

The Core Report

NEWS FROM THE PEDIATRIC RESEARCH
ALLIANCE CORES

The New Vevo[®] 3100 LT Imaging System came to the Animal Physiology Core!

Animal Physiology Core replaced the Vevo 2100 system with the newest Vevo 3100 micro-ultrasound imaging system during summer 2021. With a powerful combination of high frame rates and advanced image processing, the new Vevo 3100 reduces speckle noise and artifacts while preserving and enhancing critical information for small animal in vivo studies. The new standard in pre-clinical ultrasound imaging is here with many benefits for basic and pre-clinical researchers.



A TASTE OF WHAT'S INSIDE:

The New Vevo 3100
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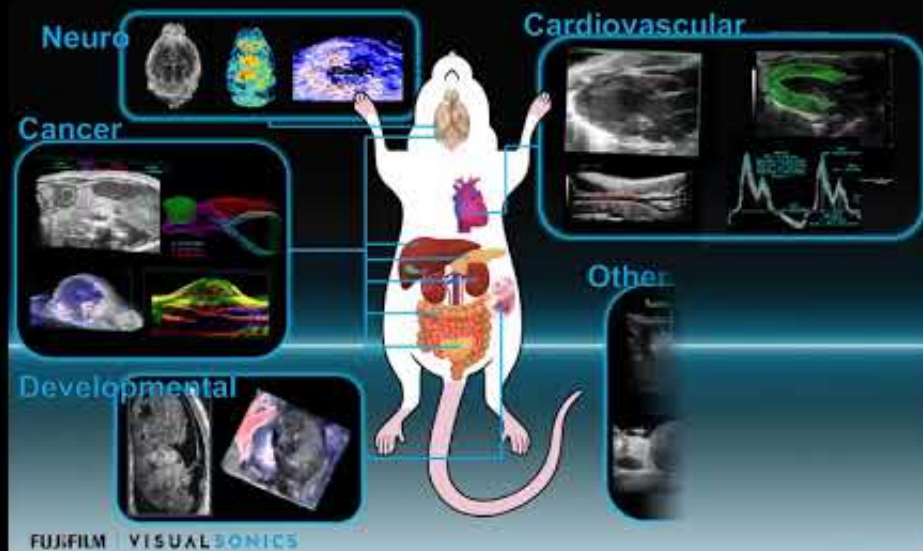
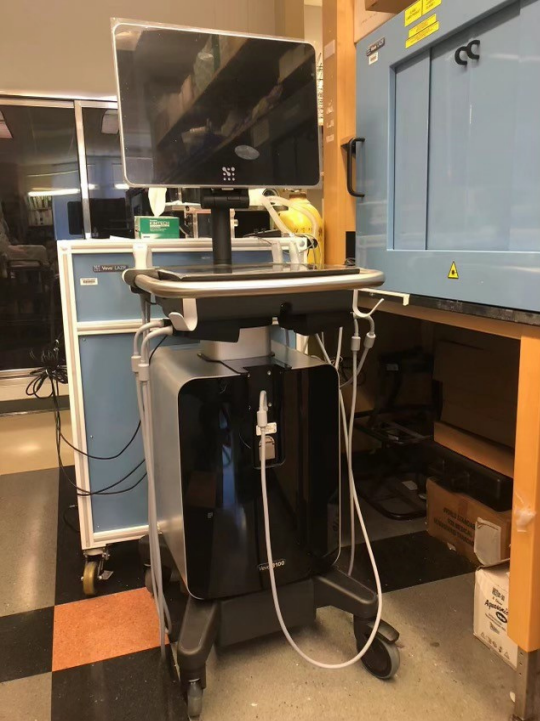
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New applications that are possible with the 3100:

- **Oncology:** Tumor detection and sizing in 2D and 3D, Vascularity and perfusion, Tumor model characterization, Response to therapy
- **Abdominal:** Kidney function, Liver fibrosis, Reproductive
- **Developmental:** Placental structure and function, Pregnancy screening, Embryo injections
- **Cardiovascular:** Cardiac function in 2D, 3D and 4D, Hemodynamics, Myocardial and vascular strain, Cardiotoxicity
- **.....and many more. Reach out to the Animal Physiology Core for more information.**

