



WOMEN'S HEALTH *In Focus* AT NIH

Newsletter of the NIH Office of Research on Women's Health

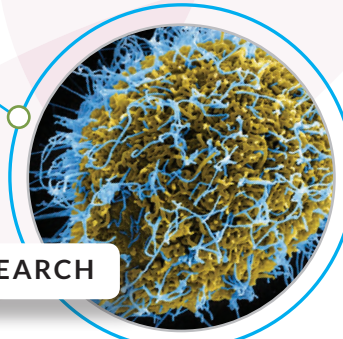
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DIRECTOR'S CORNER



BIOMEDICAL RESEARCH



FEATURE STORY

The tip of the iceberg:
your microbiome and
your health



UPCOMING EVENTS



WOMEN IN SCIENCE



TEAMING UP FOR WOMEN'S HEALTH



Also inside:

- In the Journals
- Noteworthy

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Big Influences in Little Packages: The Human Microbiome and Women's Health

Did you know that there are 100,000 times more microbes in your gut than there are people on the planet? Entire ecosystems of interacting microbes live on and in every epithelial surface of the human body and work together to keep you healthy. Depending on how and when they get out of balance, you could get a minor cold or a chronic condition.

These microbial communities and their genomes are collectively known as the *microbiome*. The microbiome consists of thousands of species of microorganisms — such as bacteria, viruses, and fungi — that live on the skin and in the nose, mouth, lungs, gut, and genitourinary tract. Each habitat, or biome, has its own physical and chemical properties and nutrient sources that make it a unique environment for a particular community of microorganisms.

Microbes perform many healthy functions within the body, including assisting in the digestion of dietary fiber and protecting gut health. But they can also foster disease and might reduce the effectiveness of some drugs by metabolizing the drug before it has its intended effect.

The microbiome has special significance for women, most notably because all of us get our initial microbes from our mother. Vaginally delivered babies acquire a gut microbiome that is ideal for digesting nutrient-rich breast milk. Babies delivered by cesarean section (or C-section) acquire different microbes — ones that are not so well adapted to the infant's needs. Given the increasing popularity of C-sections (up to 90% of births in some countries, such as Brazil¹), millions of children could be at increased risk of diseases such as metabolic syndrome.

From “Us Versus Them” to “Us and Them”

With the development of antibiotics and disinfectants, the elimination of germs became synonymous with “clean” and “healthy.” These antibiotics and disinfectants did what they were designed to do. They prevented infections and saved lives. From the 1950s to about 2000, the incidence of tuberculosis, hepatitis A, and rheumatic fever decreased.

Simultaneously, disturbing trends began. Children were developing more allergies, autoimmune diseases, and metabolic syndrome, which today have reached near-epidemic rates. The incidence of type 1 diabetes, Crohn's disease, multiple sclerosis, and asthma increased as steeply as the infectious diseases decreased.²

It seemed that killing off the germs was having serious unintended consequences. “Epidemiologists noticed that, through the use of vaccines and antibiotics, there was quite a successful drop in many kinds of infectious diseases. But at the same time, they started to see this emergence of many different kinds of allergic or autoimmune diseases, almost like a mirror image of what was happening with infectious disease. So, the question to the scientific community was, ‘What's happening?’” explained Lita Proctor, Ph.D., Program Director of NIH's Human Microbiome Project (HMP).

NIH initiated HMP in 2007 and funded it through 2016. Its goals were to develop research resources for rapid release to the scientific community. “In Phase 1,” Dr. Proctor explained, “the intention was to figure out ‘who is present’ — which microbes populate specific



Lita Proctor, Ph.D.
Director of the Human
Microbiome Project

The NIH Office of Research on Women's Health (ORWH) considers women's health to be everything that affects the health of a woman from head to toe and across the life course. Our newsletter is designed to showcase the multifaceted research on women's health that is being supported by NIH Institutes and Centers and to highlight relevant scientific advances.

