

DELIVERING ON A PROMISE

Thriving in Failure

COMPETITION AFTER COVID

Cardiologists show heart damage in athletes unlikely after COVID-19 infection

Cardiovascular imaging demonstrated no evidence of myocardial injury or myocarditis in athletes after COVID-19 infection, according to a research letter published in *Circulation* by Le Bonheur Children's Hospital and the University of Tennessee Health Science Center cardiologists. The screening and evaluation was conducted by the Le Bonheur Heart Institute Sports Cardiology team, Benjamin S. Hendrickson, MD, Ranjit R. Philip, MD, and Ryan E. Stephens, NP-C, MBA, along with Le Bonheur Director of Cardiac MRI Jason N. Johnson, MD, MHS. Researchers say this study confirms existing recommendations that cardiovascular screening can be deferred in COVID-19 positive athletes who are asymptomatic or have milder symptoms.

"Concern for cardiovascular disease as a result of COVID-19 brought about recommendations for evaluating athletes after infection," said Johnson. "Our results show that none of the athletes who underwent cardiac MRI had abnormal findings."

137 collegiate athletes from three universities competing across the National Collegiate Athletic Association (NCAA) Divisions 1, 2 and 3 were evaluated in sports cardiology clinic no sooner than 10 days after testing positive. The athletes were young adults from a broad range of sports and various racial ethnic backgrounds – 48% black, 47% white and 7% Hispanic.

Le Bonheur cardiologists used an algorithm-guided screening to evaluate the athletes. Regardless of symptoms or illness severity, cardiologists obtained a 12-lead electrocardiogram, transthoracic echocardiogram and conventional cardiac troponin I (cTn) level from each COVID-19 positive athlete. If any of these tests were abnormal or the athlete had a clinical evaluation of concern, they were referred for cardiac MRI (CMR). Athletes with normal evaluations and negative tests or negative CMR had exercise slowly reintroduced and eventually returned to full participation.

Le Bonheur's Sports Cardiology team recently published research stating that cardiovascular imaging demonstrated no evidence of myocardial injury or myocarditis in athletes after COVID-19 infection. Screening and evaluation of athletes was conducted by (left to right) Ryan E. Stephens, NP-C, MBA, Jason N. Johnson, MD, MHS, Ranjit R. Philip, MD, Ann Hyde, RN, and Benjamin S. Hendrickson, MD.



EVALUATING ATHLETES AFTER COVID-19 INFECTION

- 137 collegiate athletes from three universities
- Evaluated no sooner than 10 days after testing positive for COVID-19
- Obtained electrocardiogram, transthoracic echocardiogram and conventional cardiac troponin level

Study findings include:

- Most athletes (82%) were symptomatic and experienced mild (67%) or moderate (33%) COVID-19 symptoms. None of the athletes had severe COVID-19 illness.
- Only five (3.6%) athletes had abnormal testing that required CMR. Of these five, none had abnormal CMR results consistent with myocardial injury or myocarditis.
- None of the athletes had new symptoms or other health problems after resuming exercise and normal competition.

"On the basis of the outcomes and follow-up in our cohort, it is reasonable to defer cardiovascular screening in asymptomatic athletes or those with milder COVID-19," said Philip. "Cardiac screening, testing and imaging can be guided by the severity of symptoms and illness in an athlete."



Le Bonheur Children's Hospital in Memphis, Tenn., treats more than 250,000 children each year in regional clinics and a 255-bed hospital that features state-of-the-art technology and family-friendly resources. Our medical staff of more than 240 physicians provide care in 45 subspecialties.

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The primary pediatric teaching affiliate of the University of Tennessee Health Science Center

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THRIVING

Bringing Home a VAD

Heart failure patients find way to rehabilitate in comfort

16-year-old Deshawn Bell landed at Le Bonheur's doors in heart failure. He needed a ventricular assist device (VAD) to keep his heart beating. One hundred fifteen miles from his home in Tupelo, Miss., Deshawn and his family faced a long hospital stay while they waited for his body to regain strength while on VAD support.

Le Bonheur cardiologists quickly recognized that Deshawn was an ideal candidate for the Outpatient VAD Program – a new initiative from Le Bonheur's Heart Institute that allows qualified patients to go home to recuperate with their VAD still implanted.

"Previously, if a patient had a VAD the only option was for them to stay in the hospital for the entire duration

of implantation," said Le Bonheur Medical Director of Mechanical Circulatory Support Mohammed Absi, MD. "Staying in the hospital for months is not good for a child's quality of life, especially with chronic heart failure patients who have already been to the hospital many times."

Seven weeks after VAD implantation, Deshawn was discharged from the hospital with his VAD to recover and rehabilitate in his own home with family and friends close by.

Thanks to this initiative, children and adolescents with a VAD can now have an improved quality of life and rehabilitate in the comfort of home, both of which lead to better outcomes for those who undergo heart transplant.

A COMPREHENSIVE PROGRAM

Le Bonheur's VAD program was first established in 2016 in conjunction with the Cardiomyopathy, Heart Failure and Heart Transplant Programs. A VAD can provide the bridge to a heart transplant – allowing a child's body the crucial time

FROM DIAGNOSIS TO DISCHARGE: OUTPATIENT VAD PROGRAM TIMELINE

Children must meet a variety of qualifications, including certain diagnoses, VAD type and other psychosocial factors, to go home with a VAD. This is the timeline of what the journey looks like:

1 DIAGNOSIS

A heart failure diagnosis can ultimately be caused by various congenital or acquired heart diseases.

3 PATIENT AND FAMILY TRAINING

Five educational sessions for the patient and family members teach the basics of VAD care, recognizing device malfunctions and implementing emergency procedures.

5 24-HOUR INPATIENT INDEPENDENT STAY

The patient and family practice life at home with a VAD by performing all needed procedures for the VAD without nurse or physician assistance while still in the hospital.

2 VAD IMPLANTATION

A VAD is implanted in the heart which continues the circulation of blood in the body.

4 COMMUNITY EDUCATION

The Le Bonheur VAD team visits the local emergency medical services (EMS), hospital and the patient's school to educate on the VAD and develop an emergency protocol.

6 FEDEXFAMILYHOUSE STAY

For two weeks, the patient stays across the street from the hospital at FedExFamilyHouse to continue clinic visits and outpatient services while still near the hospital.

IN FAILURE

it needs to gain strength and heal from the effects of heart failure. VADs can also be a destination therapy if a child is not qualified for heart transplant.

“The primary goal of the VAD is for physical, nutritional and end organ rehabilitation, but another important factor prior to heart transplant is psychosocial rehabilitation,” said Umar Boston, MD, Le Bonheur’s surgical director of Pediatric Heart Transplant and Ventricular Assist Device Program. “If a child goes into transplant well rehabilitated, the outcome will be much better, but it can take a long time to get them to that state prior to transplantation.”

In order to provide the full rehabilitation that only the comfort of home can offer, Le Bonheur’s Heart Institute developed the Outpatient VAD Program that would allow select children

7 DISCHARGE

The patient is sent home with the VAD to recover and rehabilitate while living life as close to routine as possible.



Heart Institute patient Deshawn Bell visits the Outpatient VAD Clinic for follow-up with Le Bonheur Medical Director of Mechanical Circulatory Support Mohammed Absi, MD. Thanks to the Outpatient VAD Program, Deshawn is able to visit the clinic periodically for his care instead of staying in the hospital for the duration of his VAD implantation.

with a VAD to be cared for in an outpatient clinic instead of an inpatient hospital stay. Using designs from the Advanced Cardiac Therapies Improving Outcomes Network (ACTION), Mechanical Circulatory Support Coordinator Amber Merritt, BSN, MSN, CCRN, and Heart Transplant and VAD Coordinator Tiffany Street, BSN, RN, worked to make this program a reality by developing the Outpatient VAD Clinic, protocols and caregiver education.



In order to go home with a VAD, families must be trained on how to care for the device daily and in emergency situations. Mechanical Circulatory Support Coordinator Amber Merritt, BSN, MSN, CCRN, and Heart Transplant Coordinator Tiffany Street, BSN, RN, provide this education to caregivers and the patient before leaving the hospital.

Patients must meet specific qualifications to go home with a VAD. Only fully implantable VAD devices can go home with a patient, and the patient must also be medically stable with good control of their heart failure symptoms. But qualifications aren't just medical. The patient must have significant psychosocial and community support. This means that the family and patient are comfortable learning to care for the VAD, and the surrounding community — hospitals, schools, emergency

departments — is on board and willing to be educated as well.

