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Chronic Debilitating Conditions in Women

National Institutes of Health
Office of Research on 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
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ORWH, in conjunction with the Advisory Committee on Research on Women's Health (ACRWH), is preparing to host "Advancing NIH Research on the Health of Women: A 2021 Conference," which will convene NIH experts, external stakeholders, and others to discuss stagnant cervical cancer survival rates, rising incidences of maternal morbidity and mortality, as well as the topic of this issue's feature story, chronic debilitating conditions in women. Millions of Americans, a disproportionate number of whom are women, have one or more chronic diseases, such as diabetes, arthritis, depression, and Alzheimer's disease. These illnesses result in high societal costs, lost productivity, suffering, debilitation, and long-term disability. Through this conference as well as subsequent reports and efforts, we hope to inform legislators and the biomedical research community and equip them to realign the NIH research agenda to address chronic debilitating conditions more effectively and to improve the health of women overall.

This issue of In Focus *also describes ORWH's activities related to the 40th anniversary of the first scientific publication on HIV/AIDS, patterns of alcohol use in women, several manifestations of gender bias in academic science, and ORWH's signature event, the 5th Annual Vivian W. Pinn Symposium.*

We hope you find this issue of In Focus *informative. Please share it with your colleagues and subscribe by clicking the link on the front or back cover. Stay safe and get vaccinated!*

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

NIH Reviews Its Approach to Research on Chronic Debilitating Conditions Affecting Women

Data from 2018 show that over half of U.S. adults (at least 129 million individuals) have one or more diagnosed chronic medical conditions and that a disproportionate number of these individuals are women.[1] Chronic conditions draw resources from the health care and insurance systems, often result in periods of debilitation or long-term disability, reduce productivity, and cause considerable suffering and economic loss.

Multimorbidity, the simultaneous occurrence of two or more diseases that may or may not share a causal link in an individual patient, is common. Among Americans with chronic conditions, more than half have two or more such conditions.[1] Despite the prevalence of multimorbidity, researchers traditionally study diseases in isolation. Eligibility criteria for clinical studies often exclude potential participants with multimorbidity, and disease-specific NIH institutes tend to support research on individual illnesses. As a result, a limited evidence base informs clinical guidelines for treating patients with multimorbidity.

"We have an inadequate framework for studying chronic conditions, particularly when they involve multimorbidity, and virtually no framework for studying how these conditions accumulate over the life course and affect the health of women differently than they affect men," says Sarah Temkin, M.D., ORWH Associate Director for Clinical Research. "However, we know that compared with men, women have higher rates of chronic conditions, develop chronic conditions at younger ages, and tend to live longer with more chronic conditions."

Sarah Temkin, M.D., ORWH

On October 20, 2021, in response to instructions from the U.S. Congress (see Public Law 116–260), ORWH, in conjunction with the Advisory Committee on Research on Women's Health (ACRWH), will host "Advancing NIH Research on the Health of Women: A 2021 Conference" (WHC2021). WHC2021 will convene biomedical experts to explore—among other topics—chronic debilitating conditions in women. Conference participants will identify research gaps, address pitfalls in clinical practices, and discuss the future of research on these illnesses. In preparation for this meeting, planning and working group members are reviewing the research portfolios of NIH Institutes, Centers, and Offices for information to present to external experts and stakeholders who will then consider how NIH might better address the medical needs of women with chronic debilitating conditions.

Ideally, with input from NIH personnel, Congress, and others, WHC2021 participants will suggest a new research agenda for chronic debilitating conditions in women. ORWH and ACRWH organizers hope for a more holistic, organismal approach to researching chronic debilitating conditions in women. This approach may incorporate the understanding that debilitation and disability often stem from multimorbidity. Further, the new research agenda may encourage investigators to study co-occurring chronic conditions together, rather than in isolation, so that medical research can develop new prevention techniques, screening and diagnostic tools, and treatments suited to the large patient population with multimorbidity.

Below, we discuss how WHC2021 organizers define chronic debilitating conditions in women, characterize the extent of the public health problem these conditions create, consider a lifespan-based approach for researching and treating these

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conditions in women, and list some structural challenges to realigning the research agenda.

Defining Chronic Debilitating Conditions

Several definitions have informed preparations for WHC2021 (see *Definitions of Chronic Debilitating Conditions*), and WHC2021 organizers have opted to foreground a definition from the U.S. Department of Health and Human Services (HHS), which defines chronic illnesses as those that (1) persist for at least 1 year, (2) require ongoing medical attention, and (3) result in functional limitations that restrict normal daily activity.[2] Chronic debilitating conditions include physical illnesses such as cancer, diabetes, and hypertension as well as mental and cognitive disorders such as substance use disorders, depression, and Alzheimer's disease.

Lisa Halvorson, M.D.
NICHD

"Individuals with chronic debilitating conditions may have many productive days each month but will experience interruptions to their daily activities as well as their personal and professional lives," says Lisa Halvorson, M.D., an obstetrician, gynecologist, former Chief of the Gynecologic Health and Disease Branch of the *Eunice Kennedy Shriver* National Institute of Child Health and Human Development (NICHD), and a member of one of the WHC2021 working groups. She states, "For instance, a woman with uterine fibroids may have heavy menstrual bleeding—and perhaps anemia and pain—requiring her to stay home for a couple of days each month." Dr. Halvorson adds that physical chronic debilitating conditions often have mental health implications associated with psychosocial stress and emotional hardship. Treatment of chronic pain conditions can also increase the risk for opioid use disorder.

Holly Moore, Ph.D.
NIDA

Another participant in one of the WHC2021 working groups, Holly Moore, Ph.D., a Program Officer in the National Institute on Drug Abuse's (NIDA) Behavioral and Cognitive Neuroscience Branch, echoes Dr. Halvorson's sentiments. "With most chronic debilitating conditions, like treatment-resistant migraine disorder, you're not in bed all the time, but you will have several incapacitating incidents each month that last hours or even longer," Dr. Moore says. She adds that some brain and behavioral disorders, such as substance use disorders, psychotic disorders, and seizure disorders, can cause discrete episodes of debilitation punctuated by long periods of productivity. "Of course, chronic debilitating conditions also include illnesses like severe rheumatoid arthritis that can cause constant debilitating pain or other loss of function," she says.

Both Dr. Moore and Dr. Halvorson emphasize that appropriate treatment and management can increase the number of productive days for those with chronic debilitating conditions and slow the progressive deterioration associated with many of these illnesses.

