Dear Colleagues,

It has been a great honor and privilege to serve as a surgeon for nearly 30 years and as president of Spectrum Health Helen DeVos Children’s Hospital for the past 14 years. Even as I look forward to my retirement at the end of the year, it is gratifying to take a look back.

I am proud of the phenomenal growth in the breadth of services that we now offer to patients and families. We will continue to value the great physician partners we’ve come to know throughout Michigan, and we will always appreciate it when you trust us to be part of your patients’ care.

Working toward our goal of being the safest and most highly reliable children’s hospital has been challenging and hugely satisfying. I am convinced that we are among the safest hospitals in the country, if not the safest. This important work of improvement will certainly continue.

Rich DeVos’ strongest influence on me and the rest of our small children’s team beginning 30 years ago was his unwavering belief that we were on the right path to make great things happen for the children. I know he recognized our energy and drive, our passion for kids, the sacred importance of our work and our caring for each other. I will be retiring with that same strong confidence that great things will continue to happen at Helen DeVos Children’s Hospital. The future is bright. Thanks to all of you for your strong support over so many years.

With deepest gratitude,

Bob Connors, MD
President, Helen DeVos Children’s Hospital
Pectus Excavatum Patients Are Benefiting From Preoperative and Postoperative Innovations

In 1998, Donald Nuss, MD, of Children’s Hospital of The King’s Daughters in Norfolk, Virginia, introduced the minimally invasive Nuss procedure, commonly used to correct pectus excavatum. Small incisions are made on either side of the chest, and under the guidance of a narrow scope with attached camera, a curved steel bar is inserted under the sternum and fixed to the ribs on both sides of the chest. The metal bar is surgically removed after several years when the deformity has been corrected. Pediatric surgeons Marc Schlatter, MD, and James DeCou, MD, learned the procedure directly from Dr. Nuss and perform the surgery at Helen DeVos Children’s Hospital.

The cause of pectus excavatum is not certain. Dr. DeCou says, “There is definitely some genetic component because it tends to run in families.” He says, “I have seen and treated one family in which all four kids had a significant pectus excavatum.”

He says the Nuss procedure is predominantly performed in children. “The best age to undergo the procedure is from 13 to 16 years old, although we have also had success with patients as young as 8, and as old as 37,” he adds.

“We each have 20 years of experience performing the Nuss procedure in children, and we have an excellent safety record,” Dr. DeCou says. “Another advantage is our approach to pain management. We’ve had tremendous success shortening the length of stay, and Dr. Schlatter has pioneered a lot of this work.”

Over the past two decades, Dr. Schlatter has been dedicated to making ongoing improvements and modifications in various aspects of his patients’ care in order to enhance their recovery. He has developed a program of preoperative consultation. Dr. Schlatter’s focus has led to the successful reduction of the hospital length of stay (LOS) for his patients to just one day, a marked improvement from the national average of three to five days at other institutions.

Additionally, patients successfully stop using narcotics by the end of the first week following surgery.

Several factors have contributed to this success, including the use of intercostal nerve blocks to help diminish postoperative pain and the development of a protocol for scheduling pain medications after surgery in a way that serves as a successful bridge to the discontinuation of all narcotics within the first week of recovery.

Perhaps the most important factor contributing to this success has been Dr. Schlatter’s focus on addressing patients’ anxiety preoperatively and diminishing anticipatory stress. Dr. Schlatter says he seeks to make the consultation and evaluation process a helpful educational experience for patients and families, who not only learn about the impact of pectus excavatum on the cardiopulmonary system, but are also provided compelling information regarding the role that unrecognized or unaddressed anxiety can have on the speed and quality of recovery. “Mindfulness techniques have been shown to be a helpful resource in this regard and are sometimes discussed with patients and families during the consultation,” he explains.

A retrospective review of 173 of Dr. Schlatter’s patients who underwent the Nuss procedure between 2001 and 2017 examined the impact of three different successive analgesia approaches, along with the effect of enhanced preoperative consultation to educate patients about anxiety and reframe patient pain expectations. The review was published in the April 2019 edition of the Journal of Pediatric Surgery (Dr. Schlatter, Long V. Nguyen, Maria Tecos, Elle L. Kalbfell, Omar Gonzalez-Vega, TediVlahu).

