

Baylor
College of
Medicine



Baylor College
of Medicine
Department of
Pediatrics

2017 Annual Report

Baylor College of Medicine Department of Pediatrics 2017 Annual Report

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College of
Medicine



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Dear Colleagues,

By any measure, Baylor College of Medicine's Department of Pediatrics and Texas Children's Hospital are flourishing. The department, with more than 1,200 faculty members, and the hospital, with 745 licensed beds, are the largest in pediatrics in the United States. Clinical activity set all-time volume records in 2017, and the quality, safety and accessibility of the care we deliver are better than ever before. In mid-2018, we will be opening our brand new 640,000-square-foot, \$575 million critical care tower and heart center, one of the most advanced pediatrics facilities in the world.



Our training programs in pediatrics and every recognized pediatric subspecialty are among the largest, best and most competitive in the U.S. At a time when a dwindling number of young pediatricians are electing to pursue subspecialty training, and half or more of all programs nationally fail to fill their training slots, we filled every available position in every single one of our subspecialty training programs, an insurance policy on behalf of children not yet born who will need us 10, 15 and 20 years from now.

Extramural research funding hit an all-time high of \$117.8 million in 2017 (\$77.5 million from the U.S. and state governments). With that funding, our scientists are helping to drive innovation in the care and treatment of some of the most serious medical conditions children and families can face.

Our reach is greater than ever before. The Baylor International Pediatric AIDS Initiative at Texas Children's Hospital (BIPAI) now provides HIV/AIDS care and treatment to about 350,000 children and families across sub-Saharan Africa and in Romania, more than are in care with any other organization worldwide. Building on BIPAI's infrastructure and health professional capacity, Texas Children's Cancer Center has established pediatric cancer and hematology programs in Botswana, Uganda, Malawi and Angola, with more to come. International clinical, educational and research programs with the potential to impact millions of the world's poorest and least fortunate children have been initiated across the Department of Pediatrics. And proving that global health is both there and here, our footprint across Houston and the State of Texas is larger than ever before.

During devastating flooding from Hurricane Harvey, everyone at Texas Children's pulled together to continue providing the highest quality care for our patients and their families, while also supporting each other. I am tremendously proud of the dedication, resourcefulness and outstanding performance exhibited by faculty, staff and residents.

About the only thing around here that will never change is our commitment to the culture of Texas Children's. This year, we are recommitting ourselves to inclusivity, diversity, dignity and respect in all of our interactions with patients, families and each other. It's these values that we were founded on more than 60 years ago and that continue to be the secret of our success!

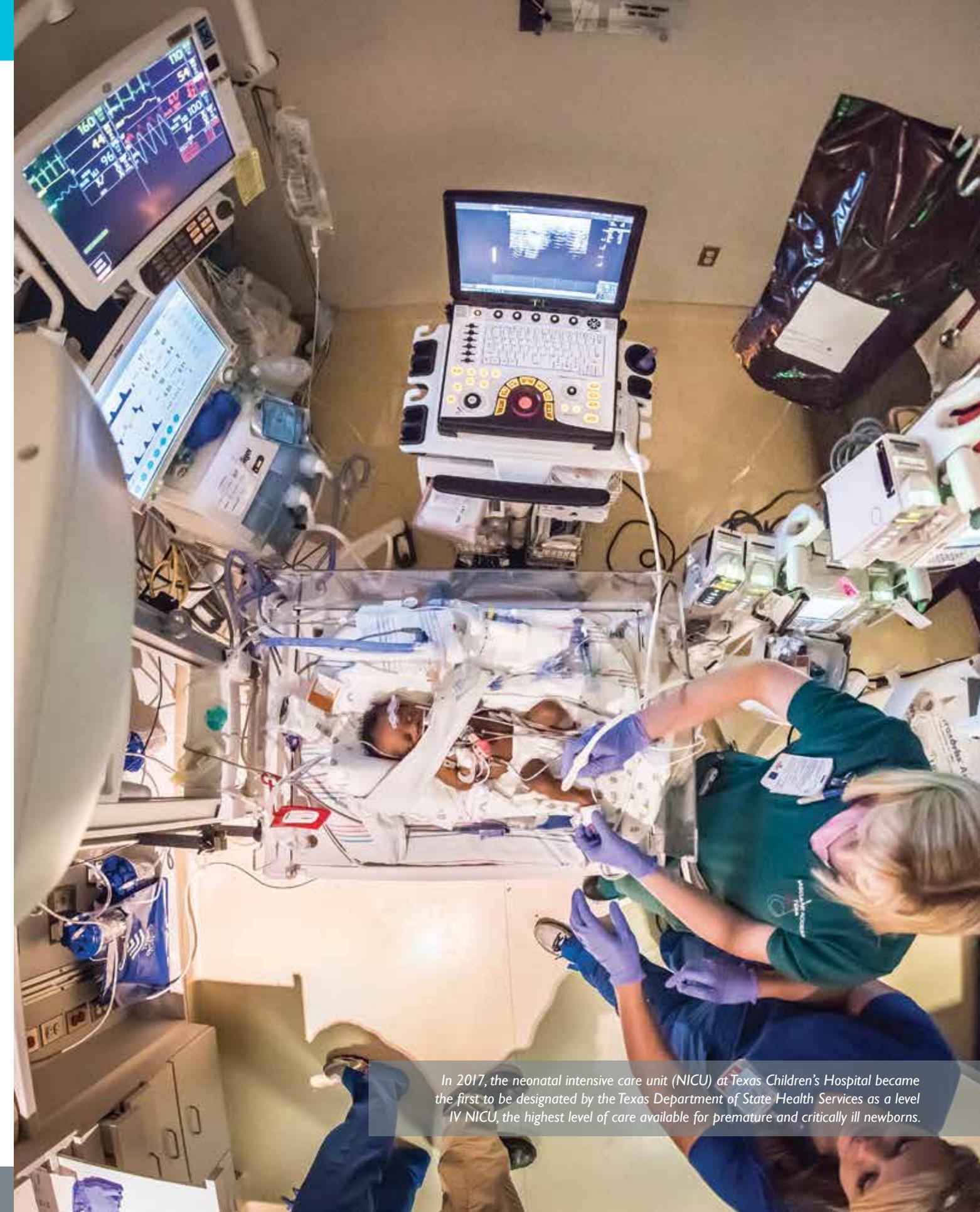
With best wishes,

Mark W. Kline

Mark W. Kline, MD

Physician-in-Chief
Texas Children's Hospital

J.S. Abercrombie Professor and Chairman
Ralph D. Feigin Chair
Department of Pediatrics
Baylor College of Medicine

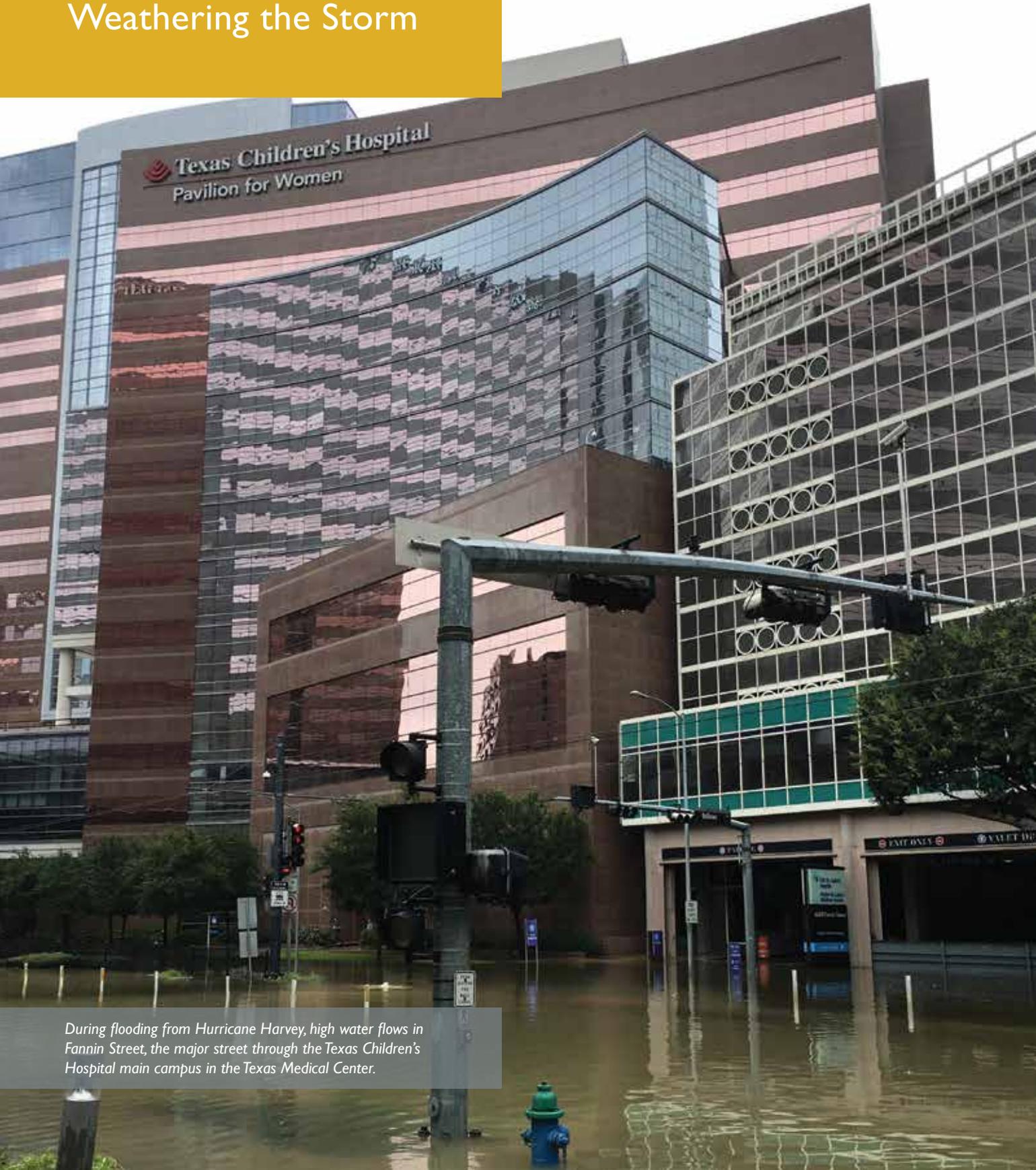


In 2017, the neonatal intensive care unit (NICU) at Texas Children's Hospital became the first to be designated by the Texas Department of State Health Services as a level IV NICU, the highest level of care available for premature and critically ill newborns.

Patient Care



Weathering the Storm



During flooding from Hurricane Harvey, high water flows in Fannin Street, the major street through the Texas Children's Hospital main campus in the Texas Medical Center.

Hospital writing the book on disaster preparedness

How do you cope with what the National Hurricane Center calls the most significant tropical cyclone rainfall event in U.S. history?

Beginning Saturday night, Aug. 26, 2017, Hurricane Harvey dumped more than 50 inches of rain while it lingered over the Houston area for several days. That's about as much rain as the metropolitan region normally receives in a year. It's about the height of an 8-year-old child.

"We obviously have our fair share of hurricanes in the greater Houston area," said Brent Kaziny, MD, assistant professor of pediatric emergency medicine at Baylor College of Medicine and physician lead of the Emergency Management Committee at Texas Children's Hospital. "It's something that we have a number of policies and plans in place for dealing with, and we drill annually at a high level across the entire system."

Clearly, the preparations were worth it. Through an all-hands-on-deck effort, Texas Children's Hospital successfully weathered the unprecedented catastrophe that was Harvey.

Preparation far in advance

The Emergency Management Committee meets monthly to plan for any types of hazards, from Ebola virus to terrorist acts. The members include leaders from Nursing, Facilities, Operations and other hospital administrators. After Kaziny was recruited in 2012, he became the first physician lead on the committee.

"In the past, there were plans in place, but they varied greatly among clinical sections. Three to four years ago, during Texas Children's high-level administrative drills, we started formalizing our approach to the clinical sections and asking section heads about physician staffing needs during an emergency. In addition, we gave presentations to the chiefs about what Emergency Management does and what our expectations would be to continue operations during these types of events," Kaziny said.

"Everybody on the administrative side of Texas Children's is really committed to being prepared. I can't speak highly enough about the leadership of Texas Children's."
– Brent Kaziny, MD

Just before

The week prior to Hurricane Harvey, the Emergency Management Committee set up a command center, where they discussed plans regarding the hurricane and how it would affect Houston and Texas Children's. Meanwhile, staff members were distributing extra supplies.

"Friday morning we made the decision that Saturday morning the teams should be in place to ride out the storm," Kaziny said.

Accomplishments

Timing was a challenging question.

"When do you have everybody come in and shelter in place in the facility? If you do it too early, you've got people just sitting around waiting. If you do it too late, maybe people won't be able to get in because their homes are flooded and the roads

are impassable. There was much uncertainty surrounding Harvey. At Texas Children's, I think we did a phenomenal job of guessing the right time to switch into emergency mode."

Another accomplishment was completing a swap of physicians from the initial ride-out team to the relief team during a break in the rain and flooding on Monday.

Communication with all personnel during and after the storm was very effective. Throughout the Texas Children's Hospital System, everyone worked together to check on the safety of co-workers at home and to identify safe routes to the various campuses.