“This program allows us to provide all of the care any child with heart failure may need,” said Boston. “The goal is to provide a full service line to any child who has heart failure to optimize their care for the best outcomes.”

THE ROAD HOME

The discharge process with a VAD takes weeks and sometimes months, and is closely coordinated by Merritt and

MEET THE OUTPATIENT VAD TEAM



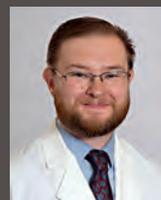
Mohammed Absi, MD
Medical Director, Mechanical Circulatory Support



Umar Boston, MD
Surgical Director, Pediatric Heart Transplant and Ventricular Assist Device Program



Jeffrey A. Towbin, MD
Executive Co-Director, Le Bonheur Heart Institute



Gary Beasley, MD
Pediatric Cardiologist



Jason Goldberg, MD
Pediatric Cardiologist



Jennifer Kramer, MD
Pediatric Cardiac Critical Care Intensivist

Street. A safe community at home is created for the patient by educating the local medical community on VAD implantation. Merritt works with electric companies to ensure the power will never be disconnected, coordinates with Pedi-Flite — Le Bonheur’s specialized transport for critically ill and injured children — in case of emergency transportation and designs a protocol for the local hospital for an emergent situation.

“It takes a whole village to make this possible,” said Merritt. “But we know from a psychological standpoint that the child needs to be at home.”

The patient and family members are trained for day-to-day VAD care and emergency procedures, learning to recognize and address signs of device malfunction. Caregivers learn everything from dressing changes to changing out batteries on the device. They are CPR-trained and must pass written and hands-on competency tests.

The final test for patients and families is an independent 24-hour hospital stay. During this time, the family provides all care for the patient without the intervention of nurses or physicians unless an emergency occurs.

After discharge, the patient transitions across the street from the hospital at FedExFamilyHouse, where out-of-town families stay free of charge, for two weeks. They are seen every other day in clinic, continue to work with any outpatient rehab services they may need and remain close by the hospital for troubleshooting the VAD.

“FedExFamilyHouse allows us to provide a transitional phase to families before sending them home. It’s a blessing to have such a resource close to us,” said Absi.



A VAD can be crucial to a child’s rehabilitation prior to heart transplant. Above, Le Bonheur Surgical Director of Pediatric Heart Transplant and the Ventricular Assist Device Program Umar Boston, MD, conducts a heart transplant surgery for a child previously on a VAD.



Hugo Martinez, MD
Pediatric Cardiologist



Kaitlin Ryan, MD
Pediatric Cardiologist



Jenny Strelsin, MSN, PNP-AC
Pediatric Cardiology Nurse
Practitioner



Webb Smith, PhD
Cardiac Rehabilitation
Exercise Physiologist



Amber Merritt, BSN, MSN, CCRN
Mechanical Circulatory Support
Coordinator



Tiffany Street, BSN, RN,
Heart Transplant and Ventricular
Assist Device Coordinator

After two weeks, the patient is typically ready to go home with their VAD. They are provided a 24/7 phone number for questions and emergencies and continue regular clinic follow-up at Le Bonheur with physicians, social workers, nutritionists and any other needed specialists.

FUTURE IMPACT

Ultimately, Le Bonheur cardiologists believe that the Outpatient VAD Program will improve quality of life for the patients and their families as well as heart failure and transplant outcomes. Where previously patients spent months

in the hospital, they will now spend that time of recuperation at home returning to as much of their usual routine and activities as possible. Le Bonheur physicians hope that the mental and physical benefits of being at home will go on to impact transplant outcomes.

“We expect to see improvement in terms of one-year and three-year survival,” said Boston. “Our hope is that they will go into transplant so well-rehabilitated, both physically and psychologically, that they will be able to handle all aspects of heart transplant much better.” 

At Home with a VAD

DESHAWN BELL, 16

Tupelo, Miss.

Before the Outpatient VAD Program, patients like Deshawn Bell would spend months in the hospital. After VAD implantation, they would rehabilitate inside the hospital walls until the device was removed or they underwent a heart transplant.

But thanks to the new initiative, Deshawn is now the first patient from Le Bonheur to be discharged with a VAD. He is at home with his family in Tupelo, Miss., healing and regaining strength.

“We knew that we could send Deshawn home safely,” said Mohammed Absi, MD, Le Bonheur medical director of Mechanical Circulatory Support. “Thanks to a lot of teamwork, especially work and effort from Deshawn and his family, we were able to make this a reality.”

Deshawn Bell came to Le Bonheur in a shock-like state, according to Absi, and was so sick that he required heart-lung bypass to survive. Diagnosed with congestive heart failure, he eventually was able to receive a VAD. Over time, his heart failure symptoms improved to the point that doctors could remove the VAD and manage his condition with medication.

But a second bout of heart failure called for the VAD to be re-implanted, this time for the long haul. Previously patients like Deshawn would spend months in the hospital. Instead, cardiologists determined that Deshawn and his mom, Kimberly, would learn how to care for the VAD themselves, so Deshawn could recuperate at home.

“We underwent an extensive teaching experience before returning home,” said Kimberly Bell. “We learned everything about the VAD from doing dressing changes to changing out the batteries.”

Mechanical Circulatory Support Coordinator Amber Merritt, BSN, MSN, CCRN, then went to Tupelo to meet with the local hospital and EMS system to refresh them on care of a pediatric patient like Deshawn and how to contact Le Bonheur in case of emergency. Once ready, Deshawn and Kimberly stayed at FedExFamilyHouse for two weeks where they were seen twice a week in clinic and continued outpatient services every day.

“FedExFamilyHouse gave us a step down before we get home, 115 miles away from the hospital,” said Kimberly.

Finally, they were able to return home to Tupelo where Deshawn resumed as many aspects of his normal routine as possible. Instead of spending months in the hospital, the Bell family visits the Outpatient VAD Clinic at Le Bonheur every few weeks for check-ups with his care team.



Deshawn Bell was the first patient from Le Bonheur's Heart Institute to be discharged from the hospital with a ventricular assist device (VAD). He is recuperating at home in Tupelo, Miss., and continues to visit Le Bonheur regularly for clinic appointments.

Le Bonheur cardiologists conduct first successful long-term use trial of platelet inhibitor cangrelor in pediatric patients on VADs

Cangrelor, a novel, intravenous P2Y₁₂ platelet inhibitor, can safely be used as a long-term antiplatelet therapy for pediatric patients on continuous flow ventricular assist devices (VADs), according to research published in

Artificial Organs by multiple Le Bonheur cardiologists and led by former Le Bonheur Pediatric Cardiology Fellow Sarah E. Fahnhorst, DO. While previous studies have demonstrated viability of cangrelor in adult populations, this study was the first published on successful long-term use



Former Le Bonheur Pediatric Cardiology Fellow Sarah E. Fahnhorst, DO (above left), led a study that showed the successful long-term use of cangrelor in pediatric patients on continuous flow ventricular assist devices (VADs). This therapy provides an alternative option for patients who don't have an adequate response to common antiplatelet drugs.

of cangrelor in pediatric patients. The study was co-authored by members of Le Bonheur's VAD team, including Mohammed Absi, MD, Gary Beasley, MD, Umar Boston, MD, Jason Goldberg, MD, Hugo Martinez, MD, Kaitlin Ryan, MD, and Jeffrey A. Towbin, MD.

"Thromboembolic events and bleeding are major sources of morbidity among pediatric patients supported on a VAD," said Fahnhorst. "Cangrelor is short-acting, reversible and intravenous, making it a feasible antiplatelet agent in select pediatric patients."

Pediatric patients who are unable to take or do not respond well to other antiplatelet drug options can safely remain on a VAD by using cangrelor. This allows for a lower risk of blood clotting or bleeding complications while they await heart transplant or recover from heart failure.

For optimal VAD function, pediatric VAD patients require a delicate balance between combatting blood clot formation and preventing bleeding episodes. This dilemma has prompted development of new strategies to mitigate risks. The factors that affect this balance are numerous and include disruption of vascular endothelium, inflammatory response, renal function and impaired absorption and metabolism of antiplatelet drugs. In addition, 20-40% of the population are poor metabolizers of common antiplatelet drugs, such as clopidogrel and aspirin, and do not have an adequate response to these drugs. Therefore, an alternative option to long-term antiplatelet therapy is necessary for patients who need this crucial therapy.

The study followed seven patients at Le Bonheur Children's

who had end-stage heart failure and were supported on continuous flow VADs. The majority of patients were started on cangrelor because of impaired enteral absorption of oral P2Y₁₂ antagonists or due to the inability to reach therapeutic goals. The median duration of a patient receiving intravenous cangrelor was 43 days.

