

A photograph of a woman with braided hair, wearing a grey shirt, smiling and looking up at a baby she is holding. The baby is wearing a white onesie with colorful patterns and is holding its hand to its mouth. The background shows a wall with several framed photographs.

Focus

SPRING 2022

**A CALL TO ACTION FOR
MATERNAL & CHILD HEALTH**

A publication of the **Yale SCHOOL OF PUBLIC HEALTH**



A flash mob of mothers nursing in public in Chengdu's Wangjiang Park, part of a national breastfeeding movement in China inspired by Yushi Zhang, M.P.H. '23. Read more on page 47.

Focus

SPRING 2022

A CALL TO ACTION FOR MATERNAL & CHILD HEALTH

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The Black Maternal Health Momnibus Act could be one of the most important pieces of legislation Congress acts on this year



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YALE ENDOWMENT PLEDGE SETS NEW COURSE FOR YSPH

In a historic February announcement, Yale University said it was creating endowment funds totaling \$250 million to support the development of future leaders in public health, medicine, and nursing.

Of that total, the Yale School of Public Health (YSPH) will receive up to \$150 million of endowment to support the school's teaching, research, and practice. The Schools of Medicine and Nursing will each also receive up to \$50 million in matching endowment from Yale as part of the university's broader support of all three schools.

YSPH will be transitioning to a free-standing, independent professional school.

Yale leaders also announced in February that YSPH will be transitioning to a free-standing, independent professional school after many years of operation as a department within the Yale School of Medicine (YSM). The school's transition and administration of the new endowment funds will begin with the arrival of YSPH's next dean. Current YSPH Dean Sten H. Vermund is scheduled to return to teaching and research when his term ends on June 30, 2022.

Calling the moment "historic," Yale President Peter Salovey and Provost Scott Strobel said Yale is committed to helping YSPH build on its immense contributions to public health over the past century, and that the changes ahead will support the school in transforming local and global health through innovative and collaborative research and practice.

"The university's commitment to develop future leaders in nursing, medicine, and public health will benefit not only the residents of this country but the well-being of everyone around the globe," Salovey and Strobel said in a statement.

Focus

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DEAN'S MESSAGE

STEN H. VERMUND



Responding to the Call for Equity in Maternal, Neonatal, and Child Health

On Dec. 7, 2021, a national call to action was made by our vice president to reduce maternal mortality and morbidity in the United States. The announcement was welcome news for those of us in public health, where addressing health inequities and improving maternal and child health have always been a central part of our mission.

The inequities that exist in maternal, neonatal and child health (MNCH) care are deeply disturbing. Despite our country's vast resources, America's maternal mortality rates are among the highest in the world compared with other higher-income nations. Mortality risks for Black and Native American women are especially high, as are infant mortality rates. The U.S. Centers for Disease Control and Prevention reports that two out of three maternal deaths are preventable.

Global estimates suggest that 810 women die every day from preventable causes related to pregnancy and childbirth. A former mentor and former classmate of mine wrote the classic call to action in *The Lancet* entitled "Maternal mortality – a neglected tragedy. Where is the M in MCH?" (PMID: 2861534), but this was published 37 years ago! Today, 94% of all maternal deaths occur in low- and lower-middle-income countries. The World Health Organization is clear – access to more skilled antenatal care and better capacitated childbirth services could save the lives of nearly 200,000 women and their newborns each year worldwide.

It is within this context that YSPH presents our Spring 2022 issue of *Focus* magazine. In this issue, you will learn about the many MNCH

challenges that exist in the U.S. and around the world. We reiterate YSPH's commitment to finding solutions to these critically important issues through collaborative research, implementation science, innovation, engagement with local communities and partnerships with our colleagues in the Yale Schools of Medicine and Nursing.

Of all the important articles featured in this issue, I'd like to highlight the work of our Office of Public Health Practice and the Community Alliance for Research and Engagement, or CARE (a joint program with Southern Connecticut State University), in collaboration with outstanding New Haven community partners, to improve maternal, neonatal and child health in New Haven County, Bridgeport, and New York City. CARE, the Elevate Policy Lab, the Prevention Research Center (with Griffin Hospital) and others are working to address health inequities related to nutrition, physical activity, and access to community clinical care, among other vital themes. One of their primary points of focus is identifying barriers to breastfeeding among communities of color and supporting parents toward the healthiest nutritional options for themselves and their families.

Sincere thanks to all YSPH faculty, students, staff, alumni, and community/academic/health system partners who are working tirelessly to address these critical issues in MNCH.

Sten H. Vermund, M.D., Ph.D.
Dean, Yale School of Public Health

MAJOR FUNDING AWARD SUPPORTS YALE EFFORTS TO ADDRESS MATERNAL HEALTH INEQUITIES



A team of Yale researchers, working collaboratively with Yale New Haven Hospital and community partners, is exploring ways to improve health outcomes for at-risk postpartum women with the support of a \$20.4 million funding award from the Patient-Centered Outcomes Research Institute (PCORI).

The award, announced March 8, will allow researchers at the Yale School of Public Health and Yale School of Medicine to compare the effectiveness of two community-based interventions designed to improve clinical outcomes among women in priority populations that have been historically underserved and experience systemic racism.

The two health care delivery models at the center of the study focus on the awareness, early detection, and control of postpartum hypertension as well as social and mental health factors known to affect maternal health.

“This study has the potential to transform the quality of care received by women of color and their babies in the period surrounding birth and beyond,” said Yale Professor of Public Health Rafael Pérez-Escamilla, Ph.D., co-leader of the study with Heather S. Lipkind, M.D., associate professor of obstetrics, gynecology, and reproductive sciences at the Yale School of Medicine. “These kinds of interventions are urgently needed. Poor blood pressure control, due to a lack of follow-up and identification during the

postpartum period, is one of the drivers of racial inequities in maternal morbidity and mortality. These inequities are beyond the pale in the U.S. and totally unacceptable from both a public health and human rights perspective.”

More than 700 women die each year from pregnancy-related complications in the United States, even though the U.S. Centers for Disease Control and Prevention says two out of three of those deaths are preventable. Pregnancy risks are especially high among women in priority populations that have been historically underserved and that experience systemic racism. Black women in the U.S., according to the CDC, are more likely to die during pregnancy or childbirth than any other demographic.

Hypertensive disorders during and after pregnancy, including preeclampsia, gestational hypertension, and postpartum hypertension, have been identified as a major cause of maternal mortality and morbidity. Social determinants of health such as poverty, lower education, racism, and lack of access to health care (including mental health care) also contribute to maternal mortality and morbidity rates and health inequities.

In the PCORI-funded study, clinical outcomes for each intervention will be compared with the current standard of care for postpartum mothers. The effectiveness of each intervention will also be compared with the effectiveness of

“Growing attention has focused on the postpartum period as an important window to address maternal mortality disparities, as half of pregnancy-related deaths occur postpartum.”

~Heather S. Lipkind

the alternate intervention. The project’s overall goal is to improve mean postpartum systolic blood pressure at six weeks and reduce depression severity at three months postpartum.

“Growing attention has focused on the postpartum period as an important window to address maternal mortality disparities, as half of pregnancy-related deaths occur postpartum,” said Lipkind. “We are thrilled with the opportunity to partner with the community and medical centers to address this critical time period in women’s lives.”

One intervention will use a remote medical service model that includes home blood pressure monitoring, weekly virtual visits by a health care provider (such as a nurse practitioner or pharmacist) and screening for mental health concerns such as anxiety and depression with referral for services if necessary. The second intervention will be based on a community health model that utilizes community health workers trained in a strength-based trauma approach.

In designing the interventions, project leaders worked with mothers who have experienced hypertension and community doulas. Pérez-Escamilla said the project’s informed design is a “prime illustration of what happens when different units within and across academic institutions come together and work unselfishly side by side with community partners.”

New Haven Healthy Start Director and Senior Community Investigator and Advisor for the project Natasha Ray, M.S., worked closely with researchers in designing the interventions, ensuring that the community engagement aspect is “meaningful, equitable, culturally respectful, and valued.”

“Typically, guidelines and recommendations for management of hypertension in pregnancy are written for implementation in an ideal setting, and that is not always possible,” Ray said. “We aim to support timely recognition and response to maternal hypertension and pre-eclampsia utilizing a community-driven, family-centered, and trauma-informed approach. Partnering with the individuals most impacted by the issue will yield us our greatest results.”

The PCORI funding award was approved pending completion of a business and programmatic review by PCORI staff and issuance of a formal award contract.

PCORI is an independent, nonprofit organization authorized by Congress in 2010. Its mission is to fund research that will provide patients, their caregivers, and clinicians with the evidence-based information needed to make better-informed health care decisions.

Colin Poitras

YSPH RESEARCH IDENTIFIES PREGNANCY RISKS ASSOCIATED WITH ACETAMINOPHEN USE

Two recent studies by researchers at the Yale School of Public Health have identified potential risks when pregnant girls and women take pain relievers containing acetaminophen.

The research adds to a growing body of evidence that suggests more caution when prescribing and taking the medication, though more studies are needed to confirm the findings.

In one recent study, YSPH Assistant Professor Zeyan Liew, Ph.D., M.P.H., and Professor Andreas Ernst of Aarhus University in Denmark evaluated the epidemiological evidence surrounding acetaminophen and child development and raised concerns over the drug's use. After reviewing existing literature, they concluded that a number of studies have linked the pain reliever with an increased risk of asthma, neurodevelopmental disorders and genital malformations in children.

In the peer-reviewed paper, however, the scientists said some issues need to be addressed in these studies, such as measurement errors and methods used. They also recommend additional research into the biological mechanisms associated with acetaminophen use.

Liew also was part of a team of researchers from across the world that published a consensus statement in *Nature Reviews Endocrinology* on Sept. 23, 2021, calling for specific changes in federal drug recommendations to reflect concerns about acetaminophen.

“Our lab was among the first to report a potential harmful effect of acetaminophen on fetal brain development in a large longitudinal human cohort study,” Liew said in September. “It is time to take the growing body of evidence seriously and consider precautionary measures.”

Acetaminophen is a chemical compound

that is commonly used to relieve mild to moderate pain and fever and can be found in over-the-counter brands such as Tylenol. Researchers estimate that as many as 65% of women in the United States have used medication with acetaminophen during pregnancy.

In another study (published in his M.P.H. thesis and under peer review at press time), YSPH Environmental Health Sciences student Tristan Furnary used human pluripotent stem cells, RNA sequencing, and metabolomics to identify cellular mechanisms that may be involved in the development of autism spectrum disorder. After exposing the stem cells in culture to clinically relevant doses of acetaminophen for six days, Furnary found acetaminophen to elicit the same gene expression patterns and metabolic behaviors in the cultures as those known to be associated with autism spectrum disorder.

“We believe that our approach of assessing the impact of clinically relevant acetaminophen concentrations on genetic expression and the metabolome reveals more nuanced effects of therapeutic doses,” said Furnary, who worked on the study under the guidance of Vasilis Vasiliou, Ph.D., department chair and Susan Dwight Bliss Professor of Epidemiology at YSPH, and Abha Gupta, M.D., Ph.D., assistant professor of pediatrics at the Yale School of Medicine.

“Tristan’s research is the first to examine the developmental effects of acetaminophen using human stem cells,” Vasiliou said. “In addition, his efforts represent an important first step towards our laboratories (in collaboration with the Yale Stem Cell Center) developing 3D neuronal organoids to study the effects of drugs and environmental pollutants on the human brain.”

Matt Kristoffersen

STUDY IDENTIFIES POTENTIALLY HARMFUL SUBSTANCES IN HOUSEHOLD DUST

An investigation led by researchers at the Yale School of Public Health has identified potential health hazards in settled dust.

Per- and polyfluoroalkyl substances (PFAS) have been used for decades to create stain-resistant carpeting, waterproof packaging, nonstick cookware and other consumer products. But while the strong carbon and fluorine bonds found in PFAS compounds have proven useful in these applications, their resistance to degradation also means they can linger in the environment long afterward, contaminating drinking water and hampering air quality.

These so-called forever chemicals are dangerous at certain concentrations, studies have shown. Exposure to PFAS has been linked to delayed brain development in children, thyroid cancers, and liver and kidney damage. And, according to some researchers, PFAS compounds can accumulate in settled dust in indoor spaces, where toddlers face an even greater risk of inhaling or ingesting them.