Chronic Debilitating Conditions and Multimorbidity Constitute a Major Public Health Concern

Chronic conditions are common among U.S. adults. A study using 2018 data from the National Center for Health Statistics (NCHS) of the Centers for Disease Control and Prevention found that 51.8% of U.S. adults had at least one of 10 chronic conditions and that 27.2% had more than one of these conditions.[1] (Note that these percentages would likely be much higher if more than 10 chronic conditions had been studied.) The NCHS study also found a higher prevalence of multiple chronic conditions among women, particularly with advancing age.[1]

To characterize the public health impact of chronic debilitating conditions among women further, WHC2021 organizers paired Research, Condition, and Disease Categorization (RCDC) listings of illnesses affecting women with data from the Centers for Medicare & Medicaid Services (CMS) on condition-specific disability-adjusted life years, or DALYs.[3] (See *Disability-Adjusted Life Years of Chronic Medical Conditions in the U.S.*) DALYs provide a population-level gauge of the number of healthy, productive years lost because of poor health, disability, debilitation, and death. Public health researchers frequently use DALYs as a way of measuring societal disease burden. The NCHS study detected a dramatic increase in DALYs associated with chronic debilitating conditions among women in recent decades—from a nationwide total of approximately 40 million years in 1990 to approximately 54 million years in 2018.[1]

Dr. Halvorson notes that many of the leading causes of death, disability, and debilitation in women are gynecological issues—those categorized as "female-specific conditions" in the chart on page 6. "Women have heart disease, mental health issues, and other health problems, but the female-specific conditions are public health concerns

warranting particular attention from biomedical researchers," she says. "Over the past couple of years, we've seen increased attention from legislators and stakeholder groups on conditions like uterine fibroids, endometriosis, and polycystic ovarian syndrome (PCOS)."

Multimorbidity also contributes to debilitation and disability and increasing DALYs. Dr. Moore states, "The only way to understand chronic debilitating conditions is to understand multimorbidity. Some diseases, like type 1 diabetes, begin in childhood and become chronic debilitating conditions from the onset. However, the majority of patients with chronic debilitating conditions have more than one. Either one is secondary to the other or as individuals age, they develop multiple health problems."

An analysis of responses to the National Health and Nutrition Examination Survey found that 59.6% of noninstitutionalized U.S. civilians who were 20 or older and 91.8% who were 65 or older had two or more chronic conditions.[4] Percentages have been increasing steadily and are consistently higher in women than in men.[4,5] Further, medical expenses increase roughly exponentially relative to the number of chronic conditions. For example, data from 2018 show per capita Medicare fee-for-services expenses of $1,825 for men and $2,294 for women with at most one chronic condition and $34,227 for men and $31,053 for women with six or more chronic conditions.[3] Dr. Moore believes that these data underrepresent the prevalence and expense of multimorbidity. "The system is set up to silo diagnoses and thus probably underreports multimorbidities," she says.

A Lifespan Approach to Studying Women's Chronic Debilitating Conditions

WHC2021 organizers are also exploring how a lifespan approach to addressing chronic debilitating conditions in women could improve the quality of research and treatment. Such an approach would encourage investigators and clinicians to consider these conditions within the context of women's major hormonal/reproductive stages—childhood, the reproductive years, and postmenopause—as well as the transitional stages of adolescence and perimenopause/menopause. Health risks, disease presentation and progression, and prognoses for chronic debilitating conditions may differ across these transitions. A lifespan approach could suggest new types of research questions, such as: Why do breast cancer diagnoses differ before and after menopause? How does pregnancy serve as a "stress test" for later-life health conditions such as diabetes and hypertension?

Dr. Moore points out that although many diseases manifest differently at different life stages, a lifespan approach can also suggest new, potentially revealing research questions. "The body is programmed to undergo periods of change—like adolescence, which we associate with high-risk behaviors," she says. "In taking a lifespan approach, we might ask, 'How is the adolescent brain at risk for mood or substance use disorders or their comorbidity?' rather than 'How are these disorders different in adults and adolescents?'"

Dr. Halvorson adds, "Female puberty is also a time when gynecologic disorders may first manifest themselves, such as the pain associated with endometriosis or the irregular menses and excess hair growth associated with PCOS."

A lifespan approach could also prompt additional research on menopause, a poorly understood transitional phase in a woman's life. "Women are at risk for different health conditions around menopause, not necessarily because physiological changes are happening but because little is known about good health

Definitions of Chronic Debilitating Conditions

Chronic illness: a condition lasting at least 1 year that requires ongoing medical care and/or limits activities of daily living (HHS).[2]

Long-term health condition: a condition that threatens well-being and function in an "episodic, continuous, or progressive way" over several years (Institute of Medicine/National Academy of Medicine [IOM/NAM]).[6]

Chronic conditions: CMS recognizes the following 21 illnesses as chronic conditions:[3]

- Alcohol abuse
- Alzheimer's disease and related dementia
- Arthritis (osteoarthritis and rheumatoid)
- Asthma
- Atrial fibrillation
- Autism spectrum disorders
- Cancer (breast, colorectal, lung, and prostate)
- Chronic kidney disease
- Chronic obstructive pulmonary disease
- Depression
- Diabetes
- Drug abuse/substance abuse
- Heart failure
- Hepatitis (chronic viral B and C)
- HIV/AIDS
- Hyperlipidemia (aka high cholesterol)
- Hypertension (aka high blood pressure)
- Ischemic heart disease
- Osteoporosis
- Schizophrenia and other psychotic disorders
- Stroke

Disability-Adjusted Life Years of Chronic Medical Conditions in the U.S. in 2018

Female-Specific Conditions	
Cancers of the female reproductive tract*	900,843
Dysmenorrhea/menstrual abnormalities	89,608
Uterine fibroids*	64,009
Endometriosis,* adenomyosis	53,777
Female infertility,* early pregnancy loss	26,355
Polycystic ovarian syndrome	42,738
Pelvic floor disorders, pelvic organ prolapse	21,613
Others	
Menopausal symptoms	
Pelvic inflammatory disease*	
Vulvodynia/chronic gynecological pain disorders (pelvic and vulvar)	
Vaginosis	

Conditions More Common in Women and/or with Greater Morbidity in Women	
Depressive disorders	1,704,524
Migraine, headache	1,573,325
Breast cancer*	1,387,670
Asthma	820,435
Autoimmune diseases	
Rheumatoid arthritis*	187,902
Systemic lupus erythematosus*	
Sjögren's syndrome*	
Scleroderma*	
Multiple sclerosis	143,123
Sexually transmitted infections	37,316
Others	
Temporomandibular joint and muscle disorders*	
Chronic fatigue syndrome*	
Fibromyalgia*	
Candidiasis	
Post-traumatic stress disorder	
Irritable bowel syndrome	
Interstitial cystitis*	
Human papillomavirus infection*	
Osteoporosis*	
Eating disorders	

Conditions Potentially Understudied in Women	
Unintentional injuries (including violence against women*)	2,050,026
Alzheimer's disease, dementia	1,296,376
Osteoarthritis	1,257,042
Endocrine, metabolic, blood, immune disorders	853,247
Recurrent urinary tract infection, interstitial nephritis	201,529
HIV	118,596
Others	
Exogenous hormone use	
Neuropathy	
Overactive bladder/incontinence	
Chronic pain (including chronic pelvic pain)	

Conditions with High Morbidity in Women	
Heart disease	3,396,660
Lower back pain	3,168,583
Chronic obstructive pulmonary disease	2,568,947
Drug use disorders	2,323,237
Stroke	2,098,900
Diabetes	2,010,853
Others	
Obesity/metabolic disease	
Influenza	
Pneumonia	

Chronic conditions are grouped according to their public health relevance to U.S. women.

