Welcome to the Spring 2021 March of Dimes Research Newsletter

March of Dimes’ integrated research strategy leverages diversified funding centered on four priority areas to advance our understanding of maternal and infant health: diagnostic biological markers, maternal microbiome and immune factors, maternal comorbidities and social and environmental drivers of health. In this newsletter, you’ll read about our work in a few of these key areas examining everything from the impact of infectious diseases on moms and babies to how basic income affects health disparities. Stories include:

• Pregnancy and COVID-19: We start on the East Coast with COVID-19 research underway at the University of Pennsylvania. In the age of this global pandemic, one of the most dangerous pathogens a woman’s placenta has to contend with is the novel coronavirus, which causes COVID-19. This study concentrates on examining risks to both mom and baby and seeks to understand the long-term consequences of contracting the virus while pregnant.

• When childhood diseases start: We continue our focus on infectious disease research with a story from one of our advisors in the field at Johns Hopkins University. Researchers there are examining how inflammation in the placenta of HIV and ZIKA-infected women affect the long-term health of their children.

• Basic income’s impact on health disparities: Then we jump to the West Coast where we’re funding a community-academic partnership between San Francisco Bay Area social justice advocates, researchers and health care professionals. It’s called the Abundant Birth Project and is examining if an income supplement can help reduce health disparities for Black and Pacific Islander moms.

• Why we give: Finally, we’ll introduce you to one of our most inspiring donors whose family—yes, all five of them—have been investing in March of Dimes for two and a half decades.

We know this work wouldn’t be possible without the hard, disciplined efforts of our researchers and the generosity of people like you dedicated to improving the health of all moms and babies. For this, we thank you.
**PREGNANCY AND COVID-19**

The novel coronavirus produces a range of serious symptoms and side effects. A new study is looking into how it may even cause negative pregnancy outcomes.

Of all the dramatic transformations a woman’s body undergoes to bring a baby into the world, perhaps the most wondrous is the creation of the placenta. The placenta isn’t an organ a woman’s body possesses—it’s one that grows during pregnancy for the sole purpose of providing her baby with protection and nourishment during gestation. The placenta serves a myriad of other functions, too, allowing nutrients and oxygen to pass through, disposing of waste from the baby’s bloodstream while allowing the growing baby to have its own blood supply and filtering out harmful bacteria and toxins. In the age of this global pandemic, one of the most dangerous pathogens a woman’s placenta has to contend with is the novel coronavirus, which causes COVID-19.

In a natural cycle of cell death and regeneration, the body releases tiny bits of mitochondria packaged in particles known as extracellular vesicles. These vesicles get into the bloodstream and go through the body and can actually influence organ or cell function by binding to them. But in COVID-19 patients, extracellular vesicles released from the sites of the infection, like the lungs, or from immune cells may actually be causing organ damage and in some extreme cases, organ failure, according to a number of recent studies.

Extracellular vesicles also are produced in large quantities during pregnancy by the placenta. What’s alarming is that we’re beginning to see adverse pregnancy outcomes from women who’ve had COVID-19 during their pregnancy. As the final barrier between the fetus and the outside world, the placenta is the battleground that will tell researchers how the struggle was waged and whether it was won or lost.

March of Dimes-funded researchers, Rebecca Simmons, MD, and Samuel Parry, MD—both at University of Pennsylvania’s Perelman School of Medicine, a March of Dimes Prematurity Research Center—are investigating the role these extracellular vesicles play in birth outcomes and the placenta pathology.

“We’ve noticed that placentas from women who have COVID-19 during pregnancy have several rather severe abnormalities associated with adverse pregnancy outcomes such as preeclampsia, low birth weight and in some cases, preterm birth,” said Dr. Simmons. “We think that these changes in the placenta result from communication between immune cells and the placenta cells. Some pregnant women who contracted COVID-19 and got very sick were much sicker than their non-pregnant age group and were affected to such a degree they had to deliver early. But what’s most interesting is that some women who were positive for COVID-19 during pregnancy were not sick. And even though they had no symptoms, their placentas were still abnormal. That’s a phenomenon that’s peculiar to this virus.”

It’s important to understand this mechanism because we know that the placenta “programs” the fetus and subsequently the child. If the placenta is abnormal, even though the baby might look fine at birth, it may have signaled those abnormalities to the fetus’ metabolism or cardiovascular health, which would have consequences later in life. The same risks could apply to the mom. Preeclampsia, for instance, is one of the potential side effects of COVID-19, and moms who develop it during pregnancy stand a much higher chance of developing high blood pressure later in life. So, while COVID-19 might go away, we need to develop strategies to prevent its long-term consequences.
“It’s impossible to know where we’re headed with the novel coronavirus. And there are so many unknowns in the pregnant population and their babies that need to be explored,” said Dr. Parry. “It would be short-sited to think this is going to be over in three or four months or that the vaccines are going to solve everything. That’s why organizations like March of Dimes play a critical role in biomedical research—they support research foci that the National Institutes of Health doesn’t. In doing so, they contribute to our overall medical and biomedical knowledge so that we not only can cope with this pandemic, but the next one as well.”