Benefits of Vevo 3100

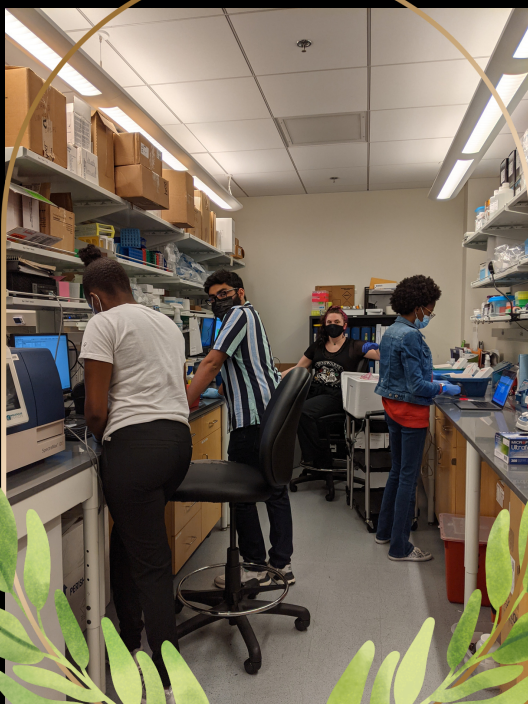
- Vevo HD - Visualize your data like never before. Revolutionary image processing technology reduces speckle noise and artifacts in images while preserving and enhancing critical tissue information, in real time.
- Intuitive touchscreen interface for all user types
- Customizable workflow for rapid data acquisition
- Anatomical, hemodynamic, functional, and molecular data all in one platform
- Compact, maneuverable system
- Hands-free scanning using Vevo Voice
- State-of-the-art Ultra High Frequency - up to 70 MHz and resolution down to 30 μm .
- 4D Cardiac Imaging - 4D ultrasound is the perfect solution for models that create abnormalities in the traditional geometric proportions of the heart such as myocardial infarction, congenital heart defects, and various genetic knockout models. Quantify ejection fraction and fractional shortening with more accuracy than traditional echocardiography, and faster than cardiac MRI.
- Auto LV - Automated analysis of left ventricular function using the VevoLAB software and acquired data. Same time and resources with Auto LV analysis.



Successful Research Takes a Village: Multidisciplinary teams unite and form new collaborations to address SARS-CoV-2

Below is an excerpt from an article describing an extraordinary effort by researchers in the pediatric research alliance who mobilized to address the SARS-CoV-2 pandemic. [Click here to read the article in full.](#)

In March 2020, a mysterious new coronavirus spread across the world, prompting a historical shutdown of life as we knew it. Frontline workers wondered what risks they may be bringing home to their families. Since the prevalence and incidence of COVID-19 infection among pediatric Healthcare Workers was unknown, the Center for Clinical and Translational Research (CCTR) co-directors Drs. Morris and Vos sprang into action to establish the Longitudinal Pediatric Healthcare Workers SARS-CoV-2 Antibody Surveillance project.



Drs. Morris and Vos led an extraordinary effort bringing together a unique and innovative team including members of some of our pediatric cores. Of note, the Children's Clinical and Translational Discovery Core (led by scientific director Dr. Chris Porter and by technical directors Drs. Brad Hanberry and Mimi Le) worked swiftly and with razor sharp precision to receive and process the influx of a large number of biological samples in a short period of time. Not only did this work provide this longitudinal study with the samples necessary, but this work also established a tremendously valuable biorepository used by dozens of other researchers in the past 18 months. [Click here to read all the details showcasing how successful research truly takes a village.](#)

RADx & CTDC

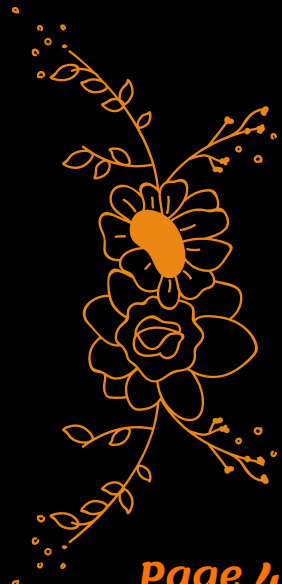
By Julie Sullivan and Mimi Le, PhD

The Clinical and Translational Discovery Core is serving as the central biorepository for pediatric COVID-19 samples, and is also playing an integral role with adult samples. The core rapidly adapted to the growing needs of the Emory community and the rest of the country when COVID-19 hit, and now serves as a key biorepository for and provider of COVID-19 samples, many of which were collected at drive-through testing sites. The CTDC is playing a critical role in the NIH's Rapid Acceleration of Diagnostics (RADx-Tech) program, and companies and entities from around the country often turn to the CTDC to see what biobanked samples are on hand, and what can be accessed and used to test a new generation of COVID-19 tests.