A Disability-Adjusted Life Year (DALY) represents the loss of the equivalent of 1 year of good health and productivity of one member of a population. The 2018 data from the Centers for Medicare & Medicaid Services (CMS) shown here[3] represent the U.S. population's total number of healthy, productive years lost (i.e., DALYs) due to debilitation, disability, and/or premature death resulting from each diseases or health condition. (Data were not available for all diseases considered by WHC2021 organizers.)

**These disease categories are particularly relevant to women's health, according to the Manual Categorization System of the RCDC.*

practices for menopausal women," says Dr. Moore. "With more understanding of menopause, we could improve prevention of heart disease and other medical problems in menopausal women."

Challenges to Realigning the Research Agenda to Address Multimorbidity

WHC2021 organizers, conference participants, and the biomedical research community face several challenges as they review the agenda for studying how multimorbidity contributes to chronic debilitation in women. "We tend to isolate one research problem into a petri dish, then to an animal, and then to a human," says Dr. Temkin. "However, the complexity of what happens between systems in a human can be difficult to replicate in cells or even in animal models."

The structure of many funding organizations mirrors these single-disease research practices. Dr. Moore points out that studying diseases in isolation impedes the medical community from taking a holistic or systems approach to human health. "For example, substance use disorders often co-occur with cardiovascular and metabolic disorders," she says. "Funding research that takes these interactions into account is difficult because these comorbidities overlap the areas of different funding organizations. We need better ways to support interinstitutional research projects. The money may be siloed, but the research questions don't have to be."

Additional challenges stem from eligibility criteria that often exclude participants with chronic diseases or multimorbidity from clinical research. "There are millions of Americans with multiple chronic conditions on whom we're not testing drugs and other interventions," says Dr. Temkin. "If we're not studying the population that needs the intervention, we can't be sure that the research will apply to that population." A patient with diabetes, heart disease, and mental illness might not respond to a medication in the same way as a patient with only one (or none) of those conditions, for instance.

The U.S. health care and medical insurance systems pose even more challenges to studying multimorbidity, particularly in obtaining accurate population-level data. "The current system cannot collect realistic data on the interaction of multiple health conditions," says Dr. Moore. "Research, particularly data-driven population studies, must have de-siloed data on multimorbidity to reflect the physiological reality of people's health." How women and underrepresented populations interact with the current health care system influences the quality of treatment of chronic debilitating conditions as well as the accuracy and thoroughness of health records and data collection. Provider-patient interactions, insurance status, biases, and systemic factors constitute additional challenges to research and treatment of chronic debilitating conditions.

WHC2021 participants will discuss these challenges and other topics related to the research and treatment of multimorbidity and chronic debilitating conditions in women.

Advancing NIH Research on the Health of Women: A 2021 Conference

ACRWH will host WHC2021 on October 20 to discuss these and other issues related to chronic debilitating conditions in women as well as rising maternal morbidity and mortality rates (see *In Focus* 4.2) and stagnant cervical cancer survival rates (see *In Focus* 4.3). For up-to-date details on the conference, please visit the ORWH Events page. Future issues of *In Focus* and the ORWH website will feature conference highlights and action items, and ACRWH plans to produce a formal report of findings and recommendations to the U.S. Congress.

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ORWH Activities Recognize the 40-Year History of HIV/AIDS

Elizabeth Barr, Ph.D.
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Just over 40 years ago, the first published report of what is now known to be HIV infection appeared in the *Morbidity and Mortality Weekly Report* (*MMWR*) of the Centers for Disease Control and Prevention (CDC). Although researchers and clinicians have made significant progress in preventing and treating HIV infection, they have yet to develop a vaccine or cure. Both domestically and globally, those living with HIV face social stigma, and women, people of color, and sexual and gender minorities experience striking disparities in vulnerability to HIV infection and accessing quality HIV treatment. To mark the anniversary of the *MMWR* report, ORWH has contributed to several publications, funding opportunities, events, and exhibits. These contributions recognize four decades of progress in HIV prevention and treatment research as well as characterize future avenues for investigation. ORWH has also continued support of HIV research that considers the influences of biological sex, social determinants of health (including gender), and health disparities on people living with HIV—in keeping with the goals of the *Trans-NIH Strategic Plan for Women's Health Research*.

ORWH Director Janine A. Clayton, M.D., FARVO, wrote a post titled "40 Years of Progress and Persistent Challenges in HIV/AIDS: We Need to Do More for Women" for the ORWH Director's Corner webpage, in which she describes major medical developments such as highly effective antiretroviral therapy, prevention strategies such as pre-exposure prophylaxis, and the Undetectable=Untransmittable concept. Dr. Clayton notes that Black women account for more than half of new HIV diagnoses among U.S. women. The blog post also explains how biological and social factors increase women's vulnerability to HIV and that women with HIV have higher rates of comorbidities—other than AIDS—than men with HIV.

The NIH Office of AIDS Research (OAR) published "Research Is Changing the Face of HIV for Women and Girls," which contains highlights from a discussion between Dr. Clayton and OAR Director Maureen M. Goodenow, Ph.D., on the HIV research agenda as it pertains to women and girls. Dr. Clayton and Dr. Goodenow described the biological and social factors contributing to women's disease risk, sex differences in HIV epidemiology and progression, the underrepresentation of women in HIV research, and future research directions, including a more thorough consideration of sex as a biological variable (SABV) in HIV research.

We collaborated with NIH colleagues on "HIV-Related Stigma Research as a Priority at the National Institutes of Health," published in *AIDS and Behavior*. This article characterizes the ongoing social stigmas associated with HIV infection and how they constitute a substantial barrier to uptake of HIV interventions. We outline the HIV stigma research efforts of each NIH institute, center, and office and discuss how these efforts contribute to the goal of ending disease-related stigma. Dr. Barr was lead author for "Impact of Dedicated Women's Outreach Workers (WOWs) on Recruitment of Women in ACTG Clinical Studies," published in *HIV Research & Clinical Practice*. The article describes a pilot study of WOWs who were tasked with increasing enrollment of diverse women in AIDS Clinical Trials Group (ACTG) studies, which have enrolled mostly White and male participants to date. In addition, on October 12, Dr. Barr spoke at the virtual Centers for AIDS Research (CFAR) Symposium on HIV Research in Women on the importance of community engagement in HIV and COVID-19 research, ORWH's efforts related to COVID-19, and lessons learned from both pandemics.