This study, and others like it, are made possible by donor support of the March of Dimes COVID-19 Intervention and Support Fund, which was developed to address the urgent need for research, advocacy and education to protect moms and babies from COVID-19 and its unknown far-reaching effects. Another grant recipient, Dr. Andrea Edlow, at the Vincent Center for Reproductive Biology at Massachusetts General Hospital is conducting an additional study, examining the transference of protective antibodies through the placenta and breast milk. Dr. Edlow is collaborating with other grant awardees, including Drs. Simmons and Parry.
We know that inflammation and infection play major roles in triggering preterm birth. But we’re now finding out that these prenatal disruptions may have serious and far-reaching consequences for babies’ long-term neurologic and immune outcomes. This groundbreaking work is so important, it’s spawning a whole new field of inquiry called immunoperinatology. This research details how inflammation or infection in the placenta causes neurobehavioral disorders such as cerebral palsy, learning disabilities, asthma and various allergies. One of the visionaries driving its progress forward is March of Dimes Maternal and Child Health Advisory Council Member Irina Burd, MD, Ph.D., a professor at one of the foremost research institutions in the world, Johns Hopkins University.

The relationship between mom and her growing fetus is symbiotic, to say the least. A woman’s body makes drastic physical and chemical accommodations to carry a baby, supplying it with a safe and nurturing environment in which to grow for its first 40 weeks. And although moms develop robust immune responses during gestation, they’re not immune to infection or inflammation during pregnancy. Just like the nutrients and blood mom shares with her developing baby, when she’s fighting an infection she likewise shares her immune response. The trouble is, the resulting inflammation isn’t good for the baby.

For example, one of the areas Dr. Burd is studying is how inflammation in the placenta of HIV-infected women affect the long-term health of their children. Even though the babies don’t have HIV, they’re forever changed by their moms having had it and they themselves may have complications and die from other infections early in childhood as a result. She’s also looking at a similar mechanism with moms who are infected with the Zika virus. In both cases, she’s looking at the determinants of inflammation in those placentas and how providers could actually treat those babies earlier in their gestation to prevent negative health outcomes later on.

“We hope to change obstetric practice and advance our way to accurately diagnosing intrauterine inflammation and identifying which babies specifically are affected by it,” said Dr. Burd. “Preterm birth and prematurity related morbidity are two different processes and we need to be treating both. Mom could be delivering preterm and if her baby is not suffering from that preterm birth, that’s okay. But by the same token, if mom is delivering her full-term baby that gestated longer in an inflammatory milieu and we didn’t do anything for the inflammation, we’re actually not helping that baby.”

Dr. Burd’s work is sponsored by NIH, the National Institute of Child Health and Development. And March of Dimes is fortunate to have her on our Maternal and Child Health Advisory Council where she participates in grant reviews and accesses the research portfolios of several organizations that are funded by March of Dimes for the purpose of developing a path for taking the research from discovery science to translational studies. She and the other Advisory Council members are charged with helping chart the research strategy for March of Dimes for the next 5 to 10 years and plotting a course that will see us investing in the most promising research and the most beneficial treatments and protocols.

“There’s no other organization like March of Dimes that is more invested in childhood development and maternal health as it relates to optimizing health for both,” said Dr. Burd. “The directions and strategies that are evolving right now at March of Dimes are the most important outside of those at the National Institute of Health. And with the dollars that are available for research in this area, it’s imperative we have another funder like March of Dimes available.”

THE IMPORTANCE OF MENTORING

Like our doctrine of transdisciplinary research, Dr. Burd considers working with a diverse team to be essential to developing good science. “I believe in life-long mentorship and I also believe that an individual needs more than one mentor. I’m lucky to be able to surround myself with peers, mentors and collaborators in parallel disciplines such as pediatrics, neurology, infectious diseases, virology and immunology. It’s a collegial environment in which the whole of our work is made better than the sum of its parts.”
IRINA BURD, MD, PH.D.
Director, Integrated Research Center for Fetal Medicine
Associate Professor of Gynecology and Obstetrics
Johns Hopkins University
It’s long been known that good nutrition and prenatal care help ensure a healthy pregnancy. Now, a new program, titled the Abundant Birth Project (ABP) in San Francisco, has set out to prove that income is one of the most important determining factors for a healthy pregnancy that can help reduce disparities. The ABP is the product of a community-academic partnership between Bay Area social justice advocates, researchers and health care professionals, with funding part from March of Dimes.