First for hospital system

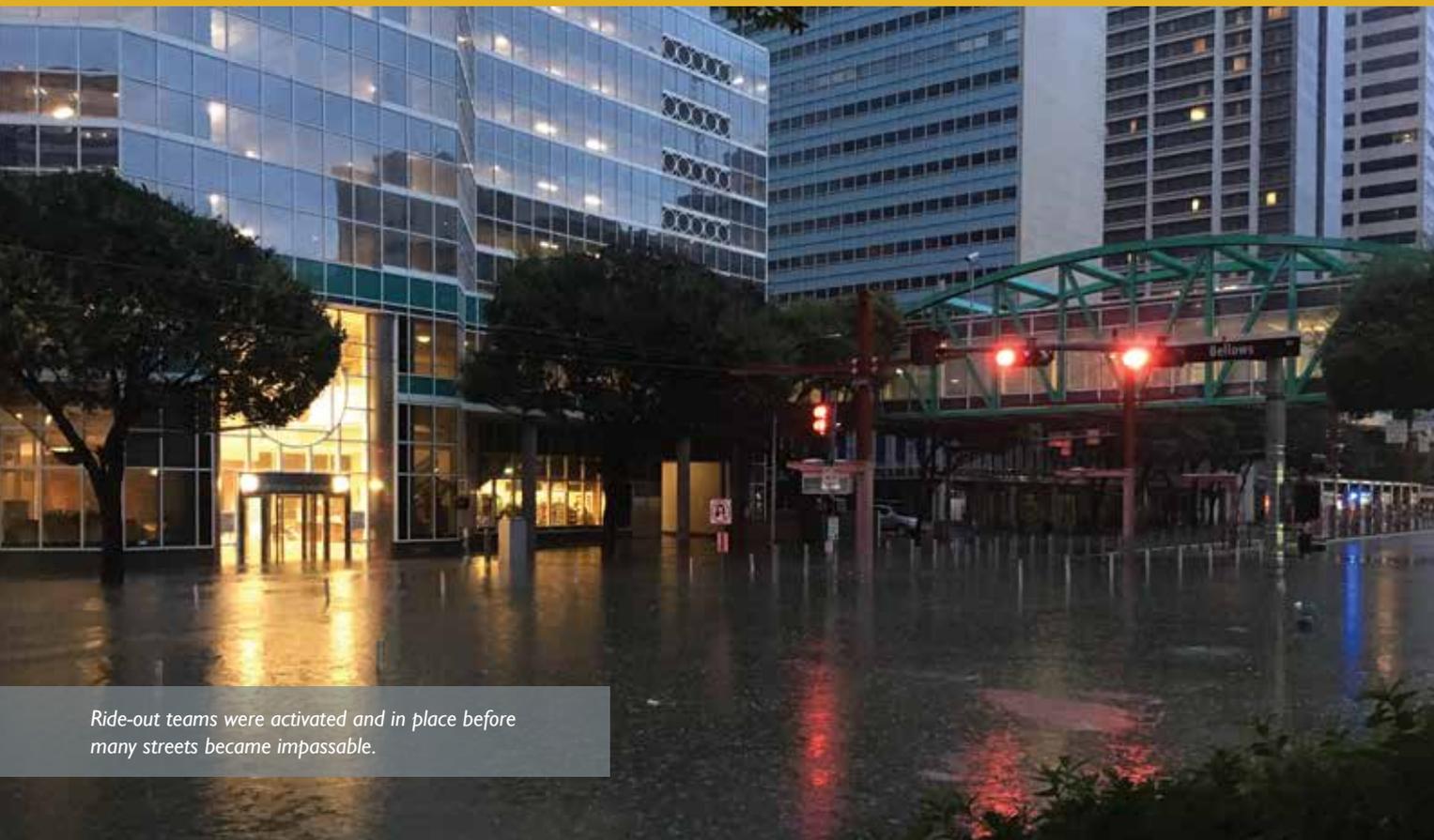
This was the first large-scale weather event for the Texas Children's Hospital System since the opening of hospitals in West Houston and The Woodlands.

The command center at the main campus had check-ins multiple times a day with all the groups within the entire system. Flooding was minimal at all the locations, and the needed supplies were in place.

Leaders with foresight

"I think it all starts with disaster preparedness. Everybody on the administrative side of Texas Children's is really committed to being prepared. I can't speak highly enough about the leadership of Texas Children's," Kaziny said.

He recalled that in 2001 during Tropical Storm Allison, most of the hospitals in the Texas Medical Center had to evacuate due to severe flooding and couldn't resume normal



Ride-out teams were activated and in place before many streets became impassable.

operations for six to nine months. Texas Children's Hospital was open and operational the entire time because the administration had the foresight to install five basement-level flood doors about six months to a year before Tropical Storm Allison.

"Texas Children's was really on the cutting edge of things," he said.

The flood doors worked so well during Allison that Texas Children's installed additional ones afterward, while other hospitals in the Texas Medical Center began installing this protection for the first time.

Commitment to patients

"We are focused on being prepared during these events because we are

committed to our patient population. We recognize you have to go very far away to find another hospital that can deliver the care to the number of patients with the high degree of complexity that we care for. It could easily overwhelm the rest of the children's hospitals in Texas if something happened to us that meant we were unable to function on a normal basis," Kaziny said.

Texas Children's provided guidance, education and assistance in preparing families of children with chronic medical issues. For example, the coordinator for heart patients with left-ventricular assist devices contacted parents in advance to be sure they had backup batteries and generators.

Stand-down

By Thursday, Aug. 31, inpatient operations were back to normal; 27 of 31 Texas Children's Pediatrics Clinics were open; and seven of eight Urgent Care Centers were open.

For the specialty clinics in the Mark Wallace Tower on the main campus, reopening was delayed until after Labor Day weekend because the tower had been used to house ride-out team personnel while they were not actively working. That's where they could sleep and spend downtime before going back to their shifts. Before reopening, the facility had to be cleaned, restocked and made ready for patient care again.

Success validation

After Harvey, a team from the Federal Emergency Management Agency came to do an assessment of challenges and problems that arose at Texas Children's.

"I think they were kind of bored because everything worked so smoothly for us. Their takeaway was that the institution is really writing the book on best practices for preparedness for these types of weather events," Kaziny said.

Ripple effect

Individuals involved with the planning and response are sharing information through articles, presentations and casual conversations. For instance, at a meeting of the American Academy of Pediatrics, Kaziny was talking with another physician and telling him about the hospital's experience with Harvey.

"Somebody pointed out to me that the person sitting on the other side of me was furiously taking notes," he said.

"People are definitely hungry for this knowledge – something that we do so well that it's become second nature to us, and we don't recognize that it is truly extraordinary. I'm grateful and fortunate to be part of the Texas Children's culture. I work with people who do their jobs extraordinarily well."

As the information spreads, Texas Children's approach to preparing for and dealing with a large-scale emergency may help hospitals, families and children far beyond Houston.

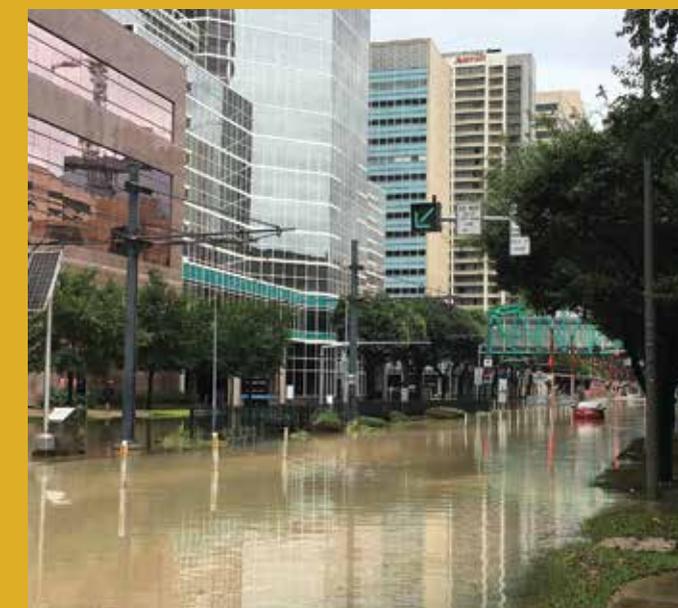
Introduction to disaster

Brent Kaziny, MD, became committed to pediatric emergency medicine and disaster preparedness while he was an intern at Tulane Hospital in New Orleans. When Hurricane Katrina struck in 2005, he assisted in patient evacuations from two hospitals with no electricity and no running water.

After completing his pediatrics residency at Baylor College of Medicine, he completed a fellowship in Pediatric Emergency Medicine at the University of Utah in Salt Lake City. He also completed a variety of training programs in topics ranging from incident command to radiation emergencies and toxic chemical treatment.

Now assistant professor of pediatric emergency medicine at Baylor College of Medicine, Kaziny is director of All Hazards Preparedness and Response for the Section of Emergency Medicine and serves as physician lead of the Emergency Management Committee at Texas Children's Hospital. In addition, he was instrumental in the training of hundreds of health care workers in the use of personal protective equipment during the Ebola outbreak of 2014.

Kaziny serves as the American Academy of Pediatrics' disaster contact for the State of Texas and as director of the Disaster Preparedness Domain for the Emergency Medical Services for Children, Innovations and Improvement Center.



Be Prepared



Pediatrics chief residents Kevin Wilkes, MD, Janaki Paskaradevan, MD, center, and Emily Copeland, MD, oversee the residents' coverage at Texas Children's Hospital during Hurricane Harvey and its aftermath.

Chief residents practice Scouts motto when hurricane comes to town

When the chief residents in the Texas Children's Hospital Department of Pediatrics gave a presentation about hurricanes during the 2017 interns' orientation, they didn't imagine just how useful that information would be.

When Hurricane Harvey brought severe thunderstorms and tornadoes to the Houston area beginning late Saturday, Aug. 26, they were prepared.

When Harvey stalled over southeast Texas for several days, bringing an estimated 19 trillion gallons of water and causing extreme flooding, they were prepared.

The National Weather Service had given advance warning as Harvey grew from a tropical depression in the Gulf of Mexico into a Category 4 extreme hurricane and made landfall on the Texas Gulf Coast southwest of Houston late on Aug. 25.

"Leading up to that weekend, we started being more mindful of the weather forecast," said Emily Copeland, MD, one of the chief residents. "As a precaution, I remember finding a file from 2001 in our office that was a hurricane preparedness plan. I spent a day looking over it, just in case. I think we realized early on that it was important to be ahead of this."

Getting ready

Over a couple of days, Copeland and other pediatrics chief residents, Janaki Paskaradevan, MD, and Kevin Wilkes, MD, developed an up-to-date plan. On Friday, from 190 pediatrics residents,

the chief residents prepared one list of 50 to ride out the storm and provide care to patients in the hospital and a second list of 50 to serve as a relief team. When Texas Children's administration activated its staff ride-out teams Saturday, the pediatrics chief residents activated their team as well.

"Our forethought and planning demonstrated to our residents that this was something to take seriously," Paskaradevan said. "We had a number of residents who had spouses or children or pets that they were able to make plans for, before the hurricane hit, so that they were able to come to work and focus on taking care of patients instead of their responsibilities at home."

"This was part of their calling, to help care for not only the patients at Texas Children's, but their friends and colleagues as well."
 – Kevin Wilkes, MD

The ride-out teams arrived Saturday, prepared to stay for several days.

"Saturday during the day, you could look out the windows and it wasn't even raining," Wilkes said. "Then Saturday night into Sunday morning, you woke up to torrential flooding, and no one could get to the hospital."

Checking in

During the storm, the chief residents split up the list of residents and checked in by phone with those at home every 12 hours to make sure that everyone was safe and to find out who might be able to get to the hospital and who was stranded at home.

The ride-out teams worked 12-hour shifts. The chief residents made rounds once during each shift to make sure all the residents had a place to sleep, that they had enough food and snacks, that they were updated on the weather, and that they had enough staffing to meet patient needs.

The majority of the pediatrics residents were able to use their services' call rooms, each equipped with a bed, a shower and a desk. For those without call rooms, the chief residents worked with the hospital administration, which also was finding spaces for staff members such as nursing and respiratory therapy.

Attending meetings with the administration three times a day provided the chief residents a great deal of information useful for making decisions and dispelling anxiety among the residents. Here they learned the most up-to-date weather forecasts; status of the hospital facilities; what the surgery faculty, nurses and other departments were doing; where to sleep; and what cafeterias were open.

"Toward the end of the storm, we had a lot of questions about how to discharge our patients home safely and where patients could get medications. Because of attending these hospital-wide meetings, we were able to speak directly with pharmacy staff. Within 20 minutes we had a list of open pharmacies that we emailed out to our residents," Copeland said.

Boosting morale

The chief residents considered morale part of their responsibility too. They provided movies, games and snacks for the residents during their breaks.

On Monday morning, during a temporary break in the weather, the roads drained enough that travel was possible, and the relief team was able to replace the original ride-out team.

“We noticed a big influx of morale when that second team came in,” Wilkes said. “In that two-to-three hour span where we changed out residents, they all came in with their bags over their shoulders, excited, ready to go to work, ready to relieve their friends and colleagues, to let them go home and care for themselves. The attitude that all the residents had was that this was part of their calling, to help care for not only the patients at Texas Children’s, but their friends and colleagues as well.”

The chief residents also had relief after the ride-out. The fourth chief resident, Kirsty Hillier, MD, was out of town during the storm but was able to be helpful by providing a sounding board for the chief residents at the hospital. When she returned to Houston, she relieved the others so that they could take time to refresh.

Safety first

Although many Houstonians had to be rescued from cars and homes because of rapidly rising water, none of the pediatrics residents got stuck in the water.

“When we sent out emails for relief and replacement teams, we were very clear that the protocol was, if you get to an area where you feel unsafe, turn around. Then, when you get home safely, call and tell us. We did have one or two residents who were unable to make it to the hospital. We have a big pool from which to draw, so we

notified the next person that he or she needed to come in,” Wilkes said.

Wilkes and Paskaradevan remained at the hospital from Friday until Tuesday. Copeland, who was pregnant, lived close enough that she tried to come in to work on Sunday, but found the last quarter-mile impassable. She was able to get to the hospital on Monday and spent one night there.

“When we would do rounds, the residents would say, ‘Oh, you’re sleeping here too?’” Paskaradevan said. “We would say, ‘We wouldn’t leave you here alone.’ I think they appreciated that level of support.”

On Tuesday, the weather had improved enough that the residents who were able to get home safely were allowed to leave and to return to the hospital on Wednesday. By Saturday, they resumed their regular shifts.

Looking back on the experience, Paskaradevan said one of the most difficult aspects was the necessity of adapting hour to hour to the unpredictability of the weather.

Copeland was surprised by the overwhelming enthusiasm of the residents to come in to work.

A blessing

“We were actually having to tell people, ‘No, you need to stay home,’ because we needed to have a manageable number of people here in the hospital. But that was definitely a blessing and a good problem to have, that we had the manpower that we needed already in the hospital,” she said.

Residents whose homes did not flood offered places to stay for other residents who were displaced.