The YSPH study, published in *Current Environmental Health Reports*, increases researchers' understanding of the specific PFAS compounds often found in dust and where they may come from, as well as their potential implications for human health.

"Dust collected from on the top of door frames or windows or from carpets can be used to capture a person's exposure to pollutants in the air," said Krystal Pollitt, Ph.D., P.Eng., an assistant professor of epidemiology (Environmental Health Sciences) at YSPH and senior

author of the study. "Settled dust is especially relevant for infants and children that spend extended periods on the ground where they may inhale or ingest the dust."

For the paper, Pollitt's team compiled a list of some of the sources potentially contributing to the presence of PFAS in settled dust, as identified by other scientists. The list is long: rugs and carpets, food packaging, cosmetics, paper products, clothing, insecticides and more.

"So many children's products, like foam play mats or clothing that is stain- or water-resistant, likely contain PFAS," Pollitt said. Cookware, too. "PFAS are applied to many household items to achieve the nonstick surface," she said.



There are steps individuals can take to try to avoid potentially hazardous compounds in dust, Pollitt said, including frequent cleaning and having greater awareness of the chemicals that are in household products.

"It is important to prevent exposure from the onset," she said. "There are a growing number of companies that are committed to not using PFAS in their products."

Matt Kristoffersen

NIH GRANT SUPPORTS SUICIDE INTERVENTIONS FOR PREGNANT AND POSTPARTUM WOMEN

Yale School of Public Health Assistant Professor Ashley Hagaman, Ph.D., M.P.H., has received a prestigious Ko1 grant from the National Institutes of Health in support of her research investigating suicide among women of reproductive age in low- and middle-income countries.

“Suicidality and postpartum depression are important contributors to maternal mental health,” said Hagaman, a researcher with the YSPH Department of Social and Behavioral Sciences and an affiliated faculty member with the Yale Institute for Global Health.

Hagaman’s research centers on understanding the social determinants of depression and suicidal ideation among pregnant women and mothers in Pakistan and Nepal, and developing culturally relevant sustainable interventions.

“Motherhood [in Pakistan and Nepal] confers some social mobility, but it also means additional responsibilities,” she said. “Some expectant mothers endure concurrent violence and vulnerabilities while pregnant and after giving birth, so it is essential to create more psychosocial support for them at this specific time.”

The Ko1 grant is an early career development award for investigators. Hagaman said the funding will support her ongoing effort to develop culturally appropriate interventions through implementation science. Her goal is to create interventions that can be easily scaled up and adopted in health systems, ranging from large tertiary care centers to the community level.

“Our interventions need to be culturally adapted and thoughtfully deployed, since suicide is a delicate matter,” she said. “We partner with community health leaders in these regions who are already working to address suicidality in women. We build on the existing infrastructure that exists in the local context.”

One of the ways Hagaman aims to make the interventions sustainable is through her team’s peer-driven pilot suicide prevention package known as SuPP. The SuPP process focuses on community engagement and support to help mitigate suicidality in postpartum women and also creates an implementation plan for health systems to adopt evidenced-based suicide prevention practices such as screening, safety planning and contact follow-up.

“Suicidality and postpartum depression are important contributors to maternal mental health.”

~Ashley Hagaman

The program is adapted from two existing interventions for mental health endorsed by the World Health Organization: Thinking Healthy Program Peer-Delivered and the Mental Health Gap Action Program. It leverages existing peer health workers in helping to detect and support women in crisis. These women are closely integrated within the social context, working alongside Lady Health Workers (the backbone of Pakistan’s primary and maternal health care systems), and are especially close with pregnant women and mothers, “which makes them the ideal wraparound agent for our project,” Hagaman said.

Devina Buckshee

SHORTER ANTIBIOTIC TREATMENT IS BETTER FOR YOUNG CHILDREN WITH COMMUNITY-ACQUIRED PNEUMONIA



A five-day course of antibiotics for children with community-acquired pneumonia (CAP) is just as effective as, and actually better than, the standard 10-day treatment, as it could help reduce side effects and limit antibiotic resistance. That's according to a study co-authored by a professor at the Yale School of Public Health.

Published in *JAMA Pediatrics*, the study compared short and standard antibiotic treatment strategies for pediatric CAP, a common and serious infection that leads to 1.5 million doctor visits in the U.S. each year.

Clinicians in the U.S. typically treat CAP with a 10-day course of antibiotics. Treatment strategies involving shorter courses of antibiotics have been proposed as a proactive measure to limit antibiotic resistance and decrease possible side effects.

"One of the best ways to prevent antibiotic resistance is to use fewer antibiotics," said Melinda Pettigrew, Ph.D. '99, the Anna M.R. Lauder Professor of Epidemiology (Microbial Diseases) at YSPH and a co-author of the study.

"Approximately 1 million courses of antibiotics are prescribed for pneumonia in children and adolescents each year in the U.S. Widespread adoption of a five-day treatment strategy for pediatric CAP could lead to a reduction of approximately 5 million days of antibiotic use in U.S. children," Pettigrew said. "This study shows that a shorter antibiotic course for CAP is not only effective, it also reduces the abundance of antibiotic resistance genes in the respiratory tracts of children receiving treatment."

Antibiotic resistance is considered one of the world's most urgent public health problems. Antibiotic resistance occurs when bacteria and fungi develop the ability to evade the drugs designed to kill them. Those microbes that are not killed continue to grow and are transmitted in the community and in hospitals. More than 2.8 million antibiotic-resistant infections occur in the U.S. each year, according to the U.S. Centers for Disease Control and Prevention.

The randomized trial was led by members of the Antibacterial Resistance Leadership Group (ARLG), a national team of more than 100 leading experts dedicated to combating the global antibiotic resistance crisis, and researchers at Vanderbilt University Medical Center. Pettigrew, senior associate dean of academic affairs at YSPH, serves on the steering and executive committees of the ARLG.

Previous studies have shown that antibiotic treatment shorter than 10 days can work well for childhood pneumonia. The current study is believed to be the first that also looked at the effects of antibiotic duration on the respiratory resistome (i.e., the collection of antibiotic resistance genes in our microbiome). The study design was also innovative in that it incorporated a superiority design with response adjusted for duration of antibiotic risk (RADAR) and desirability of outcome ranking (DOOR). This innovative trial design was pioneered by the ARLG and provides a holistic and patient-centered way to assess the benefits and harms of interventions designed to optimize antibiotic use.

FETAL ALCOHOL EXPOSURE DATA UNDERSCORE NEED FOR PUBLIC HEALTH INTERVENTIONS

While alcohol consumption during pregnancy may result in harm to developing embryos and fetuses, a study led by the Yale School of Public Health finds that a significant number of pregnancies that result in live birth still involve alcohol exposure.

Researchers led by Reza Yaesoubi estimate that 54% of pregnancies that result in a live birth are exposed to at least one alcoholic drink during the nine-month gestation period, 12% are ever exposed to five or more drinks in a week, and 3% are ever exposed to nine or more drinks in a week.

Yaesoubi and his team used a computer simulation model of U.S. women of reproductive age to determine what proportion of pregnancies that result in live birth are exposed to alcohol. Their results are published in the journal *Medical Decision Making*.

“Finding that more than half of pregnancies that result in a live birth are exposed to alcohol was a big surprise, so we tried to understand what is contributing to this,” said Yaesoubi, Ph.D., an assistant professor in the Department of Health Policy and Management.

“When we consider alcohol-exposed pregnancies, much of the focus is on women who are aware of their pregnancies but may continue to drink,” he said. “But what we found in this study is that among pregnancies that are exposed to alcohol, in fact, more than half are exposed while the pregnancy is still unrecognized.”

Unintended pregnancies (either due to contraceptive failure or sex without the use of contraception) account for 80% of pregnancies unknowingly exposed to alcohol, Yaesoubi and his research team estimate. They also project that public health efforts that focus only on

promoting alcohol abstinence among women who are aware of their pregnancy or seeking pregnancy could reduce the prevalence of alcohol-exposed pregnancies by at most 42%. Augmenting this strategy with efforts to avert unintended pregnancies could yield an 80% reduction in the prevalence of alcohol-exposed pregnancies.

“Finding that more than half of pregnancies that result in a live birth are exposed to alcohol was a big surprise.”

~Reza Yaesoubi

Alcohol use during pregnancy is associated with a range of adverse outcomes and can cause fetal alcohol spectrum disorders (FASDs), which are characterized by lifelong physical, behavioral, and intellectual disabilities. Approximately 1% to 5% of the U.S. population is affected by FASD. Not every pregnancy that is exposed to alcohol results in a child with FASD, but in the absence of a scientifically proven safe threshold for fetal alcohol exposure, averting alcohol-exposed pregnancies remains the key tactic to avoiding FASDs.

The findings underscore the need for integrated efforts to prevent alcohol-exposed pregnancies that both seek to prevent unintended pregnancies and that promote alcohol abstinence among women who are pregnant or planning to become pregnant.

Michael Greenwood

““ The truth is women in our nation ... are dying. Before, during, and after childbirth, women in our nation are dying at a higher rate than any other developed nation in our world. And we know that ... Black women are three times as likely to die from pregnancy-related complications. ””

U.S. Vice President Kamala Harris
Nationwide Call to Action
December 7, 2021

MATERNAL-CHILD HEALTH PROMOTION & THE FUTURE OF GLOBAL HEALTH

BY RAFAEL PÉREZ-ESCAMILLA, PH.D.
& DONNA SPIEGELMAN, SC.D.



Gestation and the first years of life are the foundation for human development and arguably the development of nations and the future of our planet. Decades of research have documented the enormous harms that poor health, household food insecurity, malnutrition, a lack of early stimulation opportunities, and physical and psychological abuse can inflict in the bodies and minds of children. The consequences of adverse early life experiences can have a lifelong impact, including a higher risk of obesity, noncommunicable diseases, poor social functioning and lower levels of education and income. Consistent evidence has shown how these factors also strongly and negatively affect the agency, self-efficacy, and, ultimately, the physical and mental health of mothers, which

is crucial for them as well as the well-being of their families. This also decimates the social fabric needed for societies to develop with equity.

In addition to having already identified many modifiable risk factors for delayed early childhood development and poor maternal health, we now have a constellation of multi-component evidence-based interventions that cut across the socio-ecological model that can be used to prevent these detrimental, unjust and unnecessary human development outcomes from happening. The main challenge today is that this knowledge is not being translated into policies and programs on a large scale. Why? In our view, this is in part because, until recently, we had not benefited from the field of implementation science.

Implementation science in public health focuses on the development of innovative methods and strategies that advance the use of evidence-based interventions in targeted settings such as communities, schools and hospitals to improve public health. Through implementation science, mixed-method research tools and approaches have been developed that can be used to guide the effective scaling up of and sustainability of multicomponent, well-coordinated maternal-child health programs across the globe. For example, at YSPH, we are conducting research to figure out how to empower countries to improve their cultural environments and policies so that appropriate infant feeding practices are properly integrated and early childhood development outcomes are more positive. We are also doing research on how to advance the scaling up of evidence-based interventions to reduce the unacceptably high maternal mortality rate among low-income women and women of color because of postpartum hypertension and cervical cancer.

Regarding cervical cancer, there is absolutely no reason why this continues to be such a massive public health problem, given that we have very strong interventions that screen for and prevent cervical cancer, including an extremely efficacious vaccine that has been available for years. We understand that interventions that may at first appear to be very simple solutions to a public health issue, such as giving a vaccine, can actually be very complex and difficult to deliver due to inequitable access,

“There is no doubt in our minds that future global health security will not be attained unless all women, infants and young children, and their families have access to adequate primary health care.”

lack of trust in government programs related to reproductive health, and logistical issues. This is why learning how to apply implementation science principles and methods to advance global maternal-child health in the 21st century is so crucial.

There is no doubt in our minds that future global health security will not be attained unless all women, infants and young children, and their families have access to adequate primary health care that supports the early detection and prevention of developmental, physical and mental health challenges. Many interventions are available to do this. In many ways,

implementation science can help governments navigate the complexities of the policies and programs that are necessary for implementing and sustaining such interventions across the social-ecological model,

especially in the strongly inequitable world in which we currently live. These inequities are especially harsh for low-income women and young children, as illustrated by the recent COVID-19 pandemic. YSPH has a lot to contribute in this area through its Center for Methods in Implementation and Prevention Science (CMIPS) and its newly minted Maternal and Child Health Promotion Program, as well as its existing Office of Public Health Practice (OPHP) and Global Health Concentration. What remains to be seen is if there will be the political will globally to invest much more in advancing maternal-child health. We hope the answer is a resounding “Yes!” as not doing so will only lead to even more health inequities and a very uncertain future for nations and our planet.

