems by using secure videoconferencing equipment to connect children in their local pediatrician’s office to pediatric psychiatrists and child abuse pediatricians at Akron Children’s. This, said Buzzard, greatly improves the patient experience by facilitating access to these specialists.

For example, some families live nearly 75 miles from Akron, while others live relatively close by, but don’t have reliable transportation or would have to take several forms of public transportation, with other children in tow, to see one of these specialists, making even a five-mile trip challenging. “It’s impossible to staff every community with the specialists our patients need, so we bring these services to them through telemedicine,” Buzzard said. “The more we can do in their local community, the better it is for the patient experience.”

Of course, access isn’t always associated with proximity; some families prefer to keep their need for these services private. “Because the service is provided from their pediatrician’s office,” said Buzzard, “they don’t have to worry that a neighbor or friend will see them walking into a psychiatrist's office or child abuse care center,” which can deter parents and patients, particularly adolescents and young adults requiring psychiatry, from receiving care.

The two pediatric group practices participating in the Telepsychiatry program have a telemedicine cart consisting of a high-definition monitor, codec, microphone and speaker, and pan-tilt-zoom camera. A nurse in the pediatrician’s office documents clinical data in the child’s electronic health record (EHR), activates the equipment, introduces the child to the psychiatrist and leaves the room; the parents can stay in the room if the situation warrants it. The psychiatrist connects with the child through a hospital laptop and has full control of the camera in order to maintain visual contact with the child. In addition, the psychiatrist has real-time access to the child’s EHR in order to document the visit.

The telemedicine cart at the pediatric group practice participating in the Tele-Evaluation of Child Abuse service has the same equipment, plus an additional camera that’s used during the physical exam. A nurse at the pediatrician’s office conducts the exam, guided by the child abuse pediatrician, who witnesses the exam in real time through a hospital laptop. From this exam, the child abuse pediatrician can assess whether abuse occurred. If the exam reveals something that warrants further evaluation, the child is referred to Akron Children’s for treatment. The exams are recorded, and the footage can be used in court should criminal charges arise.

In addition to these programs, Akron Children’s Family Child Learning Center (FCLC) offers two tele-early intervention programs: Tele-EI and Tele-CONNECTIONS, both of which use videoconferencing through a standard Internet connection to allow families of children with Autism Spectrum Disorder (ASD) or similar social-communication disorders to receive early intervention services in their homes.

According to Akron Children’s, the number of children under age 3 being diagnosed with ASD is increasing in Ohio, creating a shortage of evidence-based early intervention services, especially those that are close to home. Available in 11 counties across the state, these programs—originally funded by a federal grant and now supported through state agency and local foundation dollars-enable the family to remain at home with their child and have a virtual meeting with an early intervention service provider from FCLC, who observes the child and provides feedback and strategies to the family for working on behavior concerns and building interaction between the child and others. The family receives a secure link to an encrypted recording of the session so that the parent who was present can review the strategies and a caregiver/parent who wasn’t present can watch the session at a later date.
In informal surveys conducted by Akron Children’s, Buzzard said the children and their families have been “overwhelmingly positive” in their responses to questions about the delivery of these four services through telemedicine, stating that the experience is so natural they “forget the doctor is on the screen and not in the room with them.”

Of Telepsychiatry in particular, Buzzard said the remote connection made the sessions less intimidating for the children, and that the children appeared comfortable with the technology, most likely through their experiences with FaceTime and Skype, and didn’t see it as impersonal. “In fact, parents have told us their child disclosed information to the psychiatrist that they may not have done in person, or that it would have taken them longer to feel comfortable with the psychiatrist had the appointment been in person,” she said.

A high comfort level among the children receiving Akron Children’s telemedicine services is important, especially those participating in the tele-early intervention programs. Children on the autism spectrum tend to respond poorly to changes in their routine and to unfamiliar surroundings; an office visit can be so stressful for a child with ASD that it alters the way the child behaves during the appointment.

Replacing office visits with virtual visits allows the early intervention service provider to see the child in their home—the environment in which they’re typically most comfortable—which makes the appointment far less stressful and gives the service provider an accurate picture of the child’s typical behavior. “Because the child feels more comfortable, we can make more progress with the family,” Buzzard said, and added that an analysis of pre-post family ratings of their own knowledge and skills demonstrated significant positive changes ($p < .001$) as a result of tele-early intervention, similar to changes seen in families who had received face-to-face early intervention.

A Growing Force in Pediatric Health Care

Although telemedicine has made great progress in pediatrics, reimbursement policies have not kept pace. As a result, funding for BCH’s programs tends to come from philanthropy, research grants and select reimbursement from payers for specific services or select pilots, and funding for Akron Children’s programs comes from grants and foundations initially and from Akron Children’s over the long term.

Funding issues notwithstanding, telemedicine is proving to be a viable way to deliver safe, high-quality care to children. “Akron Children’s approached telemedicine as a way to improve the patient experience by making it easier for patients and families to access care,” said Buzzard. “By minimizing access issues, patients and families feel more comfortable receiving the care they need.”

“BCH’s mission is to improve child health, and telemedicine is a way for us to do that,” concluded Mixer. “We see telemedicine as transformational in pediatric health care. When provided in coordination with in-person care, it allows the flexibility to provide the right care, at the right time, in the right place, to best meet the needs of patients and their families.”