The review found that patients who received an epidural after surgery had an average LOS of 4.4 days, while those who received patient-controlled analgesia delivered using a computerized pump, in conjunction with intercostal nerve block, had an average LOS of 2.2 days. Those most recent patients who received scheduled oral pain medications and intercostal nerve blocks had an average LOS of 1.6 days.

The collaborative efforts of Drs. DeCou and Schlatter at Helen DeVos Children’s Hospital have resulted in improving the physical and psychological well-being of many children who were suffering from pectus excavatum. Their success in reducing LOS and use of narcotics postoperatively fuels their desire to treat even more patients with thisrepairable condition.

Dr. Schlatter says that after the journal article was published, “Dr. Nuss emailed me and said, ‘This is fantastic.’ “That kind of positive reaction, along with the benefits to my patients, is very rewarding,” Dr. Schlatter says.

Dr. DeCou says he also hears from many parents who appreciate the positive self-image their children have after undergoing the procedure. “We also see significant improvements in cardiopulmonary function,” he adds.

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Chronic Abdominal Pain Requires Broad Thinking

Chronic abdominal pain can be caused by such a wide variety of organic gastrointestinal illnesses and non-gastrointestinal conditions that an open mind and broad thinking are necessary to arrive at an accurate diagnosis and course of action.

“Abdominal pain is a huge portion of my practice,” says Deborah Cloney, MD, section chief of pediatric gastroenterology at Spectrum Health Helen DeVos Children’s Hospital. “I would estimate that 25% of my new referrals are for abdominal pain of some sort, and 90% of those have a functional gastrointestinal disorder.”

Functional abdominal pain is pain that cannot be explained by any visible or detectable abnormality, even after a thorough physical examination and appropriate testing. Abdominal pain can occur in several types of functional gastrointestinal disorders, including functional abdominal pain, functional dyspepsia and irritable bowel syndrome.

“It is common for primary care providers to see children with abdominal pain, and for the vast majority of patients, there is no significant organic illness,” Dr. Cloney says. “Nonetheless, they should be on alert for the red flags that would indicate organic disease.”

Those red flags, Dr. Cloney says, include:

- Weight loss
- Any persistent fever
- Growth failure ("For example, if a child is gaining weight but at a slower rate than in the past, then the physician should check the change in weight and height percentiles," Dr. Cloney says. “If the child was in the 75th percentile, then dropped to the 50th, then to the 20th, an underlying disease should be considered.”)
- Blood in the stool
- Vomiting or diarrhea that has been consistent since the pain began
- Family history of gastrointestinal illness such as celiac disease

The findings from a thorough physical exam are also important, Dr. Cloney says. “Is it hard to describe the pain or pain that is difficult to define?” she says. "Is the pain generalized or limited to one area such as the belly button?"

Functional pain is often vague in nature, generalized or periumbilical in location and without radiation. For example, she says, if the child has Crohn’s disease, he or she may indicate the pain is situated in the right lower side, the location of the ileum.

Physicians should ask about not only diarrhea but also constipation, she says. “Determine if the child has had stools or if they have been skipping days between stools,” she says. “If so, they may want to recommend a stool softerener before pursuing further evaluation.”

Once the physician has gone through all the necessary steps, the decision can be made as to who needs further evaluation and who needs advice and management, Dr. Cloney says.

If there is a significant indication of organic illness as the cause of the pain, further testing may include a complete blood count and chemistry profile, erythrocyte sedimentation rate and C-reactive protein tests, and/or a screening for celiac disease. “The tests may or may not include a urinalysis,” she says. “Also, quite frequently we would conduct a rectal exam or request a hemoccult to test for blood in the stool.”

If the laboratory test results indicate an abnormality, “that is the point most primary physicians would want a gastroenterologist to see the patient for a possible endoscopic examination or additional bloodwork,” Dr. Cloney says. While some physicians may screen for the bacterium Helicobacter pylori, “we do not recommend this for children with chronic abdominal pain,” Dr. Cloney says. “Not all H. pylori tests are created equal. The (H. pylori) antibody could remain positive for a long time, even when there is no clear, active infection. That would lead to treatment for children who do not need it.”

