

# WOMEN'S HEALTH *In Focus* AT NIH

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## Global Women's Health



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## Director's Corner

Janine Austin Clayton, M.D., FARVO  
Director, NIH Office of Research on Women's Health  
NIH Associate Director for Research on Women's Health

*In this issue of In Focus, we explore the tremendous progress and some of the key remaining challenges for global women's health—the aging of the world's population, the shift in disease burden from communicable to noncommunicable diseases, and the impacts of climate change. Women comprise half of the world's population, and improving their health benefits not only women themselves, but also their families, communities, and broader societies.*

*Our feature story describes these new global challenges and highlights three NIH-supported initiatives to improve global women's health: the Innovation Equity Forum and Opportunity Map—a joint initiative of ORWH with the Bill & Melinda Gates Foundation to develop a globally focused, inclusive, and widely accepted roadmap to drive innovation in women's health; the Lancet Commission on Women, Power and Cancer; and the NIH Climate Change and Health Initiative.*

*Closer to home, this issue explores the growing maternal health crisis in the United States and NIH's IMPROVE initiative, which is funding research to address this crisis. We're also excited to share more about the recent release of the Fiscal Year 2021–2022 Biennial Report and the White House Initiative on Women's Health Research.*

*This issue also highlights important upcoming ORWH events.*

*If you find this issue of In Focus interesting and informative, please share it with your colleagues. You can subscribe by clicking the link on the front or back cover.*

Janine Austin Clayton, M.D., FARVO  
Director, NIH Office of Research on Women's Health  
NIH Associate Director for Research on Women's Health

# Global Women's Health

Recent successes in reducing the global burden of infectious diseases, particularly among children, and decreasing fertility rates have increased healthy lifespans worldwide.<sup>1</sup> However, as the world's population is living longer, new challenges have arisen.<sup>1</sup> The global burden of noncommunicable diseases such as heart disease, cancer, and diabetes now greatly exceeds that of communicable diseases.<sup>2</sup> In addition, climate change is fueling rapid shifts in precipitation patterns, water access, air pollution, and extreme heat events.<sup>3</sup> These rapid weather shifts and changes in access to critical resources stir political strife and violence and threaten population health.<sup>4</sup>

Throughout the world, these challenges disproportionately and differently affect women.<sup>4</sup> Women comprise the majority of those experiencing poverty, which renders them particularly vulnerable to the health impacts of climate change and political instability.<sup>4</sup> Women face intersecting forces of social and structural marginalization that hinder their ability to access and receive high-quality care.<sup>4</sup> Women also provide the majority of the care for the young, the old, the injured, and the sick.<sup>5</sup> Despite being the most affected by climate change, women often lack the power to influence factors that affect their health.<sup>4</sup> Empowering women as leaders and decision makers is fundamental for improving women's health worldwide.

Historically, global health actors focused primarily on women's reproductive and sexual health. This approach overlooked critical health issues that occur outside women's reproductive years. Fortunately, the focus is now shifting to a life course approach that recognizes the unique health experiences and challenges women face throughout their lives. This shift reflects a growing emphasis on gender equality and recognition that improving women's health through the life course benefits not only women, but also their families, communities, and broader societies.



## STAFF

### NIH Office of Research on Women's Health

**Janine Austin Clayton, M.D., FARVO**  
Director, ORWH; Associate Director for Research on Women's Health, NIH

**Vivian Ota Wang, Ph.D., FACMG, CGC**  
Deputy Director, ORWH

**Chyren Hunter, Ph.D.**  
Associate Director for Basic and Translational Research, ORWH

**Samia Noursi, Ph.D.**  
Associate Director for Science Policy, Planning, and Analysis, ORWH

**Sarah Temkin, M.D.**  
Associate Director for Clinical Research, ORWH

**Xenia Tigno, Ph.D.**  
Associate Director for Careers, ORWH  
Women in Science, Section Editor

### Editorial Team

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Copyeditor

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**Rachel Collins<sup>2</sup>**  
**Nancy Tuvesson<sup>1</sup>**  
Contributors

**Jesse Guay<sup>2</sup>**  
Graphic Artist

1. Rose Li & Associates  
2. Booz Allen Hamilton, Inc.

## A Shifting Focus to a Life Course Perspective

[Ana Langer, M.D.](#), a widely respected expert in reproductive and maternal health and evidence-based health-related policies and programs, shared her perspective on the shifting landscape of global women's health. Dr. Langer is a Professor of the Practice of Public Health



**Ana Langer, M.D.,  
Harvard T.H. Chan School  
of Public Health**

Emerita at the Harvard T.H. Chan School of Public Health, where she led the Women and Health Initiative and served as Director of the [Maternal Health Task Force](#). Before joining the Harvard T.H. Chan School of Public Health, Dr. Langer served as President and CEO of EngenderHealth, the Population Council's Regional Director for Latin America and the Caribbean, and the Chair of the Department of Research in Women and Children's Health for the National Institute of Public Health in Mexico.

**During your career, you have seen the conversation on global women's health shift from a narrow focus on reproductive and maternal health to a life course approach that values women's health throughout their lifespans. How did that shift occur?**

*The way the global community views women's health has changed dramatically over the past 60 years. In the 1960s, the health and developmental communities were primarily focused on improving children's health and survival. In that context, mothers were seen almost solely as a means to achieve these goals. At the same time, policy makers, donors, researchers, and program managers, concerned about the rapid population growth many countries in the world were experiencing, saw women as the targets of their efforts to curb fertility. But little attention was devoted to women themselves.*

*In the mid-1980s, the World Health Organization (WHO) published the first estimates of global maternal mortality, and reducing maternal mortality became a global priority. The Safe Motherhood Initiative was launched in Nairobi in 1987. Then, in 2000, the United Nations (UN) Member States agreed to the [Millennium Development Goals](#), including the fifth goal, which focused on reducing maternal mortality.*

*In 1994, the landmark International Conference on Population and Development in Cairo marked a true paradigm shift in how women's health was conceived. At the Cairo conference, most countries around the world embraced a comprehensive sexual and reproductive health and rights construct and committed*

*to an ambitious 20-year program of action. Sexual and reproductive health involves both the study of normal processes (e.g., fertility, normal pregnancies and deliveries, sexuality) and disease-related factors and outcomes (e.g., maternal mortality, HIV/AIDS, unsafe abortion, gynecological cancers, sexually transmitted infections, gender-based violence).*

*The past decade has witnessed a growing recognition that women's health goes well beyond issues related with their reproductive functions and that such a reductionist perspective does not reflect women's burden of disease, which is characterized by an overlap of pre-epidemiologic transition problems and a growing burden of chronic and noncommunicable diseases (NCDs). However, women's health is still primarily conceived in a fragmented way, with an emphasis on biological functions, particular diseases, or stages of life, without recognizing the biological and social connections between phases of the life course.*

*Fortunately, a life course approach to the health of women is now gaining traction. This approach focuses on health challenges that affect girls and women before, during, and after their reproductive years, including conditions that men also experience (e.g., NCDs), but which have manifestations and effects that are especially severe for women because of biology, gender, and social determinants of health that disproportionately affect women. This expanded vision, when fully adopted and implemented, will benefit not only women throughout their life course, but also the next generation, families, and communities, because we know that when women are healthy, valued, and able to fulfill their potential, the positive impacts ripple throughout entire societies.*

**What are some of the most important successes and challenges remaining in improving reproductive, sexual, and maternal health globally?**

*Since the 1994 Cairo conference, we have made important progress in various areas of sexual and reproductive health, such as adolescent sexual and reproductive health. Fertility rates among adolescents have consistently declined over the past few decades, giving young women the opportunity to thrive in key areas of their lives.*

*An outstanding example of the unfinished agenda is maternal mortality. Despite many countries reducing maternal mortality in recent decades, the pace is too slow and uneven, with persisting inequalities among nations and population groups. A very sad example is the maternal mortality situation in the United States, which not only is the highest among industrialized countries, but also has huge and unacceptable differences between women of different ethnic, racial, and socioeconomic groups. Improving maternal health requires much more attention and resources.*

## What does the shift toward noncommunicable diseases mean for global women's health?

An estimated two-thirds of women's deaths globally are due to NCDs, that is, cardiovascular disease, diabetes, respiratory conditions, and cancer.<sup>2,6-8</sup> Other chronic problems, such as anxiety and depression, affect the health and quality of life of millions of women. Despite the overwhelming burden of NCDs, many health care systems are not prepared to deal with them. Attention and resources are not commensurate with the size and complexity of the problems, care is fragmented, and preventive measures taken at early stages of the lifespan are insufficient. Furthermore, we still need to better understand and act upon the impact of sex and gender on women's NCDs. Women's biology and their roles and position in societies contribute to the unique severity and manifestations of the NCDs they experience.