Patients on cangrelor reached the therapeutic P2Y₁₂ level in a mean of 1.86 days. No cerebrovascular events occurred while on cangrelor. There were two episodes of mild gastrointestinal bleeding, one episode of hematuria and

one pump thrombosis. The number of these events are comparable or reduced when compared with previous statistics. Adequate platelet inhibition was achieved quickly and with a much lower dose of cangrelor than previously reported by the manufacturer.

"The quick onset of action and reversible nature of cangrelor is crucial when oral antiplatelet therapies cannot be implemented or bleeding is a concern," said Fahnhorst.

Overall, this study showed that cangrelor is a successful, viable, long-term antiplatelet therapy in select pediatric VAD patients. Future studies would benefit from a larger sample size with a control group to further evaluate safety and effectiveness in the pediatric population.

"Cangrelor addresses some of the major pitfalls of oral antiplatelet therapy, including impaired enteral absorption, reversibility and epigenetic factors," said Fahnhorst. "As more pediatric patients are placed on VAD support, cangrelor may be a feasible antiplatelet strategy." 

"Thromboembolic events and bleeding are major sources of morbidity among pediatric patients supported on a VAD. Cangrelor is short-acting, reversible and intravenous, making it a feasible antiplatelet agent in select pediatric patients."

Le Bonheur Pediatric Cardiology Fellow
Sarah E. Fahnhorst, DO



Le Bonheur Radiologist Jignesh Shah, MD, has pioneered a novel imaging technique measuring the chest cavity volumes of transplant recipients and donors to successfully match heart size in 25 complex pediatric heart transplant surgeries to date.

The Perfect Match

In the last five years, Le Bonheur Radiologist Jignesh Shah, MD, has pioneered a novel imaging technique to match pediatric heart transplant recipients with donors. Using computed tomography (CT) volumetric analysis, Shah developed a methodology to improve donor weight selection in recipient patients awaiting complex pediatric heart transplantation.

Shah measured the volumes of the chest cavities of heart transplant recipients. He then measured the heart volumes of hundreds of patients who underwent CT scans for non-cardiac reasons and created a database of the correlation of total cardiac volume and the child's weight. He utilizes this information to choose appropriate donor weight that corresponds with the recipient's chest cavity volume.

This technique has been utilized for successful heart size matching in 25 complex pediatric heart transplant surgeries at

Le Bonheur. In all cases, the donor hearts were perfectly compatible with the recipient's chest cavity and inflow/outflow vascular connections.

Le Bonheur was one of the first hospitals in the world to use this technique and is now leading the way to establish Shah's methodology as a standard of care for complex pediatric heart transplants. This has been particularly important for Heart Transplant Program Surgical Director Umar Boston, MD.

"Dr. Boston was in search of a more scientific way to evaluate patients on the heart transplant waiting list," says Shah. "In the last five years, we've been able to develop this method into a standard of care in our heart transplant program."

The new methodology can be most valuable in young infants with complex heart anatomy, such as dextrocardia (right-sided heart) where an accurate donor size is critical to avoid compression issues. Shah worked with Boston

A Heart for Lincoln

LINCOLN HOPPER, 3 Dyer, Tenn.

It was a long road to Lincoln Hopper's heart transplant. But thanks to Le Bonheur Radiologist Jignesh Shah's novel imaging technique to match him with the best donor, Lincoln received the perfectly sized heart and is home and healthy.

At a 20-week ultrasound, Lincoln Hopper's parents received the news that their baby's heart was on the wrong side of his chest. After his birth, they came straight to Le Bonheur where, after four open-heart surgeries and a ventricular assist device (VAD) implantation, Lincoln was listed for a heart transplant. He spent 10 months in the hospital waiting for a new heart.

"With the complex anatomy of Lincoln's heart, it was important to make sure the donor heart was the appropriate size for him," said Shah. "Using the CT imaging, we were able to match him perfectly."

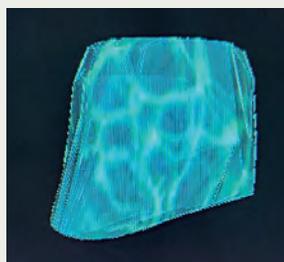
Lincoln underwent transplant on May 17, 2020. He is now at home where he is thriving and excited to start school this year.



Lincoln Hopper waited ten months for a heart at Le Bonheur Children's. Le Bonheur Radiologist Jignesh Shah, MD, used a new imaging technique to ensure that the heart Lincoln received would be the right size for his chest cavity.



Using computed tomography (CT) volumetric analysis, Le Bonheur Radiologist Jignesh Shah, MD, calculated the volume of Lincoln Hopper's chest cavity to match him with the appropriate donor.



Shah determined that Lincoln's chest cavity volume was 201 cubic centimeters (cc). Matching this volume with a database of CT chest cavity volumes in patients without cardiac conditions, Shah suggested that a donor weight of 16-17 kilograms would be ideal for a successful size match.

to develop a more accurate methodology that better predicts the size of donor best suited for Le Bonheur's heart transplant recipients.

"This is a key indicator for donor selection," says Shah. "It's important to have accurate information for the surgeons, and it helps families to understand the care with which we match their child to a donor heart."

Heart size matching has been helpful for the heart transplant to go smoothly and for postoperative success. Of the 25 patients matched using this technique, none have had instances of open chest immediately after surgery due to size mismatch. In partnership with heart transplant surgeons, Shah has been able to refine his technique and establish a methodology for heart transplant recipients.

Currently, Shah is representing Le Bonheur in the Advanced Cardiac Therapies Improving Outcomes Network (ACTION) size-matching project — a multi-institutional effort to help standardize the size matching methodology for heart transplantation. 

Pediatric Onco-Nephrology: Time to Spread the Word

The need for pediatric nephrologists to develop a special expertise in the onco-nephrology field is increasingly important as childhood cancer rates have been on the rise and new therapy protocols are advancing, according to a *Pediatric Nephrology* article published by Le Bonheur Nephrologist

Arwa Nada, MD. Nada also serves as a consulting nephrologist at St. Jude Children’s Research Hospital. The first of a two-part educational summary, Nada provides an overview of how pediatric cancer and its therapies can impact kidney function and the increasing need for pediatric nephrologists to serve as integral care team members for children with cancer.

“Children diagnosed with malignancy can experience unique and complicated forms of kidney injury at any stage of therapy and afterwards,” said Nada. “Therefore, the pediatric nephrologist has become an increasingly important member of the care team to mitigate and manage the different forms of acute kidney involvement or injury during pediatric cancer treatment.”

Cancer and kidney disease have numerous interconnections. Historically, pediatric nephrologists have treated the kidney complications occurring during cancer therapy, such as acute kidney injury (AKI), fluid and electrolyte disturbances, tumor lysis syndrome (TLS), hypertension and chronic kidney disease. However, advances in treatments in the field of pediatric cancer, specifically the introduction



Le Bonheur Nephrologist Arwa Nada, MD, recently published the first of a two-part educational summary on the importance of the role of pediatric nephrologists in the field of onco-nephrology.

of CD19-targeted chimeric antigen receptor T cell (CAR-T) therapy, now require more specialized knowledge and expertise in the field.

The review explores 11 unique consult scenarios in the field of pediatric onco-nephrology to highlight the role of the pediatric nephrologist during pediatric cancer therapy:

- 1. “I have a child with a kidney tumor.”** Pediatric nephrologists monitor children for hypertension, AKI, medication side effects and mitigate risk factors for chronic kidney disease (CKD).
- 2. “I have a child with rising creatine.”** AKI is common during cancer treatment and close monitoring of kidney function is vital for proper dosing of medications.
- 3. “I have a child receiving potentially nephrotoxic medications.”** The risk of AKI can be mitigated with drug-specific preventative measures for both chemotherapeutic and adjuvant medications.
- 4. “I think my patient has TLS.”** TLS is an oncologic emergency. Severe outcomes can be prevented and early intervention begun by evaluating patients for predictors of TLS.
- 5. “I’m sending my patient to get CT with intravenous contrast. What is the risk?”** Contrast-induced nephropathy is an acute kidney dysfunction after exposure to intravascular contrast media. The best strategy to decrease this risk is considering alternative imaging techniques. Additional measures are available that can decrease the risk of contrast-associated kidney injury if absolutely indicated.
- 6. “My patient with refractory leukemia is receiving CAR-T therapy.”** CAR-T therapy is associated with high rates of AKI due to cytokine release syndrome (CRS) after CAR-T cell infusion. CRS treatment includes supportive and anti-cytokine therapies.
- 7. “My patient is getting a stem cell transplant.”** The occurrence of kidney disease in the setting of bone marrow (BM) and hematopoietic stem cell transplant (HSCT) is well described. Kidney involvement associated with HSCT can be divided into early, intermediate and late according to the time of occurrence.