She says H. pylori is not all that common in children. “If the child had been overseas or in an orphanage setting where the transmission of the bacterium is more common, that might raise my suspicions,” she says. “In that case, the gold standard for diagnosis is an upper endoscopy, although the H. pylori fecal antigen is a reasonably reliable test.”

There are many ways to treat functional abdominal pain, Dr. Cloney says. “The first is diet manipulation,” she says. “Get a good diet history. If it is heavy with carbonation, caffeine, greasy foods and things such as energy drinks, changing to a healthier, high-fiber diet can decrease symptoms.” Stress also can trigger or worsen functional abdominal pain. “If the child presents with functional abdominal pain and is in a highly stressful situation at home or school, helping the family understand how the brain and gut work together can make it easier to manage the pain,” Dr. Cloney says.

“Peppermint can reduce the symptoms, but I would not recommend straight peppermint oil,” she says. “That can induce acid reflux and other symptoms.” Dr. Cloney says there is evidence that probiotics may also be helpful. “But there is not really strong evidence at this point. I have no objection to trying probiotics, but if it isn’t working after a month, it probably won’t work.”

The key is to understand that functional abdominal pain is a real condition. “Seldom is a child making up symptoms or just faking,” Dr. Cloney says. For parents, the lack of a clear cause for the pain can be frustrating. “The vast majority of the parents I meet think there is something going on, but that the cause has been missed by the previous exams and tests,” she says. Even when a pediatrician or primary care doctor has explained functional abdominal pain to the family, sometimes a referral is necessary to put fears to rest. “If we also determine that it is functional abdominal pain and not an organic illness,” Dr. Cloney says, “it can help if the family hears it from us as a second opinion.”

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Deborah Cloney, MD

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Deborah Cloney, MD
Screening Is a Vital Tool in Teenage Suicide Prevention

Rising rates of suicide for adolescents ages 15-19 both nationally and in Michigan are evidence of a crisis that requires additional preventive efforts such as routinely screening for depression and anxiety.

“Emergency departments across the nation are reporting a huge influx of suicide attempts by children, adolescents and young adults, and we are no different,” says Jennifer Bowden, MD, child and adolescent psychiatry specialist and section chief of Behavioral Health at Spectrum Health Helen DeVos Children’s Hospital.

The United Health Foundation’s 2019 America’s Health Rankings Health of Women and Children Report states that teen suicide in the United States in the past three years has increased 25%, from 8.4 to 10.5 deaths per 100,000 adolescents ages 15-19.

Suicide has risen to become the second-leading cause of death among adolescents and young adults ages 15-24 in Michigan (behind “unintentional injuries”). The suicide rate for that age group in Michigan in 2018 was 14.7 per 100,000 population, compared with a rate of 13.1 for the U.S.

The Michigan Department of Health and Human Services reports that young men die by suicide nearly four times more often than young women in Michigan, 16.1 versus 4.1 per 100,000 population.

Far more adolescents have suicidal thoughts or attempt suicide and survive than those who die by suicide. Results from the 2017 Youth Behavioral Risk Factor Surveillance System indicate that in the previous 12 months, 17.2% of high school students seriously considered attempting suicide and 7.4% attempted suicide.

“These statistics show why screening for depression and anxiety is essential in all primary care settings,” says Dr. Bowden.

She says between 40% and 50% of people who attempt suicide report having recently visited a primary care provider. “That is the time to identify a child with significant risk factors and intervene,” she says.

Screening and an open, honest exchange with a primary care provider can reveal suicide warning signs, which include:

• Feeling like a burden
• Being isolated
• Increased anxiety
• Feeling trapped or in unbearable pain
• Increased substance use
• Looking for a way to access lethal means
• Increased anger or rage
• Extreme mood swings
• Expressing hopelessness
• Sleeping too little or too much
• Talking or posting about wanting to die
• Making plans for suicide

“Although teenagers may be hesitant to reveal issues that are affecting their mental health, it helps if they can be interviewed without a parent present,” Dr. Bowden says.

The rising teenage suicide rate has mental health professionals asking questions, but few have definitive answers as to precisely why. Depression is a primary risk factor for suicide, but not every suicidal child is depressed, Dr. Bowden says.

Dr. Bowden says stress, alcohol or substance abuse, a major family disruption and attention deficit hyperactivity disorder are also risk factors. Children who identify as LGBTQ also have a higher rate of suicide attempts. Access to weapons independently increases the risk, she says, as adolescents are developmentally impulsive and may act on impulsive thoughts of suicide.