To date, CTDC processed and banked nearly 24,000 samples for RADx. These samples include nasopharyngeal swabs, anterior nasal swabs, dry swabs, and saliva from both adults and children. Additionally, The CTDC have banked over 12,000 nasal swabs from the Variant Task Force that were collected from patients harboring variants of concern.

Additionally, as the CTDC staff are trained research specialists, they have been called upon to help with device testing for the RADx-Tech program, utilizing the very clinical samples banked in the biorepository. Research specialists are also engaged with testing devices for the variants of concern to ensure that new COVID-19 tests are still sensitive and specific for the variants. The team is also working with our Emory scientists on generation and storage of inactivated variant samples and panels. These samples will be used to retest their devices against the rapidly evolving variants.



Flow Cytometry Core & The Outstanding COVID Research

By Matthew Woodruff, PhD
Immunologist at Emory University

As the COVID-19 pandemic approached Atlanta in March of 2020, the Sanz and Lee labs made the decision to direct our expertise in the development of atypical antibody responses and human B cell biology and toward understanding immune development in severe COVID-19. Previous work in autoimmunity, particularly systemic lupus erythematosus (SLE), had directed us towards flow cytometry-based assessment of developing B cell responses. When the pandemic hit full-force, we were rapidly developing new protocols to take advantage of the newly acquired Cytek Aurora available through the Pediatrics Flow Core to perform deep phenotyping of emerging B cell responses, and quickly applied those protocols to the assessment of patient samples acquired from the rapidly-filling ICUs around the city. With critical help by Aaron and his team, we were able to evaluate B cell responses in the most severe patients from the early phases of the pandemic in real time and identify startling similarities between those infected patients and patients with active underlying autoimmunity. In work published in *Nature Immunology*, and now cited more than 150 times, we used high-dimensional B cell profiling to show that patients with severe COVID-19 make use of an 'alternate' pathway of B cell activation and antibody production most frequently associated with active autoimmune disease and antibody self-targeting. These patients develop fast-acting, robust, neutralizing antibody responses against SARS-CoV-2, but they also display hallmarks of autoimmune disorders that suggest that those antibody responses might also play a pathologic role in ongoing disease. As a result of this work, and our continued work with the Pediatrics core, we find ourselves in a unique position at the cutting edge of COVID-19 research worldwide – deeply documenting and characterizing the emergence of clinical autoreactivity as a result of severe viral infection.