## Throughout your career, you have advocated for advancing women's careers and leadership in health and acknowledging the value of women's work, including unpaid caregiving. Why are these efforts essential for promoting global women's health?

In most societies, caregiving is seen as a normal part of women's domestic roles. Girls and women provide care to children, the elderly, acutely and chronically ill relatives, and people who are disabled or dying. Domestic health care providers are not trained, linked to the health systems, recognized, or remunerated. Their opportunities for education and generation of income are often nonexistent or interrupted because they must care for a family member. Their work represents an invisible subsidy to the health system.

Community health workers are overwhelmingly female, and their contributions are essential for the health and wellbeing of women and children, especially those with no easy access to health care institutions. However, they do not always receive a salary or stipend, and when they do the amounts are small, inconsistent, and insufficient.

Women are also a majority in the formal health care workforce. Nurses, most of them women, comprise nearly 90% of frontline health workers.<sup>9</sup> But female nurses earn less than male nurses, even in the same discipline, and are often not allowed to practice up to their full capacity.<sup>10</sup> Furthermore, nurses, despite being the dominant health workers in developed and developing countries alike, are often not represented in decision-making bodies of health institutions and governments and lack the power to make their voices heard.<sup>10</sup>

Although the proportion of women physicians is increasing worldwide, their increasing numbers have not translated into greater influence within the health system. Because of social expectations and the lack of policies to help women integrate their family and professional roles, women physicians are less likely than men to practice medicine once trained, to complete medical residencies, and to work full-time or assume leadership positions. Similarly, in the intensely competitive academic system, the lack of supportive policies results in relatively few women in leadership positions.

The challenges women face in these realms, and the design and implementation of measures to overcome them, have received more global and domestic attention in recent years. We are making progress, but still there is a long way to go.

## Climate Change and Global Women's Health

Climate change presents multiple challenges to progress on global women's health and gender equality. "Climate change affects health through diverse mechanisms, including extreme temperature and weather events, poor air quality, as well as other meteorological changes that alter vector-borne disease, affect water quality, and increase food insecurity," says Stefania Papatheodorou, M.D., Ph.D., Associate Professor of Epidemiology, Rutgers University, and Climate and Health Scholar with the National Institute of Environmental Health Sciences (NIEHS). Dr. Papatheodorou studies how extreme temperatures and air pollution affect the health of pregnant people and their offspring.



**Stefania Papatheodorou, M.D., Ph.D., Rutgers University**

Women are especially vulnerable to climate-related health risks, including "death and injury from extreme weather, food insecurity, infectious disease, and poor reproductive and maternal health," says Guillermina Girardi, Ph.D., M.Sc., Health Scientist Program Officer at the Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD). Dr. Girardi is a reproductive immunologist who studies potential targets for the diagnosis, prognosis, and treatment of pregnancy complications. She serves as NICHD representative on the Climate Change and Health (CCH) Initiative Steering Committee. For example, "extreme weather events such as hurricanes, floods, and drought displace women from their homes, disrupt their access to health care, and increase their exposure to infectious diseases," says Dr. Girardi. Childcare responsibilities and sociocultural norms regarding women's roles as caregivers can prevent women from migrating or seeking refuge following natural disasters. Women and children are 14 times more likely to die during such disasters.<sup>4</sup>



Women are also more likely than men to experience mental illness (e.g., anxiety, depression, posttraumatic stress disorder) following extreme weather events, Dr. Girardi says.

Climate change has numerous indirect impacts on women's health through increased political conflict and economic instability. "Climate and environmental changes create political and economic stress that aggravates gender inequalities with respect to human rights, political and economic status, land ownership, housing conditions, exposure to violence, and education and health; and during conflict, women suffer increased domestic violence, sexual intimidation, human trafficking, and rape," says Dr. Girardi. Although women bear the brunt of many of the effects of climate change, they are less able to confront and adapt to climate change because of persistent inequalities in political power and decision making.<sup>4</sup> Women in low- and middle-income countries are especially vulnerable to the effects of climate change, says Dr. Girardi, because "they represent the majority of the world's poor and are disproportionately dependent on threatened natural resources."

### Clean Water Access and Impact on Women's Educational and Career Opportunities

Progress has been made toward increasing access to clean and safe water worldwide, although the rate of improvement is falling short of the targets set by the sustainable development goals. In low- and middle-income countries, "microbial contamination, contamination with pesticides, fertilizers, and pharmaceuticals are major impediments to clean and safe water access," says Samendra Sherchan, Ph.D., Associate Professor of Biology, Morgan State University, who studies climate change and water quality and reuse. "Areas that rely on groundwater are also vulnerable to contamination with heavy metals such as arsenic," he adds.

Climate change is exacerbating water scarcity, by worsening flooding, droughts, and wildfires. It is causing sea levels to rise, increasing saltwater intrusion into groundwater, and shrinking glaciers that many populations depend on for sources of fresh water. Increasing numbers of people therefore lack access to safe drinking water or experience severe water scarcity for some part of the year.<sup>11</sup>

Increased water scarcity will disproportionately affect women, because women and girls shoulder most of the burden of collecting clean and safe drinking water. An estimated 1.8 billion people live in households where water is collected off premises.<sup>11,12</sup> Women shoulder the primary responsibility for water collection in 7 out of 10 households and bear more responsibility for water collection than men in all countries with data that enable gender comparisons. For example, with 90% of Lake Chad in West Africa gone, women in the regions of Chad, Nigeria, Niger, and Cameroon must walk longer distances for water every year.<sup>13</sup>



**Guillermina Girardi, Ph.D., M.Sc., Eunice Kennedy Shriver National Institute of Child Health and Human Development**

The additional time spent collecting water can have educational and career impacts for women, particularly adolescent girls, for whom the time required to collect water can contribute to dropout rates, explains Dr. Sherchan. “Inadequate sanitation facilities such as safe, private toilets, and access to menstrual hygiene products can further discourage girls from attending school,” he adds. Lack of sanitation can also affect women’s health through unsafe re-use of menstrual products.<sup>12,14</sup>

NIH is funding research to understand how precipitation changes and more frequent extreme weather events, particularly flooding and storm surges, will affect water supplies, water treatment facilities, and distribution systems, says Dr. Sherchan. In collaboration with the U.S. National Science Foundation (NSF), NIH is funding [research centers](#) at the University of Colorado, Boulder, and the University of Washington, to support rapid data collection and health research following climate-related disasters. In July 2022, NIH issued a notice of special interest ([NOT-ES-22-006](#)) for funding applications that address the impact of climate change on health over the life course, in the United States and globally.

## Heat Stress, Air Pollution, and Women’s Reproductive and Cardiovascular Health

Globally, air pollution is the leading environmental health risk factor, and climate change will exacerbate its health impacts.<sup>15,16</sup> “Climate change can alter the concentration and dispersion of primary pollutants, particularly particulate matter, and intensify the formation of secondary pollutants, such as near-surface ozone,” says Dr. Papatheodorou. Women are particularly susceptible to the adverse effects of air pollution, because they experience greater deposition of particulate matter in the lungs and are more likely to have anemia, she explains.

Outdoor exposures are not the only source of air pollution. Women also have greater exposure to indoor air pollution, because they generally spend more time inside the home than men and so are more exposed to particulate matter released by traditional indoor gas and wood stoves, Dr. Papatheodorou explains.



**Samendra Sherchan, Ph.D., Morgan State University**

Air pollution and climate change–associated heat waves can also affect women’s sexual maturation and fertility, pregnancy, lactation, and menopause.<sup>17,18</sup> A growing body of evidence suggests that exposure to air pollutants during pregnancy is associated with increased risks for miscarriage, stillbirth, and preterm delivery as well as other pregnancy complications such as gestational diabetes and high blood pressure.<sup>15–17</sup> In addition, pregnant people are especially vulnerable to heat waves because pregnancy compromises the ability to regulate body temperature.<sup>19</sup> Dehydration and heat-related stress contribute to complications during pregnancy, affecting both maternal and fetal health.<sup>18,19</sup>

In countries with high temperatures that are heavily impacted by climate change, exposure to extreme heat is associated with reduced birthweight and pregnancy loss.<sup>18</sup> Notably, not everyone is equally vulnerable to extreme temperatures, notes Dr. Papatheodorou. For example, in the United States, exposure to extreme heat is associated with a greater risk for adverse birth outcomes such as preterm birth and stillbirth for Black women than for White women. However, “the pathophysiologic mechanism through which heat stress interferes with pregnancy maintenance remains unknown,” says Dr. Girardi. Better understanding of the mechanisms can help inform strategies to reduce the impacts of heat-stress on pregnancies, fetal development, and children’s health, she adds. Beyond preterm birth and stillbirth, heat exposure during pregnancy could also result in longer-term health impacts for women and children, but these impacts are poorly understood.