“For some teens, a romantic or friendship breakup can be a trigger,” she says. “Adolescents often put these interests above their families, so a breakup like this can be as devastating as a loss due to death or divorce.”

When suicidal death is celebrated or glorified by social media, movies or television, there can be a copycat effect, but when suicide is depicted and followed by a discussion on how it should not be considered an answer to a problem, it reduces that effect. As medical professionals, teachers and parents, we have a responsibility to lead that discussion.

Jennifer Bowden, MD

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Continued
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Jennifer Bowden, MD

“… especially if they live in small, rural towns where their opportunities for active socialization with similar peers are minimal.”

On the other hand, she says, “one of the trends we see here is that some kids who tend to isolate themselves then go on social media and perceive that they are interacting with their peers, but because these are not quality social interactions, it can lead to worsening feelings of isolation. The more time teens spend on electronics of any kind, the greater the risk for anxiety and depression.”

She says the number of teens who attempt suicide after their parents take away their cellphones or place limits on the use of social media “shows how integral these devices have become in kids’ lives. Take them away and they think they can’t live without them. This is yet another reason why it is so important to set limits with electronic media for children and adolescents from the very beginning of their use.”

Another danger with free access to electronic media is that there are countless depictions of suicide on the internet, she says, including websites that explain how to die by suicide.

No matter the form in which it is delivered, if the message teens receive is that suicide is a viable option, they will consider it, Dr. Bowden says.

“… When suicidal death is celebrated or glorified by social media, movies or television, there can be a copycat effect,” she says. “But when suicide is depicted and followed by a discussion on how it should not be considered an answer to a problem, it reduces that effect. As medical professionals, teachers and parents, we have a responsibility to lead that discussion.”

Several nationwide hotlines are available as resources, such as the National Suicide Prevention Lifeline, at 800.273.8255 or suicidepreventionlifeline.org; or text CONNECT to 741741, and America’s suicide prevention hotline, 877.365.8860.

Helen DeVos Children’s Hospital. “A lot of these tests will come back positive, but does that mean the child has lupus or other rheumatic disease? ANA does not automatically equal lupus or other rheumatic disease, and that is the conundrum. Many physicians misunderstand these initial test results.”

Dr. Abulaban says pediatric rheumatic disease is not rare but also not widespread. “Even for those children with moderate to high ANA, I would say the majority will not have a rheumatic disease, but further testing is necessary in patients with high ANA,” he says.

Several methods to test ANA are available, including the immunofluorescence assay (IFA) and the enzyme-linked immunosorbent assay (ELISA). The IFA test is performed by taking a sample of blood serum and diluting 1 part of the serum into 40 parts of diluent (called a “1:40” dilute). This diluted sample is tested for the presence of ANA antibodies. If the test is positive, a new sample is made at half the strength (1:80) and tested for the presence of ANA. The test is repeated every time it is positive by diluting the sample to 1:160, 1:320, 1:640, 1:1280 and, if the test is positive, a new sample is made at half the strength (1:2560).

In the ELISA plate-based test, an antigen is immobilized on a solid surface and then complexed with an antibody that is linked to an enzyme. Detection is accomplished by assessing the conjugated enzyme activity via incubation with a substrate to produce a measurable product.

Khalid Abulaban, MD, MS

Section Chief, Pediatric Rheumatology
Helen DeVos Children’s Hospital
helendevoschildrens.org/rheumatology
HDVCH Direct: 877.391.2345

Positive Antinuclear Antibody Tests Are Often Misinterpreted

Antinuclear antibody (ANA) testing to evaluate the presence of autoimmune rheumatic diseases is common, but further testing by an experienced pediatric rheumatologist is necessary to determine if an autoimmune disease is truly present.

In a given population of healthy children, 20% to 30% can test positive for ANA. ANA testing is generally used to screen for the presence of autoantibodies that are directed to components in the nucleus of the cell. Clinicians use the ANA test to assess the likelihood that a given patient has a systemic autoimmune rheumatic disease, a group including systemic lupus erythematosus, Sjögren’s syndrome, systemic sclerosis, juvenile idiopathic arthritis, dermatomyositis and others.