- 8. “My patient has developed thrombotic microangiopathy (TMA).”** TMA in cancer patients can develop directly from certain malignancies but more often can result from HSCT and in the setting of other cancer related interventions/ treatments. Early diagnosis of TMA is critical and patients on medications associated with TMA should be closely monitored.
- 9. “I need help with electrolyte and acid-base management.”** Electrolyte and acid-base disturbances are common in cancer patients, either due to the malignancy itself or as a result of therapy.
- 10. “I am seeing a child with proteinuria.”** Glomerular diseases can be associated with solid and hematological malignancies, chemotherapeutic agents and following stem cell transplant.
- 11. “I have a child with a kidney infection.”** Children with cancer are high risk for developing bacterial, viral and fungal infections — each with its unique risk factors.

Nada shows that kidney involvement in pediatric cancer is not uncommon and can be encountered in myriad ways. It is crucial for pediatric nephrologists to be involved in the care of children with cancer from time of diagnosis to help prevent kidney complications and improve outcomes, she said.

“We do have preventive measures that can help decrease the risk of AKI and other kidney complications in this population,” said Nada. “Due to the improved survival of children with cancer and long-term effects of interventions on kidney function, the role of the pediatric nephrologist is now expanded to include management of kidney health in pediatric cancer survivors.”

ANTIVIRAL RESPONSE: EOSINOPHILS ACTIVE IN IMMEDIATE DEFENSE DURING INFLUENZA A INFECTION

For the first time in published literature, Le Bonheur Researcher and University of Tennessee Health Science Center Plough Foundation Endowed Chair of Excellence Amali Samarasinghe, PhD, showed that a variety of white blood cells known as eosinophils, naturally supercharged after an asthma attack, have a protective effect against a subsequent influenza A (IAV) respiratory infection. These findings were published recently in the journal *Cells* and may have a direct correlation to understanding SARS-CoV-2 (COVID-19) infection, explaining why asthmatics with COVID-19 fare better and providing a potential avenue of treatment for non-asthmatics.

The Le Bonheur study found that eosinophils directly immunomodulate airway epithelial cells during IAV infection, helping to neutralize the virus and protect the airway. The research was conducted by University of Tennessee Health Science Center Postdoctoral Fellow Meenakshi Tiwary, PhD, from the Samarasinghe group in collaboration with Robert Rooney, PhD, assistant professor of Pediatrics at the University of Tennessee Health Science Center and director of the Biorepository and Integrative Genomics Initiative at Le Bonheur, and Swantje Liedmann, PhD, a postdoctoral fellow at St. Jude Children's Research Hospital.

"We examined eosinophil responses to influenza A virus during the early phase of infection and found that eosinophils exhibit multiple functions as active mediators of antiviral host defense," said Samarasinghe. "These include virus neutralization, trafficking to draining lymphoid organs and, most importantly, protecting the airway barrier from virus-induced cytopathology."

The study used both mouse models and cell culture models to observe eosinophil responses during the early phases of IAV infection. Investigators found that eosinophils altered the respiratory epithelial transcriptome to enhance

epithelial cell defenses against virus-induced damage. As eosinophil-deficient allergic mice had heightened virus-induced damage to the epithelial barrier, eosinophil and epithelial cell interactions are necessary for host protection during influenza.

Further results included the following:

- Eosinophils are rapidly activated upon virus exposure. As a result of IAV infection, eosinophil movement into and out of the lungs increased, and activated eosinophils expressed molecules necessary to migrate into lymphoid organs from the site of infection.

- Crosstalk between airway epithelial cells and eosinophils promotes activation in both cell types. The presence of eosinophils reduced expression of specific surface markers in epithelial cells when placed in close proximity during IAV infection. This is especially important given that this study provides direct evidence that eosinophils are not toxic to host tissue.

This study builds on Samarasinghe's lifelong inquiry into elucidating the protective functions of the immunological system,

specifically eosinophils, against respiratory infections based on the observation that asthmatics were less likely to suffer from severe disease than non-asthmatics during the swine flu pandemic of 2009. Recent data come at the heels of previous discoveries from the Samarasinghe group that eosinophils played a crucial role in enhancing T cell defenses during influenza and that eosinophils continue to safeguard the host from virus-mediated bacterial co-infection.

"Reports from the COVID-19 pandemic have early indicators that patients with allergic asthma are not at increased risk of severe COVID-19," said Samarasinghe. "It is tempting to speculate that eosinophils may play an antiviral role against SARS-CoV-2, similar to their function against influenza A and other virus infections."



The lab of Le Bonheur Researcher Amali Samarasinghe, PhD (above), recently showed, for the first time in published literature, that white blood cells modify the respiratory barrier during influenza A infection. This research could have implications in understanding COVID-19 infection in asthmatic patients.

SPOTLIGHT: A LONG JOURNEY

Hospital embraces diversity, equity, inclusion effort



The Diversity Equity and Inclusion (DE&I) Steering Committee was formed in response to overwhelming evidence of inequities in society and concern that these affect care and caregivers. The committee was intentionally designed to have representation from various Le Bonheur entities and meets every two weeks to continue addressing matters of diversity, equity and inclusion at Le Bonheur.

Brandon Edgeron, PharmD, MS, vividly remembers standing on the lawn of the hospital following the death of George Floyd. It was June 2020, and he was listening to a poem read by Le Bonheur Chaplain Sarita Wilson-Guffin, EdD, MDiv, as part of a White Coats for Black Lives event.

“I turned around and noticed that I was surrounded by a far larger crowd than anticipated, and the diversity within that crowd,” said Edgeron, Le Bonheur chief operating officer. “I saw staff and providers from all different departments understanding and embracing that moment, recognizing the seriousness of the time we are living in now. It was such an emotional moment for me.”

Traffic came to a standstill on Poplar Avenue, one of Memphis’ busiest streets, as drivers joined the time of reflection and prayer. Wilson-Guffin calls it a moment of gut-wrenching unity.

It was also a turning point that led hospital leaders to launch a strategic effort to create safe spaces for conversations

“The key is to recognize when we may be part of the issue, why someone might be uncomfortable and how that affects the way we deliver care.”

Brandon Edgeron, PharmD, Le Bonheur Chief Operating Officer

about diversity, equity and inclusion. Le Bonheur President Michael Wiggins, DBA, FACHE, assembled a Diversity, Equity and Inclusion (DE&I) Steering Committee, chaired by Edgeron and Wilson-Guffin.

The 12-person committee, which includes physicians, began their work with a survey of 255 hospital leaders. Edgeron says the survey revealed gaps in understanding and provided an outline for a hospital-wide curriculum, specifically addressing conscious and unconscious bias and cultural humility. The survey also showed that newer terms, such as allyship and microaggression, were opportunities for education.

“The ah-ha moment for us was really the way the

organization has embraced this work,” said Edgerson. “We want to make sure we’re on the forefront. We want to make sure we address those terms that impact our care.”

The committee focused first on educating itself and making sure its members were equipped to facilitate conversations across the hospital. Along with the hospital’s executive leadership team, the committee is participating in a series of trainings with New Memphis, a local company focused on leadership development. Additionally, members of the hospital’s Center for Bioethics and Health Equity team lead guided trips to the National Civil Rights Museum to help caregivers better understand the city’s history of racism and role in the civil rights movement.

The committee members serve as a resource to hospital staff and physicians, and often help troubleshoot patient and family concerns. These conversations help increase the staff’s awareness of their own bias, Edgerson says.

“The key is to recognize when we may be part of the issue, why someone might be uncomfortable and how that affects the way we deliver care,” Edgerson said. “By first identifying where those biases may be, we can address a family’s concerns. We want families to feel comfortable coming into our hospital.”

And ultimately, diversity, equity and inclusion work impacts the well-being of the entire community, Wilson-Guffin says. By addressing the social determinants of health that vary by culture, race, gender and age, caregivers can begin eliminating the roadblocks to better health.

“The social determinants of health don’t stop at the front door of the hospital.”

Cynthia Cross, MD
Chief of Pediatric Hospital Medicine

Cynthia Cross, MD, chief of Pediatric Hospital Medicine and member of the DE&I Steering Committee, says physicians play a key role as they learn a patient’s history, interpret it and develop a treatment plan in the context of the social determinants of health.