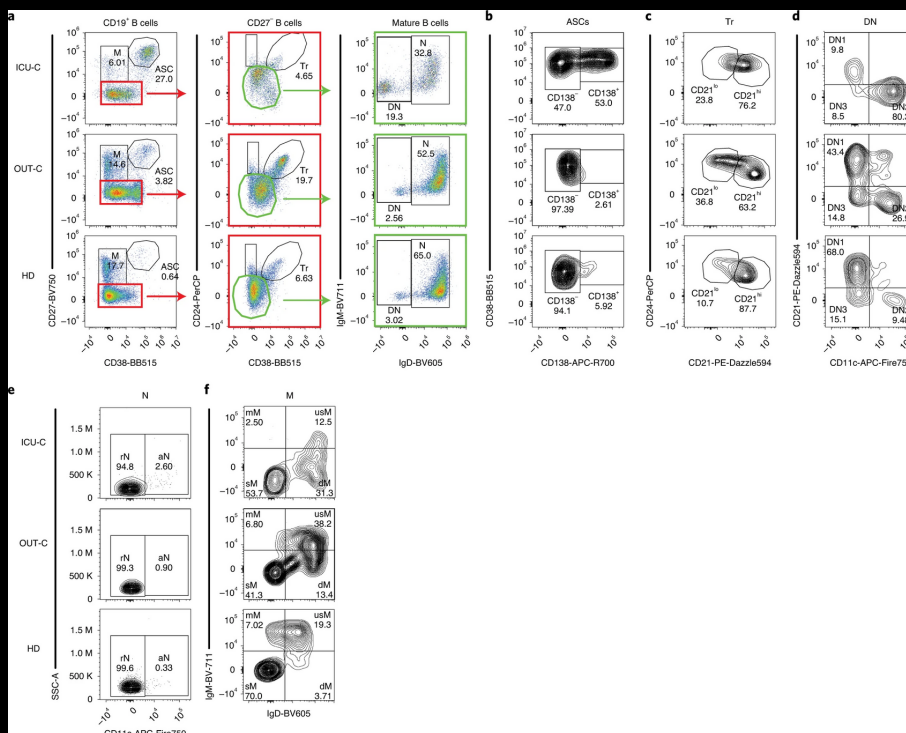


Fig. 1: B cell characterization in acute COVID-19 infection by high-dimensional FCM.

From: Extrafollicular B cell responses correlate with neutralizing antibodies and morbidity in COVID-19

a-f, PBMCs from HD (n = 17), OUT-C (n = 7) or ICU-C (n = 10) patients were analyzed by FCM.

Representative patient samples were selected for display (OUT-C: day 4 after symptom onset; ICU-C: day 7 after symptom onset). a, Primary population gating of representative patient samples. b, ASC sub-gating (CD138⁺ ASC and CD138⁻ ASC) of representative patient samples. c, Transitional B cell sub-gating (CD21^{lo} Tr and CD21^{hi} Tr) of representative patient samples. d, Double-negative B cell sub-gating (DN1, DN2 and DN3) of representative patient samples. e, Naive B cell sub-gating (resting naive (rN) and aN) of representative patient samples. f, Memory B cell sub-gating (mM, usM, dM and sM) of representative patient samples displayed a decrease in usM in ICU-C. dM, IgD-only memory; mM, IgM-only memory; usM, unswitched memory.

Cystic Fibrosis Discovery Core



The CF Discovery Core utilizes the Cystic Fibrosis Biospecimen Registry (CF-BR) which is a storage bank of several thousand biofluids collected from patients with cystic fibrosis at varying disease states. Patients are consented from both the adult and pediatric clinics at Emory and may donate samples at each outpatient clinic visit, at their annual visit only (which typically runs long and includes more lab tests), when hospitalized, or any combination of the above. We believe that these treasured samples may be the keys that will allow our researchers to unlock the mysteries underlying the changes that occur in the lungs of CF patients as the disease progresses.

Dr. Balazs Rada: (The University of Georgia)

"The Rada laboratory at the University of Georgia studies neutrophil-mediated inflammation in cystic fibrosis airways using animal models and human biospecimen. The team also investigates autoimmunity in cystic fibrosis. The laboratory is involved in tight collaborations with several investigators at the Emory University CF Center related to these projects. The CF Discovery Core has played essential roles in all of our CF-related projects by providing blood and sputum samples, bacterial isolates and live immune cells obtained from cystic fibrosis patients."

Dr. Joshua Chandler: (Emory University)

"Access to the CF Discovery core is essential to my laboratory's experiments. As a PhD scientist, reliable access to deidentified fresh and frozen clinical samples is a wonderful benefit that is difficult to overstate. Additionally, we have used the core's well-organized clinical data - such as which patients are taking highly effective CFTR modulators - to make novel discoveries within our results and carve out new research directions."

Meet The New Staff

Shasha Bai, PhD

- Director of Pediatric Biostatistics Core

Hello! My name is Shasha, and I am the newly appointed Director for the Pediatric Biostatistics Core. I am beyond thrilled to join Emory and continue my contribution to pediatric research as a team science Biostatistician. With a combined domain knowledge and statistical expertise, my research interests build upon the core foundation of novel statistics applications with special considerations to the pediatric population. I bring in seven years of experience in research, grant writing, and study design, and two years of experience in direct team management. My research profile represents diverse topics with major contributions in outcomes of at-risk populations, obesity research, cystic fibrosis research, and more recently, pediatric trials and non-invasive diagnostic studies. I am also an advocate for advancement of underrepresented faculty and staff in medicine and science. By analyzing information and identifying trends, I wish to make a broad impact on the issue of gender and racial inequality with data-informed decisions. My education background includes M.S. in molecular biology, M.S. in statistics, and Ph.D. in Biostatistics. Prior to joining Emory, I was a faculty at University of Arkansas for Medical Sciences and The Ohio State University.