“If a child presents with nonspecific symptoms, such as they are tired or simply not feeling well, many physicians will order an ANA assay as a screening test,” says Khalid Abulaban, MD, MS, section chief of Pediatric Rheumatology at Spectrum Health Helen DeVos Children’s Hospital. “A lot of these tests will come back positive, but...”
For example, the most common symptoms of lupus include:

- Extreme fatigue (tiredness)
- Headaches
- Painful or swollen joints
- Fever
- Anemia (low numbers of red blood cells or hemoglobin, or low total blood volume)
- Swelling (edema) in feet, legs, hands, and/or around eyes
- Pain in chest on deep breathing (pleurisy)
- Butterfly-shaped rash across cheeks and nose
- Sun or light sensitivity (photosensitivity)
- Hair loss
- Abnormal blood clotting
- Fingers turning white and/or blue when cold (Raynaud’s phenomenon)
- Mouth or nose ulcers

However, many of these symptoms occur in other illnesses. “A positive ANA test, especially with the ELISA test, is not conclusive,” Dr. Abulaban says. “It could be a false positive. A positive ELISA test should be followed by an IFA test for confirmation, in addition to other antibody and other immunological tests, depending on the clinical picture.”

He says referring to a pediatric rheumatologist is warranted if ANA test results are positive and there is a concerning medical history or physician exam finding. “We can perform additional testing and assess if the positive ANA is truly associated with a systemic autoimmune disease or not,” he says, “keeping in mind that up to 30% of healthy kids can have a positive ANA.”

Knowing when to order ANA testing is essential. For children with a high probability of a systemic autoimmune disease, such as presenting with specific symptoms of SLE or SSc, the more likely an ANA test will help confirm a diagnosis.

Jeffrey Cassidy, MD
Section Chief, Pediatric Orthopedics
Helen DeVos Children’s Hospital
helendevoschildrens.org/orthopedics
HDVCH Direct: 877.391.2345

“From the orthopedic perspective, scoliosis can be lethal for infants who develop a severe curvature of the spine,” says orthopedic surgeon Jeffrey Cassidy, MD, section chief for pediatric orthopedics at Helen DeVos Children’s Hospital. “No other center offers all the treatment modalities that we do.”

The program includes body casting for infants and includes bracing and physical therapy for children with spinal deformities. The goal of treatment is to avoid surgery, especially in children who are younger than 6 years old and therefore too young for surgery in most cases. “We also offer traction for children with severe curves of the spine,” Dr. Cassidy says. Scoliosis is a curvature of the spine from side to side. It can be caused by neuromuscular disorders such as muscular dystrophy or cerebral palsy, but the cause of most scoliosis is not known.

“From the orthopedic perspective, scoliosis can be lethal for infants who develop a severe curvature of the spine.” Dr. Cassidy says. “As these children grow, their lungs also grow. But if the chest cavity is restricted due to a spinal curvature, their lungs may not be able to grow and function properly. In the most severe cases, the treatments we offer really save these kids’ lives.”

He says casting is the most common form of treatment delivered at Helen DeVos Children’s Hospital for infantile scoliosis with a high risk of progression. Initial stretching in the operating room is followed by placing the child in a form-fitting body cast. In many cases, the curve gradually straightens over time. The cast is changed every two to three months for a period of up to two years, and the spine gradually rotates into place.

“We have between 10 and 12 children here for casting at any one time,” Dr. Cassidy says. The goal of casting in children under 2 years of age is curing the scoliosis. Despite the extensive casting, a brace will still be needed after the casting treatment. Older children demonstrating
Another fusionless option in treating scoliosis available in Michigan only at Helen DeVos Children’s Hospital is vertebral body tethering. A minimally invasive surgical procedure, vertebral body tethering involves the anchoring of titanium bone screws to the front of each vertebral bone within the curved area, and then attaching a flexible cord (tether) to each screw and adjusting the tension to the desired degree of spinal straightening.

“Recurrence” can be re-casted for four months to adjust the deformity before continuing with brace management. For a child whose spine cannot be successfully corrected despite traction casting or bracing, spinal fusion may be chosen to keep the curvature from becoming more severe over time.