Through the U3 Administrative Supplement Program, ORWH has supported 11 projects focused on HIV-related disparities in populations of women that have been understudied, underrepresented, and underreported (U3) in biomedical research. The U3 program supports studies examining the complex intersection of biological and social factors in the health status, disease presentation, and treatment responses of women as well as interventions aimed at addressing poor health outcomes, improving quality of life, and decreasing disease burden. Past U3 projects have examined:

- Peer support promoting antiretroviral therapy adherence among low-income pregnant and postpartum women living with HIV
- An intervention targeting a biomarker of latent HIV to mitigate cognitive impairment and to maintain viral remission in HIV-infected women
- Sexual trauma, genital immunity, and racial and ethnic differences in HIV susceptibility
- The effects of stigma and minority stress on the health concerns of transgender women, such as mental illness, substance use, and HIV infection

Two recipients of funding from the *Intersection of Sex and Gender Influences on Health and Disease* research project grant—NIH's first investigator-initiated, disease-agnostic R01 focused on studying

the intersection of sex and gender in health and disease—are investigating sex and gender in HIV. One project, titled Sex, Gender and the Immunopathogenesis of HIV, uses genomic and clinical data to disentangle the contributions of chromosomal sex, hormone use, and lived gender identity to the immune response. The other project, called Hormonal Control of HIV Latency, focuses on the latent HIV reservoir and uses primary cell models to investigate whether and how sex hormones and hormone replacement therapies could influence HIV cure strategies for people living with HIV, including cisgender and transgender women.

ORWH helped to promote a series of exhibits and events organized by Federal health agencies in recognition of the 40th anniversary of the *MMWR* publication. CDC produced Reflections on 40 Years of HIV, a virtual museum commemorating the more than 32 million people who have died from complications caused by HIV/AIDS since the beginning of the worldwide epidemic as well as the 38 million people currently living with HIV. The exhibit details the history of the epidemic through photographs, timelines, oral histories, and other documents and virtual artifacts. Also, throughout June, Federal agencies held a series of Live with Leadership virtual sessions on the 40-year history of HIV, featuring presentations by national health leaders, discussions with long-term survivors, and a review of HIV testing practices. Also, to highlight women's continued presence throughout the HIV epidemic, ORWH is developing a commemorative video of interviews with nearly a dozen women leaders in HIV science, advocacy, medicine, and policy. The video montage will release on World AIDS Day on December 1, 2021.

Taken together, these initiatives constitute part of the effort of NIH and the biomedical research enterprise as a whole to realize the U.S. Department of Health and Human Services' (HHS) plan to end the HIV epidemic by 2030. For more information on these initiatives, events, and publications, click on the links above.

IN THE JOURNALS

Researchers Call for Consideration of Intersectionality in Environmental Health Science

(Commentary by Zota and VanNoy. 2021. Am. J. Public Health *PMID: 33211578.)*

In a recent commentary, Ami R. Zota, Sc.D., M.S., and Brianna N. VanNoy, M.P.H., argue that environmental health studies have focused on the exposome—the sum of an individual's environmental exposures—but largely neglected intersectionality, i.e., how intersecting systems of power affect individuals from marginalized populations. Using the transdisciplinary Fibroids, Observational Research on Genes and the Environment (FORGE) study as an example, the authors suggest ways that environmental health scientists can incorporate considerations of intersectionality into their work.

The authors explain how multiple systems affect Black women's exposures to chemicals, their epigenetic regulation of uterine fibroids, and their medical care. Genetic evidence suggests that racial and ethnic differences alone do not account for the disproportionately high rates of uterine fibroids in Black women. However, conditions created in the interaction between social systems and environmental exposures may explain this disparity. For instance, racist housing policies, such as redlining, may increase Black women's risk of lead exposure. Normative cultural beauty standards result in the exposure of many Black women to hair-straightening products and other cosmetics containing endocrine-disrupting chemicals. Other sociohistorical forces may function to exclude Black women from gynecological research and contribute to poor patient–doctor communication. The authors conclude that incorporating considerations of intersectional health influences into research efforts on the exposome could improve health equity, medical care, and environmental justice.

NIAAA Journal Addresses Women and Alcohol Use

(Various Authors. 2020. Alcohol Res. *Topic Series.)*

A special topic series in *Alcohol Research: Current Reviews*, a publication of the National Institute on Alcohol Abuse and Alcoholism (NIAAA), focuses on recent trends in the drinking patterns of women and girls in the United States. Epidemiological data indicate that both the amount and the frequency of alcohol use are increasing among White and Latina girls and young women, while drinking is on the decline among boys and young men. Further, current alcohol use and binge drinking are up among older women, coincident with increases in alcohol-associated morbidity, emergency room visits, and mortality among this population.

Articles in the series explore (1) the interactions of alcohol with gonadal sex steroid hormones and stress steroid hormones; (2) factors that influence sex-specific effects of alcohol, such as age, drinking patterns, and psychiatric comorbidities; (3) cognitive deficits in women who drink heavily; (4) alcohol and pregnancy; and (5) new diagnostics, preventive interventions, and treatments for women with alcohol use disorder.

The gender gap in alcohol use and associated problems has narrowed, and women's lifetime alcohol use patterns now approach those of men. These trends warrant focused, sex- and gender-specific studies on alcohol use as well as on the effects of women's race, ethnicity, socioeconomic status, and sexual orientation on alcohol use.

Investigators Address Bullying in Academic Settings

(Original article by Moss and Mahmoudi. 2021. SSRN. doi:10.2139/ssrn.3850784.)

Sherry Moss, Ph.D., and Morteza Mahmoudi, Ph.D., have published several articles on abuse and academic incivility—or bullying—by academic supervisors. In a recent article, they report results of a cross-sectional global survey of individuals at academic scientific institutions and other higher-education departments. Of the more than 1,900 survey respondents, mostly graduate students or postdoctoral fellows, 84% reported having experienced abusive supervision; 59% reported having witnessed it; and 49% reported both. The reported bullying took many forms: ridiculing, name-calling, threatening to terminate or cancel positions, writing bad recommendations, and encouraging others to bully. The majority of bullies in the study were men. However, as men constitute a higher percentage of academic leadership, men were proportionately no more likely to engage in abusive behaviors than women. Bullies were often principal investigators and were more likely to work at the highest-ranked institutions. Many targets of bullying reported using avoidance tactics to evade retaliation. Only 16.6% of bullied targets reported the behavior to institutional leaders, and of these, 58% reported unfair and biased outcomes.