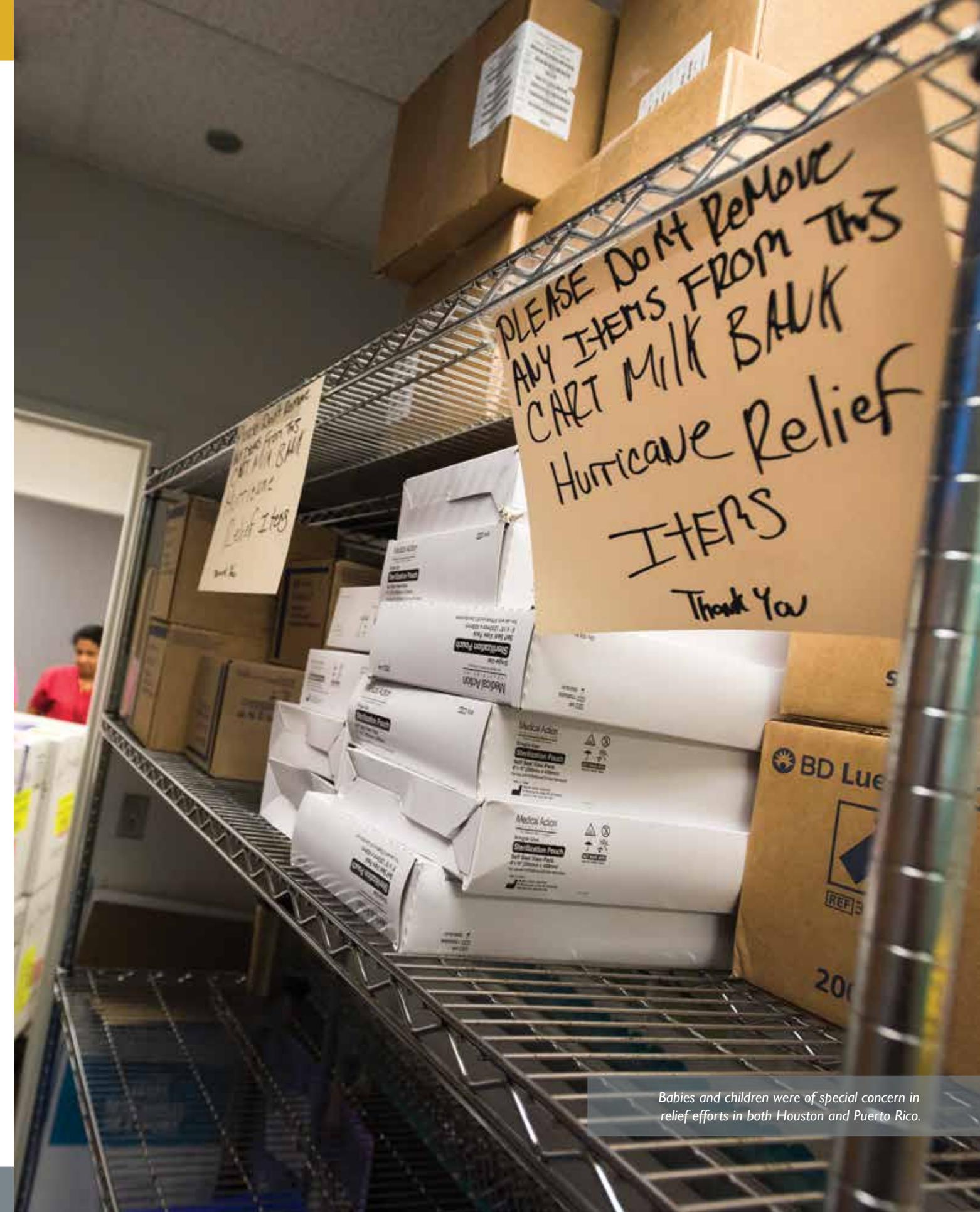
“It didn’t really stop with the storm,” Wilkes said. “They collected money, went to Costco and brought a bunch of diapers and baby supplies to Ben Taub (the county hospital down the street from Texas Children’s main campus) for mothers who had brand-new babies but had lost everything to flooding. The residents wanted to make sure that the babies were leaving with diapers, formula, wipes and other necessities.”

Pediatrics residents volunteered to help with supplies in the shelter at Houston’s convention center. Several residents organized a group called Baylor Helping Baylor. On weekends this group would help clean up the drywall or demolish the flooded houses of attending physicians, residents and fellows who requested assistance.

“They worked so hard here, and then they went home, and as soon as they had the opportunity, they were volunteering and trying to help other people. It really was nice to see how dedicated our residents were to their patients, to each other and to helping the community,” Paskaradevan said.

With all the planning and close communication before and during the hurricane and flood, the chief residents had the information and resources they needed when they needed them. Afterward, they updated the hurricane manual for future chief residents.

When the next weather emergency hits, they will be even more prepared.



Babies and children were of special concern in relief efforts in both Houston and Puerto Rico.

High-water mark



After members of the Coast Guard rescue dialysis patients and their families from the floods, their visit to Texas Children's Hospital brings a happy fist bump.

Coast Guard aids Dialysis Center in rescuing patients

When Americo Almaguer woke his wife, Lillie, at about 1 a.m. Sunday, Aug. 27, the house across the street from them in Friendswood was flooding. They rushed to take care of their son, Kyle, placing him, his medications and his medical equipment on the tall island in the kitchen. Born with a rare congenital syndrome, Kyle, 21, is blind, technology dependent and only three feet tall.

Within 45 minutes, water in the house was three inches deep; before the rain from Hurricane Harvey ended days later, the house had four feet of water.

Traveling by truck and boat, the family wound up in nearby Pearland at the home of Kyle's pediatrician, whose house did not flood and who had electricity to run Kyle's ventilator. But there was a problem.

Since he was 1 year old, Kyle's failing kidneys brought him to Texas Children's Hospital three times a week for hemodialysis, which filters blood to remove waste and excess fluid. Because of flooding, it was impossible to drive from the pediatrician's home to the hospital on Monday for his usual, scheduled treatment. By Tuesday evening, he had gone too many days without dialysis, and the toxins in his body were starting to reach dangerous levels.

Meanwhile at Texas Children's

Recognizing that mobility during Hurricane Harvey could be a problem for families like the Almaguers with a chronic dialysis patient, Texas Children's Dialysis Center activated a disaster preparedness plan almost a week

before the storm. Although a few families evacuated to other cities with dialysis centers, most did not.

"The Friday before Harvey, we had every single one of our hemodialysis patients come in and get dialyzed. The dialysis unit was open until 9 o'clock that night," said Michael C. Braun, MD, chief of nephrology at Texas Children's and professor of pediatrics at Baylor College of Medicine.

"We have a really outstanding group of nurses, transplant coordinators, dietitians, social workers and quality of life specialists who all feel very passionately about coming to work and making a difference every day."

– Michael C. Braun, MD

Dietitians put patients on a special disaster diet to reduce the risks from missing a day of dialysis. Social workers made sure that the center had updated contact information for all the patients.

By Sunday night, the team realized that they had a problem. The effects of Harvey had been more widespread and longer lasting than anticipated. Although the dialysis unit would reopen Tuesday, many patients would not be able to get there.

With the help of Brent Kaziny, MD, physician lead of emergency management at Texas Children's, Braun got in touch with the Coast Guard, which worked with the dialysis centers at both Texas Children's and Memorial Hermann Hospital to coordinate and schedule transport of 33 children who needed dialysis. The two centers treat almost every child on dialysis in Southeast Texas.

Amazing team

"It was a huge effort by an amazing team of folks. Our social workers, our dietitians, our nurses and nursing leadership were calling families and figuring out what their status was," Braun said.

The team kept track of who was able to get to the Texas Medical Center without the assistance of the Coast Guard or Texas Task Force One and who needed a rescue escort.

At the same time, they checked on staff and gave them directions on how to avoid flooded areas on the way into the medical center. One physician who had a large pickup truck provided transportation for other physicians who were part of the relief team.

Patients arrived from about 3 a.m. Tuesday until early Wednesday morning.

"One of our last patients who was air-lifted by the Coast Guard was trapped at her home, and her mom was getting very worried about her. The neighbors heard the helicopter overhead and waved it down," Braun said.

For Kyle and his mother, a Coast Guard helicopter flew them to Memorial Hermann Hospital, where an ambulance from Texas Children's was able to pick them up.

"They were ready for us when we got there," Lillie Almaguer said. "A lot of people were involved to get Kyle to the hospital, so I was super thankful."

Resourceful families

About a third of the patients had assistance from either the Coast Guard

or other first responders. The other families figured out a way to get care for their children on their own.

“One of the remarkable things about our patients on dialysis is that the parents end up being unbelievably resourceful people,” Braun said.

Of the dialysis patients who went to Texas Children’s, about 90 percent were able to go home after treatment. A few were admitted to the hospital for medical reasons related to their kidney failure and others were faced with flooded neighborhoods or destroyed homes. The hospital assisted

some in finding temporary housing, and others moved in with family or friends.

Quality ranks high

The quality of dialysis care is one aspect that is graded by *U.S. News & World Report* in its ranking of the Pediatric Nephrology section as No. 4 in the nation. Other aspects include the quality of kidney transplant outcomes and the quality of care in intensive care units and in the outpatient setting.

“It’s impossible to be successful in all those settings without having a dedicated, multidisciplinary team that’s committed to patient care and improving

the lives of children with pediatric kidney disease. We are fortunate to work with some of the best surgeons and radiologists in the country, but we’re also extremely fortunate in that we have a really outstanding group of nurses, transplant coordinators, dietitians, social workers and quality of life specialists who all feel very passionately about coming to work and making a difference every day,” he said.

The long hours, teamwork and care involved in rescuing patients trapped by Hurricane Harvey exemplified the outstanding quality of care for kidney patients at Texas Children’s.



Staff of the Dialysis Center celebrate with visiting members of the Coast Guard.



Bubbles are a hit with a young dialysis patient.

Reaching Out



Ricardo Flores, MD, left, Texas Children's Hospital The Woodlands, teamed up with Shakira Cruz, immigration attorney; Mario Polo, MD, right, Houston Methodist The Woodlands Hospital; and other Puerto Rican professionals in Houston to establish Texas Professionals United for Puerto Rico. With them is Shakira's father, Jose "Cheo" Cruz, former Houston Astros star outfielder.

Houstonians pitch in for recovery from one-two punch in Puerto Rico

Houston was still recovering from Hurricane Harvey in early September when Puerto Rico was struck by two hurricanes.

With rain and 100-mile-per-hour gusts, Hurricane Irma cut off power to about two-thirds of Puerto Rico's electricity customers. About a third of the population lost access to clean water.

Just two weeks later – before all the damage from Irma could be repaired – Hurricane Maria made landfall with maximum sustained winds of 155 miles per hour. The storm dumped 30 inches of rain in one day on parts of Puerto Rico and knocked out power to the entire island, which is about the size of Connecticut. Without electricity, much of the population could not access clean water. Most cell towers were knocked out, cutting off communication. In some towns, 80 to 90 percent of structures were destroyed.

For Ricardo Flores, MD, clinical director of the Cancer and Hematology Centers at Texas Children's Hospital The Woodlands, the storms were personal. A native of Puerto Rico, he was not content to just worry about his extended family members who still live there.

Flores, who is assistant professor of pediatrics at Baylor College of Medicine, collaborated with other Puerto Rican professionals living in Houston to establish a nonprofit organization, Texas Professionals United for Puerto Rico. Together, they raised

funds; collected thousands of pounds of water, medications and other supplies; and arranged for transporting the supplies 2,000 miles to the island.

For help, they called on fellow Puerto Ricans Carlos Beltrán and Carlos Correa of the Houston Astros. In the midst of winning the World Series, the Astros stepped up to the plate for hurricane relief. They donated food, money and toys, while others donated water, medical supplies and generators. Astros owner Jim Crane donated use of the Astros' plane, and less than a week after Hurricane Maria hit, Texas Professionals United for Puerto Rico sent thousands of pounds of supplies.

"They say that in Texas everything is bigger, but their hearts are bigger, too, the way they were able to help their own community in Harvey and then help us."

– Ricardo Flores, MD

Texas-size hearts

"Many people who are not Hispanic or Puerto Rican joined forces with donations and supplies," Flores said. "They say that in Texas everything is bigger, but their hearts are bigger, too, the way they were able to help their own community in Harvey and then help us."

Over the next few months, supply flights were arranged by donors including Waste Management Inc., Ross Perot Jr.'s Hillwood Airways, Ralph Alexander of Talen Energy Corporation and United Airlines.

Even after a dozen plane loads, about 250,000 pounds of donated supplies remained, including medical

supplies, clothing, water, ant-killer, first-aid kits, and tools for gardening and reconstruction. In late January, Brother's Brother Foundation donated the use of their ship to transport the rest of the supplies by sea.

"Most of the help coming from the United States and elsewhere was focused on the metropolitan areas, mainly San Juan. From the beginning, we decided that we were going to help other communities on the island, especially in the central part and on the western part of the island, where they were most affected," Flores said.

By February, they had reached 30 out of 78 towns in Puerto Rico.

Not all the trips were one-way deliveries of supplies. With the majority of the island's hospitals damaged by the storms, some patients were unable to get the care they needed. The Houston team brought 25 patients plus family members back to Houston for treatment. One of the patients was an 8-year-old who received a bone marrow transplant at Flores' cancer center. Others had heart disease, kidney disease, dementia or other complicated medical conditions.

Related health issues

Because of the flooding, people remaining in Puerto Rico faced serious public health issues, such as gastrointestinal problems, leptospirosis due to contaminated food and water, and dengue fever from mosquitoes. In addition, there were many accidents and trauma such as from burning debris.

By late December, the main streets were clear but much debris remained.

Thousands of pounds of donated supplies and equipment remain in a Houston warehouse until use of a ship is donated for transportation to hurricane-devastated Puerto Rico.



“There were still no traffic lights, so just driving was really dangerous,” Flores said.

“Overall, it’s improving, but more slowly than people here expect. My brothers were more than 100 days without power, and they live in a metropolitan area. You can imagine remote towns near the center of the island may not get power back for years,” he said.

Rebuilding is the goal now. The plan is to develop grants to help small businesses recover and inject money into the economy. They are working with other foundations, like one established by professional soccer player Joe Serralta, to help public schools become more energy efficient and to rebuild and furnish schools with computers and other modern equipment.

“The kids are affected psychologically, and they have missed a lot of days of school. But if we can get them back to their normal academic routine, I think that will help the island come back. The children are the future of Puerto Rico,” Flores said.

Now the biggest need is financial donations. The group has set up a GoFundMe account for individuals who would like to help: gofundme.com/UnidosPorPuertoRico.



Among those helping to handle supplies donated to Puerto Rico is Antonio “Puruco” Latimer, (in NY baseball cap) a member of the Puerto Rico National Basketball Team and founder of a humanitarian group that serves the indigent in some of the poorest housing projects on the island.

Surviving a Disaster

The Harvey Resiliency and Recovery Program is helping some children and adolescents who developed post-traumatic stress disorder after surviving flooded cars and homes.

Program helps children cope with trauma and loss

A 16-year-old was driving back from a party with her 14-year-old brother when their car got stuck in the floodwaters from Hurricane Harvey. They got out of the car and walked for an hour to a friend's house, as the water rose to their necks.

The stress of the dangerous situation was exacerbated by the loss of their beloved brother just a few months before. The siblings were especially vulnerable to harmful psychological aftereffects that no one should have to experience, especially a child.

Research has shown that bereavement coupled with extreme stress increases the risk of post-traumatic stress disorder and other long-term psychological difficulties that could begin to reveal themselves a number of months later. Symptoms may include severe anxiety or panic attacks during thunderstorms, nightmares, difficulty concentrating and physical complaints such as headaches or stomach pain.