Cross remembers a 3-week-old patient who came to the hospital with a fever. Typically, a patient with this diagnosis stays in the hospital for 48 hours for treatment, but the baby still wasn’t feeding well after this period.

“The whole time I felt that there was something about the situation (the mom) wasn’t telling me. When I told her that the



In June 2020, Le Bonheur providers and staff gathered in front of the hospital as part of the White Coats for Black Lives event. This was a turning point for hospital leaders leading to the formation of the Diversity, Equity and Inclusion Steering Committee.

little one needed to stay longer, she burst into tears,” Cross said. “I told her ‘you’re going to have to talk to me.’ The mom said, ‘I’m hungry. I’ve been here for two days. No one can bring me food. I don’t have any money.’”

It was a situation Cross could solve quickly. Each inpatient unit has a pantry with food for families in need, and Cross also arranged for the mother to get a meal from the hospital cafeteria.

“The social determinants of health don’t stop at the front door of the hospital. They affect issues here. If we can, in a non-judgmental way, address these issues, families will be better off. Next time they come, they will know we have their backs,” Cross added.

The committee has aligned itself with partners, including the University of Tennessee Health Science Center, to ensure everyone who serves Le Bonheur patients, including residents and fellows, is working toward the same goal.

“Long-term, our goal is to eradicate the bias in health care at least on our campus,” Wilson-Guffin said. “We want staff and providers to feel free of any discrimination or retaliation, and for Le Bonheur to be a place where everybody feels celebrated and comfortable in their work.”

The moment on the front lawn in June 2020 was just the beginning.

“This road to diversity and inclusion is a journey. It’s not a quick fix. We’re talking about unlearning generations of unrest,” Wilson-Guffin said.

Edgerson agrees, saying, “We see this as a part of the way we deliver our care. This is not an episodic program. This is a way we see ourselves operating moving forward.”

AVOICE FOR EVERY CHILD

Memphis Children's Health Law Directive relies on collaboration among four community partners to address social determinants of health, legal barriers to health care

For Tim Flack, senior attorney of Memphis Children's Health Law Directive (Memphis CHiLD), joining Le Bonheur Children's Hospital's medical-legal partnership felt like coming back home. His oldest daughter Madeline had been a patient at Le Bonheur since 10 months of age when she was diagnosed with four congenital heart defects, and the Flack family had already been involved as volunteers on the hospital's Family Partners Council.

"Working at Memphis CHiLD allows me to really practice patient- and family-centered care more directly than I ever have and use what I was professionally trained to do," said Flack. "The collaboration we have with community partners allows us

to directly address the legal barriers to health care for the children in our community."

Flack is one of four attorneys and a team of individuals including law students, medical students, medical providers and social workers, who form Memphis CHiLD — a unique medical-legal partnership among Le Bonheur Children's Hospital, the University of Memphis Cecil C. Humphreys School of Law, Memphis Area Legal Services (MALS) and the University of Tennessee Health Science Center (UTHSC).

A CREATIVE PARTNERSHIP

Memphis CHiLD was unique among medical-legal partnerships (MLPs) from its inception. Unlike many

MLPs, the four organizations came together before the program launched, sharing the same desire. Each wanted to partner and collaborate for the well-being of children. Formal talks began, and Memphis CHiLD launched in 2015.

Four attorneys are entirely dedicated to the program, including Flack — one of only two attorneys in the country directly employed by a hospital. The team accepts a wide variety of cases from patients and families — also unusual among MLPs, which typically limit cases to specific issues such as disability, housing or special education needs.

"Originally we focused on cases coming through our community asthma program," said Flack. "But it soon became obvious that kids and families



Assistant Professor at the University of Memphis Cecil C. Humphreys School of Law Katy Ramsey (left) and Le Bonheur Senior Attorney Tim Flack (right) are two of the leaders of the Memphis Children's Health Law Directive (Memphis CHILD). This unique medical-legal partnership brings together four organizations to break legal barriers for children's health.

needed us to widen our net. While most partnerships focus on one or two case types, we will take almost any civil legal matter that is presented to us.”

Each partner plays a unique role in the collaboration to provide comprehensive legal care for kids and families. The program includes an attorney, social worker and social work intern from the hospital, law students and professors, a medical champion physician and dedicated teaching to medical students and residents.

“Partnership with all of these organizations is crucial in the effort to address social determinants of health and overcome the legal obstacles to child health and healing,” said Flack.

The majority of funding for Memphis CHiLD comes from grants and donors including Memphis’ Urban Child Institute. The unique

partnership among the organizations is what drew funders to support the program and keep it sustainable.

THE COLLABORATIVE PROCESS

Collaboration on a patient’s case begins as soon as a patient or family is referred. Any Le Bonheur employee — physicians, nurses, social workers and others — can refer a family with a legal issue to Memphis CHiLD. The team determines if the family fits within the requirements, and they almost always do.

All team members of the partnership meet on a weekly basis to review cases. Going through referrals, they determine what each patient needs and who in the partnership can handle it best. Assistance runs the gamut from simple legal advice to a case that goes to trial. Memphis Area Legal

Services (MALS), the primary provider of civil legal representation to low income families in western Tennessee, dedicates an attorney who works full time on cases from Memphis CHiLD.

“We ask ourselves: how can we stabilize the lives of a family as much as possible,” said MALS Chief Executive Officer Cindy Ettingoff. “Working in collaboration is really the key for us to obtain all of the underlying information to truly help. Medical professionals can’t really obtain everything needed for a child from a legal perspective, and we certainly can’t provide medical care.”

Le Bonheur employs Flack as senior attorney as well as Lydia Walker, LMSW, social worker for Memphis CHiLD. Walker works with cases that may or may not need to be handled legally.

“Our case review process is all about how can we maximize our efforts and collaboratively get the best outcomes for the family,” said Walker.

An important aspect of the process is connecting with a child’s physician and care team. This is unique among MLPs as families give lawyers permission to discuss health conditions with their child’s physicians.

Medical issues are interpreted by Le Bonheur Hospitalist and UTHSC Assistant Professor Emilee Dobish, MD, who leads the University of Tennessee Health Science Center’s part in the Memphis CHiLD collaboration. She serves as medical



Memphis CHiLD members round in the hospital periodically to meet with families who might benefit from their services. Pictured above, Le Bonheur Hospitalist Emilee Dobish, MD, physician champion of Memphis CHiLD, speaks with a patient’s family members.

“Partnership with all of these organizations is crucial in the effort to address social determinants of health and overcome the legal obstacles to child health and healing.”

Tim Flack
Senior Attorney, Memphis CHiLD

champion, promoting the program with Le Bonheur’s medical staff and serving as a resource for cases to interpret medical data.

“It’s important for us to have a conversation about how the diagnosis impacts the child,” said Dobish. “Engagement from all medical disciplines is vital to break down legal barriers for families. Prior to this MLP, the legal issues would never have been on a physician’s radar.”

Armed with the appropriate medical information, lawyers are better able to represent patients to get the legal help they need. Patients and families receive legal advice and discuss their case at a Medical Legal Partnership Clinic. Law students taking an interdisciplinary course through the University of Memphis Cecil C. Humphreys School of Law staff the clinic, which is led and directed by Assistant Professor of Law Katy Ramsey. Students simultaneously provide free legal services while receiving an education on the intersection of law and health.

And for families whose needs extend beyond legal matters to social issues, social workers are able to step in to find housing and employment, work on individualized

education plans or refer to other agencies that meet their needs.

BREAKING BARRIERS AS A TEAM

Memphis CHiLD’s role in helping families doesn’t stop with solving a single legal issue — ultimately, the partners work to address the social determinants of health that affect the patient and family. According to the Centers of Disease Control and Prevention, social determinants of health (SDOH) are the environmental conditions into which a person is born that can affect their health, including factors for greater risks and poor outcomes.

The team at Memphis CHiLD handles a wide variety of issues, but almost all of them are influenced by SDOH in some way. According to Walker, housing is a major issue in the Memphis area where the housing stock is outdated and families struggle with utility bills. Lawyers and social workers intervene to get improvements to housing conditions or find new housing

for families. A large portion of the program’s legal cases center around supplemental security income (SSI) for children, particularly those who have been denied previously. Memphis CHiLD’s experts know how to build the best case and present the right information to get approval. Beyond these issues, the team helps patients with specialized education needs, including 504 and IEP plans, conservatorships and Medicaid coverage.

“Families come in with one issue but have underlying barriers that prevent us from addressing that main issue,” said Walker. “There is always a social determinant of health involved and a social service need that can impact it.”