Rafael Pérez-Escamilla, Ph.D., is a professor of Public Health (Social and Behavioral Sciences); director, Office of Public Health Practice; director, Global Health Concentration; director, Maternal and Child Health Promotion Program; principal investigator, Yale-Griffin CDC Prevention Research Center; affiliated faculty, Yale Institute for Global Health.

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CONGRESS MUST PASS THE BLACK MATERNAL HEALTH MOMNIBUS ACT OF 2021 NOW

BY JON ANDRE SABIO PARRILLA

Today in America, Black and Indigenous pregnant women are dying at an alarming rate because of neglect by our health care system. According to the U.S. Centers for Disease Control and Prevention (CDC), Black and Indigenous women are two to three times as likely to die from a pregnancy-related cause as white women. The Black Maternal Health Momnibus Act of 2021, led by U.S. Reps. Alma Adams (D-N.C.) and Lauren Underwood

(D-Ill.) and Sen. Cory Booker (D-N.J.), is our opportunity to address the disparities Black and Indigenous women experience during pregnancy and to invest in the health outcomes of all mothers and babies.

The Momnibus Act is a suite of bills all designed to protect mothers and babies across the country. Benefits include, investing in organizations that are working to improve maternal and child health; improving living

conditions to promote better health outcomes for newborns; investing in midwives, doulas, and birthing professionals; and enhancing maternal health care women to women who are veterans or who are incarcerated.

The simple truth is that the majority of the deaths of pregnant women of color are preventable.

This issue is not new. For decades, advocates have been fighting to improve maternal and child health outcomes. And in 2021, the United States led the industrialized world in maternal mortality. This is simply unacceptable. This country is not living up to its promise of life, liberty, and the pursuit of happiness. We are failing our families, our mothers, our birthing people, and our next generation.

The urgency of passing this bill lies in the fact that the syndemic of COVID-19 and systemic racism has exacerbated maternal mortality in Black mothers, especially. The bill addresses these health disparities by increasing federal programs to confront unique risks pregnant Black and Indigenous women experience due to COVID-19. The legislation would invest in the development of maternal vaccinations and also tackle the increased mental health burdens women experience during pregnancy and postpartum.

However, when the pandemic is over, the entrenched racist institutions in our society that inform our social determinants of health will still exist. According to recently published data on maternal vulnerability in the U.S., educational status, exposure to poverty, and access to OB-GYNs and midwives have a direct impact on a woman's chance of having a healthy pregnancy.

Controlling for socioeconomic status and educational status, race still plays an integral role in shaping health outcomes for Black and Indigenous moms. The pregnancy complications that tennis star Serena Williams experienced showed the world that risks during childbirth do not care about fame or money. Black maternal mortality in America is a manifestation of the centuries-long abuse and neglect of Black women in this country. The health care system was designed not to believe Black

women. Even the medical school curriculum today reproduces racist, discriminatory behaviors against Black women. These health disparities that Black women experience are real and must be addressed with urgency. The lives we have lost are far too great.

“The simple truth is that the majority of the deaths of pregnant women of color are preventable.”

To address environmental racism that yields negative birth outcomes, the Momnibus bill would invest in reducing air pollution, undertake climate change in impoverished communities, and work to improve the health outcomes of moms and newborns. To contend with the legacy of transportation barriers that women of color disproportionately experience, this bill works to partner with the private sector including coordinating with rideshare companies like Uber and Lyft to help pregnant women get to their appointments and check-ups with their doctors.

This legislation isn't just throwing money at a problem. It's a comprehensive package informed by data and evidence. It also is, admittedly, a huge government expenditure. But maternal mortality deserves a whole of government and whole of society response. Though fiscally conservative opponents of this bill may argue that the government should not increase spending, it is supported by members on both sides of the aisle as well as organizations from both the public and private sectors. The time to act is now.

History will judge America on how it treats its mothers and babies. If we care about the health and well-being of moms in our country, we must fight to ensure equity for all mothers because all families deserve the opportunity to lead healthy lives. Mothers and babies are worth fighting for and the Momnibus Act is our once-in-a-generation chance to put an end to the maternal health crisis in America.

Jon Andre Sabio Parrilla is a first-year YSPH student in the Department of Social and Behavioral Sciences.

CONVERSATIONS WITH FOCUS

One of the best ways to exchange information and ideas is through simple discourse. In the pages that follow, some of the Yale School of Public Health's most intriguing individuals share their knowledge, insights and perspectives in Conversations with Focus.

A CONVERSATION WITH AMBER HROMI-FIEDLER



On the Importance of Breastfeeding and Early Childhood Nutrition

As co-principal investigator of the Becoming Breastfeeding Friendly global health initiative, Amber Hromi-Fiedler, Ph.D., M.P.H., has traveled all over the world emphasizing the importance of breastfeeding and nutrition when it comes to maternal and child health. A research scientist in the Department of Social and Behavioral Sciences, she is also the associate director of the Yale School of Public Health's new Maternal and Child Health Promotion Track.

Focus recently connected with Hromi-Fiedler to discuss Becoming Breastfeeding Friendly, the new Maternal and Child Health Promotion Track and important work she is doing in Ghana.

What is the Becoming Breastfeeding Friendly initiative, and what is the goal of the program?

AH-F: Becoming Breastfeeding Friendly (BBF) is an evidence-informed global initiative that is designed to guide countries in scaling up their national breastfeeding policies and programs. BBF does this by helping countries assess the strength of their breastfeeding-friendly

environment, identify gaps, develop recommendations and design plans to scale up their breastfeeding policies and programs. The long-term goal of BBF is to identify and plan which concrete measures a country can take to sustainably increase its breastfeeding rates.

What advantages does breastfeeding provide for infant health, and what is the current prevalence of breastfeeding around the world?

AH-F: There is overwhelming evidence that breastfeeding protects infants from short- and long-term health problems including illnesses (e.g., respiratory infections, ear infections), gastrointestinal problems, overweight/obesity, diabetes. Breastfeeding also protects the mother by reducing her risk for breast cancer, ovarian cancer and Type 2 diabetes. The World Health Organization (WHO) recommends that infants be exclusively breastfed for the first six months, which means that they should not receive anything other than breast milk during that time. However, according to WHO, only 44% of infants under 6 months of age are exclusively breastfed globally.

The new YSPH Maternal and Child Health Promotion Track emphasizes a solution-based approach to improving maternal and child health. Can you tell us more about it?

AH-F: The YSPH Maternal and Child Health Promotion (MCHP) Track was launched in 2021 to provide M.P.H. students with an opportunity to receive training in MCHP. This track takes a different approach from other MCH programs by strengthening student training in implementation science and its application to maternal and child health promotion. Students are required to take three core courses that address implementation science, maternal-child public health nutrition, and women's and children's health. Through applied internships, students integrate classroom knowledge with hands-on learning experiences. We spoke with several employers that implement MCH programs and designed this track to help students emerge with strong implementation skills that would be highly attractive to potential employers.

You have collaborated extensively with health professionals in Ghana working to improve nutritional programs for infants and young children. What are the existing nutritional challenges in Ghana, and how is that work going?

AH-F: I am extremely fortunate to have worked for many years conducting MCH research in

the Central Region of Ghana with wonderful collaborators from Point Hope Ghana and the University of Ghana. We have focused our work on the Central Region because it is impoverished (34.9% of the population living within the two lowest income quintiles), has the highest perinatal mortality rate of the regions, has high acute and chronic malnutrition rates (14% and 22%, respectively) and almost three-quarters of breastfed children ages 6-23 months lack the minimal acceptable diet. Through our current project, we are trying to understand the best practices to improve exclusive breastfeeding and two important factors influencing child outcomes: meal frequency (how often are children being fed and does it meet global recommendations?) and diet diversity (are children getting diverse foods in their early life?) in the Central Region of Ghana. We are doing this using the Trials of Improved Practices, a formative research approach, to implement a home visiting-based intervention designed to integrate responsive feeding into established infant and young-child feeding training and program delivery. We expect to be finished within the next few months, and at that time, we will know whether this intervention was acceptable and feasible to the mothers and health care providers who participated.

A CONVERSATION WITH HEPING ZHANG

On the Power of Statistics and Improving Reproductive Health

Heping Zhang's pioneering work in the fields of epidemiology, statistics and reproductive health has garnered international attention and acclaim. This year, Zhang, Ph.D., the Susan Dwight Bliss Professor of Biostatistics at the Yale School of Public Health, will deliver the prestigious Neyman Lecture at the Institute of Mathematical Statistics' annual meeting in London, one of the highest honors in statistical societies. The author of more than 300 research

publications, Zhang is perhaps best known in medicine for his work with infertility. He served as a principal investigator on a collaborative study that found the infertility drug letrozole was more effective than clomiphene citrate in helping women with polycystic ovary syndrome (PCOS). The findings, released in 2014, dramatically changed how doctors treat millions of patients with PCOS experiencing fertility problems. In a separate study two years later,



Zhang and colleagues found that frozen embryos rather than fresh ones for in vitro fertilization may improve the chances of a successful pregnancy in women diagnosed with PCOS, another major advancement in reproductive science.

As the director of Yale's Collaborative Center for Statistics in Science, Zhang has been an international leader in fostering research collaborations that are applying innovative statistical methods to address complex issues in public health, including infertility.

Focus recently asked Dr. Zhang, who is also a professor in the Yale Child Study Center and professor of statistics and data science, to share his thoughts on the power and potential of statistical methods and data science for improving maternal and child health.

The tremendous amount of health data being generated today has created an enormous opportunity for scientists to better understand diseases and develop new treatments and prevention strategies. How is your research in biostatistics contributing to this effort?

HZ: The availability of a large amount of health data is tremendously helpful to statisticians and scientists in general. We have two NIH-funded research projects that make use of such data, first, as the benchmark to develop better analytic methods and software that can be used broadly to understand the etiologies of diseases and human development, particularly as it pertains to genetic mechanisms and gene-environment interaction; and second, to aid in the discovery of novel results related to specific disorders, including COVID-19-related mortality and cognition. Also importantly, I have led the data coordinating centers for several large national and international research consortiums in reproductive health, which have generated large-scale and high-quality data. Those data are available for public use. So, our contributions are threefold: (1) generating and sharing data; (2) analyzing available data to better understand specific human conditions; and (3) developing tools for everyone to analyze similar data.

Much of your work is associated with the fields of medicine and health. Yet, you have been quick to point out that you are a statistician, not a clinician. Can you please explain how those two roles differ when it comes to the work that you do?

HZ: If I were a clinician, I would have firsthand information in diagnosing and treating patients and an understanding of what treatments work best for them. This knowledge and expertise is essential to knowing the most pressing issues that patients face and what research is necessary to resolve those issues. As a statistician, through research and collaboration, I have a good understanding of issues in medicine and health, yet I don't have the day-to-day knowledge and expertise of a clinician. When the patients' information comes to me, the human aspect is "de-identified" and detached. The focus of my responsibility is to understand the data. Who contributed the data is irrelevant to me. As a statistician, my research is designed to help the general population rather than specific individual patients.

You have organized and led scientific collaborations around the world. How important is collaboration in the fields of biostatistics, statistics and data science?

HZ: I have colleagues in statistics and biostatistics who have built successful careers using mathematics and computers without in-depth collaborations with health scientists. So, collaborations are not the only avenue to be successful in the fields of biostatistics, statistics and data science. That being said, in this era of data science, collaborations are essential if we want to resolve the most impactful problems in medicine and health.

You recently published a study with colleagues from the University of Minnesota that shed new light on potential fertility treatments for women with PCOS. What did you find?

HZ: That was a paper with three of my former postdoctoral students. The work began a few years ago, and those students are now faculty members at other universities. It was really a Yale-based study. We analyzed existing data from PCOS women using a more efficient analytic approach that considers the special

relationship between ovulation, conception, and live birth, in that a later event happens only if the earlier ones did. As a result, we were able to accommodate more data in our analysis. For example, in an RMN trial published by the *New England Journal of Medicine* in 2017, letrozole

was found to be overall more effective than clomiphene. Our new analysis suggests that the effectiveness of clomiphene in older women warrants further investigation.