Dancing has been my life-long passion. I started with traditional dance in my childhood. After taking a break in high school, I was drawn to the world of competitive ballroom dancing in college. I have competed and ranked in several major collegiate ballroom competitions in the U.S. Post-college, I fell in love with Argentine tango, and have travelled around the US and Canada for different tango events. Through tango dancing, I was able to find friendship with people from all walks of life, especially those I would have otherwise not have had a chance to meet.



Pamela D. Winterberg, MD

- Scientific Director of Animal Physiology Core

Hello, my name is Pam Winterberg and I am an accidental cardiovascular researcher."

The surgical services of the AP Core were instrumental to me in my first few years as junior faculty. The AP Core provided me with the technical expertise needed to establish a reliable mouse model of chronic kidney disease (CKD) to launch my research career. My entry into cardiovascular research was entirely serendipitous arising from interactions with the AP Core staff and leadership. As we were establishing the CKD model, I was asked if the core could use my animals to evaluate a new cardiovascular imaging technique.



Though I wasn't initially considering focusing on cardiovascular disease when I first started, the data generated during this "practice" imaging and the amazing interactions with the AP Core staff and leadership convinced me to pivot my research to include cardiac biology. I think this is one of the great examples of how the AP Core's approach to continuous improvement and collaboration with PI's to develop new services can super-charge research in Pediatrics.

I am excited for the opportunity to support researchers in Pediatrics as the new AP Core Director. The AP Core's expertise in small animal surgery, physiology assessment, and imaging is applicable to a wide variety of research outside cardiovascular biology. I love hearing about all the amazing research on campus and am looking forward to discussing how the AP Core can support your research.

Winterberg Lab

I am a research-focused physician scientist and Associate Professor in Pediatric Nephrology. My lab focuses on the intersection of immunology, cardiovascular biology, and kidney disease. We are currently investigating how the immune system is involved in the development of the cardiovascular comorbidities occurring during chronic kidney disease (CKD) and kidney failure.



Outside the Lab

When I'm not working, I enjoy camping, hiking, and vlogging my family's annual road trips.

Mimi (Uyen) Le, Ph.D.

Greetings! My name is Mimi and I became the laboratory director of Emory + Children's Clinical and Translational Discovery Core (CTDC) in January 2021. Prior to this role, I received my Ph.D. in biomedical science from MD Anderson Cancer Center UTHealth in Houston, TX. I was a laboratory manager for the Sarafianos Lab at Emory University for two years before my recruitment to CTDC. I work with various clinical investigators in the Department of Pediatrics and provide support for several clinical trials. Our core also serves as a biorepository for healthy biological specimens and we are the central biorepository for the NIH-funded Rapid Acceleration of Diagnostics (RADx) initiative aimed to speed the development, commercialization, and implementation of COVID-19 diagnostic technologies for the American public.

At a young age, I have always been interested in science and medicine. During graduate school, I discovered my passion for teaching and mentoring. I was Vice President of the student-led Community Outreach Program, whose mission is to help serve the Houston community by increasing science understanding and awareness. Helping others has always been my goal and I am extremely enthusiastic to a part of the Emory community.