Dr. Moss and Dr. Mahmoudi include many survey responses in their article, and the following typifies the experiences of those bullied in academic contexts: "I complained to the (human resources) representative, who raised the issue to the Head of Department, who then spoke to the bully without giving my identity. The bully then emailed the entire group about it, asking the person who had complained to come forward. Nothing changed, and I resigned a few months later."

The authors conclude that the extent and nature of bullying within academic institutions warrant systemic corrective action throughout the scientific community.

Researchers Review Scientific Literature on Physician Mothers

(Review article by Chesak et al. 2021. Mayo Clin. Proc. PMID: 33840524.)

Sherry S. Chesak, Ph.D., RN, and colleagues recently reviewed empirically based academic articles to characterize the challenges facing physician mothers and to identify potential negative consequences and solutions. Seventy-one articles met the researchers' inclusion criteria for studies that explored

challenges "related to family planning, pregnancy, raising children, work–life integration, inequities, and biases."

The individual challenges the investigators identified included the difficulty of work–life integration; parental responsibilities endangering career success; pregnancy complications, infertility, or delay in childbearing; and physician burnout and mood disorders. Organizational challenges included a paucity of networking support, mentorship, and professional development for women; inadequate family leave; and long, inflexible hours. Societal challenges included gender inequities, discrimination against physician mothers, and workplace gender norms pertaining to women with children.

The literature suggested multiple solutions to address these challenges, including policies, programs, and initiatives for mentorship; childbearing/child-rearing support; improving career satisfaction and work–life integration, and reducing bias against mothers. The researchers posit that these solutions are essential to supporting professional women in the medical workplace and improving the quality of care. Research demonstrates that recruitment and retention of women physicians have positive effects on the quality of patient care and outcomes (e.g., greater adherence to clinical guidelines, lower mortality rates, fewer hospital readmissions, and more patient-centered communication). Thus, addressing the challenges facing physician mothers could improve not only social equity but also the quality of health care.

Scientific Agencies Target Gender Bias in Allocating Time with High-Demand Scientific Equipment

(Original article by Watson. 2-Feb-2021. Nat. Index.)

The National Aeronautics and Space Administration (NASA) and other scientific agencies have recently adopted double-

blind peer reviews of researcher applications to use high-demand supercomputers and specialized equipment, such as the Hubble Space Telescope. Studies showed that anonymizing proposals with respect to name and institution equalized men's and women's chances of securing time with these valuable scientific resources and prompted the switch to double-blind reviews to counter bias in the field.

The Space Telescope Science Institute (STScI), which operates the Hubble Space Telescope and the James Webb Space Telescope, was the first to initiate this practice, which successfully led to a reversal of the long-standing trend of awarding more telescope time to men than to women. STScI's adoption of anonymized applications also increased the likelihood of success for first-time and early-career applicants. Researchers will soon be required to remove all investigator names and gender pronouns from their research proposals. Following STScI's example, the European Southern Observatory, European Space Agency, and Atacama Large Millimeter/submillimeter Array have adopted similar application processes, and other U.S. agencies, including the National Science Foundation and the U.S. Department of Energy, are considering doing so.

SCIENTIST SPOTLIGHT

Joyonna Gamble-George, Ph.D.

Neuroscientist, artist, innovator, and entrepreneur Joyonna Gamble-George, Ph.D., has had a distinguished biomedical career as a health care administrator; a widely published, NIH-supported neurological researcher of Alzheimer's disease pathology, anxiety- and stress-related disorders, neurotoxicity, and drug addiction; and co-founder of SciX, LLC, a biotech company that develops wearable devices and mobile applications for monitoring health conditions. She holds degrees from Xavier University of Louisiana, the University of South Florida College of Public Health, and Vanderbilt University.

In 2019, Dr. Gamble-George was selected as an IF/THEN Ambassador through a program of the American Association for the Advancement of Science (AAAS). IF/THEN Ambassadors are accomplished STEMM professionals who serve as high-profile role models for girls, young women, and others by sharing their stories and career journeys. (See *In Focus* 2.2 for more information on IF/THEN.) Recently, IF/THEN commissioned life-size 3D-printed statues of over 100 of its Ambassadors. Dr. Gamble-George's statue depicts her holding a human brain, symbolizing her expertise as a neuroscientist. Her likeness, along with similar statues, has been exhibited at the Dallas Love Field Airport and elsewhere as part of an IF/THEN outreach initiative.

Who inspired you to become a scientist?

My grandmother Menda Gamble Pettway, a retired elementary school teacher and grocery store owner, raised me on a farm in Alabama. She was a registered voter prior to the passage of the Voting Rights Act of 1965 and an activist who participated in the Selma-to-Montgomery march. Grandma Menda's activism taught me the importance of community service and how it can help to build character, promote personal growth, and create a sense of accomplishment. My grandmother's example helped me to realize that scientific discovery can be a form of humanitarianism, especially when it helps to improve and save lives.

Of which achievements are you proudest?

In 2014, I attended the 64th Lindau Nobel Laureate Meeting (Medicine/Physiology) in Lindau, Germany, after being selected as one of the 600 young researchers to attend the meeting from a pool of approximately 20,000 applicants. I was the first African American woman to represent Vanderbilt University School of Medicine at this meeting. I discussed future approaches to medical research with Nobel laureates, including Elizabeth H. Blackburn, Ph.D., who won the 2009 Nobel Prize in physiology or medicine for her discovery of how telomeres protect chromosomes. Dr. Blackburn told me and a few other young female researchers from a variety of ethnic and racial backgrounds that our selection to attend the meeting signified that we were "going to do extraordinary things." Her encouraging words helped me to see that I belonged in a STEMM career, even though many professionals in STEMM did not look like me.

How do you balance your many roles as a neuroscientist, artist, innovator, and entrepreneur?

I plan each day in advance and give priority to urgent tasks, particularly those that will help me advance my goals. I also take breaks throughout the day to exercise, participate in hobbies, enjoy nature, and relax, which benefits my physical and mental health and, ultimately, my productivity. My body provides cues when I am stressed. I have learned to take note and adjust my schedule accordingly. I have also learned to delegate, to say "no" to opportunities that might threaten my healthy work–life balance, and to reevaluate priorities when I find myself off track.

What are some of the challenges of being a scientist and a woman of color?

I am the first one in my family who pursued a career in STEMM. My

family members have backgrounds in education, law, or administration. As a result, I did not have any role models in my family to guide me. Also, as a woman of color, I have often been the "only one" in educational or research settings. The absence of Black/African American mentors in the biomedical sciences was a tremendous challenge. A guiding hand can make all the difference in helping one to understand an environment and the important "invisible" components of the work. I have endured social isolation, limited access to resources and opportunities, and some not-so-subtle microaggressions. At times, I did not receive proper credit for work I completed on research projects.