A CONVERSATION WITH NICOLA HAWLEY



On Obesity and Maternal and Child Health

Associate Professor Nicola Hawley, Ph.D., leads a variety of innovative research projects within Pacific Islander communities, which have been identified as some of the most at-risk for adverse, obesity-related health outcomes globally. A member of the Epidemiology (Chronic Disease) Department, Hawley focuses her research primarily on improving maternal and child health and preventing obesity-related chronic disease in resource-poor, low-income settings.

Focus connected with Hawley recently to discuss the impact of obesity on maternal and early childhood health, her ongoing work and some of the innovative solutions she is pursuing to address the problem.

What health risks do women who are overweight or considered obese face during and after pregnancy?

NH: Women who have overweight or obesity when they become pregnant have greater risk of a number of complications compared to women without overweight/obesity. They might experience gestational diabetes, gestational hypertension or preeclampsia (a severe form of pregnancy high blood pressure). There are also risks of preterm birth, macrosomia—where the baby is larger than normal—and stillbirth. Because of some of these complications, the risk of having a Caesarean-section birth is also greater, making postpartum recovery more challenging.

Much of your research is taking place in the Pacific Islands and American Samoa. What is the situation there in terms of obesity, diabetes and maternal and child health, and are things getting better or worse?

NH: The Pacific Islands are continuing to experience an epidemic of noncommunicable diseases (diabetes, cardiovascular diseases, cancer), many of which are related, at least in part, to overweight or obesity. This is presenting real challenges for those working in maternal and child health. In many low-resource settings, providers and policymakers are still addressing the fundamentals of maternal and child health: increasing the number of women who receive prenatal care, ensuring that women have access to skilled birth attendants and making sure that emergency obstetric care is available. Now they are also dealing with increasing incidence of diabetes and high blood pressure in pregnancy, which is leading to worsening maternal and child outcomes. There is a real need to rethink the way that care is delivered before, during and after pregnancy that addresses these issues in a holistic way.

You are the principal investigator for the Samoan Obesity, Lifestyle and Genetic Adaptations Study Group, or OLaGA (meaning “Life” in Samoan). What is the group’s purpose and goal?

NH: As the Samoan name suggests, the group’s goal is to look at every aspect of the life course, from birth to old age, to see what leads some people to be at risk of overweight or obesity

and related diseases, while others are not. By learning what the most important risk factors are at any given age, the hope is that we will be able to tailor intervention approaches to better prevent and treat obesity. The expertise of the faculty and students who are involved in the group spans genetic epidemiology to nutrition to psychosocial well-being to intervention development and health service delivery, and all have the same goal of improving the health of this underrepresented, at-risk group.



Your Ola Tuputupua'e (Growing Up) study in Samoa has received significant attention. What is the focus of that research?

NH: The Ola Tuputupua'e study is very special. It is the first cohort study, following the same families over time, to have been established in any Pacific Island nation outside of New Zealand. More than 500 families have been enrolled for seven years now and graciously give us their time every two years so that we can check in on their children's health. We have learned a lot about what puts children at risk of obesity, high blood pressure and hyperglycemia, including some things you might expect, like poor diet quality. By following children over time, we have also been able to uncover some new information about the persistently high levels of anemia that are seen in many Pacific islands. What is really amazing about this study, though, is that it was established by a Yale M.P.H. student, Courtney Choy,

in 2015 and has been almost entirely student-resourced since then, proof that our students do incredible, important work.

You have been testing some creative solutions to addressing obesity and maternal and child health through your Strong Together Raising Our Next Generation (STRONG) study in American Samoa. What are some of the interventions that you are applying and are they proving impactful?

NH: We recently completed a pilot study of STRONG, which used a group prenatal care curriculum developed here at Yale by Jeannette Ickovics and others. Women randomized to the group care intervention, which had a weight control focus, gained almost 4.5 kg [10 pounds] less weight during their pregnancies, were less likely to develop gestational diabetes, and breastfed longer than women receiving standard care. We are hoping to scale that study to make group care available to everyone in the territory soon. We were just awarded a grant from the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) that will allow us to do some new work with adolescents to see if they can serve as agents of change among their own families and promote better diabetes-related outcomes. All of the interventions draw on the existing strengths of the American Samoan community, and so far, have generated a lot of excitement locally.

Can you share with us some of the other areas of maternal and child health research that you are pursuing or hope to pursue in the near future?

NH: Much of my work to date has been in the Pacific Islands or the U.S.-affiliated Pacific territories. A major current focus is bringing that work back to the Pacific Islander communities here in the U.S. who are underrepresented and experience major perinatal health disparities. One of my Ph.D. students, Bohao Wu, has been documenting some of the disparities in preterm birth between Pacific Islanders and other populations. We are looking forward to developing interventions to address the issue.

861 women in the United States **died** as a result of pregnancy or delivery complications in 2020. The U.S. Centers for Disease Control and Prevention reports that two out of three of these deaths are preventable.

2 **OUT** **3**
OF

PREVENTABLE
DEATHS

Maternal Mortality Rates in the United States, 2020
Centers for Disease Control & Prevention



MATERNAL & CHILD HEALTH NEWS

YALE SCHOOL OF PUBLIC HEALTH LAUNCHES MATERNAL AND CHILD HEALTH PROMOTION TRACK

BY FRAN FRIED

The Yale School of Public Health has launched a new academic track that promotes the health of mothers and their babies and children.

Three years in the making, the Maternal and Child Health Promotion Track (MCHP) is available to all students enrolled in the Master of Public Health program.

The program takes a multidisciplinary approach to implementing evidence-based practices to improve maternal and child health (MCH) outcomes. Students will be trained on the importance and application of implementation science to MCH promotion. They will also be required to complete three courses and an

internship or practicum to gain applied experience specific to this area.

“We are very excited about the fact that we have gotten approval for our new Maternal and Child Health Promotion Track, which, in many ways, is a response to popular demand from students and faculty members across departments,” said Professor Rafael Pérez-Escamilla, Ph.D., director of the new track as well as YSPH’s Global Health Concentration and Office of Public Health Practice.

The track’s co-director, Donna Spiegelman, Sc.D., director of the Center for Methods in Implementation and Prevention Science

(CMIPS), is equally enthusiastic about the launch. “I am thrilled to have the MCHP program join our portfolio of activities,” she said. “I look forward to engaging students in innovative training programs and designing and implementing new projects to close the gap in maternal and child health around the world.”

It’s a sentiment shared by YPSH Dean Sten H. Vermund, M.D., Ph.D. “This track is good for mothers and children, good for the environment that nurtures families, good for social justice in the United States, good for addressing challenges in low- and middle-income nations, and fantastic for our students looking for this interdisciplinary training,” he said.

The MCHP Track, Spiegelman said, came about through discussions with Pérez-Escamilla after he became one of CMIPS’ associate faculty. Pérez-Escamilla said it was time, and he explained why.

“First of all, we know it is very well established through hundreds, if not thousands, of studies that the first 1,000 days of life – that is, gestation or pregnancy, plus the first two years of life – are a very critical window of opportunity for promoting infant growth and development,” he said.

“Secondly, promoting optimal nutrition, health and care through the implementation of high-quality, evidence-based interventions during this time has the immense potential to improve short-term, medium-term and long-term infant and child health and development outcomes,” he continued. “And we know that these translate into healthier families, healthier societies and, at the end of the day, improved national development and improved environmental sustainability and planetary health. So really, the first 1,000 days of life, in many ways, are the foundation for the ability of nations and of the world to reach and meet the 2030 U.N. sustainable development goals.”

Spiegelman provided one glaring example of the inequities the track plans to address.

“Maternal mortality is perhaps the world’s greatest health inequity, with deaths in childbirth around 100 times greater in some Sub-Saharan African countries than in

Northern Europe,” she explained. “With rates so low among high-income countries, clearly maternal mortality is nearly fully preventable through interventions well known to us; these include the use of simple hygienic delivery practices, control of maternal hypertension through inexpensive generic medications, use of oxytocin to prevent excessive bleeding, and calcium supplementation in regions where dietary calcium intake is low. The problem is getting these low-cost and simple interventions adopted, contextually adapted and scaled up.”

“Maternal mortality is perhaps the world’s greatest health inequity.”

~Donna Spiegelman

Pérez-Escamilla said the implementation framework emphasis that they’re giving to this new track is unique globally.

“Science in the field of implementation has advanced a lot, and we now have access to very powerful methods to understand not only how to deliver interventions on a large scale, but also how to do that with quality through innovative approaches,” he said. “So, at the end of the day, a very important focus of this track is to bridge that gap between what happens during the process of translating the evidence from small-scale, evidence-based interventions into the implementation of very cost-effective, large-scale maternal child health-promotion programs that take equity and social justice considerations into account.”

The specific aim of the MCHP Track, Pérez-Escamilla said, is to provide those choosing to do training in maternal and child health a systematic way that emphasizes the application of implementation science principles in delivering evidence-based interventions and programs. “We know that the earlier we start in life, the more can be done about preventing adverse outcomes and fostering health and human development in the long term,” he said.

YALE CENTER FOR PERINATAL, PEDIATRIC AND ENVIRONMENTAL EPIDEMIOLOGY HUNTS THROUGH HISTORY TO ANSWER TOMORROW'S RESEARCH QUESTIONS

BY MATT KRISTOFFERSEN

Hidden deep within freezers, in rows of inherited specimens from years past, lies what Andrew DeWan, Ph.D., M.P.H., considers to be a gold mine for the Yale Center for Perinatal, Pediatric and Environmental Epidemiology: biological samples from thousands of children, pregnant women and whole families over the past several decades.

The biggest obstacle? Organizing them—and, of course, analyzing their contents.

It's hard work, said DeWan, the center's director and an associate professor of epidemiology (Chronic Diseases) at the Yale School of Public Health. But with enough time and effort, he predicts the center's vast collection of urine, blood and other specimens could turn out to be a treasure trove for answering some of the biggest questions in maternal and child health.

"They've been stored in freezers for 20 or more years. Let's go back into these freezers and see if the samples are still viable," he said. "And if they are, we can leverage the data with new techniques and generate new data from these biological samples."

The work to assess this wellspring of data, DeWan said, will require more time, funding and energy to continue. But the possibilities are nonetheless promising.

When coupled with efforts to locate sample donors and their offspring, he explained, the multitude of existing biological specimens can

fuel powerful longitudinal studies that look into a range of different areas, including potential risk factors for asthma and environmental exposures. And since the samples have been preserved for so long in freezers, they can give researchers a rare window into how these impacts could have ripple effects across generations.

These long-term studies not only offer a wealth of biological data, they also include extensive residential and environmental information collected from thousands of surveys and questionnaires. Colleagues at the center can now use newer models with powerful mapping software not available 20 years ago to analyze the data and estimate exposures to air pollution and other environmental factors.

DeWan began his tenure as the center's director in 2019 after its two longtime co-directors—YSPH Susan Dwight Bliss Professors Michael B. Bracken and Brian Leaderer—retired. Founded in 1979, the center has fostered an innovative research environment for the Yale School of Public Health and epidemiologists around the world. It has had a long tradition of conducting population-based research, especially studies involving mothers and children and chronic health issues, such as asthma.

"Each of us at the center have our own individually funded research programs," DeWan stated. "But one of the things that

“One of the things that we do as a center is provide a built-in collaborative network.”

~Andrew DeWan, Director, Yale Center for Perinatal, Pediatric and Environmental Epidemiology



we do as a center is provide a built-in collaborative network. Being a genetic epidemiologist, I have perinatal epidemiologists or environmental epidemiologists at my disposal to talk to when planning a study.”

In recent months, researchers at the center have published important findings on a range of scientific explorations. Newer research has focused on neuropsychiatric diseases potentially linked to environmental organic pollutants and man-made chemicals. Efforts to use and analyze large datasets rich with information on human health such as those found in the U.K. Biobank, Denmark, Norway and U.S. state registries, are also underway.

The variety of research areas in the center—including obesity, childhood cancers and exposure assessment—has proven particularly inspiring, DeWan said.