"Surviving a disaster can be distressing for anyone, but youth who have already been exposed to trauma, traumatic loss or severe adversity are at particularly high risk for severe persisting stress and may need the support of a mental health professional," said Julie Kaplow, PhD, associate professor of pediatrics-psychology at Baylor College of Medicine and director of the Harvey Resiliency and Recovery Program.

The program launched in September 2017 as part of the Texas Children's Hospital Trauma and Grief Center, which Kaplow also directs. Mental

health professionals evaluate children and youth between the ages of 7 and 17 and offer evidence-based treatment to those needing intervention.

Those struggling the most

"When we look at data from post-Hurricane Katrina, we find that the vast majority of kids who developed post-traumatic stress were those who had a prior history of bereavement. And we're seeing that now in Houston. The kids who seem to be struggling the most after Harvey are those who experienced a death prior to Harvey," Kaplow said.

Other potent risk factors that are likely to predispose children to long-term mental, emotional and physical consequences from Hurricane Harvey include:

- A family member died in the hurricane.
- A family member was injured.
- A parent served as a rescue worker and/or attempted to save others during the storm.
- The children lost pets.
- They had to be evacuated.
- They were separated from their caregiver for a period of time.
- They had to live in a shelter.
- They had to move to a new school.

"What we have frequently heard from school-based clinicians and from our patients is that Harvey is really just the tip of the iceberg. Many of

these families have long histories of prior traumas and prior adversities. Were they affected by Harvey and the flooding? Absolutely. On the other hand, some of them have also experienced years of sexual abuse, physical abuse, domestic violence and multiple losses, including death," Kaplow said.

The Harvey Resiliency and Recovery Program is dedicated to addressing not only Harvey-related needs, but any significant mental health needs for Houston-area youth.

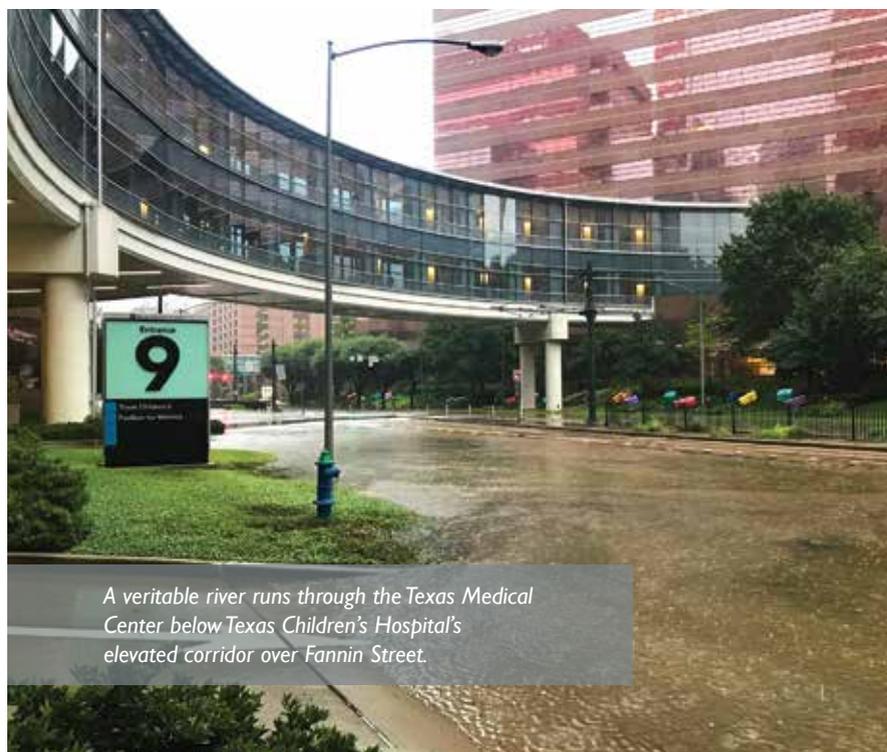
"I have heard a number of leaders in some of our most underserved communities say that in some ways Harvey was a blessing because people are finally paying attention to our kids. They're no longer invisible," Kaplow said.

Helping in the community

To help parents, teachers and mental health professionals in the community recognize and provide treatment to children who need help, Kaplow and her team created webinars and videotaped lectures available at [texaschildrens.org/departments/trauma-and-grief-center/resources](https://www.texaschildrens.org/departments/trauma-and-grief-center/resources).

To increase access to care, a recently hired bilingual social worker travels on the Texas Children's mobile unit, and three new social workers are deployed to Texas Children's Pediatrics outpatient clinics, adding psychosocial services to medical care.

A \$2 million grant from the Greater Houston Community Foundation supports several initiatives related to Hurricane Harvey, including:



A veritable river runs through the Texas Medical Center below Texas Children's Hospital's elevated corridor over Fannin Street.

- Hiring more clinicians within the Trauma and Grief Center to expand their “in-house” treatment services to children who need them.
- Partnering with Lyft to bring families to Texas Children’s if they lost their car in the flood or if transportation is difficult.
- Paying all parking fees for families coming to the Trauma and Grief Center.
- Training large cohorts of school-based and community-based clinicians to provide trauma-informed interventions with children in schools adversely affected by the storm.

Program leaders have worked with a number of school districts, including HISD, Spring Branch and YES Prep, to ensure that staff are trained in the

screening, assessment and referral of hurricane-exposed youth. They also work with clinicians from Communities in Schools, who are deployed in schools with a high level of need.

“Our trainings with school-based clinicians have been an essential step toward meeting kids where they are and providing greater access to best practice care. Many of these kids would never receive any mental health services if it weren’t for the school-based clinicians,” Kaplow said.

Other funding to support the hiring of additional clinicians and dissemination of trauma and bereavement best practices has come from donors, including lead gifts from the JPB Foundation, the John P. McGovern Foundation and the Children’s Health Fund, with a generous donation from singer/songwriter and co-founder

of the fund, Paul Simon, and his wife, singer/songwriter Edie Brickell.

Partnering with others

Partnerships with other organizations extend the work of the program.

Texas Children’s is working with a number of grief support facilities, including Bo’s Place, dedicated to assisting bereaved families through peer support and providing a safe space for children and families who have lost loved ones.

“We have trained their staff so they can refer children to our program who may need a higher level of intervention,” Kaplow said.

Mental Health America, another collaborative partner, which has long-standing relationships with many Texas school districts, helps inform the districts and ensure that interested school-based clinicians can receive trauma-related training.

UNICEF is helping to conduct a large-scale situation analysis of which children were most affected, in what areas, and what their specific needs are.

Within Texas Children’s, Kaplow and her team created HEART, or Hurricane Exposure Adversity and Recovery Tool, a screening tool for children about what they experienced both during and after the storm, as well as any preexisting adversities. Initially given to children in oncology and psychology, the survey will be disseminated more widely throughout the hospital.

“This is just one more way that we are hoping to identify those kids who

may have had a lot of exposure and make sure that they’re doing okay psychologically,” Kaplow said.

Children often resilient

The children’s response to treatment is encouraging.

“Many of the kids we treat are very resilient. We’re seeing a lot of post-traumatic growth, in that kids are coming away from the experience feeling stronger than they were before, even in the midst of all the turmoil, terror and frustration that so many are dealing with,” she said.

One of the siblings who walked through the deep floodwaters said, “If I could get through the death of my brother, I can survive this flood. And I know that my brother would want me to survive.”

Kaplow and the clinicians on her team emphasize the importance of not just reducing distress, but also promoting adaptive grieving and post-traumatic growth.

“Our evidence-based treatments focus on how to take those terrible life events and transform them into something meaningful. Kids are capable of adjusting to their new normal, especially when you combine their natural resilience with treatments that emphasize not just what’s wrong, but how we can harness the strength that they already have,” Kaplow said.

With help from partners and supporters, the Harvey Resiliency and Recovery Program recognizes and addresses the needs of children affected adversely by the storm and its aftermath.

Children can bounce back

Children’s natural resilience in the aftermath of trauma and loss inspired Julie Kaplow, PhD, to conduct the research and develop the interventions that led to establishment of the Trauma and Grief Center at the University of Michigan in 2012.

She began interviewing bereaved children while she was still an undergraduate in psychology about two decades ago.

“I was taken with the idea that kids can be resilient even after their worst fears have come true,” said Kaplow, now associate professor of pediatrics-psychology at Baylor College of Medicine. “I think for most children, the death of their parent is probably the scariest thing that could ever happen to them. Yet the majority of these kids were able to lead healthy, happy lives even in the midst of their grief.”

She focused on figuring out what helped the children successfully navigate their losses, and how that could be used to inform interventions to help children who may not have the internal resources to deal with bereavement on their own.

During her graduate training, she began to examine the interplay of trauma and bereavement and address the potentially traumatic aspects of the children’s losses.

In 2014, Kaplow and the center moved to the University of Texas Health Science Center at Houston, and in 2017 moved to Texas Children’s Hospital.

“Children’s resilience in the face of tragedy is what keeps me going and keeps our staff and clinicians going after hearing these devastating stories. The kids are so inspiring that it makes you want to help even more,” she said.



Taking Inspiration to Heart

Daniel J. Penny, MD, PhD, MHA, is committed to reducing impact of heart disease on children and their families.

Cardiology leader seeks always to do better for children and families

Inspirational people at key times in his life influenced Daniel J. Penny, MD, PhD, MHA, to treat children's heart disease as his life's work.

First, there was his older brother, who became a cardiologist and influenced Penny to become a physician.

While a medical student at the National University of Ireland, Penny met some inspiring neonatologists and an inspiring pediatric cardiologist. The pediatric cardiologist was trained at Texas Children's Hospital and Baylor College of Medicine.

Now Penny, a native of Ireland, is chief of Pediatric Cardiology at Texas Children's and professor of pediatrics-cardiology at Baylor. He sees that heart disease affects all aspects of a child's life.

All-encompassing care

"Our care for the child doesn't finish when we've closed the hole in their heart or opened up their valve," he said. "We look at the whole continuum of care for the child – not just their heart but how the cardiac disease affects their overall quality of life, the ability to perform well at school and in sports, and to integrate with their peers."

A large, multidisciplinary team in the Texas Children's Heart Center shares Penny's broad view of heart disease in children and in adults who grew up with congenital heart disease. Among the team members are pediatric cardiologists, cardiovascular surgeons, cardiovascular anesthesiologists, cardiac intensivists, perfusionists,

nurses, child life specialists, psychologists, respiratory therapists, social workers, dietitians, pharmacists and support staff. State-of-the-art facilities, with all services located close together, allow integration among the multiple specialists.

Co-directors are Penny; Jeff Heinle, MD, interim chief of congenital heart surgery; Emad Mossad, MD, director of pediatric cardiovascular anesthesiology; and Lara Shekerdemian, MD, MHA, chief of critical care.

"It is a real privilege for me to work with what I consider to be the most amazing pediatric cardiology faculty anywhere."
– Daniel J. Penny, MD, PhD, MHA

With more than half a century of experience in caring for children's hearts, Texas Children's Heart Center ranked #1 in the nation for pediatric cardiology and heart surgery in 2017, according to *U.S. News & World Report*.

"The vision of our Heart Center is to reduce the impact of heart disease on children and on their families," Penny said. "We pay a lot of attention to education, psychological support, social support and the implications of heart disease in a child on the overall functioning of the family. The psychological effects of having a child with congenital heart disease are enormous for a young family. We need to pay attention to these aspects of heart disease to get the best outcomes that these children and these families deserve."

International pursuits

Penny's pursuit of medical excellence took him nearly halfway around the

world. After medical school, he trained in internal medicine and pediatrics in Ireland, then completed training in cardiology and pediatric cardiology in Australia.

"In the early 1990s the outcomes after care for congenital heart disease in Australia were truly exceptional. I wanted to learn what the secret was that allowed them to get these great results, in the hope that what I and others could learn there could be translated around the world," he said.

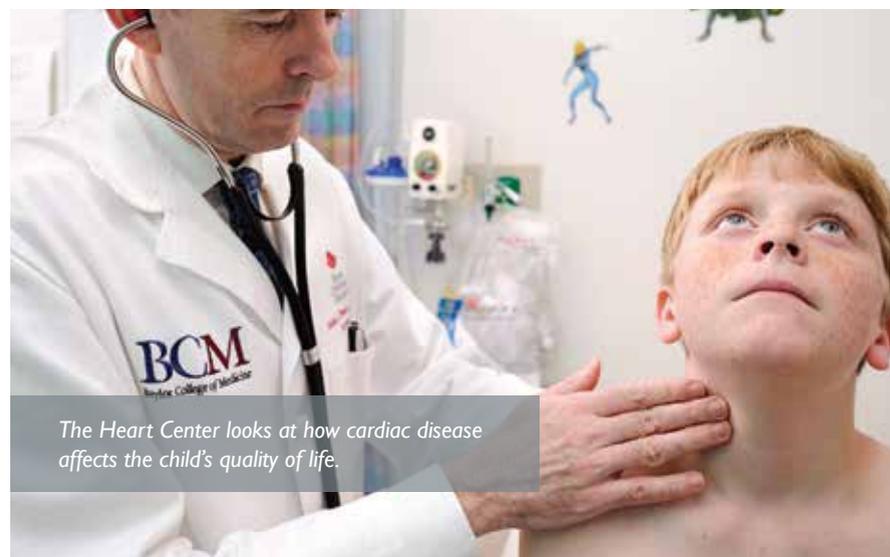
Coincidentally, Charles D. Fraser Jr., MD, was training there at the same time. As co-directors of Texas Children's Heart Center for many years, Penny and Fraser worked closely together. Fraser recently stepped down as chief of congenital heart surgery and surgeon-in-chief at Texas Children's.

After completing fellowship training and a PhD in Australia, Penny returned to the United Kingdom to work as an attending physician at the Great Ormond Street Hospital in London, one of the world's leading children's hospitals.

He went back to Australia in 1999 as chief of Pediatric Cardiology at the Royal Children's Hospital in Melbourne. While there, he was a founding director of the Australia and New Zealand Children's Heart Research Centre, a collaborative network for multicenter research.

A trip to central Vietnam in 2001 led to Penny spearheading a drive to build a pediatric cardiovascular center there.

"I was saddened to see how many children, who if they had been born in Australia, the United Kingdom or the



The Heart Center looks at how cardiac disease affects the child's quality of life.

United States, had conditions that were curable with a single procedure. But they had absolutely no access to care, so these conditions would shorten their lives significantly. I felt that this was an ethical obligation to try and improve the lot for these children," he said.