Perceptions and stereotypes continue to challenge women in STEMM, especially women of color. It is vital to see women and people of color represented in STEMM to dismantle preconceived notions of who scientists are and how they look.

Do you have any advice for students and young scientists?

First, appreciate your skills and abilities and think outside of the box. My high school art teacher would encourage us to be different when it came to creating a piece of art. This advice has been helpful in my research. Sometimes you have to think outside of the box to understand how biological processes in the human brain and the rest of our bodies work, especially when you want to develop a cure to treat them.

Second, don't allow negativity in other people's actions or words to deter you. When you let challenging life events or other's actions defer your dreams, you deny yourself the opportunity to see whether they can become a reality. Strive to live the life you want. Pursue the dreams and career path you want. And never give up on *you* and your lifelong aspirations. I've always liked this saying: "Life is like a camera. Focus on what's important. Capture the good times. Develop from the negatives. And if things don't work out, take another shot."

IN CASE YOU MISSED IT

Biochemist Katalin Karikó's mRNA Research Led to Development of COVID-19 Vaccines

Katalin Karikó, Ph.D.*

Katalin Karikó, Ph.D., of the Perelman School of Medicine at the University of Pennsylvania has dedicated her career to the study of messenger RNA (mRNA), the genetic material that conveys DNA's "blueprint" to a cell's protein-making mechanisms. Through decades of research, Dr. Karikó developed techniques for inserting modified mRNA directly into individual cells or into cells in a living animal's body to direct those cells to create different proteins, including proteins that can serve as medicines or vaccines. Although Dr. Karikó's research contributed directly to the development of the widely publicized and lifesaving Moderna and Pfizer/BioNTech mRNA vaccines, she faced numerous challenges over the course of her career.

Dr. Karikó's career began in the late 1970s at the Szeged Biological Research Center (BRC) in her native Hungary. When the financially taxed BRC eliminated her position in 1985, she immigrated to the United States, where she took a series of temporary, nontenured positions. She eventually ended up at the University of Pennsylvania, where she has moved from lab to lab, relied on financial support from other scientists, and never received tenure. Throughout, she has persisted with her study of mRNA. Only in 2006 did her research win a grant, a $100,000 award from NIH, a modest amount by the standards of biomedical research. Finally, her work began to draw the attention of biotech companies interested in developing mRNA vaccines against influenza, Zika, and other viruses. Upon publication in January 2020 of the genetic sequence of SARS-CoV-2, the virus that causes COVID-19, vaccinologists put Dr. Karikó's research to good use. With techniques she and her colleague Drew Weissman, M.D., Ph.D., had pioneered, Moderna and BioNTech scientists developed their COVID-19 vaccines within a matter of days.

Dr. Karikó's story is one of vision, innovation, and perseverance as a scientist, woman, and immigrant. Her contributions to the development of mRNA COVID-19 vaccines have been shared in greater detail in the journal *Structural Chemistry*, *The New York Times*, and media outlets throughout the world. The success of these vaccines suggests that mRNA-based techniques could play important roles in new vaccines and clinical treatments for HIV, sickle cell anemia, and other health conditions.

*"Katalin Kariko light corrected" by Innisfree987 is licensed under CC BY-SA 4.0.

STEMM Educators Strive to Increase Inclusivity by Fixing the Academic System, Not the Students

A story in *The Scientist* details efforts by the Howard Hughes Medical Institute and other STEMM organizations to make their programs more welcoming to individuals from underrepresented racial and ethnic groups. Traditionally, academic diversity initiatives have focused on scholarships, mentorship, and supplementary courses. Underlying these programs was the assumption that with the right skills and resources, students from underrepresented groups could succeed. However, most diversity initiatives have failed to reduce the achievement gap appreciably, and Black, Latinx,

and American Indian/Alaska Native students consistently drop out of STEMM programs at higher rates than White and Asian American students. Some newer programs—such as iEMBER (Inclusive Environments and Metrics in Biology Education and Research)—have adopted a different approach and strive to change the often unwelcoming academic environment rather than the students themselves. These programs focus on breaking communication barriers, encouraging classroom connections between peers, fostering student-instructor relationships, and incentivizing inclusive teaching methods.

Meyerhoff Scholars Program Increases Retention of Black Students in STEMM

A recent news feature in the *Proceedings of the National Academy of Sciences of the United States of America* describes the successes of the diversity-oriented Meyerhoff Scholars Program, an initiative spearheaded by University of Maryland, Baltimore County President Freeman A. Hrabowski III, Ph.D., and co-founded by philanthropists Robert and Jane Meyerhoff in 1988. Research indicates that overall, 40% of Black undergraduates in STEMM programs switch majors, whereas only 29% of their White peers do so. The Meyerhoff Scholars Program has achieved retention rates of over 90% by addressing barriers to the success of students from underrepresented racial and ethnic groups. The program involves tutoring, mentoring, internships, a summer transition program for high school graduates prior to their freshman year, and community building efforts to prevent the isolation many people of color experience in STEMM programs. Other institutions, such as the University of North Carolina at Chapel Hill, are adapting the successful Meyerhoff model to suit the cultural needs of their STEMM programs and students.

Heavy Teaching Loads and Other Challenges Reduce Retention of Academic BIPOC Women

A recent article by Chavella T. Pittman, Ph.D., published by *Inside Higher Ed*, explores the heavy teaching loads of BIPOC (Black, Indigenous, and people of color) women and the associated effects on publishing productivity, academic success, and retention. University administrators often assign BIPOC women a disproportionately high number of classes, a greater number of new course preparations, and courses with larger class sizes. Increased teaching responsibilities result in less research productivity, fewer publications and grants, and ultimately lower rates of tenure, promotion, and retention. Other challenges facing BIPOC women include hostility from students, their teaching methods and course contents being viewed as marginal or illegitimate by colleagues, improper use of their student evaluations, and flawed processes of classroom observation. While many university initiatives strive to recruit and retain BIPOC women, Dr. Pittman suggests that these unaddressed teaching obstacles constitute a major impediment to retention.

NOTEWORTHY

ORWH Hosts 5th Annual Vivian W. Pinn Symposium

On May 11–12, 2021, ORWH, in partnership with the Foundation for the NIH (FNIH), hosted the 5th Annual Vivian W. Pinn Symposium, in honor of the office's first full-time Director, Vivian W. Pinn, M.D., Senior Scientist Emerita at NIH's Fogarty International Center. This year's symposium, titled "Integrating Sex and Gender into Biomedical Research as a Path for Better Science and Innovation," focused on illustrating the scientific, societal, and economic opportunities of integrating sex and gender into biomedical research. Attendees explored strategies to create bridges and capacity across the scientific enterprise to build a broad-based network of government, nonprofit, academic, and business organizations; to integrate sex and gender considerations into the research enterprise; and to apply a multidimensional perspective to women's health to advance the integration of sex and gender considerations via transdisciplinary approaches and partnerships.