## Meeting New Challenges to Improve Global Women’s Health

### The Climate Change and Health Initiative

In 2022, in response to the [White House Executive Order 14008: Tackling the Climate Crisis at Home and Abroad](#), NIH launched the [Climate Change and Health \(CCH\) Initiative](#), a

crosscutting NIH-wide effort to reduce the health impacts of climate change and build resilience to its impacts around the world, especially among the most vulnerable. The CCH Initiative is led by an Executive Committee consisting of directors from seven NIH institutes and centers.

“The CCH Initiative will strengthen research by expanding capabilities in scientific workforce development, prioritizing equity, and building partnerships with other organizations working in this space,” says Dr. Girardi. The CCH Initiative funds research through a variety of different funding mechanisms, including Research Project Grants (R01s), Research Program Projects and Centers (P20s), and various collaborations, including two coordinating centers focused on the development of an NIH-wide climate and health community of practice. Priorities include developing the research infrastructure and workforce, creating new partnerships to achieve greater impact, enhancing research translation to ensure that findings are actionable, and identifying risks and benefits to mitigating or adapting to climate change.

“Building women’s political and economic power, as well as directly addressing climate and environmental change-related challenges, are critical components of climate resilience. It’s time to increase awareness of the effects of climate and environmental changes on women’s health and their transgenerational effects in order to ensure that all people, regardless of race and ethnicity, are protected from the detrimental effects of climate and environmental changes,” says Dr. Girardi.

## The *Lancet* Commission on Women, Power, and Cancer

Progress on global public health has reduced the burden of infectious diseases. This success, coupled with the aging of the worldwide population, has created new challenges regarding the large and growing burden of noncommunicable diseases, such as cancer, cardiovascular diseases, chronic respiratory diseases, and diabetes.<sup>6,8,20</sup> Noncommunicable diseases now account for two out of every three deaths among women worldwide.<sup>8</sup>

Cancer alone is among the top three causes of premature deaths (defined as death before age 70) among women in nearly all countries, and the primary cause of premature death in 82 countries, including China and Brazil.<sup>21</sup> However, despite the high and growing burden of cancer among women, global efforts to improve women’s health continue to prioritize their sexual and reproductive health.

In its December 2023 publication, “[Women, power, and cancer: A Lancet Commission](#),” the Commission attempts to shift this focus by surveying the unique burden that cancer poses to women.

The five leading types of cancer in women—breast, colorectal,

lung, cervical, and thyroid cancer—account for more than half of all cancer cases among women. Breast, colorectal, lung, cervical, and stomach cancers cause more than half of cancer deaths among women. This pattern of cancer burden differs from men, for whom lung, liver, and colorectal cancers cause the most cancer deaths.<sup>21</sup>

Although roughly equal numbers of men and women die from cancer each year—48% of annual cancer diagnoses and 44% of cancer-related deaths are among women. Two-thirds of the people who are diagnosed with cancer under the age of 50 are women.<sup>7</sup> Globally, 2.3 million women die prematurely from cancer each year.<sup>21</sup>

The Commission estimates that 1.5 million of these premature deaths are preventable through reduced exposure to risk factors and enhanced early detection. An additional 800,000 could be prevented through access to optimal care. An estimated “1.3 million women’s lives could be saved if we could tackle just four main risk factors: alcohol, obesity, smoking, and infections,” says lead author, Ophira Ginsburg, M.D., Senior Scientific Officer, Senior Advisor for Clinical Research, Center for Global Health (CGH) at the National Cancer Institute.

Power structures, women’s status in society, and other aspects of structural marginalization (e.g., age, race, sexual identity) contribute to the global burden of cancer on women. Gender bias influences women’s exposure to cancer risk factors and their ability to obtain prompt, high-quality care, notes Dr. Ginsburg. Beyond gender bias, women experience overlapping discrimination and social marginalization based on their race, ethnicity, age, sexual orientation, gender identity, and socioeconomic status. “The huge disparities between women in different countries and in different contexts, women who are structurally marginalized, women of color, women of lower socioeconomic status, women who identify as belonging to a sexual or gender minority made clear that this report needed an intersectional framing,” says Dr. Ginsburg. For example, “9 in 10 women who die of cervical cancer live in low- and middle-income countries, and the women who die of cervical cancer in high-income countries tend to live in circumstances or contexts that render them structurally marginalized,” says Dr. Ginsburg.

These potentially avoidable cancer diagnoses and premature deaths reverberate throughout women’s families, communities, and broader societies. Women are more likely than men to experience financial catastrophe following a



**Ophira Ginsburg, M.D., M.Sc.,** Center for Global Health, National Cancer Institute



cancer diagnosis, with dire consequences for their families. In 2020 alone, cancer deaths caused approximately 1 million children to become maternal orphans, and an estimated 7 million children were living without their mothers because of cancer-related deaths.<sup>22</sup>

In addition to these direct health impacts, cancer exerts profound indirect effects on women through their traditional roles as caregivers. Most cancer caregivers are women who receive no compensation for the care they provide. The Commission’s economic working group, led by Rachel Nugent, Ph.D., Senior Technical Advisor, RTI Center for Global Noncommunicable Diseases, estimates that the value of unpaid cancer caregiving was 1.17% of the national health expenditure in Mexico and 2.53% in India.<sup>21</sup> “These estimates provide incredibly important information for governments,” says Dr. Ginsburg, “and make the case for valuing women’s unpaid caregiving.”

Based on its review of women’s global cancer burden, the Commission recommends [10 priority actions](#) for governments, industry, academia, health care institutions, and nonprofit organizations to advance “a more nuanced, inclusive, and gender transformative approach” to cancer, including routine collection and reporting of data on sex, gender, and other sociodemographic factors in all cancer-related statistics; strengthening of laws and policies that reduce women’s exposures to known cancer risk factors; more research into emerging cancer risks for women; and design and implementation of gender and intersectional transformative strategies to increase equitable access to early detection, treatment, and survivorship care. Building on the Commission’s work, Dr. Ginsburg and her colleagues at CGH are working with partners, including multilateral organizations such as WHO and other UN agencies involved in cancer control, to advance these priority actions.

## Innovation Equity Forum and Opportunity Map

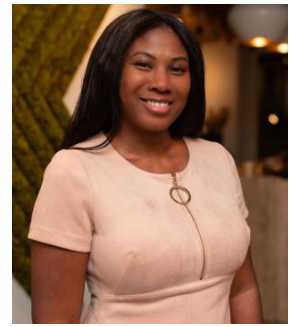
Relative to its impact on women, their communities, and their societies, women’s health receives relatively little investment in research and development (R&D). Although organizations across multiple sectors have started to address this funding gap, they lack a roadmap to align their efforts and to generate cross-sector partnerships. To develop a widely accepted, globally focused, and inclusive roadmap, on July 6–7, 2023, ORWH and the Bill & Melinda Gates Foundation convened the Innovation Equity Forum (IEF)—a global community of more than 250 key stakeholders. IEF is part of NIH’s ongoing efforts to “integrate sex, gender, and intersectionality into R&D solutions, center women’s voices as patients, leaders, and decision makers, and build partnerships that drive innovation,” says IEF Co-Chair Jamie White, M.S., Health Science Strategy and Relations Lead, ORWH.

This drive to stimulate additional funding derives from the recognition that improving women’s health reverberates throughout their societies. “Women are at the core of healthy families, vibrant communities, and prosperous societies,” says Rufong Joanne Cheng, M.D., FACOG, Director of Women’s Health Innovations, Bill & Melinda Gates Foundation. “That’s why progress on women’s health—including innovations designed to meet women’s unique health needs—is catalytic. Innovations can help us save millions of lives and spark billions of dollars of economic returns.”

IEF brought together stakeholders from more than 50 countries and from multiple sectors, including health care providers, philanthropists, venture capitalists, patient advocates, government regulators, nonprofits, nongovernmental organizations, and biopharmaceutical companies. Drawing on their diverse viewpoints and multidisciplinary expertise, these stakeholders developed the Women’s Health Innovation Opportunity Map 2023, which details 50 high-return opportunities to advance global women’s health R&D.

The Opportunity Map calls on innovators, influencers, and advocates across the R&D ecosystem to (1) commit to the equitable inclusion, participation, and funding of women; (2) invest in women’s health innovation; and (3) create partnerships to strengthen the R&D ecosystem across the full spectrum of women’s health. The Opportunity Map focuses on unmet needs for women’s health and prioritizes the PRIME criteria: Potential for impact, Readiness, Innovation, Matters to women, and Equity. It also stresses the importance of addressing social and structural factors such as social marginalization, disability, and poverty, which so often compound women’s health and economic challenges.

The Opportunity Map outlines 10 high-impact topic areas ripe for new equitable innovation. These areas include cross-cutting topics—data and modeling, research design and methodologies, regulatory and science policies, training and careers, and the introduction of innovations (e.g., data repositories to catalyze novel product development, improved pathways for funding and bringing products to market)—as well as issue-specific topics—communicable diseases, noncommunicable diseases, and female-specific health conditions (including reproductive and maternal health, gynecology, and life stages).