Several affiliated faculty have been conducting research into the potential risks associated with using acetaminophen-based pain relieving medications

during pregnancy. After contributing to the growing body of evidence that suggests using the analgesic during pregnancy is linked to an increased risk for impaired cognitive function in children, YSPH Professor Zeyan Liew, Ph.D., M.P.H., and colleagues joined a consensus statement urging caution.

In a set of studies published last year, center researchers were part of a team that uncovered new monitoring strategies for preventing obesity in Samoan children.

Research in these and other areas remains ongoing, as does the massive organization effort for all those samples in the freezers. DeWan said he is confident that the center can keep providing novel insights for maternal and child health for years to come.

“We’re one of the oldest centers at the Yale School of Public Health. We really like to draw on that experience and the previous studies that we’ve done,” he said. “Now, we’re really trying to leverage the historical aspects of the center for the future.”

BIRTH OUTCOMES IMPROVED THROUGH EXPECT WITH ME PRENATAL CARE

Expectant mothers who received group prenatal care through Expect With Me, a program co-developed by the Yale School of Public Health, had significantly better birth outcomes than their peers receiving traditional one-on-one prenatal care, a new study finds.

Expect With Me was developed in 2014 by YSPH researchers along with representatives of UnitedHealth Group and health care providers at Vanderbilt University Medical Center to address high rates of preterm birth and low birth weight in the United States and racial disparities in birth outcomes.

YSPH researchers Jessica Lewis, Ph.D., LMFT, and Jeannette Ickovics, Ph.D., and co-authors studied 2,402 women receiving prenatal care in Nashville and Detroit for the study, which published in the journal *Preventive Medicine*.

Mothers who received Expect With Me group prenatal care had a 58% lower risk of having a preterm birth, 63% lower risk of having an infant with low birth weight, and 37% lower risk of having an infant admitted to the neonatal intensive care unit, than mothers who received traditional individual care. The findings build on previous research demonstrating that group models of prenatal care can be beneficial for moms and babies.

“Rates of preterm birth in the United States are comparable to those of developing nations and have risen every year for the last five years. Preterm birth and other adverse birth outcomes are even higher among Black women,” said Lewis, the study’s lead author and an associate research scientist at YSPH. “We need new models of care that can improve both pregnancy outcomes and health equity for growing families. These findings suggest that Expect With

Me prenatal care can be part of that solution.”

Study participants received either traditional prenatal care or Expect With Me, which brings together eight to 12 women who are due to deliver their babies the same month for 10, two-hour group medical visits led by a prenatal care provider.

Expect With Me care includes a brief individual check-up and facilitated group discussions about pregnancy, childbirth, and wellness that focus on long-term healthy lifestyle choices and stress/mental health. An Expect With Me information technology platform enables patients to track their weight and blood pressure, connect with group members and health care providers, and access medically reviewed, multimedia resources, including educational videos and tip sheets as well as links to local and national resources.

Expect With Me differs from other approaches by engaging women deeply in their own pregnancy care and connecting them with other pregnant women and their providers both through extended group visits and online engagement between prenatal visits.

“If we are to achieve sustainable improvements in birth outcomes for mothers and babies, health systems and payors such as Medicaid and private insurers must invest in innovations in prenatal care,” said Ickovics, the Samuel and Liselotte Herman Professor of Social and Behavioral Sciences and professor of psychology.





ELEVATE JOINS YSPH, BRINGING MATERNAL & CHILD MENTAL HEALTH EXPERTISE

“Elevate’s mission is completely aligned with the goals of YSPH’s new Maternal and Child Health Promotion Track.”

~Elevate Executive Director Hilary Hahn, M.P.H.

The Elevate Policy Lab has joined the Yale School of Public Health’s Office of Public Health Practice (OPHP).

Elevate focuses on addressing mental health as a strategy for improving the social and economic mobility of families living in poverty. In this new position, the lab will bring new perspectives and expertise to public health practice in New Haven, particularly the recently launched Maternal and Child Health Promotion Track for M.P.H. students.

“Elevate’s mission is completely aligned with the goals of YSPH’s new Maternal and Child Health Promotion Track,” said Elevate Executive Director Hilary Hahn, M.P.H. “Our new home within the OPHP could not be a more perfect fit.”

As part of Elevate’s mission, the lab works to expand the Mental Health Outreach for Mothers Partnership®. Founded in 2011 in New Haven, MOMS is an evidence-based program model designed to reduce depressive symptoms for over-burdened and under-resourced mothers and female caregivers. Elevate partners with government agencies to ensure long-term sustainability of the program beyond the pilot program. The lab is expanding MOMS to new

sites across the United States, with current partnerships in Vermont, Washington, D.C., New York City, and Bridgeport, Connecticut. Elevate conducts evaluations at each site to understand the impact of services for mothers, with a most recent publication on the D.C. MOMS pilot in the journal *Psychiatric Services*.

Additionally, Elevate is working to simultaneously tackle health, economic, and environmental challenges for overburdened and under-resourced populations to address the root causes of health disparities and improve outcomes. Together with Connecticut state Rep. Caroline Simmons (D-Stamford), Elevate Policy Director Barbara Ruhl is advancing this approach at the local, state and federal levels.

“Our team is thrilled to welcome Elevate to YSPH and excited to partner, specifically by sharing our experiences working with communities and community health workers to ensure equitable partnerships and crafting robust maternal and child health practice experiences for our students,” said Susan Nappi, M.P.H., OPHP’s executive director.

The Elevate team looks forward to becoming more integrated within the YSPH community over the coming year. In addition to exploring collaborations in its new home, Elevate is excited to launch MOMS services for mothers living in family shelters in the Bronx, mothers currently or formerly incarcerated in the Bronx and Brooklyn, and mothers in the Springfield and Holyoke, Massachusetts area.

JIOVIO USES TECH FOR GOOD HEALTH

BY ROSALIND D'EUGENIO

Senthilkumar Murugesan had the passion and determination to bring his company focused on providing healthier pregnancies through new technology to fruition, but he needed to get the word out about his product. Enter Yale's Sustainable Health Initiative.

"I applied as soon as I saw the SHI opportunity," said Murugesan. "The program was not only going to offer us a global platform on which to tell our story but also would provide us with a better understanding of how to work with different cultures and adjust our approach to different markets."

"The SHI program taught us how to organize and share our ideas."

~Senthilkumar Murugesan, Co-founder & CEO of JioVio HealthCare

Murugesan is the co-founder and CEO of JioVio HealthCare, a Singapore-based MedTech international company focused on providing a healthy pregnancy, infant care, and parenting experience through innovation in technology. The company created Savemom, a jewelry-inspired battery-run wearable device that collects various physiological signals from the expectant mother such as blood pressure, heart rate, temperature, respiratory rate, and glucose. The device also tracks sleep and has a weighing scale integrated with the application to monitor the steady rise in weight throughout the pregnancy.

Murugesan said he was inspired to create JioVio when he saw how many health departments in his native India are short-staffed and how workers are overextended, resulting in rural women being nearly three times as likely to die from complications during pregnancy or childbirth as women in more urban areas. Many of

these women are wary of the health care system and cannot afford to make frequent visits to far-off hospitals. With the Savemom device, all the data collected is uploaded in the cloud for doctors to view remotely and quickly become aware if any woman's risk assessment is negative, so that preventive measures may be taken at the right time.

Murugesan credits the mentors at Yale School of Public Health for helping the JioVio team get its product in front of the right audiences and guiding them on how to present their story.

"The SHI program taught us how to organize and share our ideas," he said. "We needed to learn how to present our story at a global level which meant learning different cultures and what type of technology communities would use."

"Gaining a better understanding of our audience helped us create a product of value to them, one they would want to use," he added.

Through collaborations with local government agencies, hospitals, and non-governmental organizations, Savemom has successfully helped more than 3,600 mothers across India have healthy pregnancies and babies by ensuring that collected vital information is sent to doctors in real time for feedback.



60,000

The number of women in the U.S. each year who experience unexpected outcomes during labor or delivery that have serious short- or long-term effects on their health and well-being. As with maternal deaths, many cases of maternal morbidity can be avoided with timely and appropriate care.



SNAPSHOTS



Improving maternal and child health has long been a cornerstone of the Yale School of Public Health’s mission – from the pioneering polio-myelitis research of Drs. John Rodman Paul and Dorothy Horstmann to the groundbreaking indoor air quality studies of Brian Leaderer and community alliances for better health established by Jeannette Ickovics. YSPH’s innovative research and practice initiatives, along with its many interdisciplinary collaborations addressing maternal and child health, span decades and extend around the world. It is impossible for us to fully represent all of the individuals involved in this important effort. Rather, we present to you here a sampling of just some of the Yale public health pioneers, trailblazers and current investigators working to address existing inequities and improve maternal and child health.

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PIONEERS

JOHN RODMAN PAUL, M.D. (1893–1971)



Dr. John Rodman Paul made significant contributions to the study of rheumatic fever, infectious mononucleosis and hepatitis. But he is especially noted for his work on poliomyelitis. He was named to the Polio Hall of Fame in 1958.

DOROTHY HORSTMANN, M.D. (1911–2001)



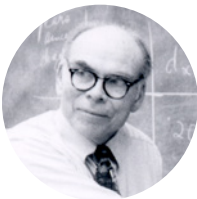
Dr. Dorothy Horstmann demonstrated that the poliovirus reached the nervous system via the blood, a discovery that made later polio vaccines possible. She also studied maternal rubella and the rubella syndrome in infants. She was a member of the National Academy of Sciences and a president of the Infectious Diseases Society of America.

IRA V. HISCOCK, M.P.H. '21 (1892–1986)



Ira Hiscock was passionate about the control of communicable diseases such as typhus, tuberculosis, and measles; the improvement of maternity and child health care; and the promotion of health education for children and adults. He served as president of the National Health Council and the American Public Health Association.

COLIN WHITE, M.D. (1913–2011)



Dr. Colin White's research focused on the development and application of biostatistical methods in epidemiology. He was known for his research on inheritance in fraternal twins, as well as early studies of whether there was an association between oral contraceptives and cancer risk in women.

FRANCIS L. BLACK, PH.D. (1926–2007)



Frank Black pioneered the in vitro cultivation of the measles virus and tested the efficacy of measles vaccines in susceptible populations in both the United States and abroad. His research also helped determine factors that influence the age at which a child can be effectively vaccinated against measles.

TRAILBLAZERS

MICHAEL B. BRACKEN, PH.D., M.P.H., FACE

Susan Dwight Bliss Professor Emeritus of Epidemiology, and formerly Professor of Obstetrics and Gynecology, Reproductive Science and Neurology.



Professor Emeritus Michael Bracken is former head of the Department of Chronic Disease Epidemiology at Yale and former vice chairman (deputy dean) of the Yale School of Public Health. He is considered a founder of the evidence-based medicine paradigm. His textbook, *Perinatal Epidemiology* (1984), defined the field of perinatal epidemiology, predicting the role of fetal and early childhood illness on later chronic disease. A second textbook, *Effective Care of the Newborn Infant* (with John C. Sinclair, 1992), introduced the concepts of meta-analysis into neonatology and was named one of the most influential books in evidence-based medicine by the *British Medical Journal*. His most recent award-winning book is *Risk, Chance and Causation: Investigating the Origins and Treatment of Disease* published in 2013. Bracken is the founding director of the Yale Perinatal Epidemiology Unit and director emeritus of its successor, the Yale Center for Perinatal, Pediatric and Environmental Epidemiology.

JEANNETTE ICKOVICS, PH.D.

Samuel and Liselotte Herman Professor of Social and Behavioral Sciences and Professor of Psychology; former Dean of Faculty, Yale-NUS College, Singapore



Professor Jeannette Ickovics' research investigates the interplay of complex biomedical, behavioral, social, and psychological factors that influence individual and community health. Ickovics served as principal investigator for two multisite randomized controlled trials involving an innovative model of group prenatal care, demonstrating a 33% reduction in preterm birth and other positive health outcomes for mothers and babies. Ickovics also was principal investigator of a group prenatal care study funded by UnitedHealth Foundation, a public-private evaluation with Merck for Mothers (evaluating the use of community health workers for pregnant women with chronic disease), the U.S. Centers for Disease Control and Prevention, Yale-Griffin Prevention Research Center, and an NIH-funded randomized controlled obesity prevention trial at 12 middle schools in collaboration with the Rudd Center and the New Haven Public Schools. She was founding director of the Community Alliance for Research and Engagement (CARE) at YSPH in 2007.