ABP will investigate how a monthly, unconditional income supplement throughout pregnancy and into the postpartum period changes the pregnancy and birth experience for Black and Pacific Islander moms. Until now, these groups have had far worse birth outcomes than White communities in San Francisco. According to the San Francisco Department of Public Health, between 2012 and 2016, Black infants were twice as likely to be born preterm as White infants—13.8 percent versus 7.3 percent. Likewise, infants born to Pacific Islander moms have the second highest preterm birth rate, 10.4 percent.

“We know what communities need in order to have healthy birth outcomes because we have in our midst some communities that are having healthy birth outcomes,” said Zea Malawa, Physician Director of Expecting Justice. “These communities have access to high-quality employment, educational opportunities, housing and food. But in San Francisco and across the country, there are certain communities, which because of racism, don’t have access to these amenities and opportunities. The ABP seeks to repair some of these injustices and if we are successful, we’re hoping to become a city where the quality of your birth is not determined by the color of your skin.”

Historic disinvestment and the generational impacts of economic exclusion have created substantial differences in wealth in Black and Pacific Islander communities. One telling measure of that disparity is the San Francisco median income, where incomes for Black moms are three times lower than the citywide median income.

That discrepancy takes a related toll on the physical and mental well-being of those communities, which in turn gets passed along to babies.

“I know if I had had this extra income, my own pregnancy and postpartum period would have been a lot less stressful,” said Maile Chand, a Community Researcher with the ABP. “I understand the women in this study because I’m one of them—my lived experience not only as a mom of color, but also as a doula, coaching moms through their pregnancies and births. I understand their stresses and their worries. The simplest things in life are very, very difficult for these women. And it shows in their birth outcomes.”

### ABOUT THE ABUNDANT BIRTH PROJECT

The Abundant Birth Project (ABP) is a pilot program that tackles the economic consequences of structural racism head-on by providing an unconditional monthly income supplement of $1,000 to 150 low-and-middle income pregnant Black and Pacific Islander women for 12 months during pregnancy and the postpartum period. ABP is a program of Expecting Justice, Black-led cross-sector initiative of San Francisco city agencies, community-based organizations and health care providers dedicated to reducing the high rate of preterm birth in Black and Pacific Islander communities. ABP will work with local prenatal care and pregnancy support service providers and enroll eligible participants over the next two years with evaluation funding through a grant from March of Dimes, among other funders.
Expecting Justice, a collective impact effort developing innovative approaches to eliminating birth inequities in San Francisco, is leading the ABP. Research partners include the California Preterm Birth Initiative at the University of California, San Francisco, and the School for Social Welfare at the University of California, Berkeley.

“Most of my work has been focused on how social and economic environments contribute to birth inequities,” said Deborah Karasek, Ph.D., MPH, a social epidemiologist and Assistant Professor in the Department of Obstetrics, Gynecology and Reproductive Sciences at UCSF. “We know from other studies that housing, food and economic insecurity greatly increase the risk of preterm birth and other adverse birth outcomes. With such dramatic and intractable inequities for Black and Pacific Islander women here in San Francisco, we need interventions that address racism as a root cause.”

Birth inequities resulting from structural racism and systemic inequity are affecting communities of color across the U.S. Racism isn’t something that can be identified in a laboratory and wiped out with a vaccine. Critical programs like this are a starting point to gather more data and develop solutions that can help us ensure the best possible start for all moms, babies and their families.

“Wicked problems require radical solutions,” said Anu Manchikanti Gómez, an Associate Professor of Social Welfare at UC-Berkeley. “This bold and brave program is different and there’s good reason to believe it will have an important and positive impact on these communities and its babies.”
WHY WE GIVE:
COMMitted TO THE MISSION
Anita and John O’Connell have supported March of Dimes from practically the first time they encountered our work. But that’s not the first time they experienced love at first sight.

How did you become involved with March of Dimes?

John: Our initial introduction was through St. Louis Children’s Hospital here in St. Louis. I was invited to sit on one of their subsidiary boards called the Development Board. Part of the orientation was a tour of the hospital, including the neonatal intensive care unit (NICU). And I really, really had trouble getting through those tours. But their work helping to save these babies was just so impactful that I eventually ended up on the hospital’s Foundation Board, Board of Trustees and Board of Managers for their Research Institute. I was introduced to March of Dimes through one of their top doctors, Dr. F. Sessions Cole, who was very active in March of Dimes, and through my sister, Anne Albrecht who was also involved in March of Dimes community fundraising. There was the obvious linkage between what was so important to me down at Children’s Hospital and this other organization that was having such a dramatic, broader impact for kids everywhere.