Jamie White, M.S., ORWH

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# Promoting Maternal Health, Reducing Maternal Morbidity and Mortality in the United States

## NIH is driving research to help address the growing U.S. maternal health crisis.

The United States faces a worsening maternal health crisis, with women living in the United States today more likely to die from pregnancy- and birth-related complications than their mothers were a generation ago.<sup>1</sup> In 2021, the maternal mortality rate climbed to 32.9 deaths per 100,000 live births—one of the worst years on record and far above rates in comparable high-income countries.<sup>2</sup>

“Racial and ethnic disparities are a key driver of the high maternal mortality rate in the United States,” says [Esa M. Davis, M.D., M.P.H.](#), Professor of Family & Community Medicine and Senior Associate Dean for Population and Community Medicine at the University of Maryland School of Medicine. Black and American Indian/Alaska Native women are two to three times more likely to die from pregnancy- and birth-related complications than are White women. “Access to prenatal care and high blood pressure disorders during pregnancy contribute to these disparities,” says Dr. Davis. She adds, “We see elevated rates of complications and deaths even among highly educated, high income Black women,” which may reflect structural racism in the health care system.<sup>3</sup> Very young women and women of advanced maternal age, women with disabilities, and women living in rural areas with limited health care access also experience disproportionately high rates of severe pregnancy-related complications and deaths.<sup>1,4</sup> Disparities in maternal deaths and serious pregnancy-related complications reflect differential access to high-quality care, exposure to adverse social conditions, and decreasing individual and family economic resources.

These deaths are tragic. They affect young women and can devastate their families and communities, and most could have been prevented with timely, appropriate care. More than four out of five maternal deaths in the United States are preventable, according to the U.S. Centers for Disease Control and Prevention (CDC).<sup>5</sup>



**Esa M. Davis, M.D., M.P.H.,**  
University of Maryland  
School of Medicine

Mental health conditions are also a major driver of maternal mortality. Postpartum depression, for example, raises the risk for suicide, a leading cause of death during pregnancy and the year after giving birth. The COVID-19 pandemic exacerbated the growing maternal health crisis and was a contributing factor in approximately a quarter of maternal deaths in 2020 and 2021, according to a [report](#) by the U.S. Government Accountability Office.

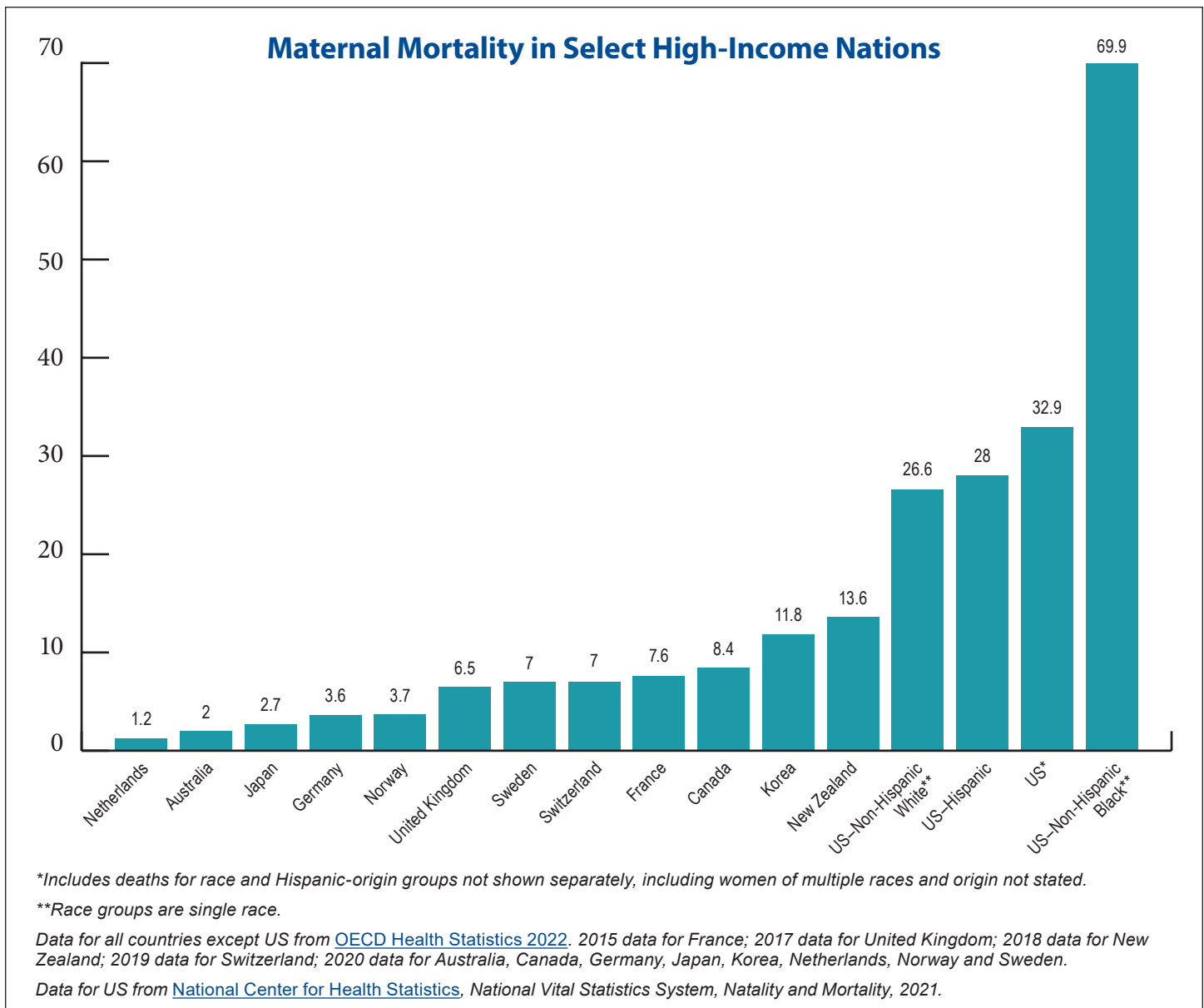
The postpartum period is particularly high risk. “More than half of maternal deaths occur during the first year after delivery,” says [Nahida Chakhtoura, M.D.](#), Branch Chief, Pregnancy and Perinatology Branch, *Eunice Kennedy Shriver* National Institute of Child Health and Human Development. It is critical to catch health issues during the recovery period. “Sometimes hypertensive disorders such as preeclampsia don’t occur until postpartum. Gestational diabetes can continue well into the postpartum period, and severe bleeding and post-C-section complications can occur after discharge,” says Dr. Davis.

Maternal deaths are only one aspect of the maternal health crisis in the United States. In addition to the high number of deaths, every year, an estimated 50,000 to 60,000 women experienced severe maternal morbidity,<sup>6</sup> which the CDC defines as “unexpected outcomes of labor and delivery that result in significant short- or long-term consequences to a woman’s health.”<sup>7</sup> As with maternal mortality, these severe health complications are increasing in the United States, despite most being preventable with timely, appropriate care.<sup>6</sup> Leading causes of severe maternal morbidity and mortality include mental health conditions (including substance use disorder), hemorrhage, heart disease, infection, stroke, cardiomyopathy (a weakened heart muscle), and high blood pressure.<sup>5</sup>

In 2019, to help address this growing maternal health crisis, NIH launched the Implementing a Maternal health and PRenancy Outcomes Vision for Everyone ([IMPROVE](#)) initiative—an NIH-wide effort coordinated by the [NIH Coordinating Committee for Maternal Morbidity and Mortality](#). In 2022, Congress allocated \$30 million annually to support IMPROVE through 2027.<sup>8</sup>

In August 2023, NIH announced funding through IMPROVE for 10 Maternal Health Research Centers of Excellence and two hubs: a data innovation and coordinating hub and an implementation science hub. Situated throughout the United States, these research centers are developing and evaluating innovative approaches to reduce pregnancy-related complications and deaths and improve maternal health equity. Other IMPROVE projects focus on training the next generation of researchers to conduct maternal health research that meets the needs of diverse communities.

Because so many severe pregnancy-related complications and deaths are preventable with timely, appropriate care, “research on identifying risks, diagnostics, and management is critical for improving outcomes,” says Dr. Chakhtoura. Implementation



science research to bridge the science to implementation gap is also essential. One important approach is community partnered research. “Community partnered research can build on existing health infrastructure to improve maternal health. We can expand our collaborative care models by integrating community health workers such as doulas, lactation specialists, and home visiting teams with our medical teams,” says Dr. Davis. For example, the ongoing multi-site [ENRICH study](#), funded by the National Heart, Lung, and Blood Institute (NHLBI), is examining the impact of partnering with evidence-based home visiting programs already providing postpartum support to monitor mother and child heart health. “Community health workers often come from the communities they are serving, which helps build trust,” Dr. Davis explains.