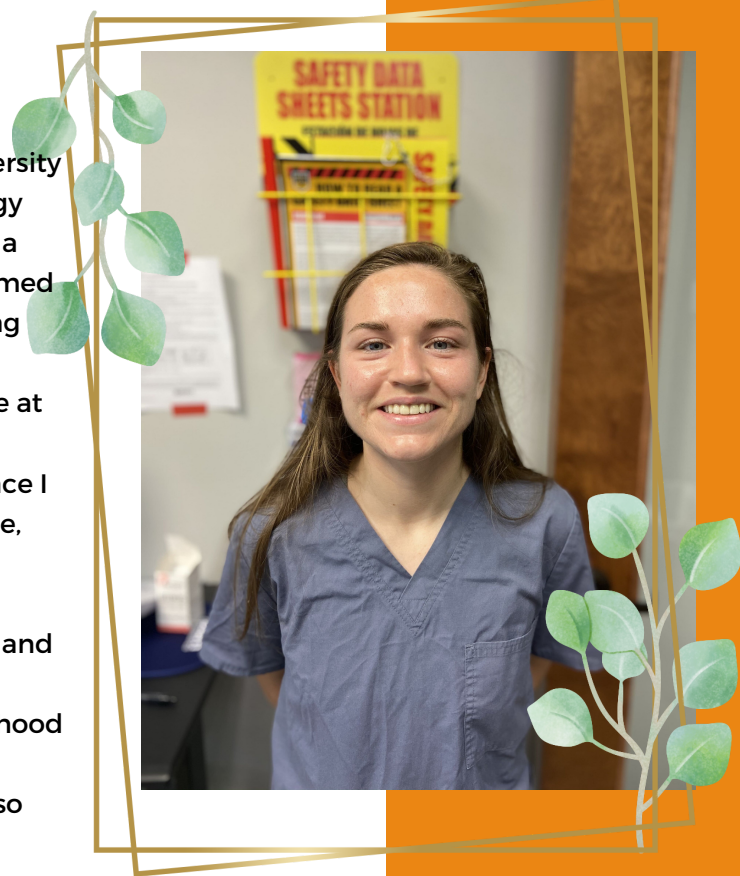


"In my spare time I love to travel, embroider, crochet, read mystery/thriller novels, re-watch Harry Potter & Marvel movies, and partake in my husband's baking experiments! We have friends and family who live all over the country and we enjoy visiting them as often as we can."

Ellen Clegg

Hello, my name is Ellen Clegg, and I recently joined the Children's Clinical and Translational Discovery Core as a Research Specialist in April 2021. I graduated from the University of Georgia in 2018 with a Bachelor's degree in Cellular Biology and a minor in Women's Studies. Before joining CTDC, I was a lab technician in a molecular lab where we primarily performed PCR testing for COVID-19 specimen. I look forward to working with this core because of the many interactions I'm able to experience with various departments and research labs here at Emory's School of Medicine. Working with a wide variety of people will allow me to develop my own career pathway since I am currently trying to find my place in the field of healthcare, medicine, and scientific research.

After a long day, I love unwinding by going on a run outside and coming home to cook a fresh meal for myself. I like home gardens, fresh produce, and going for walks in my neighborhood so that I can feel connected to nature and the community around me. I also love to read and visit my local bookstores so that I can support the small businesses around me.



Giovanna Sifontes

Hi, my name is Giovanna Sifontes and I just became part of the Children's Clinical and Translational Discovery Core and the Pediatric/ Winship Flow Cytometry Core. I am a recent graduate from Brenau University, where I received my bachelor's in biology. I am enjoying getting to learn about the various different studies that the CTDC gets the opportunity to aide in, as well as having the ability to grow in skill and in knowledge about flow cytometry.

I spent my collegiate career volunteering at Children's Healthcare of Atlanta and love that through the CTDC and the Pediatric/ Winship Flow Cytometry Core, I can continue to impact the lives of children.



"In my spare time I can be found outdoors. I love getting to go on hikes with my pup, go outdoor rock climbing, and attempt skateboarding and mountain biking. I look forward to any days I get to spend with my two adorable nephews and strongly believe that ice cream makes everything better!"



Adrianna Westbrook, MPH



I am a recent graduate from the Master of Public Health program at the University of Georgia. I recently worked at Tulane University as a research analyst assisting on genetic epidemiological research. I was also an ORISE fellow with the Centers for Disease Control working with carbapenem resistance and increasing surveillance capacity. Because of my interest in clinical epidemiology and the intersection of public health and medicine, I am thrilled to be a part of the Emory community now. In my free time, my fiancé and I love to explore the outdoors, whether it is by hiking or going geocaching. I have recently gotten into kayaking and hope to try out rafting next! When we are not outdoors, we are usually doing a movie marathon--with Lord of the Rings being our latest series of choice.



PEDS CORES CONTACT INFORMATION

These cores are generously supported by Children's Healthcare of Atlanta and Emory University. When presenting or publishing work completed using the core, please include "Children's Healthcare of Atlanta and Emory University [insert core name]" in the acknowledgments.

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For more information on Peds Cores, please visit:
<https://www.pedsresearch.org/research/cores/>

This newsletter serves to highlight the activities of the cores supported by Emory University's Department of Pediatrics and Children's Healthcare of Atlanta. If you have a story idea for a future edition, please contact:
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