As a social worker, Walker is on the front lines addressing these social needs — her ultimate goal is to get families to a place of stability. While attorneys address legal aspects a family faces, Walker and her social work interns from local universities work with families on the

**MEMPHIS CHiLD:
BY THE NUMBERS**

- Received more than **2,100** referrals
- Handled **1,500** cases
- Obtained **\$19,864.31** in social security income (SSI) monthly
- Obtained **\$256,662.92** in SSI back payments

THE WARD FAMILY

In September of 2017, Tammie Ward and her husband Roz were faced with a serious question: could they become parents for seven of their grandchildren?

The children's mother had experienced a mental crisis and was diagnosed with bipolar disorder, and in the wake of this event, the children were also diagnosed with an array of mental illnesses and developmental disabilities, including bipolar disorder, depression and autism. Who would be able to help the Wards through the adoption process and caring for the many needs these grandchildren had?

But thanks to a Le Bonheur nurse, the Wards were connected to Memphis CHiLD, Le Bonheur's medical-legal partnership, and received the support, resources and legal expertise they desperately needed to care for their grandchildren. The nurse had been making home visits to care for Jeremie, the youngest grandchild who had cerebral palsy, scoliosis, was blind and required a feeding tube. She knew the Wards would benefit from additional legal support.

"Dealing with mental illness really took a toll on us at that time. We didn't know anything about it, but we knew we needed to keep the kids in our home for the best opportunity for them to thrive," said Tammie Ward. "Tim Flack (senior attorney at Memphis CHiLD) and his team came alongside us to walk through the legal system to get our kids what they needed."

The Ward family received an array of resources and support from the Memphis CHiLD team. The Memphis CHiLD attorneys helped the children obtain social security and individual education plans (IEP) and walked the Wards through the process of adopting all seven of their grandchildren. Le Bonheur Social Worker Lydia Walker helped the family obtain everything from rent assistance to beds to Christmas dinner and gifts for the whole family.

"We have gained more strength and knowledge since that first year we had the kids when we didn't know what to do," said Tammie Ward. "Just having someone like Lydia to talk to gave me strength."

Their youngest grandchild Jeremie, died in his sleep in September 2019. But this tragedy only strengthened the Wards' resolve to help others facing similar situations. Their experience with family members with mental illness even led them to create a non-profit, Seed House, Inc. Through this organization, the Wards aim to provide education and support to families of children with disabilities by connecting families with much needed resources in the community.

"Our journey with caring for children with disabilities prompted us to create something that would be a help to other families," said Tammie Ward. "Where one person may see no hope, we believe there is hope for every child."

Tammie and Roz Ward's grandson Jeremie was the link that brought them to Memphis CHiLD. His nurse, who made home visits to help with his care, saw the potential benefit that legal assistance could provide and connected the Wards with Memphis CHiLD.



Senior Attorney Tim Flack and the Memphis CHiLD team walked the Wards through the process of adopting their grandchildren after the children's mother experienced a mental crisis. Thanks to Memphis CHiLD, the Wards not only adopted their grandchildren but had access to additional resources and support for their family's journey.



practical aspects of their situation, including finding housing, securing funds and avoiding eviction. But not all MLPs have social workers attached to their program.

"Families come in with one issue but have underlying barriers that prevent us from addressing that main issue. There is always a social determinant of health involved and a social service need that can impact it."

Lydia Walker, LMSW
Social Worker, Memphis CHiLD

"Being a social worker in this program involves being a case manager, liaison, advocate and broker all at the same time," said Walker. "The diversity in our role shows just how impactful the social work component of an MLP can be."

And while Walker is able to focus on individual families, the partners ultimately realize that it is vital to improve children's health on a scale larger than individual families and affect more far-reaching change.

"For a long-term impact, we have to have community change, not just individual family success," said Flack. "Using the knowledge we've gained about the barriers from social determinants of health that impact children's health, we can translate this legal intervention to larger scale community change."

To accomplish this, the partners at Memphis CHiLD focus on child health advocacy in the community

in several ways. Through thought leadership, the partners work to inform the community and shape thinking around the intersection of policy and children’s health. The power of patient success stories are one way that the partners leverage advocacy and donor engagement. The program hopes that these tactics will affect policy change that breaks down barriers for families.

Ultimately legal intervention and social services have a direct impact on a child’s health. For example, finding stable housing for a child can reduce hospitalizations by reducing asthma triggers, mental stress and anxiety and minimizing stress levels.

“Stable housing is like preventative medicine,” said Walker. “Hearing families release a sigh of relief because they no longer have to worry about this issue makes it all worth it.”

THE FUTURE OF MEMPHIS CHILD

As Memphis CHiLD has grown exponentially, goals for the future have as well. Plans are underway to formalize advocacy on behalf of children and families by collaborating with hospital and university leadership.

“We have to make sure that families will benefit long term — not just a drop in the bucket but access to full resources and lasting change,” said Ettingoff. “Children are our future. If we can help them, ultimately we are giving this



To help physicians understand the role of legal issues in the health of a child, the University of Tennessee Health Science Center (UTHSC) educates the next generation of physicians with an elective for residents that covers the intricacies of the intersection of health and law. Pictured above, UTHSC residents join the Memphis CHiLD team while rounding in the hospital.

community a healthy, productive adult in the future.”

A core objective of Memphis CHiLD is continuing to educate physicians on the function of the program to better assist with this vital role. UTHSC educates the next generation of physicians with an elective for residents taught by Dobish, covering the intricacies of the intersection of health and law.

Physician education will continue especially on plans for specialized education, IEP and 504 plans, to help prevent these cases from escalating to a legal issue. Social work hopes to add new social workers, one for IEPs and one

for housing, to intervene for families and avoid going to court.

While the outcomes and data show the impact of the program, the stories of collaboration and family success are the best witness to how legal intervention can affect

children’s health and the stability of a family.

“How do you quantify getting a landlord to clean up mold

or establishing an IEP for a child?” said Flack. “Child advocacy among the partners of Memphis CHiLD is key to future sustainability of the program and greater impact on the community we serve.”

“For a long-term impact, we have to have community change, not just individual family success.”

Tim Flack
Senior Attorney, Memphis CHiLD

Racial Disparities in Diabetes:

WHEN DIABETES AND COVID COLLIDE

Black patients with Type 1 diabetes and COVID-19 are almost four times as likely to present with diabetic ketoacidosis compared to white patients

Non-Hispanic black patients with Type 1 diabetes and COVID-19 were almost four times as likely to present to the hospital with diabetic ketoacidosis (DKA) compared to non-Hispanic whites, according to an article published in *The Journal of Clinical Endocrinology & Metabolism* by Le Bonheur Pediatric Endocrinologist Kathryn Sumpter, MD.

The study examined 180 patients with Type 1 diabetes and laboratory-confirmed COVID-19 from 52 clinical sites, including Le Bonheur Children's. The objective of the study was to evaluate instances of DKA, a serious complication of Type 1 diabetes, in patients with Type 1 diabetes and COVID-19 and determine if minorities had increased risk when controlled for sex, age, insurance and last hemoglobin A1c (HbA1c) level.

"We know that Type 2 diabetes is a risk factor for worse COVID-19 outcomes, but less is known about Type 1 diabetes and COVID," said Sumpter. "This study allowed us to examine the intersection of Type 1 diabetes and COVID while also determining the racial inequities in DKA for these patients."

Previous studies have shown that COVID-19 disproportionately affects racial and ethnic minority groups with higher rates of infection and death. The same minority groups with Type 1 diabetes have also been shown to have increased risk of DKA and associated mortality. Because of these existing risk factors, it is critical to understand how COVID-19 and Type 1 diabetes interact and affect outcomes. The results of this study show that non-Hispanic black patients with COVID-19 and Type 1 diabetes have an additional risk of DKA beyond the risks associated with diabetes or being of minority status.

The results of the study show that non-Hispanic blacks were more likely to present with DKA and COVID-19 (55%) compared with non-Hispanic whites (13%). Hispanics had almost two times greater odds of presenting with DKA compared to non-Hispanic whites, which researchers found to not be statistically significant.

"A combination of factors lead to higher rates of DKA among minority Type 1 diabetes patients with COVID-19 that relate to social and structural risks," said Sumpter. "Social determinants of health, including income level, education, racial discrimination and inadequate health care access, impact these populations with devastating complications for Type 1 diabetes and COVID-19."

According to the study, intervention in these areas is essential to prevent these poor outcomes that unequally affect minority populations.