In October 2023, the IMPROVE initiative announced additional funding opportunities to promote maternal health and reduce health disparities:

- Career Enhancement Award to Advance the Study of Intimate Partner Violence in the Context of Maternal Morbidity and Mortality Research ([RFA-OD-24-001](#))
- Short Courses on Techniques for Measuring IPV in Different Populations ([RFA-OD-24-002](#))
- Understanding the Impact of Healthcare System and Clinician Factors on Disparities in Maternal Morbidity and Mortality ([PAR-24-059](#)).

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## WOMEN IN SCIENCE

### SCIENTIST SPOTLIGHT

#### Women in Science Spotlight: An Interview with NIH Director, Dr. Monica M. Bertagnolli



**Monica M. Bertagnolli, M.D., NIH Director**

On November 9, 2023, Dr. Monica M. Bertagnolli, M.D., became the 17th Director of NIH, making her the first surgeon and the second woman to hold this position. Prior to taking office as the Director of NIH, she was the 16th Director of the National Cancer Institute (NCI), and first woman to hold that position. Prior to joining NCI, she specialized in studying and treating

gastrointestinal cancers as the Richard E. Wilson Professor of Surgery at Brigham and Women's Hospital, as a member of the Gastrointestinal Cancer Treatment and Sarcoma Centers at the Dana-Farber Cancer Institute (Dana-Farber), and as Chief of the Division of Surgical Oncology for the Dana-Farber Brigham Cancer Center. Her laboratory focused on the genetic drivers of cancer development and the role of inflammation in promoting cancer growth. Dr. Bertagnolli graduated from Princeton University with a bachelor of science degree in engineering and attended medical school at the University of Utah. She trained in surgery at Brigham and Women's Hospital and was a research fellow in tumor immunology at Dana-Farber.

#### What were your primary areas of research prior to coming to NCI and NIH?

*My clinical practice focused on patients with a rare genetic syndrome that led to a very high risk of intestinal cancer. These patients had a disease known as Familial Adenomatous Polyposis (FAP), which is caused by a germline mutation in the adenomatous polyposis coli (APC) gene. My laboratory studied the impact of mutations in this gene, both in animal models and in patients with FAP, to understand how the activity of this gene produced tumors. We also studied whether anti-inflammatory agents would help prevent or treat tumors in patients with FAP.*

*This research eventually led to the recognition that the cyclooxygenase-2 (COX-2) enzyme was a powerful driver of tumors in both animals and humans. We conducted a large clinical trial to test whether COX-2 inhibitors would reduce the risk for colon cancer in individuals at high risk. The clinical trial demonstrated that although selective COX-2 inhibitors dramatically reduced the incidence of colon cancer, they also increased the risk of heart attacks, stroke, and heart failure. Thus, we returned to the drawing board to determine other ways to achieve control over chronic inflammation in the intestine and to prevent cancer through inhibiting pathways involved in inflammation.*

*My laboratory also collaborated with several different researchers to identify genetic risk factors and tumor molecular characteristics that predict cancer prognosis. This biomarker work was done largely in collaboration with a large NIH-funded [Cancer](#)*

[Cooperative Groups Program](#) (now known as [NCI's National Clinical Trials Network](#)) and utilized specimens collected from cancer clinical trials networks nationwide.

My former trainees and collaborators are continuing this work on tumor immunology, inflammation, and immune responses to cancer. However, I do not maintain an active laboratory at NIH. Several years ago, I stepped away from being the active head of a basic research laboratory to focus on clinical research and biomarker research collaborations.

**You co-chair the Working Group on Women in Biomedical Careers with ORWH Director Dr. Janine Clayton. What do you see as some of the most exciting new strategies and next steps for supporting and promoting entry, recruitment, retention, and sustained advancement in the women in biomedical research careers?**

We are finally seeing broad recognition that women have brilliant minds that are just as capable as men at conducting research. We have clear evidence that when women are given the opportunity, they achieve NIH funding at a rate equal to men.

But of course, challenges remain. Fewer women than men seek out research careers, and thus fewer women participate in NIH funding and research. This imbalance is more noticeable for R01 funding and some of the individual grants, but less so in other areas. For example, women are well represented in the cooperative groups. Many women serve as leaders, PIs, and Study PIs in the NCI Cooperative Groups

Seeing women's participation change dramatically over the 30-odd years I have worked with the Cooperative Groups has been very gratifying. When women are given opportunities and proper support, they can thrive.

**Speaking of women thriving in biomedical careers, what are some of the biggest challenges you have faced as a physician scientist, as a leader, and as a female leader?**

I was a clinician scientist, and taking care of patients is a 24/7 job. The patients are counting on you. Marrying that level of responsibility to a research career can be very challenging for men and women. When you add on the responsibilities of being a parent, it becomes doubly challenging, especially because childcare falls disproportionately on women. It can be a real burden to try to achieve a balance. I was incredibly fortunate that my husband and I shared the responsibilities for caring for our family equally. That fact allowed me to succeed in my career. I often think about people who do not have that support, such as single parents, and how incredibly challenging it is for them to balance that kind of responsibility with a research career. I was also extremely fortunate to be at an academic institution that truly valued research and that supported both my clinical responsibilities and research endeavors. Clinician scientists need supportive environments that value both clinical care and research.

**What advice would you give young researchers who are just starting out?**

First, I would say, know your value. Achieving a medical degree or a doctorate is a tremendous accomplishment. It can be tough to succeed in a biomedical career; my best advice is do not give up. Believe in your worth, believe in your value, and look for colleagues you can collaborate with and who will support you. Nobody can do anything alone. In addition to working on your own contributions, make sure you reach out to others and find the people that value you and your work. It may take multiple attempts, but you will eventually find your team, and that is one of the most important things you can do.

## INSTITUTIONAL SPOTLIGHT

### Perelman School of Medicine, Advancing Leadership of Women in Academic Medicine

In 2021, NIH recognized the Perelman School of Medicine with an [NIH Prize for Enhancing Faculty Gender Diversity in Biomedical and Behavioral Science](#) for its [FOCUS on Health & Leadership for Women \(FOCUS\) program](#). Established in 1994, FOCUS has a dual mission: (1) support the advancement and leadership of women in academic medicine and (2) promote education and research in women's health and careers. FOCUS pursues initiatives within five broad categories: (1) collection and monitoring of data, (2) leadership training, (3) building a trusting and supportive community, (4) policies and procedures, and (5) research. The program employs both "top down" (e.g., working with leadership on institutional policies and procedures) and "bottom-up" (e.g., mentorship, training



# Penn Medicine

programs) data-driven approaches. FOCUS conducts and publishes research on the causal factors affecting women's career trajectories and evidence-based solutions to share its findings and promote gender equity at other institutions. A [list of these publications](#) is available through the FOCUS website.

In recent years, FOCUS has used the results from the [NIH-Transforming Academic Culture \(TAC\) Trial](#) to inform a diverse set of initiatives that encompass leadership training, professional development, family-friendly policies, recruitment, searches, salary, community building, and mentoring. The Perelman School of Medicine received NIH funding for this

4-year cluster randomized TAC Trial in 2009. The TAC Trial tested a multilevel intervention—involving senior leaders, department and division leadership, and women assistant professors—to improve the work environment for junior women faculty in clinical and basic science.

The program uses data and metrics to track key indicators of gender equity success and collects qualitative data through seminars, workshops, and its longitudinal leadership programs. From 2008—the year prior to the initiation of the TAC Trial—to 2020, women faculty at the Perelman School of Medicine increased from 31% to 43%, and women “standing faculty” increased by 56%. By comparison, men “standing faculty” increased by 3% over the same period. In addition, the number of women associate professors from groups

underrepresented in medicine (URM) increased by 350%, and the overall number of URM women faculty increased by 147%, while men URM associate professors increased by 93%. FOCUS continues to prioritize support for URM women faculty, who currently comprise 8.6% of all women faculty.

ORWH thanks the Perelman School of Medicine and FOCUS for their innovative gender equity research and initiatives. For more information regarding the NIH Prize for Enhancing Faculty Gender Diversity in Biomedical and Behavioral Science and other award-winning programs, please see the [Executive Summary](#) of “Effective Approaches to Fostering Faculty Gender Diversity, Equity, and Inclusion: Celebrating Progress,” a virtual forum hosted by ORWH.