BRIAN LEADERER, M.P.H.'71, PH.D.'75

Susan Dwight Bliss Professor Emeritus of Epidemiology (Environmental Health Sciences); Affiliated Faculty, Yale Institute for Global Health; Senior Research Scientist, Yale Center for Perinatal, Pediatric and Environmental Epidemiology, Environmental Health Sciences

Professor Emeritus Brian Leaderer is former co-director of the Yale Center for Perinatal, Pediatric and Environmental Epidemiology (CPPEE). Leaderer led several large epidemiologic studies that



looked into the role of environmental and genetic factors on the respiratory health of children, particularly as it pertains to the development of asthma and asthma severity. His collaborations with colleagues at the Yale CPPEE included an examination of the impact of pollutants on perinatal and pediatric outcomes. He also investigated the relationship between exposures to indoor levels of nitrogen dioxide, traffic contaminants and the exacerbation of asthma in 1,401

children in what was known as the STAR Study.

CATHERINE PANTER-BRICK

Bruce A. and Davi-Ellen Chabner Professor of Anthropology, Health and Global Affairs and Professor of Public Health; Affiliated Faculty, Yale Institute for Global Health



Professor Catherine Panter-Brick's research consists of critical analyses of health and well-being across key stages of human development, giving special attention to the impact of poverty, disease, malnutrition, armed conflict and social marginalization. Her focus on children in global adversity has included biocultural research with street children, refugees and war-affected adolescents.

Professor Panter-Brick has published widely on child and adolescent health, including articles on violence and mental health in Afghanistan, household decision-making and infant survival in famine-stricken Niger.

RAFAEL PÉREZ-ESCAMILLA, PH.D.

Professor of Public Health (Social and Behavioral Sciences); Director, Office of Public Health Practice; Director, Global Health Concentration; Director, Maternal and Child Health Promotion Program; Principal Investigator, Yale-Griffin Prevention Research Center; Affiliated Faculty, Yale Institute for Global Health



Professor Rafael Pérez-Escamilla's public health nutrition program has contributed to improvements in maternal, infant, and young child feeding and health and health outcomes across the globe. His work has had a positive impact on breastfeeding, iron deficiency anemia among infants, household food security, childhood obesity prevention and nurturing care policies and programs. His domestic community health workers program has led to

improvements in health outcomes among people of color with Type 2 diabetes. He has published over 300 research articles, three books, and numerous journal supplements, book chapters, and technical reports. He is a member of the National Academy of Medicine, co-editor-in-chief of the prestigious *Maternal & Child Nutrition* journal and deputy editor of *Advances in Nutrition*. He has been a senior adviser to many public health nutrition and integrated early childhood development initiatives including those led by the World Health Organization, the Pan American Health Organization, UNICEF, the Food and Agriculture Organization of the United Nations (FAO), and the U.S. Agency for International Development (USAID).

CURRENT INVESTIGATORS

CAROLINE JOHNSON, PH.D.

Assistant Professor of Epidemiology (Environmental Health Sciences)



Assistant Professor Caroline Johnson's research uses mass spectrometry-based metabolomics to understand the role of metabolites in human health. Her primary research interest is to investigate relationships between genetic and environmental influences (diet, hormones and microbiome) in colon cancer. She is also examining the metabolome during conception and pregnancy to assess the relationship between environmental exposures, reproductive function and health. This research has allowed for the development of a metabolomic epidemiology approach that combines epidemiologic data, environmental exposure measurements and biomarkers of biological effect to identify causal links between exposures and outcomes. She has collaborations within YSPH to use this approach in birth cohorts, relating early-life exposures to disease development in children and adults.

TRACE KERSHAW, PH.D.

Chair, Department of Social and Behavioral Sciences and Susan Dwight Bliss Professor of Public Health (Social and Behavioral Sciences); Affiliated Faculty, Yale Institute for Global Health; Director, Center for Interdisciplinary Research on AIDS (CIRA).



Professor Trace Kershaw conducts research into HIV/STD prevention and reproductive and maternal-child health. Specifically, he is interested in the role of interpersonal relationships (e.g., romantic, social network, family) on sexual health, reproductive health, mental health and substance use of adolescents and emerging adults; the development of behavioral interventions to improve sexual, reproductive and mental health of adolescents and emerging adults; and the use of technology and social networking to assess and intervene on risk behavior of adolescents and emerging adults. Currently, he is involved in several research projects assessing the influence of behavioral interventions aimed to reduce the occurrence of HIV/STD and negative perinatal and postnatal outcomes for adolescents and emerging adults in the United States and abroad.

identify *conclude*
investigate

TORMOD ROGNE, M.D., PH.D.

Assistant Professor of Epidemiology (Chronic Diseases)



As an assistant professor of perinatal epidemiology Dr. Tormod Rogne studies genetic epidemiology in the perinatal setting. To tackle clinically relevant questions, he applies modern methods ranging from instrumental variable analyses and inverse-probability weighting to mediation and genome-wide association analyses. His research includes the study of the maternal and offspring genetic effect of birth outcomes and implementing genetic variants in an instrumental variable analysis framework (often referred to as Mendelian randomization) as a technique to come closer to the causal effect of an exposure on an outcome. The nationwide Nordic registries and the Norwegian Mother, Father and Child Cohort Study are currently his primary sources of data, but he aims to include data from the U.S. in the future. Rogne's current research includes evaluating the genetic susceptibility to sepsis, the causal effect of vitamin B12 supplementation during pregnancy on offspring outcomes, and how being born preterm affects the risk of cardiovascular and infectious diseases in adulthood.

YASMMYN SALINAS, B.S.'10, M.P.H.'14, PH.D.'19

Assistant Professor of Epidemiology (Chronic Diseases)



Assistant Professor Yasmmyn Salinas' research is focused on the inter-generational transmission of obesity and its comorbidities. To date, she has approached this issue from a genetics lens. Her current work searches for genetic variants that display pleiotropy for obesity-related metabolic disorders and examines the interactions between maternal genetic factors and early-life modifiable risk factors in relation to metabolic outcomes in children. As part of her research, she has conducted genetic epidemiologic studies to examine cross-ethnic differences in the genetic determinants of body mass index and to elucidate the shared genetic determinants of asthma and body mass index. Salinas joined the YSPH faculty in 2019. In 2021, she received the YSPH Distinguished Teaching Award, the school's highest honor.

research
pioneering
analyze
examine

MATERNAL MORTALITY RATES BY RACE AND HISPANIC ORIGIN IN THE U.S.

55.3

**NON-HISPANIC
BLACK**

19.1

**NON-HISPANIC
WHITE**

18.2

HISPANIC

23.8

ALL PEOPLE

Number of Deaths per 100,000 Births

*National Center for Health Statistics, National Vital Statistics
System, Mortality and Natality*



COMMUNITY CONNECTIONS

The Yale School of Public Health is working with community partners and residents to address maternal and child health inequities across New Haven County and beyond.



NEW PRACTICE FELLOWSHIPS FOCUS ON EQUITY AND MATERNAL AND CHILD HEALTH

BY SUSAN NAPPI

The Office of Public Health Practice (OPHP) at the Yale School of Public Health facilitates collaborations among faculty, students and community organizations to meet pressing public health challenges through innovative and equitable solutions. This vision and framework align with YSPH's commitment to social justice through humility and evidence-informed service, affecting both local and global communities.

To support this vision and deepen experiential learning at YSPH, we recently expanded internship opportunities and deepened partnerships. Together with the Community Alliance for Research and Engagement (CARE), the Yale-Griffin Prevention Research Center, and Southern Connecticut State University (SCSU), the Health Equity Fellowship Program (HEFP) has supported 23 fellowships focused on co-designed projects that address the needs of historically marginalized populations and equity issues in public health.

Additionally, we developed community lecturer positions to train students on equitable community engagement via class lectures, community panels and student mentoring. Current

lecturers include New Haven Healthy Start Director Natasha Ray, M.S., and Community Impact, United Way of Greater New Haven Vice President Jason Martinez, M.S.

With the addition of the new Maternal and Child Health Promotion Track at YSPH, the HEFP now includes three new fellowships focused specifically on equity and maternal and child health.

This expansion was made possible through a \$30,000 gift from the Robert and Virginia Shiller Foundation. In addition to providing support for students, this gift also provides three community organizations with funding to support new partnerships with the HEFP.

The inaugural partnership organizations are: All Our Kin, Hands on Peru and the Waterbury Bridge to Success Community Partnership. Partners were chosen based on their equity and maternal and child health focus. YSPH students who are designated maternal and child health fellows will collaborate with these community partners on key initiatives, which include:

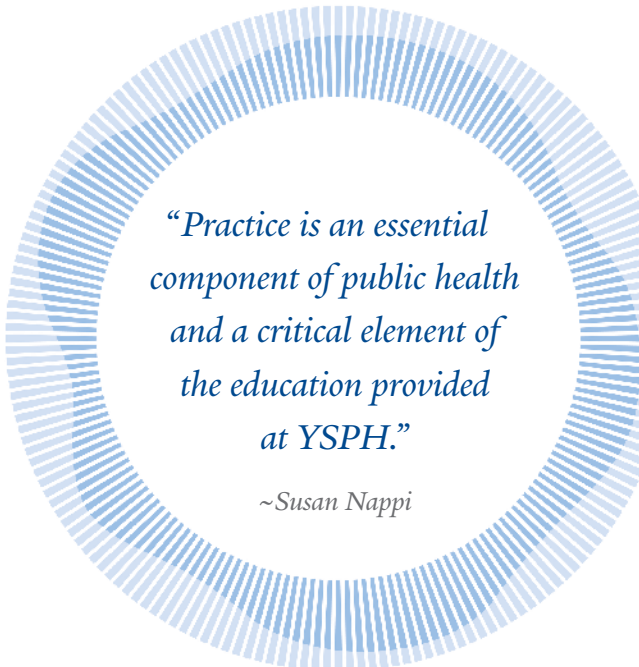
- developing culturally appropriate health-focused supports for New Haven County family child care educators, many of whom are women of color;
- addressing disparate infant and maternal mortality rates for women of color in Waterbury by improving maternal and mental health care coordination for Black and Afro-Latina women through advocacy and collaboration;
- evaluating a culturally appropriate and community-building nutrition course in Peru.

At OPHP, we center relationship-building as the organizing principle through which all activities are conducted. The internship model we've developed over time strives to honor our collaborative partnerships by offering staffing and other resources to independent community organizations. We are truly grateful for the support these organizations provide our students

and understand the potential collective impact these joint projects can have when fully supported year over year. We are grateful to the Shiller Foundation for making the expanded fellowships possible, and we hope to share our project findings with other foundations.

Practice is an essential component of public health and a critical element of the education provided at YSPH. As the nexus for practice-based learning and public health workforce education at YSPH, the OPHP's vision is clear—to provide YSPH students experiential learning opportunities that are anti-racist and equitable; mutually beneficial to our communities, students and faculty; focused on cultivating physical and mental health and wellness; and fully resourced and supported.

Susan Nappi, M.P.H., is executive director of the Office of Public Health Practice at the Yale School of Public Health.



“Practice is an essential component of public health and a critical element of the education provided at YSPH.”

~Susan Nappi



ADDRESSING MATERNAL AND CHILD HEALTH INEQUITIES THROUGH CARE

BY KATHLEEN O'CONNOR DUFFANY AND NATASHA RAY

Through the CDC-funded Racial and Ethnic Approaches to Community Health (REACH) program, the Community Alliance for Research and Engagement (CARE), co-housed at Southern Connecticut State University (SCSU) and the Yale School of Public Health (YSPH), works with community partners and residents to address health inequities related to nutrition, physical activity and access to community clinical care. A primary focus of our nutrition initiative is supporting parents in their intentions to chest/breastfeed.

While the science is clear on the important health benefits of breastfeeding for infants and mothers, new mothers can face a number of barriers to both initiating and continuing breastfeeding. These barriers include poor health care provision and lack of access to lactation support services (due to lack of transportation, childcare duties, recovery from birth and inflexible work hours). Additional barriers come in the form of workplace policies that do not meet lactation accommodation requirements, cultural norms against public breastfeeding and a lack of laws guaranteeing paid maternity leave.