In an effort to reduce hospitalizations of diabetes patients, Le Bonheur has developed two clinics, Fresh Start and BEGIN, for children and adolescents with poorly controlled type 1 diabetes.



Led by Le Bonheur Endocrinologist Kathryn Sumpter, MD, the Fresh Start and BEGIN clinics use a comprehensive approach to diabetes control, including education, psychosocial support, social work and easy access to diabetes providers. Learn more about these initiatives in the Le Bonheur Peds Pod episode "A Fresh Start and New BEGINnings: Two unique initiatives to reduce diabetes hospitalizations" at lebonheur.org/podcast.



Le Bonheur Pediatric Endocrinologist Kathryn Sumpter, MD (right), meets with a patient during the Fresh Start Diabetes Clinic. A recent study from Sumpter showed that non-Hispanic black patients with Type 1 diabetes and COVID-19 were almost four times as likely to present to the hospital with diabetic ketoacidosis.

Le Bonheur endocrinologists seek to understand how race complicates diabetes

RACE, PSYCHOSOCIAL FACTORS PREDICT NEGATIVE HBA1C TRAJECTORIES IN YOUTH WITH TYPE 1 DIABETES

Psychosocial factors, particularly diabetes management in social scenarios, are a key part of understanding racial inequities in high hemoglobin A1c (HbA1c) trajectories in youth with Type 1 diabetes, according to research from Le Bonheur Chief of Endocrinology Ramin Alemzadeh, MD, and Le Bonheur Psychologist Angelica R. Eddington, PhD, published in the *Journal of Pediatric Psychology*.

“Psychosocial factors are so central that, without addressing them, other medical diabetes interventions are unlikely to be successful,” said Alemzadeh. “From a clinical standpoint, it is important to consider youth who anticipate trouble adhering to treatment in social situations when forming a treatment plan.”

The study was led by Principal Investigator Mary E. Keenan, MS, using data from the University of Memphis Predicting Resilience in Youth with DiabetEs (PRYDE) study, which was led by Principal Investigator Kristoffer S. Berlin, PhD. The aim of this research was to expand the literature that speaks to health disparities in glycemic control of black adolescents based on factors that might contribute to these disparities – particularly social information processing (SIP) variables. Adolescents who disagreed with statements about diabetes care such as “I’d think my friends would understand” or “I think I would be likely to do my diabetes care in this situation” were a predictor of poor HbA1c trajectories.

Youth were divided into three groups based on the trajectory of HbA1c in the study: high decelerating, mid-high accelerating and near-optimal accelerating. Results showed that black participants

were highly likely to be in the high decelerating and mid-high accelerating groups. Anticipated adherence difficulties (AAD) to treatment in social situations and other stress associated with diabetes management were also predictors for these groups. These results shine a light on the need to focus on the unique psychosocial factors and stress in social interactions faced by youth with Type 1 diabetes in communities of color in order to improve HbA1c trajectory.

“Previous studies have been carried out in predominantly white samples,” said Keenan. “But we know that black youth have distinct social experiences that impact diabetes care adherence, including institutional and individual instances of racism.”

Previous studies have also shown that racial and ethnic minorities experience significant disparities in achieving recommended HbA1c levels. But health care related factors such as barriers to care and access to diabetes technology such as insulin pumps do not account for the entirety of that disparity. Psychosocial factors are another vital component of diabetes management especially when they cause youth to forego diabetes care in public to avoid negative judgments from peers.

The study followed 184 youth between 12



Le Bonheur Chief of Endocrinology Ramin Alemzadeh, MD, (left) and Le Bonheur Psychologist Angelica R. Eddington, PhD, (right) were authors of a recent article that reviewed the psychosocial factors of diabetes management and how they impact the racial inequities of glycemic control in youth with Type 1 diabetes.

and 18 years with Type 1 diabetes receiving treatment at Le Bonheur. Fifty-seven percent of participants were black. Youth and caregivers completed questionnaire packets at baseline and approximately six and 12 months later to analyze psychosocial factors of diabetes management. The questionnaire consisted of the Attributions of Peer Reactions Scale Short Form (APR-SF) which describes various situations in which youth would need to take insulin around peers and allowed youth to choose how they would likely respond, and the Diabetes Stress Questionnaire (DSQ), a 65-item self-report measure covering various stressors including parental stress, peer stress, adverse personal effects and more. HbA1c values were also gathered at the same three time points.

“For black youth, addressing stressors at multiple levels of their social systems could be an important avenue for future intervention, especially contextualized within the minority stress model,” said Eddington. “Further research should consider the intersecting identities of youth with Type 1 diabetes and the multiple sociocultural levels at which they interact with their world.”



Le Bonheur Psychologist Angelica R. Eddington, PhD (right), meets with a Le Bonheur patient in the Endocrinology Clinic.

Molecular biology of brain tumors impacts prognosis, treatment

Understanding the molecular biology of brain tumors is key to prognosis and treatment said Le Bonheur

Neuroscience Institute Co-Director Frederick Boop, MD, in his presentation “How Molecular Biology Impacts Clinical Practice” at the International Society for Pediatric Neurosurgery (ISPN) 2020 Virtual Meeting.

“Historically we have depended on what we see under a microscope to differentiate tumor types and determine prognosis and therapy,” said Boop. “We know now that what we see doesn’t necessarily predict how these tumors are going to behave.”

Physicians are able to send a piece of a child’s tumor to FoundationOne, an FDA-approved tissue-based broad companion

diagnostic (CDx) for solid tumors, which provides the genomic alterations of that particular tumor. This explanation of the genetic aberrations includes its significance, best available treatment with mechanism of action and studies open for enrollment.

Manipulation of tumors based on molecular genetics began more than 35 years ago with shrinking prolactinomas before turning to neurosurgery. Boop and his team now use a molecular biological approach with

medulloblastomas, low-grade gliomas, congenital glioblastomas and many more types of brain tumors. Closer study of molecular genetics has revealed different variants within each type of tumor, each with a different treatment approach and prognosis based on the genetic variant. Further study is needed into treatment side effects and long-term consequences for some of these therapies.

“As neurosurgeons, it is important for us to get tissue to the lab in every instance for us

to understand what’s going on so that these children can have a chance,” said Boop.

When tumors can’t be removed surgically but tissue is needed for diagnostics, biopsies provide better understanding and treatment of the tumor. Previously, neurosurgeons avoided these biopsies because it was believed that the cells required were closest to necrotic areas that could cause catastrophic complications. Better understanding of tumors means that the tumor can be biopsied in a safer area in order to obtain

the molecular profile of the tumor.

“Molecular genetics has completely changed our field and will continue to do so,” said Boop. “There may come a time when the role for surgeons is much less than it is today.”



Le Bonheur Neuroscience Institute Co-Director Frederick Boop, MD, presented on the impact of molecular biology of brain tumors on clinical practice at the International Society for Pediatric Neurosurgery (ISPN) 2020 Virtual Meeting.

Le Bonheur joins REGEN-COV trial for pediatric COVID-19 treatment

While children infected with COVID-19 are less likely to develop severe illness compared to adults, not enough data exists to determine how they respond to various available treatments. Children with pre-existing conditions who are unvaccinated are a vulnerable population. If infected, they may experience severe symptoms than can lead to hospitalization and death.

Le Bonheur Children's Hospital and the University of Tennessee Health Science Center (UTHSC) are currently enrolling pediatric volunteers in a clinical trial to understand how they may respond to Regeneron's investigational antibody medicine, REGEN-COV, which has been approved for emergency use.

Recruiting participants quickly when they first test positive remains critical.

"REGEN-COV is another potential tool in the fight against COVID-19 that we can use for children with high-risk conditions, such as heart and lung disease or obesity, who are infected with the virus and have some symptoms but are not sick enough to require hospitalization," said Sandra Arnold, principal investigator for the REGEN-COV trial and Le Bonheur chief of Pediatric Infectious Diseases.

Le Bonheur is currently recruiting volunteers ages 0 to 17 years with at least one risk factor, who have tested positive within the last three days. Visit www.lebonheur.org/research/clinical-trials to learn more about the COVID-19 clinical trial and how to enroll.

Le Bonheur attains Magnet recognition



Le Bonheur has attained Magnet recognition from the American Nurses Credentialing Center (ANCC) for the second time, a testament to continued dedication to high-quality nursing practice. The ANCC's Magnet Recognition Program® distinguishes health care organizations that meet rigorous standards for nursing excellence. This credential is the highest national honor for professional nursing practice. To achieve initial Magnet recognition, organizations must pass a rigorous and lengthy process that demands widespread participation from leadership and staff. This process includes an electronic application, written patient care documentation, an on-site visit and a review by the Commission on Magnet Recognition.