## FEATURED RESEARCH AND PERSPECTIVES

### Gender and Retention Patterns Among U.S. Faculty

(Original article by Spoon et al., 2023, *Science Advances*, DOI: [10.1126/sciadv.adi2205](https://doi.org/10.1126/sciadv.adi2205))

An analysis of an employment census of more than 250,000 tenure-track and tenured professors, published in *Science Advances*, shows that women continue to leave academia at higher rates than men at every career stage. Compared to men, women assistant, associate, and full professors were 6%, 10%, and 19% more likely to leave each year, respectively, found lead author, Katie Spoon, Ph.D. candidate, University of Colorado, Boulder, and colleagues. In addition, women professors were 7% and 12% less likely to be promoted to associate and full professors, respectively, each year. Gender differences in attrition were highest in lower-prestige institutions, among full professors, and in non-STEM fields.

A follow-up analysis of responses to a survey of 10,071 current and former tenure-track and tenured professors in the census database suggests that women are more likely than men to leave academic positions because they feel pushed from their position, rather than pulled toward new opportunities. Women who left academia were more likely than men to report leaving because of factors related to workplace climate (43%), whereas men were more to point to professional reasons (40%). Men and women were approximately equally likely to cite work–life balance (26% and 29%, respectively) as a reason for leaving academia.

These results demonstrate how gendered attrition can undermine efforts to attain gender parity among faculty. “In a hypothetical cohort of new faculty hired at gender parity, the percentage of women faculty would fall to 48.2% after 15 years, 45.4% after 25 years, and 40.6% after 35 years,” note the researchers. These results underscore the importance of

addressing gendered attrition and customizing efforts to improve retention of women faculty to specific institutions and settings.

### A Call for a More Nuanced Approach to Global Health Funding Than Simply Prioritizing Cost-Effectiveness

(Editorial by Pierson and Verguet, 2023, *Lancet Global Health*, DOI: [10.1016/S2214-109X\(23\)00055-4](https://doi.org/10.1016/S2214-109X(23)00055-4))

In an editorial published in *The Lancet Global Health*, [Leah Pierson, Ph.D.](#), medical student at Harvard Medical School, and [Stéphane Verguet, Ph.D.](#), Associate Professor at the Harvard T.H. Chan School of Public Health, call for a more nuanced approach to uncertainty regarding the cost-effectiveness of health interventions.

Global health actors use economic evaluations such as cost-effectiveness analysis to determine which interventions to fund. These evaluations rely on assessments of disease burden and the potential impact of various health interventions. However, some cost-effectiveness analyses yield far more uncertain estimates than others. Cost-effectiveness estimates tend to be more uncertain for interventions that are complex, that have been less widely tested or only tested in particular cultural or social contexts, and are oriented toward future threats, such as potential pandemics.

Drs. Pierson and Verguet urge global health actors to carefully consider several aspects of a funding proposition: whether skepticism about a given intervention is warranted; how information gained from funding an intervention will help guide future investments; whether the type of intervention is inherently uncertain; whether funding the intervention will require long-term support; and whether minimizing uncertainty could compound inequities. For example, the effectiveness of interventions conducted in settings with weak

health information systems or infrastructure challenges can be more difficult to predict, but avoiding these settings to minimize uncertainty could worsen health inequities.

Simply prioritizing more certain interventions without consideration of their additional potential benefits could lead global health actors to “overlook opportunities to aid less well-studied populations, address the structural causes of illness, conduct valuable impact evaluations, and identify new promising interventions,” the authors conclude.

## Global Health Trainees Report Less Awareness of Efforts to Decolonize Global Health, Survey Finds

(Original research by DeCamp et al., 2023, *Annals of Global Health*, DOI: [10.5334/aogh.3961](https://doi.org/10.5334/aogh.3961))

[Matthew DeCamp, M.D., Ph.D.](#), Associate Professor, University of Colorado, and colleagues conducted an online survey of approximately 200 doctoral and postdoctoral trainees and mentors within a multi-year mentored global health research program. The survey revealed that trainees from low- and middle-income countries (LMICs) reported less awareness of efforts to decolonize global health. However, in open-ended responses, trainees from LMICs defined decolonization efforts similarly to trainees from high-income countries. Both groups defined these efforts as actively combatting power imbalances, working with local leaders, and providing equitable opportunities and culturally appropriate programs. The authors conclude that training programs that raise awareness of efforts to decolonize global health may help future global health leaders remediate the impacts of historical colonialism.

## IN THE JOURNALS

### Artificial Intelligence Holds Promise for Improving Diagnosis of Polycystic Ovary Syndrome

(Original article by Barrera et al., 2023, *Frontiers in Endocrinology*, DOI: [10.3389/fendo.2023.1106625](https://doi.org/10.3389/fendo.2023.1106625))

Artificial intelligence (AI) and machine learning can accurately detect and diagnose polycystic ovary syndrome (PCOS), offering a promising new approach to early diagnosis of this often hard-to-diagnose disorder, finds a NIH-supported new systematic research review.

PCOS is the most common hormone disorder among women of reproductive age, affecting an estimated 1 in 10 women aged 15–45.<sup>3</sup> PCOS can adversely affect women’s health, appearance, and fertility.<sup>3</sup>

Diagnosis is based on the presence of at least two of three clinical criteria: irregular or absent menstrual periods, elevated testosterone levels, and polycystic ovaries.<sup>4</sup> However, despite being common, PCOS can be difficult to diagnose because its signs and symptoms overlap with other conditions, explains [Skand Shekhar, M.D.](#), senior author of the review and Assistant Research Physician and endocrinologist at the National Institute of Environmental Health Sciences.<sup>5</sup> Women often require multiple clinical visits before receiving a diagnosis. In a recent survey of more than 1,000 women with PCOS, more than one-third reported that they sought medical assistance for more than 2 years before receiving a diagnosis; nearly half of women reported seeing three or more providers before receiving a diagnosis.<sup>6</sup>

Dr. Shekhar and colleagues at NIH and the Harvard T.H. Chan School of Public Health conducted a systematic review of all peer-reviewed studies using AI and machine learning to detect and diagnose PCOS published over the past 25 years (from 1997 to 2022). Based on their review, they conclude that AI may improve early detection of PCOS. In several studies, AI-based techniques provided “a high degree of diagnostic accuracy relative to standardized [diagnostic] criteria.”<sup>7</sup> “Across a range of diagnostic and classification modalities, there was an extremely high performance of AI/ML in detecting PCOS, which is the most important takeaway of our study,” says Dr. Shekhar.<sup>5</sup> Integration of AI-assisted diagnosis into clinical care may ultimately help reduce health care costs and improve early detection and diagnosis for women with PCOS.

### Heavy Menstrual Bleeding Is Common in Low- and Middle- Income Countries and Linked with Lower Quality of Life

(Original article by Sinharoy et al., 2023, *Lancet Global Health*, DOI: [10.1016/S2214-109X\(23\)00416-3](https://doi.org/10.1016/S2214-109X(23)00416-3))

Heavy menstrual bleeding is a widespread and understudied challenge affecting global women’s health. It can cause iron-deficiency anemia, a leading cause of disability in LMICs, and can lower women’s overall quality of life, by interfering with their productivity, earning potential, and ability to perform daily activities and engage socially.

Lead author [Sheela Sinaroy, Ph.D.](#), Assistant Professor of Global Health at the Rollins School of Public Health, Emory University,



and colleagues surveyed women across 10 cities throughout southern Asia and sub-Saharan Africa about their menstrual bleeding and other aspects of their health and quality of life.

Heavy menstrual bleeding was reported by nearly half of all women surveyed (49%). The presence of heavy bleeding was associated with feeling tired or out of breath, both potential symptoms of anemia, during menstruation and worse overall self-reported health. Women in Kathmandu, a setting of many documented taboos regarding menstruation, reported the highest frequency of heavy bleeding (77%). These findings underscore the importance of health care providers prioritizing assessment and management of heavy menstrual bleeding, and of policies to combat taboos regarding menstruation and to improve access to safe, high-quality, and appropriate menstrual hygiene products.

## Sex-based Differences in Liver Metabolism May Contribute to Known Sex Differences in Medication Side Effects

(Original research by Moore et al., 2023, *PLoS Computation Biology*, DOI: [10.1371/journal.pcbi.1010927](https://doi.org/10.1371/journal.pcbi.1010927))

Most toxicology testing is performed in men and male animals. However, women are more likely to experience liver-related medication side effects in response to medications such as acetaminophen and diclofenac (an anti-inflammatory medication). Building on research showing sex-differences in gene expression in the liver, [Connor J. Moore, Ph.D. candidate](#) in biomedical engineering at the University of Virginia, and colleagues used gene expression data to model sex differences in liver metabolism pathways. Using metabolic network models, the researchers found sex differences in metabolism of fatty acid, purine and pyrimidine, and foreign substances. Many of these metabolic pathways are involved in medication metabolism. Additional analysis of transcriptomic data revealed sex differences in the pentose phosphate pathway. The pentose phosphate pathway plays a major role in regulating cellular reduction-oxidation homeostasis and mitigating oxidative stress. The authors conclude that sex-specific activity in these key metabolic pathways may help explain why women experience more liver-related medication side effects. Their findings underscore the importance of assessing sex as a biological variable in basic, translational, and clinical research.