Through the Royal Children's Hospital, which already had established working relationships with a hospital in Hue, he helped develop a heart institute there, helping to secure funds, design the facility and train its staff. Now hundreds of children have access to cardiovascular care there every year.

"What's very heartening, from my point of view, is that the people doing these procedures are Vietnamese physicians, surgeons and nurses, and now they are trying to support similar initiatives in neighboring countries like Cambodia," Penny said.

Epitome of a children's hospital

In 2010 a combination of circumstances inspired Penny to accept his current positions at Texas Children's and Baylor.

Himself committed to child health around the globe, Penny admired the work in international child health exemplified by the Baylor International Pediatric AIDS Initiative at Texas Children's. And to him, Texas Children's was the epitome of what a children's hospital should be.

After his arrival at Texas Children's, U.S. News rankings for the Heart Center climbed from #4 in 2011 to #3 in 2012 to #2 in 2014. In 2017 it surpassed Boston Children's Hospital, which had topped the rankings for years.

One of only five accredited Pediatric Heart Failure Institutes in the country, Texas Children's Heart Center performed 1,000 surgical procedures, completed nearly 76,000 diagnostic procedures and cardiac imaging, and had 26,000 outpatient encounters in 2016.

Every patient who undergoes any type of procedure is entered into a database, and outcomes are published at texaschildrens.org/

departments/heart-center/heart-center-outcomes and in booklets every year. Outcomes show that the Heart Center consistently outperforms national benchmarks.

In weekly meetings, all members of the Heart Center look at the data that document the quality of patient care. Subspecialties have their own frequent quality meetings.

"What we have to be is a learning organization in which, while we believe that we provide an exceptional quality of care, we can always improve and we always need to do a better job for the next child that comes into our program," Penny said.

Translating research findings

Research is an important part of constantly improving care. The Texas Children's Heart Center is part of the Pediatric Heart Network, a National Institutes of Health collaborative, which allows participation in large studies to address problems specific to children.

"We have to do everything we can to shorten the pipeline between findings in the laboratory and care at the bedside. Unfortunately, children are often disadvantaged when it comes to research and developing new therapies for them because the numbers are fewer and the problems are more complex," Penny said.

"If you are a physician looking after a week-old child who has heart failure because of a congenital malformation of the heart, the issues in the child's care are quite different from issues that may be important in the care of a 70-year-old with heart failure because of coronary artery disease," Penny said.

"We must respect the differences between children and adults in terms of their physiology or the mechanisms of their disease.

Research within the Heart Center is diverse, such as:

- Cutting-edge molecular techniques to look at the cellular reasons for heart rhythm abnormalities and causes of sudden death in children and families.
- Community studies of sudden death in children across the ethnically diverse population of Houston and Harris County.
- Studies of conditions affecting the large arteries in the body.
- Prevention of the causes of coronary artery disease that develops in adults.

- Investigations of disparities in access to health care and in survival after surgery for congenital heart disease.

Looking ahead

A new tower opening in 2018 will expand and improve the Heart Center.

"Texas Children's Hospital never rests on its laurels. It looks for new opportunities to impact the care of families with sick children. That's what we all really want as physicians – we want to work for an organization that continuously wants to get better," Penny said.

"It is a real privilege for me to work with what I consider to be the most amazing pediatric cardiology faculty anywhere and to interact every day

with some of the most inspiring characters in our specialty."

He is one of those inspiring characters. In 2012 he received the "For Peoples Health Award" from the government of Vietnam, in recognition of his contribution to the public health of its citizens. In 2014 he received the University College Cork Medical School Medal, which was created to honor those who have made exceptional contributions to medicine and society.

Penny has come a long way since being inspired to become a pediatric cardiologist. Today, he leads and inspires others. As he continues to affect the lives of countless children and families throughout the world.



Some of the Heart Center team members celebrate the center's #1 ranking for U.S. pediatric cardiology and heart surgery.

Leading the Way

Amy Arrington, MD, PhD, followed her interest in infectious diseases to a leadership position in a new pediatric hospital unit for dangerous diseases.

Texas Children's becomes national expert on pediatric biocontainment and biopreparedness

In September 2014, the U.S. medical community was shaken. Thomas Eric Duncan, who had flown from Liberia to Dallas, became the first person diagnosed with the Ebola virus in the U.S.

After Duncan's death, two ICU nurses who treated him at Texas Health Presbyterian Hospital were diagnosed with the Ebola virus, but thankfully they survived. No one else was infected, and a crisis was averted — this time.

But what about next time? In our interconnected world, infectious diseases with no known cure and high mortality rates are no longer relegated to distant areas. It's easy to board an airplane and travel thousands of miles across the globe to a large population center in a matter of hours. Bioterrorism, the purposeful spread of deadly biological agents within a targeted population, also has become a growing threat.

This incident forced U.S. hospitals to face the reality that they were largely ill-equipped to treat patients with these types of diseases. The vast majority of hospitals lacked the proper training, policies, procedures, personal protective equipment, medical equipment and special isolation units (SIUs), all of which are critical for keeping health care workers safe and preventing devastating epidemics.

Before October 2014, only 25 biocontainment beds were available in the entire U.S., all located within

just four hospitals: the National Institutes of Health Special Clinical Studies Unit in Bethesda, Maryland; the St. Patrick Hospital Care and Isolation Unit in Missoula, Montana; the University of Nebraska Medical Center Biocontainment Patient Care Unit in Omaha, Nebraska; and the Emory University Hospital Isolation Unit in Atlanta, Georgia. Biocontainment units designed specifically for pediatric patients didn't exist.

"I enjoy my relationships with colleagues, and I appreciate the innovation fostered here. Texas Children's is full of forward thinkers."

— Amy Arrington, MD, PhD

"I found this situation to be heartbreaking," said Amy Arrington, MD, PhD, assistant professor of pediatrics-critical care at Baylor College of Medicine. "Fortunately, my peers at Texas Children's Hospital realized that we have the resources and capabilities to do better. If you have the right equipment, facilities and training, these special patients can be cared for safely and with the same high-quality care we offer all of our patients at Texas Children's every day."

While working a shift in the pediatric intensive care unit in October 2014, Arrington received a phone call from her supervisor, Lara Shekerdemian, MD, MHA.

"Amy, we're creating a brand-new unit, and we have a new position we'd like to offer you," Shekerdemian said.

Arrington, then a first-year attending physician, jumped at the opportunity to become one of two associate

medical directors for the first pediatric biocontainment unit in the U.S.

World's deadliest pathogens

Arrington has always been fascinated by infectious diseases, specifically viruses. But originally, she thought her career combating the world's deadliest pathogens would turn out differently.

"In the mid-90s when I attended college, the Ebola virus was a major news story. I saw the movie "Outbreak" and read "The Hot Zone." I thought I was going to trek through the jungle and find the host of Ebola, and it would all be very glamorous," she laughed.

Upon receiving a Bachelor of Arts in biology from Baylor University, Arrington enrolled in a PhD program in molecular virology at Baylor College of Medicine. At the time, it was the only graduate program in the U.S. focused exclusively on virology.

During a talk at a Graduate School Symposium, Ralph Feigin, MD, the physician-in-chief at Texas Children's, called out Arrington's research poster and asked her to stand. She, however, had skipped his talk in order to finish an experiment. Later, at lunch, Feigin sought her out.

"I told him I was thinking of going to medical school," Arrington said. "He encouraged me to come talk to him about it and of course stay at Baylor. Going to medical school was a big shift from the PhD world — and wasn't at all the track I set out on. I think that's why his words of wisdom and encouragement meant so much to me. Little did I know I would stay at Baylor for so many years, and he would come to be a true mentor to me, as I know

he was to so many physicians who trained at Baylor.”

The day after she handed in her dissertation, Arrington began medical school. She later completed her pediatric residency and pediatric critical care fellowship at Texas Children’s. In 2013, she began working as a full-time faculty member in the hospital’s pediatric critical care section.

Safe how-to

During the autumn of 2014 few hospitals wanted to assume the risk of treating patients with highly infectious diseases. It was up to Texas Children’s physicians to lead the way in the pediatric space and show how it could be done safely and effectively.

In October, Mark Kline, MD, physician-in-chief at Texas Children’s, first proposed the idea of building an SIU. By December, Texas Children’s raised the funds necessary to build a pediatric SIU equipped to treat diseases such as Ebola, MERS (Middle Eastern respiratory syndrome), Marburg, Lassa fever, Avian influenza (bird flu), SARS (sudden acute respiratory syndrome), smallpox and monkeypox. Arrington’s team visited the two adult biocontainment units in Omaha and Atlanta that had successfully treated patients with Ebola to observe each setup and learn proper procedures for all aspects of patient care.

Within one year, the eight-bed SIU was complete. Delivering such a complex, high-quality unit in a short time was an incredible feat and a testament to the commitment of a team of physicians that included Arrington.

“I enjoy my relationships with colleagues, and I appreciate the innovation fostered here. Texas Children’s is full of forward thinkers,” she said.

The SIU continues to be one of the few pediatric biocontainment units in the U.S. and the only such unit in the southwest region. Additionally, the Centers for Disease Control and Prevention (CDC) has designated Texas Children’s as a pediatric Ebola treatment center.

Located on the top floor of Texas Children’s Hospital West Campus, which was chosen for its ample space, the SIU is an extension of the facility’s acute care unit. Each bed in the SIU is in a private room with observation windows to minimize staff exposure and with an antechamber and exit chamber, where medical staff don and remove personal protective equipment. Negative air pressure and isolated air handling prevent the spread of pathogens. An integrated biosafety level 3 laboratory enables rapid, on-site identification of pathogens. The SIU has a dedicated medical waste room for sterilizing highly hazardous trash. When the area is not in use as an SIU, general pediatric patients occupy the rooms.

Although it isn’t quite the glamorous global virus hunter she envisioned in her youth, Arrington now leads preparations for handling global viruses as the medical director of the SIU. She is responsible for recruiting and training members of the Special Response Team, the SIU’s elite, all-volunteer staff comprising approximately 100 physicians and nurses from a variety of disciplines, respiratory

therapists, laboratory workers, and environmental service technicians.

The SIU has been activated twice for two pediatric patients who were suspected of having highly infectious viruses but who ultimately tested negative. The team undergoes mandatory training every three months to maintain preparedness. Training is simulation-based and focuses on performing difficult critical care skills using special equipment, especially while wearing cumbersome isolation suits; conducting CPR on highly infectious patients; taking isolation suits on and off; and cleaning up hazardous spills.

Preparedness for every hospital

“Although having an SIU is a significant part of our being prepared, it’s not everything. Every hospital, regardless of its size and resources, ought to have a preparedness plan, even if it doesn’t have a biocontainment unit,” Arrington said.

This idea led to the creation in March 2016 of the Section on Global Biologic Preparedness, which Arrington leads as section chief.

The purpose of Biologic Preparedness is to take the lessons learned in the SIU and share this knowledge with other staff at Texas Children’s and at institutions throughout the U.S. As other hospitals come to understand the value in biopreparedness, interest in the program is steadily increasing.

Arrington travels to other institutions and helps them grapple with big questions: What do you tell your staff when a patient requiring special isolation is admitted?

How do you control the message when discussing these issues with families and communicating to the media? How do you transfer a patient from the ICU to an isolation unit without contamination?

“No other pediatric hospital should have to reinvent the wheel if we’ve already done it,” Arrington said.

Arrington advises hospital staff to build relationships and phone trees proactively – know whom you need to contact within your own institution, at the health department and at the CDC, and know where and how you can transfer patients if you are unable to treat them.

At Texas Children’s she hosts conferences during which she provides health care workers with simulation-based training. In August 2017, she hosted a well-attended conference alongside the National Ebola Training and Education Center for medical staff from other pediatric hospitals. Her goal is to host one to two national conferences annually.

As a result of these efforts, Texas Children’s has become a widely acknowledged expert in pediatric biocontainment and biopreparedness.

Mentoring for advancement

Innovation at Texas Children’s is about taking the initiative to confront

looming threats. It’s also about a culture that helps newer physicians flourish. Arrington credits her rapid professional advancement to Kline’s willingness to trust her – a junior faculty member just one year out of her fellowship – with leadership of the trailblazing pediatric SIU and Section on Global Biologic Preparedness.

“I have enjoyed incredible mentorship during my time at Texas Children’s,” Arrington said. “I’ve been given such a tremendous opportunity to make a significant impact. It’s a career path I never expected, but I am fortunate to occupy two unique roles that have never existed before.”

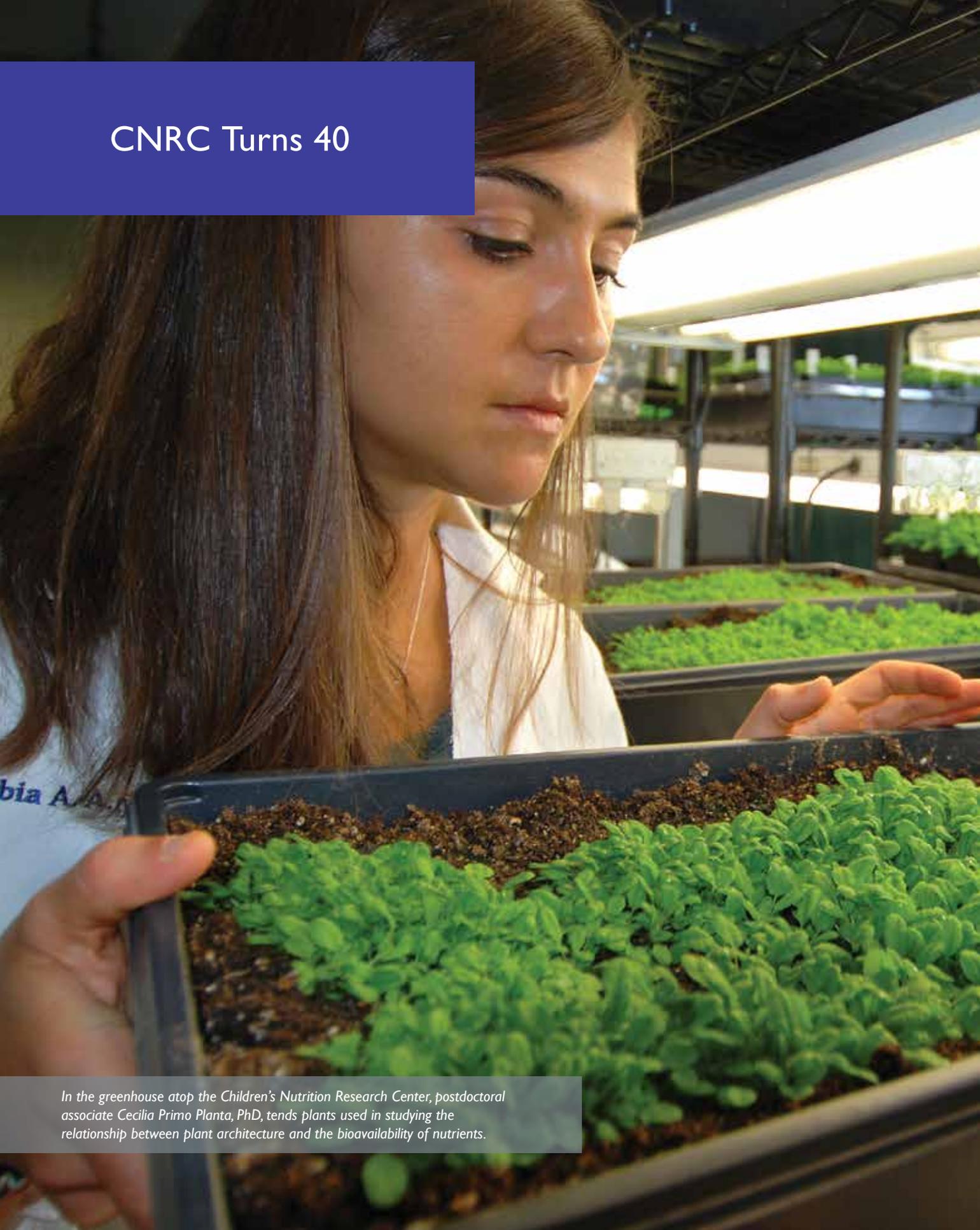


Amy Arrington, MD, PhD, left, shows visitors around the Special Isolation Unit. With her, from left, are Julie Graves, MD, MPH, PhD, American Public Health Association; David Persse, MD, Emergency Medical Services and Department of Health and Human Services, City of Houston; and Umair Shah, MD, MPH, Harris County Public Health.