Doing research to inform and improve the health of women and delivering optimal clinical care to women requires multidimensional thinking. In this issue, our feature article explores the connections between microbiomes — assemblages of microbes inhabiting different microenvironments on and inside the human body — and breastfeeding, urinary tract infection, and other issues of importance to the health of women. A column on policy discusses key ways the 21st Century Cures Act emphasizes research on the health of women.

This newsletter also contains content of interest to women in biomedical careers and announcements of recent NIH/ORWH activities concerning women's health. These include Barbra Streisand's NIH J. Edward Rall Cultural Lecture, the 3rd Annual NIH Vivian W. Pinn Symposium, and a recent meeting of the NIH Advisory Committee on Research on Women's Health.

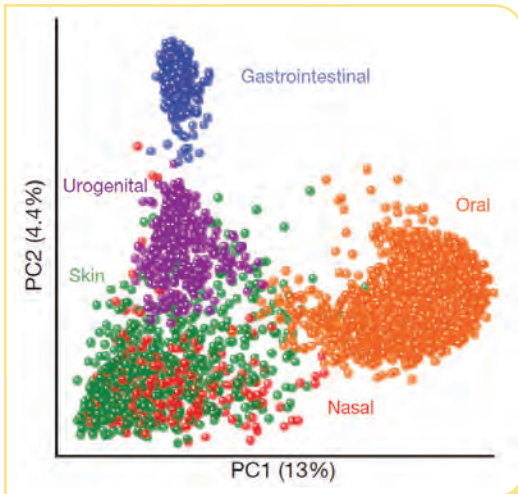
We hope you learn from, are inspired by, and enjoy reading this edition of Women's Health in Focus at NIH. Please share our newsletter widely and encourage others to subscribe.



Janine Austin Clayton, M.D.
Director, ORWH and Associate Director
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areas — to serve as a reference dataset of a healthy cohort, for later comparison to understand the contribution of the microbiome to disease.” Five biomes — skin, nose, mouth, gastrointestinal tract, and genitourinary tract — were sampled from a total of 300 men and women. One not-so-surprising finding was that microbial constitution in each body region is largely distinct (although there is some overlap).³



Variation in microbial community structure, shown here, is measured genomically and quantified using principal coordinates analysis, among individuals (points) and habitats in the human body (colors and labels).

Reprinted with permission from reference 4.

Next, about a dozen additional studies examined microbiome differences associated with disease. Significant variability was found among disease characteristics, as well as among individuals. If our genome gives us our shared human traits, our microbiome supplies uniqueness.

Finally, HMP conducted a set of longitudinal studies that examined the integration of the microbiome and the host. Genomics, proteomics, metabolomics (a comprehensive study of genes, proteins, and metabolites, respectively), and other ‘omic studies allowed the microbes to be identified without having to isolate them, which is fortunate because most of them cannot be cultured. Because the microbes did not have to be isolated, they could be studied at the community level to determine which microbes “hang out” with which other microbes.

“HMP catalyzed the field by creating various tools,” Dr. Proctor explained, referring to the protocols, analytic pipelines, and

primary and derived datasets on species composition in healthy humans versus humans with certain diseases. After 2010, NIH investment in microbiome research expanded. According to Dr. Proctor, “The initial \$200 million investment has burgeoned into a \$1 billion investment since 2008, with 21 of the 27 Institutes now funding microbiome research, involving over 700 investigators.”

Baby’s First Microbiota

Infants are microbe magnets who get their first microbiota from their mother. Although some microbes pass through the blood and amniotic fluid, most are ingested as they pass through the vaginal canal.³ Neonate microbiota initially match those of the mother’s vaginal canal, but by the time infants are weaned from breastfeeding, they shift to match those of the mother’s gut.⁴ The neonate’s initial microbiome is ideally suited to digest rich breast milk and provide sufficient energy to fuel the developing brain. It also enables the immune system to develop and begin to organize communication among the various systems — neural, metabolic, immune, and endocrine. It takes about three years for a child’s microbiome to stabilize.