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## ORWH's Specialized Centers of Research Excellence on Sex Differences 2023 Annual Meeting

ORWH Director Janine Clayton, M.D., FARVO, and ORWH Senior Research Program Officer Rajeev Agarwal, Ph.D., provided opening remarks at the Specialized Centers of Research Excellence (SCORE) Annual Meeting in November 2023, and welcomed the newest SCORE member, Augusta University (SCORE Director Jennifer Sullivan, Ph.D.). Dr. Clayton expressed gratitude for the SCORE Pls' diligence over the past year in establishing Career Enhancement Cores (CECs) at their centers. She highlighted the relaunched Sex and Gender webpage and a special issue in the *Journal of Women's Health*. This [special issue](#) reviewed the contributions of the CECs to sharing resources, enhancing mentorship, and facilitating cross-disciplinary research collaborations, and was dedicated to the memory of [Dr. Rebecca DelCarmen-Wiggins](#), who co-led the SCORE Sex Differences program and dedicated her career to the promotion of women's health. Dr. Clayton emphasized the importance of robust training and of strengthening research on how sex and gender relate to cardiovascular, gastrointestinal, immune, and mental health conditions and addiction.

### SCORE Keynote Focuses on Core Values and Improving Health Equity

President of the Albert and Mary Lasker Foundation, [Claire Pomeroy, M.D., M.B.A.](#), gave the keynote address titled "Core Values and Your Research Career: Health Equity and the Social Determinants of Health." Dr. Pomeroy shared how her experience of escaping an abusive home and being raised by African American foster parents instilled in her the core values of compassion, diversity, social justice, and caring for the vulnerable. She called upon scientists, researchers, and other attendees to examine their own core values and then use those values to chart their own professional journeys.

Dr. Pomeroy noted the stark health inequities that pervade the United States. For example, U.S. maternal mortality rates are 32.9 deaths per 100,000 live births, more than triple the rate in other wealthy countries, and this rate soars to 69.9 per 100,000 for Black mothers.<sup>1,2</sup> American women have an avoidable mortality rate of 198 per 100,000—the highest rate among the 11 high-income countries evaluated in a [recent Commonwealth Fund report](#). In addition, Black men and Hispanic women are less likely to receive statins for primary prevention of heart disease compared to White men.

Social determinants of health must be addressed, Dr. Pomeroy emphasized, before scientific expertise can help patients. She called for an expansion of research priorities and approaches and for rethinking which populations are included in research, which research questions are prioritized, and how research

is supported and incentivized. As part of this effort, Dr. Pomeroy underscored the need to expand the diversity of research teams, engage in scientific communication and social advocacy, and rebuild trust with communities that have a history of disrupted trust with research. She closed by reminding attendees that scientific research is a powerful tool for creating a healthier world.

### About SCORE on Sex Differences

The SCORE on Sex Differences program is a signature program of ORWH. It is the only NIH cooperative agreement program that supports disease-agnostic research on sex differences and major medical conditions that affect women in the United States. Each SCORE center serves as a hub for research, training, and education on these topics. For more information about the SCORE program, visit ORWH's [Specialized Centers of Research Excellence on Sex Differences webpage](#).

## Building Interdisciplinary Research Careers in Women's Health 2023 Annual Meeting

At the Building Interdisciplinary Research Careers in Women's Health (BIRCWH) 2023 Annual Meeting on December 5, 2023, ORWH Director Janine Clayton, M.D., FARVO, welcomed meeting participants and introduced keynote speaker [Karen M. Freund, M.D., M.P.H.](#), Tufts University Physician-in-Chief, Tufts Medical Center Sheldon M. Wolff Professor and Chair, Department of Medicine at Tufts University School of Medicine, and Harry and Elsa Jiler Clinical Research Professor of the American Cancer Society.

### Ruth L. Kirschstein Memorial Lectureship Keynote Address Focuses on How Teamwork Can Help Advance Women's Careers in Science

Dr. Freund's address emphasized the importance of teamwork, particularly early in women's careers, in promoting the advancement of women in science. Developing research collaborations and receiving support from mentors can help women succeed in the current challenging and highly competitive academic climate and in clinical practice. She noted that BIRCWH has helped build research collaborations not only through mentorship, but also by encouraging applicants whose mentorship teams share research interests to collaborate with each other.

Acknowledging the importance of individual recognition for career advancement and promotion, Dr. Freund discussed the need to establish guardrails when developing academic collaborations. Within research teams, individual researchers must have unique focus areas and areas of expertise as well as clear achievements that will stem from those areas. Senior leaders can encourage collaboration by recognizing all aspects of scholarship and contributions.

Dr. Freund also discussed how teamwork can help to improve clinical care and patient outcomes, and to reduce or eliminate health disparities. She noted that care navigators, who work with patients and health care providers to assist patients in navigating the health care system, have reduced income- and housing-related disparities in timely cancer care. She spotlighted the NIH-funded [Translating Research Into Practice \(TRIP\) trial](#) that is testing whether care navigation and screening for social barriers to care will reduce income- and race-related disparities in breast cancer mortality.

## Legacy of Leadership Lecture Highlights NIH Funding for Early-Stage Investigators

[Lindsey A. Criswell, M.D., D.Sc., M.P.H.](#), Director of the National Institute of Arthritis and Musculoskeletal and Skin Diseases, and Head of the Genomics of Autoimmune Rheumatic Disease Section within the Medical Genetics Branch of the National Human Genome Research Institute, gave the legacy of leadership lecture. Dr. Criswell encouraged BIRCWH scholars to examine the offerings of multiple NIH institutes for potential research funding. She noted that R01s can have multiple co-PIs and have generous budgets. Many NIH institutes provide more generous paylines for early-stage investigators. In addition, the Dr. Stephen Katz R01 Award funds high-risk research without preliminary data—ideal for early-stage investigators branching out from their mentors’ research areas.

Dr. Criswell closed her remarks by emphasizing that early-stage investigators should contact program officers, scientific review officers, and grant management specialists to learn about the funding process. In addition to noting that professional societies often provide grant application resources and training, she highlighted the [NIH Center for Scientific Review](#), which provides valuable information for navigating the grant review process, and the [NIH Early Career Review Program](#), which helps early career scientists gain insight into the grant application review process through first-hand experience with peer review.

ORWH and its NIH institute, center, and office partners created the [BIRCWH](#) mentored-career development program to connect junior faculty with senior faculty who share their interests in women’s health and sex differences research. As the NIH lead for BIRCWH, ORWH works with NIAMS and the National Institute on Drug Abuse on grant management for all awards. ORWH and its partners contribute more than \$15 million annually to support BIRCWH, which currently comprises [19 active programs](#). Eligible junior faculty must have recently completed either clinical training or a postdoctoral fellowship and intend to conduct interdisciplinary basic, translational, behavioral, clinical, or health-services research related to women’s health. A majority of BIRCWH Scholars obtain independent NIH grant funding following participation in the program.

## White House Initiative to Expand Investment in Women’s Health Research

On November 13, 2023, First Lady Jill Biden announced a new White House Initiative to fundamentally change how the government approaches and funds research on women’s health. Chronic underfunding of research on conditions that mainly or only affect women, or that affect women differently than men, has led to poor understanding of many aspects of women’s health. “Every woman I know has a story about leaving her doctor’s office with more questions than answers... because there’s just not enough research on how to best manage and treat even common women’s health conditions,” notes Dr. Biden in the [press release](#) announcing the Initiative.

“To give women and their health care providers the tools and information that they need to more effectively prevent, diagnose, and treat these conditions—from rheumatoid arthritis to menopause to Alzheimer’s disease to cardiovascular disease to endometriosis—our nation must fundamentally change how we approach and fund women’s health research,” states the press release.

As a first step, the Biden-Harris administration issued a [Presidential memorandum](#) to establish an initiative consisting of executive departments and agencies across the federal government, such as the U.S. Departments of Health and Human Services, Defense, and Veterans Affairs, as well as White House offices, such as the Office of Management and Budget and the Office of Science and Technology Policy. Initiative members will provide concrete recommendations for improving research on women’s health and maximizing the administration’s investments in women’s health research. In addition, the Initiative will explore new public-private partnerships and opportunities to engage with private and philanthropic leaders to drive research innovations.

First Lady Biden, a longtime advocate for women’s health, and the White House Gender Policy Council will lead the Initiative. Carolyn Mazure, Ph.D., will serve as Chair of the Initiative and coordinate it on behalf of the Office of the First Lady and the Gender Policy Council. Before joining the Office of the First Lady, Dr. Mazure was Norma Weinberg Spungen and Joan Lebson Bildner Professor in Women’s Health Research, and Professor of Psychiatry and of Psychology at Yale School of Medicine, where she also created Women’s Health Research, an interdisciplinary research center focused on women’s health.