Vivian W. Pinn, M.D., former ORWH Director

Opening Remarks. ORWH Director Janine A. Clayton, M.D., FARVO, set the stage for the symposium by articulating ORWH's key mission areas of enhancing and expanding women's health research, ensuring inclusion of women and minority groups in clinical research, promoting advancement for women in biomedical careers, and integrating sex and gender considerations throughout the biomedical research enterprise. Next, President and Executive Director of FNIH Maria C. Freire, Ph.D., described the partnership between FNIH and ORWH, reviewed a few of Dr. Pinn's many noteworthy accomplishments, and underscored the need to integrate sex and gender into biomedical research to improve the health of women and men. NIH Director Francis S. Collins, M.D., Ph.D., concluded the symposium's introductory remarks by describing the high bar set by Dr. Pinn's work at ORWH, NIH's efforts to include diverse populations in scientific study

cohorts, the discovery of profound sex differences in gene expression linked to over 50 bodily traits, and the profound influence of the NIH Policy on Sex as a Biological Variable (SABV) throughout the biomedical research community

Keynote Address. U.S. Congresswoman Madeleine Dean of Pennsylvania's 4th District delivered the symposium's keynote address, in which she discussed efforts to ensure inclusion of women in federally funded scientific studies, the benefit of recruiting and retaining women and people of color in health care, and the progress that has been made in integrating SABV throughout biomedical research. Congresswoman Dean described sex differences in COVID-19 symptoms and outcomes as well as the adverse economic and mental health effects facing women throughout the pandemic. She described working as a member of the Congressional Caucus for Women's Issues and co-writing an appropriations letter calling for increased consideration of SABV as it pertains to COVID-19 and other health conditions.

Panels and Breakout Sessions. The 2-day symposium featured several thoughtful panel discussions and breakout sessions focusing on various aspects of integrating sex and gender considerations into biomedical research, including how academic institutions and Federal agencies can lead this integration, how reporting and communication can advance sex and gender integration, how businesses can find economic opportunities in sex- and gender-based research, and other topics. A complete list of these conversations is available on the In the Spotlight section of the ORWH website.

Fireside Chat. Day 1 of the symposium concluded with a "fireside chat" with Dr. Pinn and National Institute of Allergy and Infectious Diseases (NIAID) Director Anthony S. Fauci, M.D. Dr. Fauci commented on how COVID-19 has increased attention to sex and gender differences in medicine. Dr. Pinn discussed her career at ORWH, mentorship, the challenges of being a woman of color in medicine, the role of men in women's health research, women in Government leadership, and ORWH's research supplements to promote re-entry into biomedical and behavioral research careers.

Symposium Conclusion. Dr. Pinn closed the symposium by emphasizing ORWH's mission to improve research pertaining to women's health across the lifespan, from the intrauterine environment to old age. Dr. Pinn also commented on how ORWH's disease focus has shifted from considering a few diseases—such as heart disease, endometriosis, and uterine fibroids—to focusing on the broad range of diseases and conditions that affect women. In response to the breakout rooms and panel discussions, she called for the continuation of interdisciplinary approaches to researching women's health and the benefits of collaborations between specialties. She also commented on the need for consideration of sex and gender as they pertain to pandemic-related issues, particularly immune responses, mental health concerns, and workforce issues. Dr. Pinn concluded by lauding the symposium's presenters, thanking NIH for naming ORWH's signature event after her, and calling for increased focus on SABV, intersectionality, and gender equity in STEMM leadership.

Resources. ORWH developed a "virtual environment" for the symposium, which includes exhibits, agendas, videos, links, and other materials related to the integration of sex and gender into biomedical research. This environment will remain available until the spring of 2022. In addition, video recordings of day 1 and day 2 of the symposium are available on the NIH VideoCasting website.

NIH Announces Winners of Prize for Enhancing Faculty Gender Diversity

NIH has awarded $50,000 each to 10 institutions for their efforts in enhancing faculty gender diversity. Last year, ORWH announced the prize competition aimed at increasing gender diversity among faculty members at colleges and universities and removing barriers for transformative change. The NIH Prize for Enhancing Faculty Gender Diversity in Biomedical and Behavioral Science recognizes institutions that have contributed to systemic change within their biomedical and behavioral science departments to address gender diversity and equity among faculty members.

The winners of the prize competition are:

- WISELI: A Wise Approach to Gender Equity, Women in Science and Engineering Leadership Institute (WISELI), University of Wisconsin–Madison
- A Framework to Promote Gender Diversity & Equity, Rochester Institute of Technology
- Promoting Women of Diverse Creative Expertise, Worcester Polytechnic Institute
- No One Size Fits All: FOCUS's Mosaic of Initiatives, Perelman School of Medicine, University of Pennsylvania
- Participatory Approaches for Gender Equity: CWIMS, Center for Women in Medicine and Science, University of Minnesota Medical School
- Enhancing Faculty Gender Diversity at MD Anderson; Office of Faculty Diversity, Equity and Inclusion; University of Texas MD Anderson Cancer Center
- FIU ADVANCE; Office to Advance Women, Equity & Diversity; Florida International University
- Leveraging Evidence to Enhance Faculty Diversity, University of Houston
- Gender Diversity in Medicine, Columbia University Vagelos College of Physicians and Surgeons

- Achieving Gender Equity at Boston University, Trustees of Boston University, Boston University Medical Campus

ORWH would also like to recognize the following institutions as honorable mentions for their commitment to faculty gender diversity:

- Intersectional Directions: Faculty Success @XULA, Xavier University of Louisiana
- Colorado Trails to Advance Gender Diversity, University of Colorado School of Medicine, Anschutz Medical Campus
- Women in Medicine and Science Program, Office of Faculty Affairs, Wake Forest School of Medicine
- University of Chicago: Using 3 R's to Elevate Women, Department of Medicine Women's Committee, University of Chicago
- Promoting Women Scientists during COVID and Beyond, Mass General Brigham, Harvard Medical School
- Eye of the Tiger: Women with a Will to Thrive, Alliance for Women in Medicine and Science (AWIMS), Southern Illinois University School of Medicine