Dr. Cassidy says that children who are too young to undergo fusion may be candidates for fusionless technologies, including the placement of a magnetic-driven growing rod, a telescopic rod surgically implanted and driven by a magnet. Clinical evidence on magnet-driven growth rods indicates they significantly reduce the number of repeat surgeries required by the use of traditional growth rods.

“The magnetic rods grow with the child as they grow,” Dr. Cassidy says. “They can be lengthened in the clinic with the use of a magnet placed against the child’s back. It does not cause pain; most children say it tickles a little bit. With traditional rods, we would have to perform surgery every six to 12 months to physically push the rods apart.”

He says magnetic growing rods can be inserted by age 6, sometimes younger in rare cases, and will help the child reach age 10 or 12 before undergoing spinal fusion, if necessary.

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“Vertebral body tethering allows the spine to grow and correct over time while maintaining spinal flexibility,” Dr. Cassidy says. Helen DeVos Children’s Hospital is setting the pace nationally in other facets of spinal surgeries.

“The efficiency of our OR team and our meticulous control of blood loss has earned us one of the lowest transfusion rates nationally,” Dr. Cassidy says. “In addition, by pioneering the development of infection prevention bundles—steps we take involving washing the skin before and after surgery, thorough dressing management and using antibiotics—we have one of the lowest postoperative pediatric spinal surgery infection rates in the country.

“A lot of other centers are just starting to do what we do,” he says. “We started this more than 10 years ago and have been perfecting it along the way. That puts Helen DeVos Children’s Hospital at the forefront of infection prevention.”

Fetal Cardiac Evaluations Help Improve Outcomes

Detection of congenital heart disease and heart conditions at the fetal stage can significantly improve outcomes for these affected babies after delivery.

“The most important reason to detect a heart condition before birth is to be able to have the proper personnel and equipment present upon that baby’s delivery,” says Jeffrey Schneider, MD, pediatric cardiologist and fetal cardiology specialist at Spectrum Health Helen DeVos Children’s Hospital.

“The other main reason for early detection is that some conditions are treatable prior to birth,” Dr. Schneider says. “Rhythm abnormalities such as fetal tachycardia can benefit from transplacental therapy, where antianhythmic medication is passed through the mother to the fetus.”

Jeffrey Schneider, MD
Fetal and Pediatric Cardiologist
Helen DeVos Children’s Hospital
helendevoschildrens.org/congenital-heart-center
HDVCH Direct: 877.391.2345

Congenital heart defects are the most common type of birth defect, occurring in approximately 8 of every 1,000 live births, Dr. Schneider says. These defects can vary from mild, such as a small hole in the heart, to severe, such as missing or poorly formed components of the heart. About 1 in 4 babies born with a heart defect has a critical CHD, also known as critical congenital heart disease.

Babies with critical CHD will require surgery or other procedures in the first year of life, some as quickly as within a few days or weeks after birth, Dr. Schneider says. One purpose of a fetal cardiac evaluation is to detect major heart defects and identify those babies who will require infant surgery or multiple surgeries.

The Congenital Heart Center at Helen DeVos Children’s Hospital has experienced fetal cardiologists specializing in congenital heart disease and fetal heart rhythm disturbances. In addition to Dr. Schneider, the Congenital Heart Center fetal cardiologists include Heather Sowinski, DO, and Anas Taqaqa, MD.

Dr. Schneider says fetal cardiac disease detection and treatment will be a focus of the new Fetal Care Center at the hospital. “This will be a multispecialty endeavor bringing together pediatric subspecialists and the maternal-fetal medicine team to coordinate care in the fetus for all manner of anomalies, including non-cardiac conditions,” he says. “The team includes a nurse navigator who will help organize all multisubspecialty care.”

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Fetal and Pediatric Cardiologist
Helen DeVos Children’s Hospital
helendevoschildrens.org/congenital-heart-center
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Early detection of congenital heart disease and heart rhythm disturbances in utero can positively impact neonatal morbidity, decrease neurologic sequelae compared with those infants diagnosed postnatally and promote better coordination of care after the child is born.

Subspecialists at the Fetal Care Center will include medical geneticists, the maternal-fetal medicine team, neonatologists, pediatric general surgeons, pediatric neurosurgeons, pediatric urologists and pediatric radiologists.