## Biennial Report

### NIH Publishes Biennial Report on Research on Women's Health for Fiscal Years 2021–2022

Since 2009, ORWH has published the [National Institutes of Health's \(NIH\) Report of the Advisory Committee on Research on Women's Health: Office of Research on Women's Health and NIH Support for Research on Women's Health \(Biennial Report\)](#) detailing NIH-wide programs conducted to fulfill ORWH's [core mission](#) and their accomplishments. The [FY 2021–2022 Report](#), released in December 2023, includes notable achievements such as continued progress on efforts to ensure that women and diverse populations are represented in NIH-funded clinical research.

One example of NIH inclusivity efforts is the [Researching COVID to Enhance Recovery \(RECOVER\) initiative](#), launched in 2022, which focuses on how people recovered from SARS-CoV-2 infections and why some people develop long-term symptoms post-infection, or "long COVID." Although pregnant people are often underrepresented in clinical research, RECOVER includes several thousand women who experienced COVID-19 infection during or shortly after pregnancy.

In FY 2021 and 2022, ORWH supported women in biomedical careers by co-authoring an article in *Nature Communications* about NIH's leadership in instituting "inclusive excellence," a new strategy for fostering a diverse scientific ecosystem; worked with [NIH partners to select 10 institutions to receive the NIH Prize for Enhancing Faculty Gender Diversity in Biomedical and Behavioral Science](#); and, in partnership with NIAMS, provided funding to [Team Science Leadership Scholars Program](#), a new pilot program designed to create a more robust cadre of women's health research leaders.

The report highlights noteworthy developments in inclusion, research on sex and gender, maternal morbidity and mortality, and careers. Read the full FY 2021–2022 report and past reports [online](#).

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**Dr. Victoria Shanmugam, MBBS, MRCP, FACR, CCD**

**Dr. Victoria Shanmugam, MBBS, MRCP, FACR, CCD**, joined ORWH as the inaugural Director of the Office of Autoimmune Disease Research in the Office of Research on Women's Health (OADR-ORWH) in November 2023. She graduated from Oxford University with a B.A. in physiology and completed her medical degree at Imperial College School of Medicine in London, graduating with honors in medicine. She is a member of the Royal College of Physicians in London. Dr. Shanmugam completed the Internal Medicine Residency and Rheumatology Fellowship at Georgetown University and joined the faculty of Georgetown University School of Medicine in 2007.

Dr. Shanmugam received master's-level clinical and translational research training through the K30 program and was a KL2 scholar at the Georgetown-Howard Universities Center for Clinical and Translational Science. Her research focused on scleroderma and wound healing, as well as the interplay of the host immune system with the microbiome in patients with chronic wounds. While on faculty at Georgetown, she served as the Chair of the Institutional Review Board and as Director of the Orthopedics, Rheumatology, and Dermatology module for Georgetown University School of Medicine.

A talented academic leader, Dr. Shanmugam subsequently served as Chief of Rheumatology at the George Washington University School of Medicine and Health Sciences from 2014 to 2021. She was the inaugural Chair of the Clara Bliss Hinds Society for Women in Medicine and Health Sciences and served as Chair of the Research Committee for the School of Medicine and Health Sciences. Dr. Shanmugam is widely respected in the field of autoimmune diseases, having served in multiple leadership roles for the American College of Rheumatology.



**Balkissa Ouattara, M.D., Ph.D., M.P.H.**

**Balkissa Ouattara, M.D., Ph.D., M.P.H.**, joined ORWH as a Physician in August 2023. Dr. Ouattara received her doctorate in medicine from the University of Ouagadougou, Burkina Faso. She received a second doctorate and a master's in public health degree from the University of Nebraska Medical Center. Prior to joining ORWH, she served as an American Association for the Advancement of Science (AAAS) Science and Technology Policy Fellow at NICHD. As a physician and public health professional, Dr. Ouattara is an advocate for maternal and child health. Her expertise is the intersection of patient-centered care across the lifespan, maternal and child environmental health, cultural and structural determinants of health, and global health.

## CONGRATULATIONS TO ORWH STAFF WHO RECEIVED A 2023 NIH DIRECTOR'S AWARD!



**David A. Thomas, Ph.D.**



**Jamie White, M.S.**

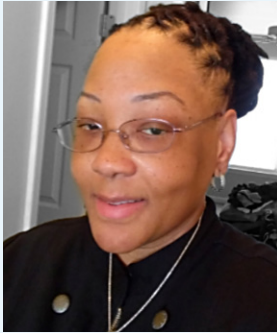


**Melissa Wong, M.D.**

**David A. Thomas, Ph.D., Jamie White, M.S., and Melissa Wong, M.D.**, received Recognition Across NIH group awards for excellence in implementing the [RADx Tech for Maternal Health Challenge](#) as part of the IMPROVE Initiative, which is designed to address the nation's maternal health crisis.

# STAFF UPDATES

CONGRATULATIONS TO ORWH STAFF WHO RECEIVED A 2023 NIH DIRECTOR'S AWARD!



**Damiya Whitaker, Psy.D.**

**Regine A. Douthard, M.D., M.P.H., and Damiya Whitaker, Psy.D.,** received administrative group awards for outstanding efforts to launch [Community Partnerships to Advance Science for Society \(ComPASS\)](#), a new community-led multisectoral structural intervention research model across NIH.



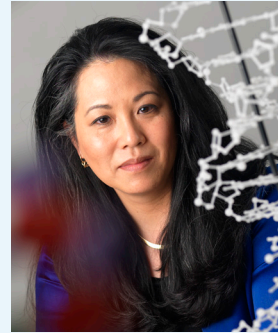
**Regine A. Douthard, M.D., M.P.H.**

**Regine A. Douthard, M.D., M.P.H.,** received a scientific/medical research group award for outstanding effort in developing [the NIH Climate Change and Health Initiative](#), an urgent, cross-cutting NIH effort to reduce health threats from climate change across the lifespan and build health resilience in individuals, communities, and nations around the world, especially among those at highest risk.



**Kelly Chandler, Ph.D.**

**Kelly Chandler, Ph.D.,** received a scientific/medical research group award in recognition of exemplary scientific contributions, teamwork, leadership, and support.



**Vivian Ota Wang, Ph.D., FACMG, CGC**

**Vivian Ota Wang, Ph.D., FACMG, CGC,** received a scientific/medical research group award for outstanding dedication and leadership in implementing and overseeing the [NIH Researching COVID to Enhance Recovery \(RECOVER\) Initiative](#). She also received administrative group awards for extraordinary dedication and teamwork in supporting NIH leadership and the research community in preparing and implementing the [NIH Policy for Data Management and Sharing](#), and for exceptional dedication and significant effort to create a research data repository, the [RADx Data Hub](#), for COVID-19 research data.



**Juliane Caviston, Ph.D.**

**Juliane Caviston, Ph.D.,** received an administrative group award for outstanding contributions to advance the NIH Mission through development of the NIH-Wide Strategic Plan for Diversity, Equity, Inclusion and Accessibility (DEIA).

# UPCOMING EVENTS

## [HIV & Women Scientific Workshop](#)

March 21, 2024, 10 a.m. EDT–March 22, 2024, 5 p.m. EDT

## [Diverse Voices: Endometriosis](#)

March 28, 2024, 3–4 p.m. EDT

## [60th Meeting on the Advisory Committee on Research on Women's Health \(ACRWH\)](#)

April 9, 2024, 9 am.–5 p.m. EDT

## [8th Annual Vivian W. Pinn Symposium](#)

May 15, 2024, 1 p.m.–5 p.m. EDT

# FUNDING OPPORTUNITIES

## **Notice of Special Interest (NOSI): Supporting Recovery-Oriented, Family-Centered Care for Pregnant, Postpartum, and Parenting Women with Opioid Use Disorder** ([NOT-DA-24-008](#))

Application due date: March 21, 2024

## **NOSI: Reproductive Health, Pregnancy, and Parenting among Women with Disabilities** ([NOT-HD-21-025](#))

Application due date: May 31, 2024

## **NOSI: Research to Improve Pre-Pregnancy Care and Enhance Healthy Birth Intervals** ([NOT-HD-23-003](#))

Application due date: September 8, 2024

## **Interventions to Address HIV-Related Comorbidities among Highly Affected Populations Experiencing Health Disparities (R01 - Clinical Trial Required)** ([RFA-MD-24-003](#))

Application due date: December 11, 2024

For up-to-date information, visit [www.nih.gov/women](http://www.nih.gov/women).

## NIH Office of Research on Women's Health (ORWH)

6707 Democracy Boulevard, Suite 400  
Bethesda, MD 20817  
Phone: 301-402-1770

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