Society for Women's Health Research Starts New "Friends of ORWH" Organization

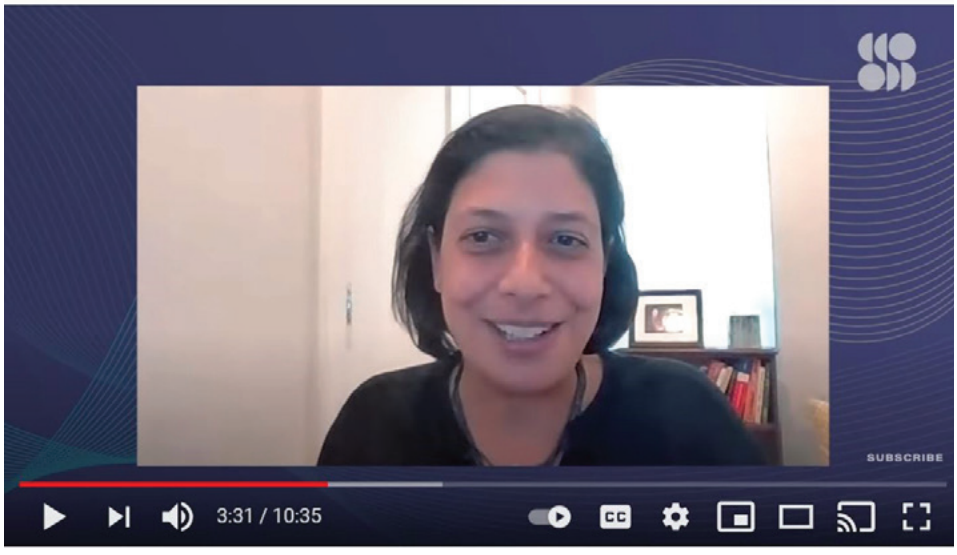
As part of the celebration of National Women's Health Week in May, the Society for Women's Health Research launched the Friends of ORWH (FORWH), a new coalition supporting the work of ORWH, particularly its mission to "strengthen and enhance the prevention, diagnosis, and treatment of illnesses in women and to enhance research related to diseases and conditions that affect women." FORWH member organizations include the American College of Obstetricians and Gynecologists, the Black Women's Health Imperative, the Endocrine Society, Healthy Women, the National Association for Nurse Practitioners in Women's Health, Women Heart, and 30 others. These organizations represent clinicians, researchers, patients, as well as policy and women's health advocates and will support ORWH by meeting regularly with ORWH leadership, elevating issues to legislators, sponsoring briefings and other events to promote ORWH, and other activities. ORWH welcomes FORWH and looks forward to many years of partnership.

IMPROVE Leadership Writes Blog Post on Maternal Health

The leaders of NIH's Implementing a Maternal health and PRegnancy Outcomes Vision for Everyone (IMPROVE) initiative recently published "Time for Action to Improve Maternal Health," a guest blog post on the National Library of Medicine (NLM) website. Co-leaders Diana W. Bianchi, M.D., Director of the *Eunice Kennedy Shriver* National Institute of Child Health and Human Development (NICHD), and Janine A. Clayton, M.D., FARVO, Director of ORWH, described the growing maternal health crisis in the United States, which has the highest rates of maternal morbidity and mortality (MMM) among high-income nations. Data from the Centers for Disease Control and Prevention (CDC) show that about 700 U.S. women die each year from complications related to pregnancy, delivery, or the postpartum period, and approximately two-thirds of these deaths are preventable. Black and American Indian/Alaska Native women are two to three times more likely to die from a pregnancy-related cause than White women. The blog post describes NIH efforts to understand and address MMM, such as the IMPROVE initiative, community engagement forums, academic workshops, investigating nontraditional care models for reducing disparities in MMM, studying the effects of COVID-19 on maternal health, and providing an estimated $223 million for research on maternal health over the past year.

ORWH Associate Director Interviewed for "Why We Know So Little About Women's Bodies" Video

ORWH Associate Director for Clinical Research Sarah Temkin, M.D., appeared on Seeker's popular YouTube channel, in a video titled "Why We Know So Little About Women's Bodies." The video shares important information on the history of women's health and health research, details NIH policies, and provides encouraging and empowering messages for women.



Sarah Temkin, M.D., ORWH Associate Director for Clinical Research, gives an interview for a video produced by Seeker.com.

STAFF UPDATES

Shilpa Amin, M.D., M.B.Sc., M.J., is a board-certified physician who recently joined ORWH. Dr. Amin earned her Bachelor of Science and Doctor of Medicine and Family Practice at the George Washington University; her Master of Biomedical Sciences (Clinical Research) at the Mayo Clinic Graduate School of Biomedical Sciences, Rochester; and her Master of Jurisprudence in health law and health care compliance at Loyola University Chicago. She completed her geriatric fellowship at the University of Pittsburgh Medical Center (St. Margaret Memorial Hospital) and her women's health clinical research fellowship at the Mayo Clinic. Her research and policy interests include quality assurance in women's health preventive and comprehensive care as well as the prevention of burnout in women physicians. Her 20-year career spans patient care, leadership, health services research oversight, and administration with corporate, clinical, and public health care organizations.

UPCOMING EVENTS

Advancing NIH Research on the Health of Women: A 2021 Conference
October 20, 2021
8:30 a.m. – 5:00 p.m. (Eastern Time)

55th Meeting of the Advisory Committee on Research on Women's Health (ACRWH)
October 21, 2021
8:30 a.m. – 5:00 p.m. (Eastern Time)

Building Interdisciplinary Research Careers in Women's Health (BIRCWH) Annual Meeting
December 13, 2021
10:00 a.m. – 3:00 p.m. (Eastern Time)

Specialized Centers of Research Excellence on Sex Differences (SCORE) Meeting
December 14, 2021
Time TBD

Sex Differences in Radiation Research Workshop
April 26–27, 2022
9:00 a.m. – 5:00 p.m. (Eastern Time)

For up-to-date information, visit www.nih.gov/women.

FUNDING OPPORTUNITIES

Administrative Supplement for Continuity of Biomedical and Behavioral Research Among First-Time Recipients of NIH Research Project Grant Awards (NOT-OD-20-055)

Administrative Supplements to Promote Research Continuity and Retention of NIH Mentored Career Development (K) Award Recipients and Scholars (NOT-OD-20-054)

Intervention Research to Improve Native American Health (R01 Clinical Trial Optional) (PAR-20-238)

Research Supplement to Promote Reentry and Reintegration into Health-Related Research Careers (Admin Supp - Clinical Trial Not Allowed) (NOT-OD-21-134)

Research to Improve Native American Health (R21 Clinical Trials Optional) (PAR-20-214)

The Role of Work in Health Disparities in the U.S. (R01 Clinical Trials Optional) (PAR-21-275)

Understanding and Addressing the Impact of Structural Racism and Discrimination on Biomedical Career Progression and the Biomedical Research Enterprise (NOT-GM-21-033)

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