Research



CNRC Turns 40



In the greenhouse atop the Children's Nutrition Research Center, postdoctoral associate Cecilia Primo Planta, PhD, tends plants used in studying the relationship between plant architecture and the bioavailability of nutrients.

First children's nutrition research center leads discoveries, improves lives

If you know how much you should feed your infant or the amount of calcium your school-age child needs to consume in a day, chances are it's a result of research at Baylor College of Medicine.

The USDA/ARS Children's Nutrition Research Center (CNRC) is operated by Baylor in cooperation with Texas Children's Hospital and the Agricultural Research Service (ARS) of the U.S. Department of Agriculture (USDA). It was the first federal center of its kind to focus solely on maternal and child nutrition and now is one of six USDA human nutrition research centers across the country.

Established in 1978, the CNRC building is on the Texas Children's campus in the Texas Medical Center. Its physical proximity makes it easier to move groundbreaking ideas from research lab to bedside, said Dennis Bier, MD, professor of pediatrics-nutrition and director of the center for the past 25 years.

"When the center was established by Congress, it was with the explicit understanding that it would look at nutrition in infants, children and pregnant and lactating women through multiple approaches," explained Bier, a pediatric endocrinologist.

Today, roughly 75 percent of the 50+ scientists working at the CNRC are PhDs, and the remaining 25 percent hold MDs. The staff includes plant scientists, animal scientists, molecular biologists, behavioral scientists and

physician scientists including pediatric gastroenterologists, neonatologists, endocrinologists, geneticists and more.

Research heavyweight

Despite its relatively small staff size, the CNRC is a heavyweight when it comes to research dollars, consistently bringing in the second highest amount of any department at Texas Children's, ranked behind only Hematology-Oncology.

"We're leaders in this field of study when it comes to methods for measuring energy expenditure and looking at bioavailability of nutrients in humans."

– Dennis Bier, MD

The CNRC conducts research into the following areas:

- Nutritional metabolism in mothers, infants and children
- Pediatric clinical nutrition
- Childhood eating behaviors and obesity prevention
- Molecular, cellular and regulatory aspects of nutrition during development
- Developmental origins of adult diseases, including obesity, cardiovascular disease, cancer and osteoporosis

CNRC research is used by physician scientists around the world to develop nutritional guidelines for babies, children, pregnant women, lactating mothers and schools.

Two of the world's leading medical journals devoted to nutrition are

directed by CNRC leaders, the *American Journal of Clinical Nutrition*, edited by Bier, and *The Journal of Nutrition*, edited by Teresa A. Davis, PhD, professor of pediatrics-nutrition at Baylor and adjunct professor in the Department of Nutrition and Food Science and the Department of Animal Science at Texas A&M University.

Ties to agriculture

On the roof of its building, the CNRC maintains a greenhouse, one of only a few of its kind. The plants there are used for experiments that measure the bioavailability of nutrients and mineral absorption in various crop plants.

"Our work has a real connection to production agriculture," Bier said. "It's a strength of our center that we have such diversity of plant to animal to medical to behavioral science."

Greenhouse plants also are bred with specific non-radioactive trace nutrients that can be fed to study participants. These special plants allow scientists to track the rates of nutrient and energy absorption in volunteers.

"We're leaders in this field of study when it comes to methods for measuring energy expenditure and looking at bioavailability of nutrients in humans," Bier said.

Rare among other pediatric centers, the CNRC has four whole-room calorimeters and a comprehensive body composition lab.

Body composition studies play a key role in understanding childhood growth and development. Questions such as whether body weight or lean body mass is the best indicator of when

premature babies are healthy enough to go home, or whether very chubby babies are more prone to develop cardiovascular problems as adults, can only be answered with research using precise body composition measurements and appropriate standard reference values.

Calorimeters allow a volunteer's oxygen uptake and carbon dioxide production to be measured precisely and then converted to energy expenditure in kilocalories per minute. The scientists can measure babies, children and teens during a variety of activities including sleep, playing, riding a bike, and walking and running on a treadmill. They also measure the accuracy of popular devices such as pedometers and activity monitors.

An in-house kitchen is used to prepare study meals in order to measure the calories and nutritional value of the foods fed to participants. Such exactitude helps the CNRC scientists accurately measure what humans are notoriously inexact about – what they eat.

A brightly colored dining room laboratory is used to study the eating

behaviors, food preferences and meal-time interactions of infants, children and their parents.

The data collected are then used to study the role of diet, energy needs and physical activity in healthy pregnancy and lactation and in the development of clinical conditions where nutrition is an important contributory factor including obesity, Type 2 diabetes, muscular dystrophy, cystic fibrosis and sickle cell anemia.

Exploring childhood nutrition

Another important component of the CNRC's work involves monitoring food consumption and calorie and nutrient intake patterns of Americans of different ages, ethnicities and income levels.

Just a few of the important studies underway today at the CNRC include:

- How child eating behaviors are linked to parenting behaviors
- The cardiovascular risks of childhood obesity
- The molecular control of appetite in the hypothalamus

- How prenatal and early postnatal nutrition and other environmental influences affect individual susceptibility to disease later in life
- Identification of the novel neural circuits, neurotransmitters and intra-neuronal signals critical for coordinated control of body weight, feeding behavior, glucose balance and blood pressure

Not all nutrition studies require eating in a lab – some require playing video games. A series of studies led by Tom Baranowski, PhD, professor of pediatrics-nutrition, is evaluating the role that specially designed video games can play in obesity and diabetes prevention, including influencing children's diet and physical activity.

In one current study, Baranowski's team enrolled 200 children ages 10-12 to play the games "Escape from Diab" and "Nanoswarm: Invasion from Inner Space," stories that encourage specific behavior changes. The scientists measure such health markers as the children's height, weight, fruit and vegetable intake, and physical activity before and after playing the video games.

The study closed at the end of 2017, and results are not yet published, but gaming in general is proving to be a promising way to influence children's nutritional health.

Volunteers needed

Any studies that don't involve plants or test animals require the researchers to recruit human volunteers. That work falls to Noemi Islam, senior research recruiter.

Islam maintains a database of 4,500 families and 12,000 individuals who may

be qualified for the various studies. She always needs more recruits and finds new volunteers by distributing flyers in places such as clinics, schools, day care centers and public libraries.

It is especially hard to find enough volunteers for studies that require multiple visits, blood samples or overnight stays in the Metabolic Research Unit, Islam said. Currently, she is actively recruiting for five CNRC studies:

- Baylor Infant Twin Study (BITS), H-36097, research on twins 4 months to 3 years old to better understand how babies and children

learn to control their behavior and feeding as they get older.

- Fatty Liver, H-31469, an investigation into risk for early heart disease among 11- to 21-year-old overweight youth.
- Teen Heart Health, H-30665, a study of normal and overweight 12- to 21-year-old youth with and without type 2 diabetes to investigate heart disease.
- Baylor Infant Orometer Study, H-40416, examines infants 1 to 4 months old and their feeding behaviors and overall behavior.

- Satiety Regulation Study, H-40538, measures certain hormones and their influence on fullness in preschool children 4 and 5 years old.

- Peppermint Oil Study, H-40351, looks at children 7 to 12 years old to learn how peppermint oil appears to relieve symptoms in children with frequent belly pain.

If you are interested in contributing to the world's knowledge of nutrition by volunteering for a study, contact Noemi Islam at nislam@bcm.edu or call 713-798-7002.

Early history of CNRC

The Children's Nutrition Research Center (CNRC) was the first USDA/ARS facility focused on children's and maternal nutrition research. It remained the only pediatric nutrition research center until a second, smaller center opened at Arkansas Children's Hospital in 1994.

Originally funded by Congress in 1978, the CNRC was housed in St. Luke's Medical Towers until its current facility, located on the Texas Children's Hospital campus, opened in 1988. Texas Medical Center and legislative luminaries including Ralph Feigin, MD, Michael DeBakey, MD, Bill Butler, MD, Rep. Jack Hightower, Rep. George Mahon, Rep. Bill Archer and Sen. Lloyd Bentsen all played a role in helping to establish the center.

The CNRC's founding director, Buford L. Nichols Jr., MD, professor emeritus, pediatrics-nutrition at Baylor College of Medicine, is a pediatric gastroenterologist who studies malnutrition and diarrhea in infants, particularly carbohydrate intolerance in babies. Nichols stepped down from his leadership post in 1993 and was succeeded by Dennis Bier, MD, its current director.

Neonatologist Steven Abrams, MD, is just one example of how CNRC researchers have changed the landscape of children's nutrition.

Through his work at the CNRC and Texas Children's Newborn Center, Abrams developed non-radioactive tracer methods for



studying mineral metabolism in infants, children and adolescents. This research led to what are now the accepted standards for feeding neonates with significant intestinal problems, allowing them to grow and thrive, and to the accepted Dietary Reference Intakes for calcium throughout the pediatric age range.

Abrams led the neonatal nutrition program at Texas Children's for 30 years before being named the first chairman of Pediatrics at the University of Texas Dell Medical School in Austin in 2015.



Up and Coming Researchers

Among the rising stars in research in the Baylor College of Medicine-Texas Children's Hospital Department of Pediatrics, these faculty members have received coveted National Institutes of Health (NIH) Mentored Clinical Scientist Career Development Awards. The purpose of these grants is to prepare clinically trained individuals for careers that have a significant impact on the health-related research needs of the nation.

Katherine Y. King, MD, PhD

Unlocking the secrets of the immune system

Everyone knows children get sick a lot. Usually, the infections are mild, but for some children, such as those who have a suppressed immune system as a result of chemotherapy or organ transplant, any infection can pose a serious threat.



"For these children, making sure their own immune systems don't harm them is as much of a concern as fighting the bacteria or bug that's causing the infection," said Katherine Y. King, MD, PhD, assistant professor of pediatrics-infectious disease.

"Because blood makes up the immune system, and stem cells in the bone marrow make blood, it's important to know how to modulate the behavior of bone marrow cells so that we have just the right amount of immune system to fight an infection but not too much to cause problems like autoimmune disorders," she said.

As described in a paper in *Cell Reports*, King's research team found that continuing to produce more immune cells due to long-lasting inflammation and infection leads to depletion in the number of stem cells in the bone marrow.

Stem cells also can be depleted by antibiotics. King's lab reported in *Blood* that this depletion is caused by the antibiotic's suppression of the normal bacteria that live in the gut.

"You need some low level of inflammatory signaling from the gut to keep the bone marrow active. If you get rid of all the bacteria in the intestine, then the bone marrow doesn't stay active as it should, and the blood counts go down," King said.

"Antibiotics are very powerful, but they also can have unintended effects. We'd like to understand more about

why that happens so that we can use antibiotics more safely."

King's research on the relationship of stem cells and the immune response garnered a \$1.3 million grant from the National Heart, Lung and Blood Institute (NHLBI) in 2017. A previous recipient of several private grants, she received another \$1.3 million NHLBI grant in 2017 for research on the contribution of infection and inflammation to cancer.

Geoffrey Preidis, MD, PhD

Deciphering the complexities of nutrition

Undernutrition in early life can have debilitating consequences that can last for the rest of the child's life. Some children who are malnourished will never fully recover, even after proper nutrition is restored. Why and how these consequences occur is the focus of Geoffrey Preidis' research.



"The same problems that we see in children in developing countries who don't have enough food to eat, we see right here among children in the

intensive care unit who've lost lots of weight due to medical conditions, in adolescents with eating disorders, and in premature neonates who are small for their gestational age," said Preidis, MD, PhD, a fellow in pediatrics-gastroenterology, hepatology and nutrition.

Consequences may include:

- Reduced production of bile acids by the liver. Bile acids are necessary for absorbing dietary fats and nutrients to help children gain weight and grow.
- Inability of the liver to synthesize a normal amount of coagulation proteins. This impairment predisposes undernourished infants and children to catastrophic bleeding.
- Slowing of transit through the intestines, which can lead to feeding intolerance and constipation.
- Changes in the gut microbiome, which make it even more difficult for children to gain weight and recover from malnutrition.
- Programming the liver to become "thrifty," which can help infants avoid losing weight when nutrients are scarce, but later in life places them at increased risk of developing obesity, type 2 diabetes and heart disease.

"We can't propose new therapies until we understand why these things occur, both acutely during hospitalization and over the long term," Preidis said.

His passion for understanding undernutrition was kindled through years of working with sick children

and families in Haiti and later in Kenya and Malawi. He is co-founder and president of Health Empowering Humanity, a nonprofit that empowers impoverished communities to achieve better health through medical services and community development.

The global health focus at Baylor and Texas Children's and the strong nutritional research environment were key factors in Preidis' decision to attend Baylor for his graduate and professional education.

His research received support from private grants and the NIH. He also served with The Bill & Melinda Gates Foundation as an expert reviewer in probiotics and global child health.

Andrew Landstrom, MD, PhD

Uncovering the causes of sudden cardiac death

You sometimes hear about it on the news – an apparently healthy teenage athlete collapses on the basketball court and dies. Although imaging and cardiac testing show a structurally normal heart, many of these children have been found to have molecular and genetic abnormalities that cause muscle defects or heart arrhythmias.