“When an unborn baby is diagnosed with a congenital abnormality of any type, the family will be meeting with several subspecialists at one time and place, all coordinated by the Fetal Care Center,” Dr. Schneider says.

There are 13 pediatric cardiologists employed by Helen DeVos Children’s Hospital, including four with a special interest in fetal cardiology. In addition, there are three highly experienced pediatric heart surgeons at the hospital.

“Our program has been in existence for 30 years, and I have been doing fetal cardiology for 25 years,” Dr. Schneider says. “We have built a highly regarded and nationally recognized pediatric cardiovascular program.”

In addition to being ranked as a “Best Children’s Hospital in Cardiology and Heart Surgery” by U.S. News & World Report, The Society of Thoracic Surgery awards star ratings based on the Duke Cardiac Research Institute analysis of each cardiac center’s data. “We have received the highest award of three stars,” Dr. Schneider says. “Only 10 of 120 programs participating in the STS Congenital Heart Surgery Database currently merit this distinction. This means we have set a really high bar for our program, not just the surgeries but also the preoperative and postoperative care we provide.”

Fetal cardiac evaluation is often recommended for select maternal and fetal conditions. Consultation with a fetal cardiologist is available in conjunction with the Spectrum Health maternal-fetal medicine service, or as a separate service. In all instances, mothers will have an opportunity to meet with a fetal cardiologist during and after the fetal echocardiogram.

Dr. Schneider says that his preferred timing for fetal echocardiography is 18 to 24 weeks gestation, “although earlier diagnosis is certainly possible.”

Maternal indications for consideration of evaluation by the fetal cardiology team include:
- Embryopathic systemic diseases including lupus and diabetes
- Family history of congenital heart disease (parent or sibling of the fetus)
- Use of potentially teratogenic medications
- Maternal infections such as congenital rubella or other viruses
- Use of artificial reproductive technology

Fetal conditions for consideration of evaluation include:
- Cardiac abnormality on obstetric ultrasound
- Fetal genetic and non-cardiac anomalies
- Suspected fetal arrhythmias
- Fetal hydrods
- Increased nuchal translucency greater than or equal to 3 millimeters

During a consultation, a fetal echocardiogram is performed. The hospital’s clinics in Grand Rapids, Lansing and Traverse City are equipped with state-of-the-art echocardiography equipment and staffed by sonographers familiar with congenital heart disease. If the baby is diagnosed with a heart defect, the experts in the Congenital Heart Center collaborate together with other specialties to plan and coordinate high-quality care for mother and baby, which is especially important if cardiac surgery becomes necessary. Once complex CHD is detected, patients and their families are seen by a cardiac surgeon and a cardiac interventionalist on the team.

The Congenital Heart Center specialists have developed the concept of hybrid 3D printing (multimodality integration), where computed tomography and 3D echocardiography are integrated to bring MRI, CT and echocardiography into a single platform. With 3D printing, surgeons can better prepare for complex surgeries by producing a complete model of the internal structure of the heart. Surgeons can also take the 3D model into the consultation with the family and describe the procedure in precise and often reassuring detail.

Dr. Schneider says early detection of congenital heart disease and heart rhythm disturbances in utero can positively impact neonatal morbidity, decrease neurologic sequelae compared with those infants diagnosed postnatally and promote better coordination of care after the child is born.

He says referring physicians are integral members of the cardiac care team, receiving consultation with a fetal cardiologist, timely response to requests for services and the prompt communication of findings.

“We have built a close working relationship with our neonatology colleagues, OB-GYNs and maternal-fetal medicine specialists throughout the region,” Dr. Schneider says. “Our shared goal is to provide the best care possible, before and after delivery.”

Jeffrey Schneider, MD

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One of 10 centers in the country to receive a distinguished 3-star rating from The Society of Thoracic Surgeons for patient care and outcomes (2015-2018).

Congenital Heart Center

Cardiothoracic Surgery 2015-2018
Catheterizations 2016-2019
Electrophysiology 2016-2019

1,230 Surgeries 2016-2019
1,003 Procedures 2016-2019
407 Procedures 2016-2019

98.5% Surgical Survival Rate

98% 3 Year Survival Rate
Allison Close, MD, is a board-certified physician specializing in pediatric hematology and oncology. Dr. Close earned her medical degree from Michigan State University in East Lansing. She completed her residency and pediatric hematology/oncology fellowship at the Children's Hospital of Pittsburgh and her masters of clinical research at the University of Pittsburgh.