While studies have shown there are no racial or ethnic differences in intentions to breastfeed between non-Hispanic white mothers

and non-Hispanic Black mothers, the ability to meet those intentions does differ. Black mothers face additional barriers to breastfeeding that are rooted in systemic racism, including a lack of appropriate representation in outreach materials; a lack of representation among breastfeeding support service providers; a legacy of violence and oppression related to the role of wet nurses in the context of slavery; and a disproportionate rate of preterm births among Black women, which makes breastfeeding more complicated. Excess stress associated with bias, discrimination or racism experienced particularly by Black people, and the aggressive marketing of infant formula in Black communities also present barriers to Black women. It is important to acknowledge how the racial inequities we see in breastfeeding today cannot be separated from their historic roots in slavery and the persistent and systemic racism that has followed.

To identify structural barriers to breastfeeding among communities of color and inform future initiatives, CARE's students, staff and faculty are working with our community partners and residents on a variety of studies.

What follows is a summary of some of those studies.

STUDY SUMMARIES

Moms & Dads Breastfeeding Focus Group

The New Haven Breastfeeding Task Force, currently co-led by Natasha Ray (New Haven Healthy Start) and Danielle Blakney, LPN, IBCLC, and including community partners such as New Haven’s Women, Infants, and Children programs, requested a study to explicitly hear from Black/African American moms in New Haven on their breastfeeding experiences to guide efforts at the local level. CARE conducted multiple focus groups, using Barrier Analysis methodology mapped to a socioecological framework to identify and support interventions at multiple levels. The project was led by Victoria Tran, MPH ’21, Amelia Reese Masterson, MPH ’13, Tomeka Frieson, Yale College ’21, and Frankie Douglass (Community Health Worker) in close partnership with New Haven Healthy Start and the New Haven Breastfeeding Task Force Community Advisory Board.

As a parallel study, focus groups with Black/African American dads are underway to hear their experience with breastfeeding and feeding their infants. Barriers and facilitators to engagement will be mapped to identify interventions at the intra- and inter-personal levels, with a focus on the institutional, community and societal levels. In partnership with the New Haven Breastfeeding Task Force and driven by Doug Edwards of Real Dads Forever and Natasha Ray of New Haven Healthy Start, CARE’s Jasmine Rios, M.P.H. ’22, is co-designing this study.

Statewide communications campaign

In partnership with the Connecticut Department of Public Health and with the support of a CDC SPAN grant, focus groups are being conducted in New Haven, assessing materials for a statewide “It’s Worth It” breastfeeding campaign to ensure that breastfeeding messages and materials resonate with and reflect the views of women of color. Debbie Vitalis, YSPH postdoc ’21, deputy director of CARE at SCSU, and three CARE M.P.H. students – Beatriz Duran-Becerra, ’22, Devina Buckshee, ’23, and Amina Mutalib, ’23 – are leading this process. Results will be reported for integration into the statewide campaign.




Kathleen O’Connor Duffany, Ph.D., is director of Research and Evaluation for the Community Alliance for Research and Engagement (CARE), co-director of the Yale-Griffin Prevention Research Center, deputy director of the Office of Public Health Practice, and an assistant professor of Clinical Public Health (Social and Behavioral Sciences) at the Yale School of Public Health. O’Connor Duffany is principal investigator for all CARE studies noted.

Natasha J. Ray, M.S., is director of New Haven Healthy Start, chair of the Center for Research Engagement at the Equity Research and Innovation Center, and community lecturer at OPHP at the Yale School of Public Health.

STUDY SUMMARIES

Breastfeeding Equity Training Module

A Roots in Racial Inequities in Breastfeeding training module is being developed and piloted for health care providers to address inequities and biases related to the delivery of care and services to support breastfeeding. In an initial review of a proposed physicians' training module to support breastfeeding, CARE partners and YSPH's Womxn of Color for Maternal and Child Health student organization identified areas of the training that needed revision and areas that required an explicit equity lens. The feedback was integrated into the current physicians' training module, and an extended module focused on the effect of biases and structural racism was requested. A CARE team led by Tomeka Frierson, Yale College '21, Victoria Tran, M.P.H. '21, Simileoluwa Falako, M.P.H. '22, Amelia Reese Masterson, M.P.H. '13, and Frankie Douglass (Community Health Worker) drafted the module, and a wide array of New Haven-based hospital and community providers and moms provided comment on the module. Providers from the Yale Schools of Public Health, Medicine and Nursing and Yale New Haven Hospital also reviewed. The feedback from these groups guided a co-design of the module that will be piloted with health care providers this summer. Eventually, the module will be available for inclusion in health care training programs (e.g., medical and nursing schools), as well as in-service training at hospitals and pediatricians' offices locally and nationally.



“New mothers can face a number of barriers to both initiating and continuing breastfeeding.”

Breastfeeding Care for Latina Women

In partnership with Elizabeth Rhodes, postdoc '22, and with the support of a grant from the National Institutes of Health's National Heart, Lung, and Blood Institute, CARE staff members Sofia Morales (YSPH) and Genesis Vicente (SCSU), along with Leslie Brown (CARE Community Research Fellow/CHW) and Elyse VanderWoude, M.P.H. '22, interviewed 21 Latina women with low incomes in Greater New Haven about their breastfeeding care experiences. The interviews focused on the women's experiences during prenatal, birth and postpartum visits and ways to improve their care experiences. The findings will be used to design interventions to make breastfeeding care for Latina women more equitable and person-centered.

Findings from all of the above studies will be presented to the community, local hospitals and local organizations to better address needs and inequities in New Haven. CARE is also partnering to support breastfeeding-friendly business designations, increase the number of public lactation spaces and increase awareness of breastfeeding benefits, rights and policies throughout New Haven. Our Community Readiness Assessment, conducted first in the summer of 2021, with plans to be conducted again in three years, will assess change over time.

12

PROVIDERS PER 1,000 BIRTHS

The U.S. has the lowest overall supply of midwives and OB-GYNs among 11 developed economies.

The other 10 countries have a supply that is two to six times greater.



Yale School of Public Health students and alumni are working locally and globally to improve maternal and child health.

YSPH STUDENTS' RESEARCH HELPS EXPAND HEALTH CARE FOR UNDOCUMENTED PREGNANT WOMEN AND CHILDREN

BY DEVINA BUCKSHEE

In the spring of 2021, Yale School of Public Health students Sreeja Kondeti, M.P.H. '22, and Thomas Stovall, M.P.H. '21, were interning in the Connecticut state legislature as part of Assistant Professor Shelley Geballe's Health Policy Practicum course.

Their research into options for health care for undocumented immigrants helped support the enactment of a law expanding Connecticut's HUSKY health insurance program to include far more undocumented women and children who met certain criteria. Prior to this, Connecticut's coverage was limited to "emergency Medicaid," which included only the childbirth (labor and delivery) costs of undocumented women.

"I wouldn't call it a discovery, but I am proud of what we were able to do," Kondeti said in a recent interview.

As part of Geballe's Health Policy Practicum course, Kondeti was placed with Connecticut state Sen. Matthew Lesser (D-Middletown), the Senate co-chair of the General Assembly's Insurance Committee, who requested a policy brief on ways to expand health care access for undocumented immigrants.

Sreeja Kondeti, M.P.H. '22, and
Thomas Stovall, M.P.H. '21



Kondeti's research revealed that multiple states had adopted the federal "unborn child" option in CHIP (the Children's Health Insurance Program), which permits states to consider a fetus a "targeted low-income child" for purposes of CHIP eligibility, resulting in pregnant women gaining access to prenatal and labor and delivery care regardless of their immigration status.

"I found that Connecticut was not among the growing number of states taking advantage of this [provision] to expand coverage," Kondeti said. She further found that six states were providing state-funded coverage to their low-income undocumented children and youth.

While Kondeti was doing her research for Lesser, Stovall was drafting a policy brief on health outcomes and health care utilization among Connecticut's undocumented immigrants as part of his internship with state Sen. Marilyn Moore (D-Bridgeport), Senate co-chair of the General Assembly's Human Services Committee.

"I knew Sreeja was working on the interface between our health systems and the undocumented, but I did not know of the intricacies of her work before she sent me the actual brief," Stovall recalled. "I was then able to use it as a great source of information about the barriers to care that undocumented immigrant families face."

Geballe, J.D. '76, M.P.H. '95, said that Kondeti, Stovall and their preceptors were encouraged by the possibilities the students' research identified as it clearly showed there were "multiple ways to expand eligibility that some other states had already enacted and which, in the case of undocumented pregnant women, was through an explicit federal option for coverage," Geballe said.

Supported by the students' research, Lesser introduced a bill to expand government-sponsored medical insurance to many income-eligible undocumented pregnant women and children in Connecticut as other states had done.

"I was there for the public hearings and the committee meetings and watched the bill progress up the ranks," Kondeti said.

At the conclusion of the General Assembly Session, Geballe sent the class an email summarizing the legislature's actions, which included the General Assembly's June 8 favorable vote to expand HUSKY Health to uninsured, income-eligible pregnant women and children under age 9 regardless of their immigration status. The new law also requires Connecticut's Office of Health Strategy to study the feasibility of offering health coverage to income-eligible undocumented children ages 9–18, with a report to key legislative committees by July 1, 2022.

"That's when I realized I actually helped make a tangible difference," Stovall said.

Public Act 21-176 was signed into law by Gov. Ned Lamont on July 12, 2021.

It was a moment Kondeti said she will never forget.

"This has been one of the most meaningful experiences of my life," she said.

Paige Farrenkopf, M.P.H. '22



IMPROVING MATERNAL HEALTH IN VULNERABLE COMMUNITIES

BY DEVINA BUCKSHEE

Paige Farrenkopf's interest in maternal and child health is much broader than her innate desire to simply help people.

For one, looking at maternal and reproductive health within humanitarian settings during her Yale School of Public Health internship last summer truly opened her eyes to the global scale of health inequities.

The Yale Institute of Global Health fellowship in July 2021 with Save the Children's Maternal, Newborn and Reproductive Health in Emergencies Team was an "incredible experience," she said.

Farrenkopf, M.P.H. '22, assisted with family planning services and specifically looked at the resources available to survivors of sexual violence among various health facilities throughout Yemen. "It fueled my passion for public health and interest in protecting vulnerable communities within the maternal and child health space," she said.

But it was a reproductive health class that focused on people of color and health equity that first sparked her interest in the field.

"I took it as an undergraduate in college and was thrilled to be able to pursue this field at YSPH and through student organizations like ReproJustice to advocate for sexual and reproductive health," Farrenkopf said.

ReproJustice helped her dive deeper into education, advocacy and community engagement around reproductive health. The group

"I want to look at the bigger picture and create a lasting impact for the populations I work with."

~Paige Farrenkopf

held seminars on sexual and reproductive health law, as well as a discussion on a Connecticut bill that would prohibit institutions from spreading misinformation about pregnancy-related services. "It's been really interesting to learn how the legal sector intersects with public health in regards to maternal and reproductive health," said Farrenkopf.

She says a large focus of her work is on preventive health care within the maternal and reproductive health sector as she believes this aspect is often overlooked despite its potential to have "significant impacts later on in life."

Looking forward, Farrenkopf is eager to use her public health training and background in an impactful way on a broad scale.

"I want to look at the bigger picture and create a lasting impact for the populations I work with," she said emphatically.



Yushi Zhang, M.P.H. '23

YSPH STUDENT LAUNCHED BREASTFEEDING MOVEMENT IN CHINA

BY ANNA LIN-SCHWEITZER

Before she had even heard the term “public health,” Yushi Zhang, M.P.H. '23, was leading a national breastfeeding movement across China.

Trained as a journalist, Zhang became interested in breastfeeding when she had her first child in 2010. Driven by the simple belief that, as mammals, the majority of women should be able to breastfeed, she was excited to learn more.

However, resources in China were scarce. China's exclusive breastfeeding rate was 21% in 2013, significantly under the already low global average of 44%. Using baby formula is deeply ingrained in the modern Chinese culture; doctors at the time barely had the chance to touch upon the topic of breastfeeding in their medical training, and some were paid to promote formula use. There were only six lactation consultants in the country around the time Zhang delivered, five of whom were foreigners. All had received their training abroad.

An investigator by nature, Zhang was undeterred, and she turned to non-Chinese resources to learn more. “My advantage at the time was really because I was able to read English,” she said.