"We are at a new frontier in pediatric cardiology, where we can use genetics and molecular biology to identify these patients, identify the defect, and identify members of the family who might be at risk of the same sort of sudden death-predisposing disease," said Andrew

Landstrom, MD, PhD, assistant professor of pediatrics-cardiology.

As a graduate student, Landstrom researched junctophilin 2, a protein in the heart that is a rare cause of hypertrophic cardiomyopathy, a hereditary condition that causes a thickened heart muscle and a predisposition to sudden death. He is now exploring the role of this protein in the pacemaker of the heart and potentially fatal arrhythmias.

"A major focus of my current research is to figure out how this protein helps regulate the speed of the pacemaker of the heart and to identify therapies that may be used to cure children with a similar disease. From studying a small number of patients with hypertrophic cardiomyopathy, we've made substantive discoveries about how the heart works and how we might treat children with arrhythmic and cardiomyopathic disease in a way that's individualized to their actual molecular defect – truly individualized medicine," he said.

Landstrom simultaneously completed a postdoctoral clinical fellowship in pediatric cardiology and a research fellowship in molecular physiology/biophysics. He is now training in electrophysiology at Baylor and starting a new research lab.

"My research is synergistic with my clinical practice. I study arrhythmias in patients in the Texas Children's clinic and study the molecular defect of these patients in the lab. I'm really fortunate to be able to train in a place where the emphasis is on the patient and to be able to translate questions back and forth between the bench and the bedside," he said.

Education

Positive Effect on Culture



Far-Reaching Innovation



Anne Gill, DrPh, MS, RN, and Angelo P. Giardino, MD, PhD, MPH, chief of the Section of Academic General Pediatrics, discuss a research poster during a break in a section meeting.

Research nurse becomes esteemed medical educator

Nursing is a family tradition for Anne Gill, DrPH, MS, RN. Both her grandmothers were nurses, as were her mother and her older sister. Her aunt taught nursing at Purdue University. It seemed only natural that Gill, too, would become a nurse.

But Gill didn't dream that she would also become an esteemed medical educator and winner of a Baylor College of Medicine 2017 Barbara and Corbin J. Robertson Jr. Presidential Award for Excellence in Education.

Given to two faculty members each year, the award is Baylor's most prestigious, college-wide, competitive award for faculty educational service, recognizing stellar and enduring contributions to the educational mission of the college. In their letter of nomination for the award, Mark W. Kline, MD, chair of the Department of Pediatrics and physician-in-chief of Texas Children's Hospital, and Judith R. Campbell, MD, the department's associate vice chair of education, described Gill's impact as far-reaching across the continuum of medical education.

In 2017, Gill also was promoted to full professor in the Section of Academic General Pediatrics and in the Baylor Center for Medical Ethics and Health Policy, and she was named to the new position of Baylor's assistant dean for interprofessional education.

"The deanship signals the seriousness by which the leadership takes interprofessional collaboration," Gill said.

She leads a team developing a curriculum that fosters interaction between medical students and others on the health care team, including nurses, pharmacists, child life specialists and chaplains. For residents and fellows, the team is exploring ways to increase teamwork, collaboration and communication.

The Robertson education award and the interprofessional education deanship together represent a culmination of Gill's varied career to date.

*"There is a sense of camaraderie within the Department of Pediatrics, a nurturing attitude. The leadership wants you to succeed; they want you to excel."
– Anne Gill, DrPH, MS, RN*

A turn toward education

After receiving a Bachelor of Science in Nursing degree from the University of Texas at Austin in 1976, Gill worked for 10 years in critical care, then worked in a pediatrics office. When her family moved to San Antonio for her husband's job in 1991, she began working as a nurse educator at what is now St. Luke's Baptist Hospital.

"I had this epiphany right about the time I was close to 40 years old," Gill said. "I was teaching IV therapy, cardiac rehab and basic life support, and I just loved it. I decided to get my master's degree so I could teach nursing."

When they returned to Houston in 1994, she continued to work toward her master's degree at Texas Woman's University (TWU).

At that same time, a joint position as research nurse at Baylor and

coordinator of the new Pediatric Injury Center at Ben Taub Hospital dovetailed with Gill's experience in critical care and pediatrics and offered research opportunities for her master's degree. On the interview committee for the position was Teri Turner, MD, MPH, MEd, a fellow in the Pediatric Injury Center, who became a good friend and mentor to Gill.

"What I saw was someone who was meticulous in her attention to detail, someone who had a breadth of experience and who could bring a different perspective," said Turner, now vice chair of education in the Department of Pediatrics and director of the Center for Research, Innovation and Scholarship in Medical Education at Texas Children's Hospital. "She had experience in the community and, being a nurse, she brought a different lens to help us in taking care of patients."

As Gill completed her Master of Science in Nursing degree with a minor in education at TWU in 1999, she was promoted to the Baylor faculty as an instructor in the Section of Academic General Pediatrics. She continued coordinating the Pediatric Injury Center and teaching pediatric injury prevention to medical students and residents.

Recognition for teaching

Gill was encouraged to present as a member of the Journal Club and was soon appointed to run the club. The Journal Club, which includes faculty, fellows, residents and medical students, fosters improving patient care, teaching critical appraisal skills, improving reading habits, increasing knowledge of clinical epidemiology

and biostatistics, and increasing use of medical literature in clinical practice. Each week, a member presents and leads a discussion about a topic and then is evaluated on teaching skills.

Gill was recognized as a gifted teacher and asked to become a peer reviewer of teaching for section faculty. She won the section's Special Projects Teaching Award for her administration of the Journal Club in 2001, the first of multiple awards related to teaching. However, she realized in order to truly progress as faculty, she would need a doctoral degree. Encouraged by her section head, Gill decided to pursue a Doctor of Public Health (DrPH) degree part-time at the University of Texas Health Science Center at Houston (UTHealth) School of Public Health.

At the same time, Gill began to split her efforts between the Department of Pediatrics and Baylor's Office of Curriculum and transitioned from the Pediatric Injury Center to assistant course director of the Baylor third-year medical school course, Longitudinal Ambulatory Care Experience.

From dream to reality

After completing her DrPH degree in 2007 with a dissertation on public health education in medical schools, Gill was instrumental in starting the MD/Master of Public Health (MPH) program at Baylor.

"The MD/MPH program had been a dream for many faculty and administrators for a good 10 years," Gill said. "Many physicians who work in primary care or infectious disease believe that all physicians need the knowledge, skills and attitudes that are acquired with public

health training. While medical school does introduce biostatistics and epidemiology, the MPH degree makes one proficient in these skills, which are required for a critical understanding of the literature and necessary to lead and conduct research."

At the request of Baylor's dean of education, she worked with the UTHealth School of Public Health to develop the curriculum and presented the plan to Baylor's Academic Council for approval.

"I made a list of the top 10 medical schools in the country, and I showed the Academic Council which ones had dual degrees. They all did," Gill said.

The program was approved. Because of her DrPH, she was able to mentor and assist fellows in academic general pediatrics as they worked toward their MPH degrees. She served as assistant director of the program for five years and then director for four more.

Educational leadership

Gill's leadership in new and innovative programs has greatly impacted Baylor's medical school curriculum over the years, led to publications and invited presentations, and served as the basis for numerous educational grants.

Because of her training in ethics and professionalism and her interprofessional background, Gill was:

- Chair for seven years of the Professionalism Appraisal and Competency Evaluation Committee for medical students. She led efforts to introduce this new evaluation program into the medical school and continued as a committee member after she stepped down as chair.

- Director of a new Baylor Second-Year Patient Safety course. The course includes an activity in which students and faculty from the Baylor medical school, TWU nursing school and University of Houston pharmacy school interact in a collaborative effort to solve a case related to patient safety. Nearly 800 students have taken part in the exercise over the last four years, and student evaluations ranked it highly.

- A member of the committee creating and implementing Team Launch, an interdisciplinary teamwork skills course that teaches students how to participate in and lead teams that solve complex problems, preparing them for careers in team-based science and health care.

- Principal investigator on a project to increase the behavioral and social sciences in medical education, which received a \$1,175,000 grant from the National Institutes of Health.

- A member of two Association of American Medical Colleges committees, through which she advocates for improving medical education and the student experience in the U.S. and Canada. She chairs the AAMC Student Surveys.

Mentor and inspiration

"The accomplishments of Dr. Gill are multiplied several fold by the many faculty she has mentored and inspired throughout her career," Kline and Campbell said in their award nomination. "She is a valuable resource to students, residents and faculty who

are starting their journey as educators, as well as established educators who are looking to improve, innovate and promote excellence."

As a member of the Center for Research, Innovation and Scholarship in Medical Education and a winner of five Norton Rose Fulbright Faculty Excellence Awards, she provides educational coaching, research mentorship and consultation for faculty submitting portfolios for the awards. She has mentored more than 80 award applicants and has a success rate of about 80 percent. The Department of Pediatrics is

the only department at Baylor to provide dedicated faculty assistance for those seeking these awards, and the department has won more awards than all the other departments put together.

"There is a sense of camaraderie within the Department of Pediatrics, a nurturing attitude. The leadership wants you to succeed; they want you to excel," Gill said.

For example, Gordon E. Schutze, MD, the department's executive vice chair, stopped her in the hallway one day and asked about her future career

plans. She credits his encouragement with prompting her to apply for promotion to full professor, which paid off.

"Just the sense that the leaders were there rooting for me, cheering me on and giving me these opportunities – it was really through those efforts that I was able to succeed," she said.

At Baylor and across the country, Gill's influence on broadening the scope of medical education has been felt, just as the scope of her own education and experience has broadened through the years.



Teri Turner, MD, MPH, MEd, right, was on the interview committee when Anne Gill, DrPH, MS, RN, was hired at Baylor and has been a mentor and friend ever since.

Up and Coming Educators

Among the rising stars in education in the Baylor College of Medicine-Texas Children's Hospital Department of Pediatrics, these faculty members are so devoted to improving the practice of pediatrics through improving education that they pursued extra educational opportunities for themselves. Two of them completed Master of Education degrees, and one attended a prestigious educational program at Harvard.

Danny Castro, DO, MEd

Educating at many levels, from med students to senior faculty

Emphasis on education at Baylor and Texas Children's doesn't stop with medical students. Education is regarded just as highly for residents, fellows and members of the faculty.



That's why it's the perfect environment for Danny Castro, DO, MEd, assistant professor of pediatrics-critical care medicine and associate director of education for the Pediatric Critical Care Fellowship.

"I really have a passion for teaching," said Castro, who also is medical director of Respiratory Care at Texas Children's. "It started with the bedside teaching I did during residency and fellowship training. I always got good feedback from the students, residents and faculty members. When I was graduating, I found that Baylor had a lot of opportunities to foster that aspect in my career."

He credits senior faculty and his section chief for mentoring, supporting and fostering his development.

In the Section of Pediatric Critical Care Medicine, Castro helps coordinate the medical students' month-long rotation.

During clinical teaching with residents and fellows, Castro models how to talk and engage with patients' families.

"I try to impress upon them the importance of communication with the families and staff, especially in today's complex health care landscape," he said.

He is a member of the planning and coordinating committee for the Department of Pediatrics faculty educational retreat, which brings physicians, physician's assistants and nurse practitioners together for

speakers and workshops exploring innovative educational topics.

Castro received an American Thoracic Society (ATS) Innovation in Fellowship Education Award in 2014 for development and implementation of an annual orientation curriculum for first-year pediatric critical care fellows. A second ATS award followed in 2016 for a curriculum to teach fellows interprofessional teamwork and its relationship to safe, high-quality patient care.

In 2015, Castro completed a Master of Education degree at the University of Houston and won a Fulbright & Jaworski LLC (now Norton Rose Fulbright) Faculty Excellence Award in Teaching and Evaluation. In 2017, he received a Baylor Pediatric Award of Achievement in Educational Innovation.

Jennifer Rama, MD, MEd

Applying the scholarship of education

When Jennifer Rama, MD, MEd, became interested in medical education, she realized she had a lot to learn herself.



An assistant professor of pediatrics-pulmonary, Rama enrolled in Baylor's two-year Master Teacher Fellowship Program.

"I wanted to be a better teacher, but I also learned a lot about the scholarship of education. I realized there is a systematic way to go about creating new curricula, and great benefits in conforming to well-known, research-backed educational principles and processes," Rama said.

Appointed director of the Pediatric Pulmonary Fellowship Program, she decided to pursue a Master of Education degree at the University of Houston.

"I was trained to be a doctor, but that skill set is not necessarily the same as training other people to become doctors. If I wanted to do it as effectively as possible, adding the more rigorous aspects and the more theoretical aspects allowed me to excel," she said.

Rama's development of an interactive respiratory therapy curriculum and its integration into the fellowship training program received a 2013 American Thoracic Society Innovation in Fellowship Education Award. In 2015, her team-based learning curriculum for board review also received the award. Team-based learning fostered skills useful not only in preparing for board exams but also for developing critical thinking and teamwork abilities of a competent physician.

"These curricula helped to bring the program more in line with how newer generations of trainees learn. Whereas traditionally medical education was

a lot of lectures and didactics, we're introducing a lot of interactivity to the fellowship curricula – more hands-on, more discussion, more theoretical-based learning strategies," she said.

"One of the great things about Baylor is that medical educators are recognized and valued for their work. There's a rigorous system with criterion-based awards in addition to support from leadership. That's a really great way to fuel people's passion."

Rama's accomplishments in education were recognized with a Department of Pediatrics Educational Innovation Award in 2014 and Norton Rose Fulbright awards in 2016 and 2017.

Diana Stewart, MD, MBA

Choosing 'endless possibilities' in medicine

When she was 4 years old, Diana Stewart, MD, MBA, told her parents she was going to be a doctor.



"I always knew I wanted to take care of people, and I knew I liked science," said Stewart, assistant professor of medicine and pediatrics. "Then I realized, with medicine, you could be a clinician and take care of patients, but you also could be an educator and an administrator. I fell in love with the endless possibilities of the medical field."

For the past five years, Stewart has focused on teaching students and faculty about quality and patient safety, subjects that are increasingly important in hospitals and in medical education

accreditation. She has co-authored a number of relevant articles in medical education journals.

"My MBA (from Rice University) had given me a great background in communication and how to align people around a particular vision, but I realized that just because you want to teach doesn't mean you have the skills for it. I had a gap in my training," she said.

Stewart decided to apply for the prestigious Harvard Macy Institute Program for Educators in Health Professions, and she was accepted. After completing the program, she returned as a faculty scholar to mentor other participants. She also mentors students at Baylor.