Harlori K. Bains, MD, is a board-certified physician specializing in pediatric neurology. Dr. Bains earned her medical degree from Wayne State University in Detroit. She completed her pediatric neurology residency at Phoenix Children's Hospital/ Maricopa Medical Center in Arizona and her neuroimmunology fellowship at Barrow Neurological Institute in Phoenix.

Her clinical interests include pediatric-onset multiple sclerosis, neuromyelitis optica, transverse myelitis, autoimmune encephalitis, acute flaccid myelitis and acute disseminated encephalomyelitis.

Candice Burns, MD, is a board-certified physician specializing in pediatric critical care medicine. Dr. Burns earned her medical degree from Indiana University and completed her residency at University of Louisville. She completed a pediatric critical care fellowship at the University of Louisville in Kentucky and a pediatric cardiac critical care fellowship at the University of Arkansas for Medical Sciences. Her clinical interests include congenital heart disease, pediatric heart failure and cardiopulmonary resuscitation.

Jodi Garvin, DO, is a board-certified pediatrician specializing in neonatology. Dr. Garvin earned her medical degree from Midwestern University College of Osteopathic Medicine in East Lansing. She completed her residency and neonatal fellowship at the Medical College of Wisconsin in Milwaukee.

Mary Lim, DO, is a board-eligible physician specializing in pediatric ophthalmology. Dr. Lim earned her medical degree from Michigan State University School of Medicine in Detroit. She completed her pediatric residency through Grand Rapids Medical Education Partners/Michigan State University.

Allison Long, MD, is a board-certified physician specializing in pediatric hospital medicine. Dr. Long earned her medical degree from Wayne State University School of Medicine in Detroit. She completed her pediatric residency through Grand Rapids Medical Education Partners/Michigan State University.
A 2-month-old female was admitted to Helen DeVos Children’s Hospital for failure to thrive. This was the parents’ second child, prenatal history was normal, and delivery was uncomplicated. Feeding was a challenge from the start, and there was also some mild hypotonia. Outpatient workups for more common causes of failure to thrive was negative, so hospital admission was pursued for strict dietary monitoring and more in-depth testing. Genetics was consulted during the hospitalization to provide insight.

**Diagnostic Evaluation:** Testing for Prader-Willi syndrome (PWS) was initiated. Prader-Willi syndrome is an intriguing genetic syndrome with multiple potential causes that are unified by altering methylation. This is an example of an epigenetic disorder where changes to the actual genetic code can cause the syndrome and also other, more complex changes, like uniparental disomy (where both copies of someone’s chromosome are from one parent instead of one from each). Testing returned normal, ruling out PWS.

Chromosome microarray testing was then performed. This test looks at all the genetic information for missing or extra pieces (deletions and duplications). It is more nonspecific, so uncertain and unexpected results can be found. For this patient, microarray returned showing both a deletion and a duplication on the same chromosome, one on each end. This complex result required additional testing by FISH (fluorescent in situ hybridization) to specifically determine the exact size and location of those changes. The deletion had previously been reported in the medical literature and did cause developmental concerns, hypotonia and growth issues. The duplication has only been seen in case reports. The combination of both deletion and duplication had also been reported, but not the exact changes seen in this patient. This left a certain amount of uncertainty with these results. Lastly, a deletion and duplication in one patient raises the possibility of a parent also carrying a genetic change—perhaps a balanced translocation of chromosomes. Balanced translocation carriers are typically asymptomatic since their genetic information is all present but just in a different orientation. However, they are at much higher risk of having children with chromosome abnormalities.

**Discussion:** The family was counseled about these test results, and medical management could now be tailored using this information. However, this case illustrates the challenges that can come with genetic testing, such as uncertainty, unexpected results and implications for other family members.
Specialized Care Across Michigan

Our hospital and main outpatient clinics are located in:
Grand Rapids

Additional outreach clinics are available in:
Cadillac  Lansing  Owosso  Traverse City
Grand Haven  Marquette  Reed City  Zeeland
Holland  Mt. Pleasant  Rockford
Kalamazoo  Muskegon  St. Joseph

For information on our locations and services, visit helendevoschildrens.org.

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