Is there a specific area of research that you’re most excited about?

John: We’ve recently gotten involved in some of the education initiatives—March of Dimes Training Institute. That funding provides continuing education for nurses and staff in the NICU. My focus at St. Louis Children’s Hospital aligns with our focus at March of Dimes, which is to get the best outcomes for kids using the most current knowledge, and supporting education and research to improve future outcomes.

How has that engagement grown over the years?

John: It’s been an evolution of our understanding from the earliest days when the focus was on treatment of the babies who were in the NICU. But it’s clear that the only way to end preterm birth and its complications is through research.

Do you make these decisions as a family?

Anita: Absolutely. John takes these proposals back to the whole family and makes sure we’re funding work we’re passionate about. We’re also funding the addition of new iPads for St. Louis Children’s Hospital to be used in tandem with the March of Dimes NICU Family Support® program, so that families can have more face-to-face connection in spite of COVID-19 restrictions, and staff who may not be able to have in-person classes and can use them for educational curriculum.

What role does philanthropy play in your lives?

Anita: It’s central. We’re so fortunate—and that means we keep giving back. All three of our kids worked with St. Louis Children’s Hospital’s Charitable Foundation on their senior projects. We’ve all been around the hospital, around the babies, and we understand what a challenge it is, but we really enjoy it.

How did you two meet?

John: We were both a couple years out of college and...oh, you don’t want this story [laughter]. As a favor to a friend, I found myself in a singles tennis league that had been started by a couple of moms who were trying to get their college-aged daughters out of the house.

Anita: My sister wanted to go but didn’t want to go alone, so I went. John and I ended up at the same place and met that first night. I went home afterwards and my mom asked, “Well, did you meet anyone?” I said, “I only met one nice guy. I don’t know, you know...” [laughs] “We’ll see.” Skip to the chase, nine weeks and two days later—we were engaged. And eight months later we were married.

John: I was two weeks ahead of her. I knew—well, I literally said to myself the first night, I could be married to her, she’s that wonderful. It took her a couple of weeks to think it might work.

Anita: A whirlwind romance was so out of character for either one of us. I mean, I still lived at home.
That’s a great story. What’s the one thing you would like to tell March of Dimes?

**John:** If I look at what was happening five years ago and compare it to what’s happening now, I can see we’re finding new ways to accomplish goals and setting new goals to accomplish—that’s the trajectory. So, keep doing what you’re doing. Continue to look for new ways to make things even better for moms and babies.

**JOHN AND ANITA O’CONNELL**
March of Dimes donors for more than two and a half decades, from St. Louis, Missouri
Congratulations to current March of Dimes grantees who include experts working on everything from development of antibodies to prevent NEC and an aspirin regimen for preeclampsia to addressing racial and health disparities and so much more.

- Dr. Khosrow Adeli, Ph.D., Hospital for Sick Children, University of Toronto
- David Aronoff, MD, Vanderbilt University Medical Center
- Ripla Arora, Ph.D., Michigan State University
- Phil Bennett, MD, Ph.D. FMEDSci, Imperial College London
- Rupsa Boelig, MD, Thomas Jefferson University
- Eliezer Calo, MD, Massachusetts Institute of Technology
- Dean Carson, Ph.D., Katana Pharmaceuticals
- Jennifer Condon, Ph.D., Wayne State
- Andrea Edlow, MD, MsC, Massachusetts General Hospital
- Sarah England, Ph.D., Washington University
- Adrian Erlebacher, MD, Ph.D., UCSF
- Ehud Gazit, Ph.D., Tel Aviv University
- Ethan Goldberg, MD, Children’s Hospital of Philadelphia
- Hanne Hoffmann, Ph.D., Michigan State University
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- Louise Laurent, MD, Ph.D., UCSD
- Jamie Lo, MD, Oregon Health and Sciences University
- Stephen Lye, Ph.D., Mount Sinai Hospital–University of Toronto
- Shruthi Mahalingaiah, MD, Boston Medical Center
- Carole Ober, Ph.D., University of Chicago
- Samuel Parry, MD, University of Pennsylvania
- David K. Stevenson, MD, Stanford University, Palo Alto, CA
- Sing Sing Way, MD, Ph.D., Cincinnati Children’s Hospital

DONATE TODAY

For more information on how you can be a part of this effort, please contact:
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