Infants born by C-section pick up more environmental microbes, for example, through skin contact or from the air. Hence, the initial microbiome is not optimally suited to perform its tasks of digesting breast milk and developing the immune system. These children also have greater colonies of potentially harmful microbiota, such as *Clostridium*, and are more prone to obesity, celiac disease, asthma, necrotizing enterocolitis, and type 1 diabetes later in life.⁵

Due to the importance of the maternal microbiome to the newborn, Tracy Bale, Ph.D. — Professor in the Departments of Pharmacology & Psychiatry and Director of the Center for Epigenetic Research in Child Health and Brain Development at the University of Maryland

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School of Medicine — studies factors that upset the optimal microbial balance in mothers. Specifically, Dr. Bale, whose work was supported by the **National Institute of Mental Health** and an **ORWH Specialized Centers of Research on Sex Differences award**, looks at the effects of maternal stress on the infant’s microbiome. In mice, she found that stressed mothers pass on fewer *Lactobacillus*, a type of bacteria, which could predispose infants to neurodevelopmental and gastrointestinal disorders.⁶

Dr. Bale’s work also revealed that stress-induced disruption of the maternal microbiome can have long-term outcomes that display important sex differences among the offspring. Specifically, “male offspring are more susceptible to the effects of maternal stress.” They show greater stress sensitivity, anxiety and depressive-like behavior, and cognitive deficits.¹

Dr. Bale also found robust sex differences in the immune system of neonates and how the immune system interacts with the microbiome. She described some exciting new research published in *Nature Neuroscience*⁷, explaining that, during childbirth,

these maternal [stress-related] changes correspond to neonate gut changes in the microbiome, as they are “seeded” differently as they pass through the birth canal. The initial interaction of these microbial species sets off a distinct programming that surfaces again during puberty and into adulthood. While the exposure to changes in the vaginal microbiome in response to maternal stress is the same for males and females passing through the birth canal, the prenatal programming of the immune system and gut itself is sex specific.

The Microbiome, Coronary Artery Disease (CAD), and Urinary Tract Infection (UTI)

Data from some studies have suggested a connection between the oral microbiome and heart disease, which is the leading cause of death for women in the United States.⁸ Dentists have long known that CAD and periodontitis often occur together, but one doesn’t necessarily cause the other.⁹ Now, researchers are also seeing ties between oral dysbiosis (an imbalance in the “normal” oral microbiota) and obesity and diabetes, which can be precursors to CAD.^{9,10} Such links may be due to common risk factors, such as inflammation, that affect both oral health and other areas of the body.

From the standpoint of the genitourinary tract, women are disproportionately affected by UTI, and antibiotics are still the first-line treatment. According to Scott Hultgren, Ph.D., Helen L. Stoeber Professor of Molecular Microbiology at Washington University of St. Louis, about 10% of acute UTIs recur and become a chronic condition, resulting in antibiotic-resistant infections.¹¹

Dr. Hultgren’s colleague at the Broad Institute of MIT and Harvard, Ashlee Earl, Ph.D., explained the vicious cycle that antibiotic use initiates:

To treat recurrences, the options are antibiotics or antibiotics. We know that these drugs wreak havoc on our microbial ecosystems, which begets more of the same or more of something a lot worse. We also know that antibiotics break down something we call “colonization resistance.” The normal, healthy gut flora are able to keep out invading bugs, including antibiotic-resistant ones, but [when one is] on antibiotics, colonization resistance goes away. You can think about it in terms of your green lawn. When there’s a drought, the grass starts to die, and drought-tolerant weeds can come in and take over.

Each biome (mouth, gut, skin, etc.) has a relatively unique set of microbiota. UTI occurs when certain bacteria from the gut are transferred to the urinary tract. Dr. Hultgren and colleagues believe that they have found a way to treat UTI without antibiotics. Their pioneering work, supported by an **ORWH Specialized Centers of Research on Sex Differences award**, co-funded by the **National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK)** and separately funded by the **National Institute of Allergy and Infectious Diseases**, has identified how the uropathogenic strains of *E. coli* attach to the bladder wall and then invade

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the bladder cells.¹² Fortunately, they are developing precision antimicrobials that do not kill microbes generally, but rather allow the body to eliminate the pathogenic bacteria.