Maller elected Secretary for Neurosonology Community of Practice for the AIUM

Le Bonheur Radiologist Vijetha Maller, MD, was recently elected secretary for the Neurosonology Community of Practice for the American Institute of Ultrasound in Medicine (AIUM). The Neurosonology Community of Practice brings together individuals focused on sonography of the brain, cerebral circulation, the spine and all peripheral nerves and muscles to discuss topics of mutual interest, communicate the needs of their discipline, develop educational content and network within each area.



Vijetha Maller, MD

UTHSC College of Medicine inducts Inaugural Class of Academy of Master Educators



Bindiya Bagga, MD



Mark Bugnitz, MD



Ajay Talati, MD

The University of Tennessee Health Science Center's College of Medicine inducted its inaugural class to the Academy of Master Educators. This year's class inductees included Le Bonheur physicians Infectious Disease Specialist Bindiya Bagga, MD, Critical Care Intensivist Mark Bugnitz, MD, and Neonatologist Ajay Talati, MD. The academy recognizes and celebrates contributions to education by dedicated physicians and other medical educators.

Giel elected president elect of the Society for Fetal Urology



Dana Giel, MD

Le Bonheur Urologist Dana Giel, MD, was recently elected to serve as president elect of the Society for Fetal Urology. Her term will begin in fall 2021. The Society for Fetal Urology serves to improve the care of patients with fetal and perinatal genitourinary anomalies by promoting research, education and appropriate practice.

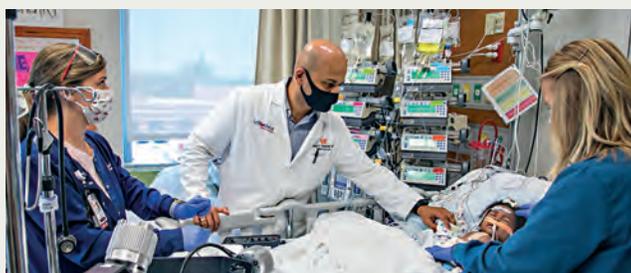
McCullers appointed to Shelby County Board of Health

Le Bonheur Pediatrician-in-Chief Jon McCullers, MD, was appointed to the newly formed Shelby County Board of Health. The board will meet regularly to provide expert advice to the Shelby County Health Department on routine issues, such as health-related policies, and responses to emerging issues, such as the COVID-19 pandemic. McCullers has been on the front lines of the response to the COVID-19 pandemic and emerged as an infectious disease leader advising the local and statewide response to the pandemic.



Jon McCullers, MD

PICU receives Gold Beacon Award



Le Bonheur's Pediatric Intensive Care Unit (PICU) recently received the Gold-level Beacon Award from the American Association of Critical Care Nurses.

This designation reflects a unit with refined processes that are applied systematically with participation by key stakeholders and clear evidence of learning and improvement cycles. These approaches support quality patient outcomes and professional development.



Kerr named executive vice chair of Ophthalmology at UTHSC

Le Bonheur Chief of Pediatric Ophthalmology Natalie C. Kerr, MD, was recently named vice chair of the Department of Ophthalmology at the University of Tennessee Health Science Center (UTHSC). Kerr is also the endowed Roger L. Hiatt Professor in Ophthalmology at UTHSC.



Natalie C. Kerr, MD

Le Bonheur's CFRI named an inaugural I-ACT for Children Trailblazer site



The Children's Foundation Research Institute (CFRI) at Le Bonheur was named as one of eight Trailblazer sites in the Institute for Advanced Clinical Trials (I-ACT) for Children Site Network, a globally collaborative research network. Trailblazer sites will focus on improving clinical trial start-up times, enrollment and patient completion.

Corkins appointed Chairperson for AAP Committee on Nutrition

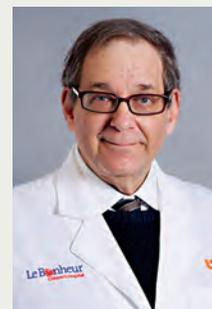
Le Bonheur Division Chief of Pediatric Gastroenterology Mark R. Corkins, MD, CNSC, FASPEN, AGAF, FAAP, was recently appointed as chairperson of the American Academy of Pediatrics (AAP) National Committee on Nutrition. He will begin a four-year term as chairperson in July 2021.



Mark R. Corkins, MD, CNSC, FASPEN, AGAF, FAAP

Cohen named to multiple national leadership positions

Le Bonheur Radiologist-in-Chief and Medical Director of Radiology Harris L. Cohen, MD, FACR, has been appointed as chair of the Neurosonology Community for the American Institute of Ultrasound in Medicine for 2021-22. Cohen has also been named as councilor to the American College of Radiology for the Tennessee Radiological Society.



Harris L. Cohen, MD, FACR

Johnson co-chairs ACR cardiac imaging education module

Le Bonheur Director of Cardiac MRI Jason Johnson, MD, MHS, co-chaired the American College of Radiology's (ACR) "CPI Cardiac Imaging Special Edition Module." The module reviews more than 130 images using cardiovascular MRI and CT scans to aid in diagnosis and predict outcomes related to cardiomyopathy, congenital heart disease and more.



Jason Johnson, MD, MHS

Comprehensive Epilepsy Program receives reaccreditation from National Association of Epilepsy Centers

Le Bonheur's Comprehensive Epilepsy Program recently received a two-year reaccreditation from the National Association of Epilepsy Centers (NAEC) as a Level 4 epilepsy center, the highest level available for pediatric centers. Level 4 epilepsy centers have the professional expertise and facilities to provide the highest level medical and surgical evaluation and treatment for patients with complex epilepsy.



Le Bonheur, West Tennessee Healthcare announce collaboration

Le Bonheur and West Tennessee Healthcare recently initiated a collaboration to provide the highest levels of care for West Tennessee children from Le Bonheur pediatric experts with advanced training in pediatric subspecialties. The pediatric unit, which would be licensed to Le Bonheur Children's Hospital, will be the first of its kind for West Tennessee. The proposal is pending state regulatory approval.

The collaboration will improve the health status of West Tennessee children by enhancing access to expert, cost-effective care, developing more comprehensive pediatric specialty programs in Jackson and strengthening the coordination of care for patients who need to travel to Memphis. Further details regarding the scope of this work, including services provided, are expected later this year.



Finkel awarded Children's Foundation of Memphis Chair of Excellence

Le Bonheur Vice Chair of Clinical Affairs Terri Finkel, MD, PhD, has been awarded the Children's Foundation of Memphis (CFOM) Chair of Excellence. Through this endowed award, Finkel will receive support to coordinate cutting-edge research at Le Bonheur with the aim of improving the health and well-being of Memphis children. Finkel is also professor and associate chair of Pediatrics at the University of Tennessee Health Science Center. The Children's Foundation of Memphis Chair of Excellence was created in 2017 through a \$1 million donation from the CFOM matched by Methodist Le Bonheur Healthcare.



Terri Finkel, MD, PhD

Black recognized as "10 Gastroenterologists to Know" by Becker's Healthcare

Le Bonheur Gastroenterologist Dennis Black, MD, was recently recognized as one of "10 Gastroenterologists to Know" by Becker's Healthcare. Black is the J.D. Buckman Professor of Pediatrics at the University of Tennessee Health Science Center and serves as scientific director of the Children's Foundation Research Institute and vice president of Research at Le Bonheur Children's Hospital.



Dennis Black, MD

Le Bonheur named a 'Best Children's Hospital' by *U.S. News & World Report* for 11th year

Le Bonheur Children's Hospital has been recognized as a Best Children's Hospital for 2021-22 by *U.S. News & World Report* for the 11th consecutive year.

The annual Best Children's Hospitals rankings and ratings are designed to assist patients, their families and their doctors in making informed decisions about where to receive care for challenging health conditions. The rankings recognize the top 50 pediatric facilities across the U.S. in pediatric specialties.

Le Bonheur was recognized in seven specialties — Cardiology and Heart Surgery, Gastroenterology and GI Surgery, Neurology and Neurosurgery, Nephrology, Orthopaedics, Pulmonology and Lung Surgery, and Urology.

"I am thrilled that for the 11th consecutive year, Le Bonheur has been recognized as a Best Children's Hospital by *U.S. News & World Report*," said Le Bonheur President Michael Wiggins, DBA, FACHE. "This honor is a sign of our dedication to providing the best health care for children. This means that families can count on us to provide safe and effective care for all children who need us."