As she sifted through information online, she discovered that many others shared her curiosity about breastfeeding. Within a year, that mutual interest coalesced into a network of 40,000 women across China. The group's goals went beyond education to peer support. Experts were brought in from abroad to train network members as on-call volunteers (and later paid professionals) capable of supporting postpartum practices in their local communities.

Zhang's work didn't stop at the individual level—she wanted to get to the root of the problem in the system and the culture. Most women in China gave birth in hospitals, many of which favored baby formula over breastfeeding, she said. Lacking traditional scientific credentials, Zhang found it challenging to gain traction with such large institutions. Yet, she found power in numbers. In addition to the 40,000-person volunteer network, she had amassed countless additional followers who supported her work.

“With that, you could consider us a market—and with that market, you all of a sudden had the power to talk with hospitals,” she said. “Because now, the women were united and could demand breastfeeding support, facilities and services.”

Her team provided consulting services to help private hospitals reshape their birth protocols that heavily affect breastfeeding initiation. Her work broadened the focus of these maternity wards from the technical and medical side of labor and birth to a wider range of public health maternal and infant essentials. Soon after, public hospitals got involved, too.

Beyond hospital birth practices, she also strove to change norms. Zhang, and the network she helped create, held flash mobs of mothers nursing in public, installed infant-friendly waiting rooms at metro stops and campaigned to replace signs depicting babies holding bottles with babies accompanied by a caregiver.

“It was fun, these culture-shifting things,”

“You all of a sudden had the power to talk with hospitals because now, the women were united and could demand breastfeeding support, facilities and services.”

~Yushi Zhang



A breastfeeding flash mob organized by Yushi Zhang, M.P.H. '23, in downtown Chengdu in 2014.

she said. “They were really fun because people were like, ‘What’s the necessity of changing a sign?’ and then you open up a conversation.”

Zhang’s passion for breastfeeding advocacy solidified when she was helping with disaster relief after an earthquake in Sichuan, where she grew up. The affected community had strong breastfeeding practices but was shifting to formula after the earthquake. Babies had grown fussy from the natural disaster’s disruption, leading mothers to have concerns about milk supply. Many switched from breastfeeding to using infant formula that had been donated as part of relief efforts. Zhang was struck by the noticeable difference between babies who were fed on that low-quality formula and those who were breastfed.

“They have totally different eyes,” she recalled. “Seeing those babies with dull eyes, you could see what this might do to a whole population. Give it, say, another 50 years, and if there are still only three babies out of ten that are breastfed—what would this do to this species?”

Soon after, Zhang began partnering with UNICEF-Beijing as a special advocate for breastfeeding promotion to help implement UNICEF’s breastfeeding campaigns across the country. With Zhang and her community’s efforts, hospitals started to embrace donated

breast milk for preterm infants and sick babies, and in 2013, the first two milk banks, in Guangzhou and Nanjing, were established. Fast-forward to today, and there are thousands of breastfeeding counselors, doulas and Chinese lactation consultants trained and working to support breastfeeding across China.

Despite national and international recognition, Zhang felt that she didn’t have enough of a scientific background to do her work to its fullest capacity. She moved to the U.S. to pursue a second bachelor’s degree in public health, management and philosophy at the University of Minnesota.

Now a first-year master’s degree student in the Social and Behavioral Sciences Department at the Yale School of Public Health, Zhang remains deeply involved in the field, both domestically and abroad. She is a mentor for the Pre- and Perinatal Psychology Education Program at the Association for Prenatal and Perinatal Psychology and Health and still has strong ties to projects she began while in Minnesota, from partnering with Minnesota nonprofits to starting a women’s shelter in China for survivors of domestic abuse to founding a program called Mother Tongue Doula that provides doulas for people who speak non-English languages.



Mahrukh Zahid, M.P.H. '20

UNICEF WORK REWARDING FOR YSPH ALUMNA

BY DEVINA BUCKSHEE

Mahrukh Zahid's love of her work as a consultant for UNICEF's Early Childhood Development Section is readily apparent in the tenderness of her voice as she describes her role.

"There's something about knowing you are reaching children at an early age that is just so impactful," said Zahid, M.P.H. '20.

What started as a broad interest in implementation science and "moms and babies" blossomed for Zahid when she was at Yale. "I was known as the implementation science girl," she said. And indeed, she did create the Yale School of Public Health's first implementation science group.

"At YSPH, I saw the impact of my passion through the opportunities I had," she said, "like working with Dr. Ashley Hagaman on her project assessing maternal health services for women living in Afar, Ethiopia."

Zahid lists working with Assistant Professor Hagaman, Ph.D., M.P.H., and hearing the stories of pregnant women from Ethiopia as some of the most meaningful memories of her time at YSPH. "Listening to the women, I knew that was what I wanted to do: either help the ones who had a bad experience or contribute to the ones that had a good one," she said.

The connections she made at YSPH shaped her career. She fondly remembers attending a child health and development in Africa class led by Yale Senior Visiting Scholar and Lecturer Nicholas Alipui. The class honed her interest in global early childhood development. Zahid

"There's something about knowing you are reaching children at an early age that is just so impactful."

~Mahrukh Zahid

also found connections working within YSPH's maternal and child health community. She said she was inspired working with Rafael Pérez-Escamilla, Ph.D., and Elizabeth Rhodes, Ph.D., on the Breastfeeding Heritage and Pride project that combined her two passions: implementation science and maternal health.

Zahid credits Alipui with helping her land her current role at UNICEF, where he is a former director of programs. "Dr. Alipui's class really instilled within me the importance of those first 1,000 days for child health," she said. "That class was so essential."

During COVID-19, Zahid immersed herself in a systematic review and data project looking at virus transmission during pregnancy.

Looking back, Zahid said her time at UNICEF and her project with Hagaman have "made me more passionate about maternal and child health."

"I love what I do but I want to always have the hat of an implementation science expert," she said. "My dream is to help implement evidence-based programs, and if I am doing that 10–20 years from now, I will be happy."



Julia Dayton Eberwein, Ph.D. '99

ALUMNA USES HER EXPERTISE TO SUPPORT WOMEN'S AND CHILDREN'S HEALTH GLOBALLY

BY KENNETH BEST

From a young age, alumna Julia Dayton Eberwein, Ph.D. '99, knew she wanted to work on economic development issues and to reduce poverty. She did not know her path to that work would be as a researcher and consultant on global health financing.

Over the past two decades, Eberwein has developed expertise in malnutrition and obesity policy, public health program evaluation and poverty reduction working for organizations that include the Inter-American Development Bank, Population Council and the World Bank.

“As I was working to support the World Bank's efforts toward reducing poverty, I realized the importance of improving health outcomes,” she said.

As a health economist consultant for the World Bank, Eberwein played a key role in developing a 10-year, \$70 billion global health and economic investment challenge called “An Investment Framework for Nutrition.” The campaign, jointly led by UNICEF, the World Health Organization (WHO) and the World Bank, sought to globally reduce malnutrition that stunts growth in children, address iron deficiencies in women of reproductive age and encourage breastfeeding during the first six months of an infant's life. Those efforts could ultimately benefit close to 69 million children, according to a recent World Bank report.

Eberwein's current work is with the World Bank's Global Financing Facility for Women, Children, and Adolescents (GFF), which

supports efforts by low- and middle-income countries to improve reproductive, maternal, newborn, child and adolescent health and nutrition while also strengthening financing and health systems for universal health coverage. Seventy-six nations are eligible for support under the GFF partnership, and 36 are currently enrolled. The program's objective is to prevent up to 3.8 million maternal deaths, 101 million child deaths and 21 million stillborn deaths.

The GFF effort includes a detailed analysis of different populations' approaches to health care, including why some populations are foregoing health care during the COVID-19 pandemic, the types of health care services not being used and the reasons individuals are not seeking care. Disruptions in care for pregnant women and new mothers in some countries is among the areas of concern, according to GFF research.

“Maintaining essential health services during the COVID-19 pandemic is critical to prevent these severe outcomes and protect the gains made over the past years in reducing maternal and child mortality,” Eberwein notes in a fact sheet about the effort.

Information already gathered about how families are using health services is being analyzed for policy briefs to assist nations in continuing to improve access to services.

Eberwein arrived at Yale after earning a bachelor's degree in political science and government from Emory University and a Master

“As I was working to support the World Bank’s efforts toward reducing poverty, I realized the importance of improving health outcomes.”

~Julia Eberwein



of Public Administration in Research and Development Management from the Middlebury Institute of International Studies at Monterey. She landed an internship at the Inter-American Development Bank, where a colleague referred her to a friend at the World Bank.

She says her decision to pursue a doctoral degree in public health at Yale was influenced by a mentor at the World Bank, Martha Ainsworth, Ph.D. '89 (Economics), who had been guided by T. Paul Schultz, the Malcolm K. Brachman Professor Emeritus in Yale's Department of Economics, who would later serve on her dissertation committee.

“I decided to pursue my Ph.D. in health economics at Yale precisely because I learned at the World Bank of the importance of being able to assess how it benefits people in economic terms,” says Eberwein, who served as a postdoctoral fellow at Yale. “Those were the skills that I was able to develop in my Ph.D. program, and I went on to apply those in a variety of settings.”

Her doctoral dissertation examined the impact of the AIDS pandemic on families, specifically when a parent dies and how it affects a child's health. When she returned to the World

Bank in 2014, she worked on the Framework for Nutrition report. “I worked on that report bringing the skills I had learned in my Ph.D. and had been practicing, but specifically to the field of undernutrition in young children,” she said.

During her time at Yale, Eberwein says she was guided by Dr. Michael Merson, M.D., the dean of Public Health at the time, and Elizabeth Bradley, Ph.D. '96, founder of the Global Health Leadership Institute at Yale and now president of Vassar College. Jody L. Sindelar, Ph.D., Yale professor of public health and of economics, served as her doctoral adviser and chair of her dissertation committee.

Eberwein and Sindelar, along with Professor Susan W. Parker from the University of Maryland, are working together on a research project focused on childhood obesity in Mexico. They are analyzing whether Mexican mothers' characteristics and parenting decisions can protect their young children from the obesogenic food environment. In Mexico, mothers are generally the key decision-makers for their children's nutrition.



GET INVOLVED: YSPH STUDENT ORGANIZATIONS SUPPORTING MATERNAL & CHILD HEALTH

REPROJustice at YSPH is dedicated to the achievement and protection of the rights of all people to the full realization and enjoyment of their sexual and reproductive health. This we embrace as part of a holistic definition of reproductive justice that works to ensure the complete physical, mental, spiritual, political, social, and economic well-being of all people. We work in pursuit of sexual and reproductive liberty, gender equity, and social justice through community engagement, education, and advocacy, and we dedicate ourselves to the creation of a healthier, safer, and more just world.

To learn more about student organizations at the Yale School of Public Health please visit ysph.yale.edu/admissions-financial-aid/student-and-alumni-life/student-activities/.



Womxn of Color for Maternal & Child Health is a group led by womxn of color passionate about health justice for pregnant people, infants, children, and young people of color.

Our mission is to:

- Facilitate interdisciplinary dialogue about health equity from a racial justice perspective.
- Elevate health narratives and health knowledge of people of color.
- Advocate for health policies and solutions alongside communities of color driven by their needs.
- Promote the integration of evidence-informed practices* and holistic healing practices.
- Provide training on combating racism as a root cause of health inequities.
- Promote equitable engagement between the Yale community, New Haven community and beyond.

** Evidence gathered from both academic and non-academic sources, including peer-reviewed articles and laypersons' experiences)*

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Expect With Me is a unique technology-enabled group model for prenatal care. Pregnant women participating in the program had a 58% lower risk of preterm births, a 63% lower risk of low-birthweight infants, and a 37% lower risk of newborns entering neonatal intensive care.

Created by YSPH researchers Jessica Lewis, PhD, LMFT, and Jeannette Ickovics, PhD, Expect With Me combines expertise in information technology, counseling, and medicine. It is the product of partnerships with a major health insurer and two other universities.

When your talents and gifts combine with our culture of cross-disciplinary collaboration, truly amazing achievements are possible. Help fund programs like Expect With Me.

Contact Cornelia Evans at cornelia.evans@yale.edu or 203.436.8544.



Discover more about Expect With Me, or visit sph.yale.edu/you-and-yale.



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