"At every step, you should mentor someone to go beyond you, achieve even more than you have. It's important to have women and minorities serving as mentors, because they inspire others like them to join the field. Physicians should reflect the patients they serve, and our patients are very diverse," she said.

Now that she's achieved mentor status, that doesn't mean she doesn't need any of her own.

"You need to have someone to bounce your ideas off of and ask, 'Do you think this is the right decision for me at this time?' I've had mentors who are more senior and mentors who are peers. You have to pick someone who has the time, who understands what your passions are, and who's willing to be honest with you. I don't think that anything you do in life can be done alone."

News of Note



The first Texas Children's Urgent Care Center in Austin opened in March 2018.

Texas Children's extends clinical care to Austin

Texas Children's Hospital is expanding its expert pediatric and maternal care services into Austin.

The first pediatric urgent care clinic in Austin opened in March 2018, providing high quality, efficient and affordable pediatric care after hours and on weekends in a convenient location.

A Texas Children's Specialty Care location is scheduled to open in October 2018. Over the next five years, plans call for opening three additional pediatric urgent care clinics, as well as 18 primary care pediatric practices, three pediatric specialty care locations and two maternal-fetal medicine practices across the city. All will be staffed by board-certified physicians, surgeons, therapists and clinical staff.

Texas Children's aspires to collaborate with the many established pediatric and OB/GYN providers in the region to help support the growing Austin market. Texas Children's Pediatrics will build on its 20 plus years of experience working with community pediatricians and will partner with existing pediatric primary care practices in the region.

"We are being thoughtful in our approach to the services we plan to bring to the Austin community," said Michelle Riley-Brown, executive vice president at Texas Children's. "Our goal is to elevate the level of care provided to children and women throughout the state by supplementing and adding value to the great health care options already available to Austin-area families."

Texas Children's Pediatrics, now the nation's largest primary-care network for pediatric doctors, was established in 1995, and the hospital's first urgent care clinic in Houston was opened in 2014. Texas Children's now has nine such clinics in the Houston area.

The new Urgent Care Center in Austin is located at 4477 S. Lamar Blvd., Suite 400. The phone number is 512-892-9231.

Texas Children's ranks fourth in the nation

Texas Children's Hospital ranked fourth in the country among the nearly 200 pediatric centers, on the *U.S. News & World Report* Best Children's Hospitals list, published in June 2017.



For the ninth straight year, Texas Children's, working closely with academic partner Baylor College of Medicine, was placed on the Best Children's Hospital Honor Roll. Texas Children's is one of only 10 children's hospitals across the country to achieve the Honor Roll designation, and the only hospital in Texas – and the southern U.S. – awarded this distinction.

Over the last decade, no other pediatric hospital in the state has ever achieved an overall ranking as high as Texas Children's.

Each year, in addition to ranking pediatric hospitals overall, *U.S. News* also ranks the top 50 pediatric hospitals across 10 major subspecialties. In the 2017-18 edition, Texas Children's Heart Center® ranked as the best cardiology and heart surgery service in the country. Overall, 8 subspecialties ranked in the top ten.

- #1 Cardiology and Heart Surgery
- #2 Pulmonology
- #4 Cancer
- #4 Gastroenterology & GI Surgery
- #4 Nephrology (kidney disorders)
- #4 Neurology and Neurosurgery
- #6 Diabetes and Endocrinology
- #6 Urology

"I am tremendously proud of every clinical service here at Texas Children's and in the Department of Pediatrics at Baylor," said Mark W. Kline, MD, physician-in-chief of Texas Children's and chair of the Department of Pediatrics at Baylor. "The commitment to mission, compassion and talent are unequaled in improving the health and lives of children and families across Houston, Texas, and the world."

ACCESS - Texas studies childhood cancer causes

Despite progress in the treatment of childhood cancer, the vast majority of cases have no recognizable cause.



A special focus of ACCESS-Texas research is the Hispanic population, which has higher rates of cancer and worse outcomes than other groups.

A \$6 million grant from the Cancer Prevention and Research Institute of Texas supports a statewide effort, led by Baylor College of Medicine and Texas Children's Hospital, to identify and understand the causes of childhood cancer.

The funding supports development of the Adolescent and Childhood Cancer Epidemiology and Susceptibility Service for Texas, or ACCESS-Texas. The goal is to identify genetic risk factors and gene-environment interactions associated with susceptibility to cancer in children and adolescents.

“Once we more fully understand the causes of childhood cancers, we can start to develop prevention strategies,” said Michael Scheurer, PhD, MPH, associate professor of pediatrics-hematology/oncology at Baylor and director of ACCESS-Texas.

The cooperative effort involves seven childhood cancer treatment centers across the state: Baylor

and Texas Children's, Children's Hospital of San Antonio (CHofSA), UT Southwestern/Children's Medical Center Dallas, Cook Children's Medical Center in Fort Worth, Vannie Cook Children's Cancer Clinic in McAllen, and Texas Tech University children's hospitals in Lubbock and El Paso.

Data are collected through a risk-factor questionnaire given to patients and their parents. The center also collects blood and saliva samples, along with key clinical and follow-up data. All the data and biospecimens are stored in a central repository that is accessible to researchers.

A special focus is the Hispanic population, which has higher rates of cancer and worse outcomes. ChofSA is one of the sites that cares for numerous Hispanic patients and can address those specific needs.

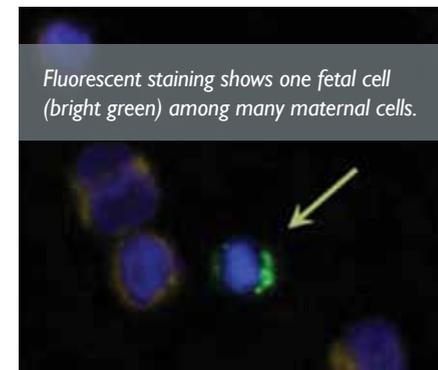
“We serve a unique population that is often under-represented in national studies, so this is a significant

opportunity to further advance knowledge that will benefit our children,” said Vivienne Marshall, PhD, professor and director of clinical research at the Max and Minnie Tomerlin Voelcker Clinical Research Center at CHofSA.

Research seeks to improve noninvasive prenatal testing

Fetal cells were first reported in the blood of pregnant women more than 40 years ago, and the hope since that time has been to use those cells for prenatal diagnosis. The main obstacles to achieving this goal were the very small number and the fragility of the cells.

At long last, researchers at Baylor College of Medicine, Texas Children's Hospital, Drexel University College of Medicine and biotechnology company RareCyte Inc. have determined that it is feasible to develop a prenatal, noninvasive genetic test based on these rare fetal cells.



Fluorescent staining shows one fetal cell (bright green) among many maternal cells.

“About two tablespoons of blood (20 to 30 milliliters) has hundreds of billions of maternal red blood cells and hundreds of millions of white blood cells but only 20 to 40 fetal cells. We showed that we frequently can recover three to 10 or more fetal cells and analyze them in various ways, including next generation DNA sequencing,” said senior author

Arthur Beaudet, MD, who is the Henry and Emma Meyer Chair of Molecular and Human Genetics and professor of molecular and cellular biology and of pediatrics at Baylor.

“At present the group can only process five to 10 samples per week on a research basis, and they are focused on increasing this number so that the test could be offered more widely as a routine clinical test,” he said.

Although other noninvasive methods for genetic testing, such as cell-free fetal DNA testing, are widely available, they have limitations. For instance, cell-free DNA testing cannot reliably detect very small changes in the fetal genome, in particular gene deletions that can lead to devastating diseases such as Angelman syndrome, a severe developmental disability.

Beaudet anticipates that, if the test can become routine, it could offer comparable information to that obtained by amniocentesis and chorionic villus sampling. These invasive tests carry risks of infection and miscarriage.

Many children outgrow common food allergies

It may not be necessary to avoid eggs or wheat forever just because you once had a mild reaction to eating them.

Research led by Carla Davis, MD, showed that many people outgrow some common food allergies. Davis is associate professor of pediatrics and chief of the Section of Allergy, Immunology and Rheumatology at Baylor College of Medicine and Texas Children's Hospital.

Published in 2017 in the *Annals of Allergy, Asthma & Immunology*, a study of more than 6,300 low-risk oral food challenges in five food allergy centers across the U.S. found that 86 percent of the children and adults showed no reaction. Fourteen percent had any reaction, and only 2 percent experienced anaphylaxis, a severe potentially life-threatening reaction.

In an oral food challenge, a patient is given gradually increasing amounts of the suspected food and monitored for an allergic reaction. The supervising allergist is equipped to treat a severe reaction promptly.

More than 90 percent of food allergies are caused by eight types of food. More than half of children outgrow reactions to four of those – milk, eggs, soy and wheat – by age 16, Davis said. Allergies to the other four – peanut, tree nut,

shellfish and fish – tend to persist into adulthood. Only 20 percent of children outgrow peanut allergies, which cause the most deaths.

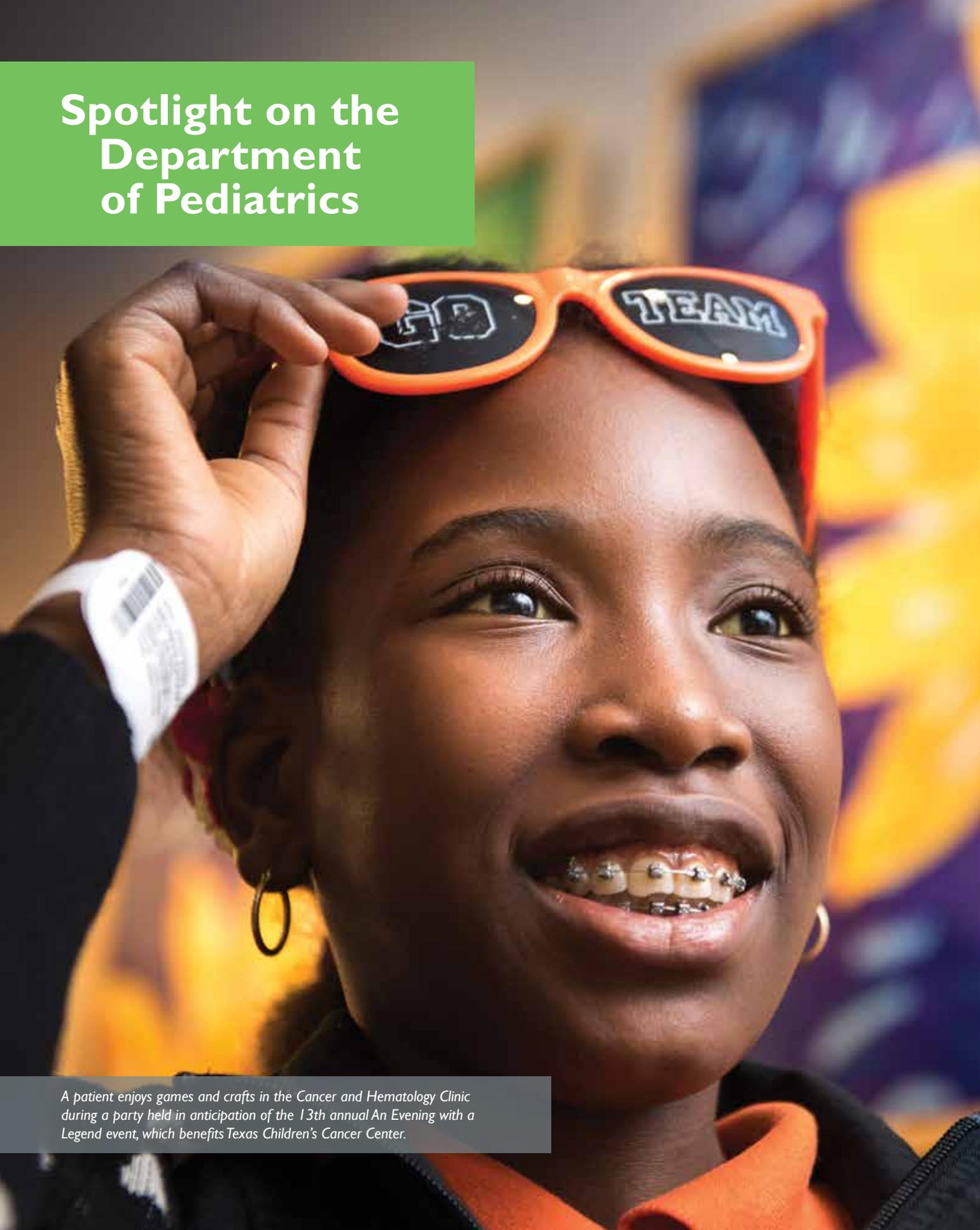
Many people who believe they have a food allergy may actually have a food intolerance, Davis said. Food allergies are caused by an abnormal reaction of the immune system. In food intolerance, symptoms like bloating, diarrhea and gas are not caused by the immune system.

“The only way to prove definitively whether people have food allergies is the oral food challenge, which should be performed with physician supervision,” she said. “Having the food challenge increases the quality of life in patients that don't have food allergies. A person with a life-threatening food allergy has to be much stricter with avoidance of that food than a person who has a food intolerance.”



Testing has shown that children often outgrow common allergies to milk, eggs, soy and wheat, but seldom to peanut, tree nut, shellfish and fish.

Spotlight on the Department of Pediatrics



A patient enjoys games and crafts in the Cancer and Hematology Clinic during a party held in anticipation of the 13th annual An Evening with a Legend event, which benefits Texas Children's Cancer Center.

By the Numbers 2017

Baylor College of Medicine* Department of Pediatrics

One of the largest, most diverse departments of pediatrics in the United States

- #1 provider of pediatric HIV/AIDS care and treatment in the world
- #3 rank of pediatrics in National Institutes of Health funding for 2017 by Blue Ridge Institute for Medical Research
- #9 rank of pediatrics educational program for 2017-2018 by U.S. News & World Report
- 1,248 full-time, part-time, secondary and voluntary faculty
- 184 residents
- 189 clinical postdoctoral fellows
- 75 research postdoctoral fellows
- 1,528 applicants for 48 slots in pediatric categorical residency program
- 12 books written or edited
- 454 chapters written or edited
- 1,378 journal articles
- \$69 million in federal research funding
- \$8.4 million in state research funding
- \$63.7 million in gifts and contributions from individuals and foundations



Texas Children's Hospital**

- #4 rank on U.S. News & World Report Best Children's Hospitals list
- 33,366 total patient admissions
- 227,984 census days
- 126,112 Emergency Center visits
- 2,422,895 distinct patient encounters
- Patients from 74 countries



*Baylor College of Medicine = July 1, 2016 – June 30, 2017

**Texas Children's Hospital = October 1, 2016 – September 30, 2017, including Main Campus, West Campus and Pavilion for Women

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For a patient referral form, see texaschildrens.org/refer/