“*E. coli* have a molecule, FimH, that binds to the bladder cells,” Dr. Hultgren explained, “and FimH binds mannose [a sugar molecule], which is ubiquitous in bladder cells.”

First, they tested an investigational FimH vaccine. In the clinical study, volunteers with many UTI recurrences showed a 70–87% decrease in *E. coli* re-infection. Now, they are testing a molecule that mimics mannose, called mannoside, and are finding that, in mice, mannoside binds FimH with over a million-fold more potency.

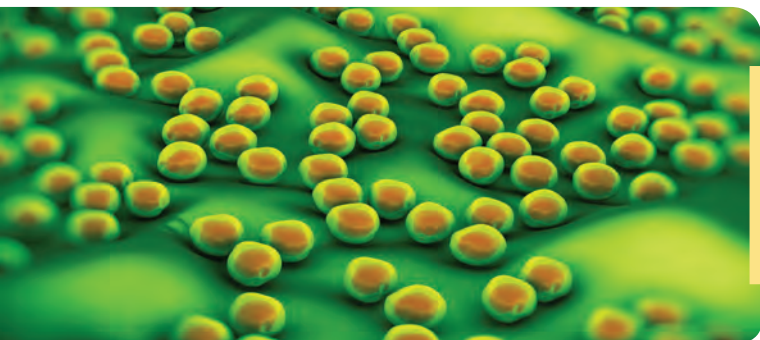
“Mannoside, like molecular tweezers, gets rid of the pathogen and leaves the rest of the microbiota structure intact and healthy,” Dr. Hultgren explained. “If you can get rid of the reservoir [of *E. coli* cells in the gut], you could also decrease the rate of recurrence, which would reduce our dependency on antibiotics.”

Leveraging the Microbiome for Better Health

It is becoming increasingly apparent that keeping the microbiome healthy could help keep the whole body healthy. The [HMP website](#) describes the latest research and its applications to our health.

An advocate for having a healthy microbiome is Emeran Mayer, M.D., Executive Director of the G. Oppenheimer Center for Neurobiology of Stress and Resilience at the University of California, Los Angeles, and a Specialized Centers of Research on Sex Differences Principal Investigator (co-funded by ORWH and NIDDK). In his book *The Mind-Gut Connection: How the Hidden Conversation Within Our Bodies Impacts Our Mood*, he describes how the gut and brain are in constant communication.¹³ He is optimistic about what can be accomplished by modulating the microbiome by dietary intervention. For example, he

We humans are truly supraorganisms, composed of closely interconnected human and microbial components, which are inseparable and dependent on each other for survival.
— Emeran Mayer, M.D., Executive Director, G. Oppenheimer Center for Neurobiology of Stress and Resilience at the University of California, Los Angeles, and an ORWH Specialized Centers of Research on Sex Differences Principal Investigator¹³



“Superbug” methicillin-resistant *Staphylococcus aureus* (MRSA) bacteria.

For a Healthy Gut Microbiome:

- Aim to maximize microbial diversity through regular intake of naturally fermented foods and probiotics.
- Reduce low-grade inflammation by cutting down on animal fat and sugar and avoiding mass-produced, processed food.
- Select organically grown food.
- Eat smaller servings at meals.
- Be mindful of prenatal nutrition.
- Reduce stress and practice mindfulness.
- Avoid eating when stressed, angry, or sad.
- Enjoy the secret pleasures and social aspects of food.
- Become an expert in listening to your gut feelings.

Adapted from *The Mind-Gut Connection*, by Dr. Emeran Mayer

describes how some of his patients with irritable bowel disease, depression, and even obsessive-compulsive disorder found relief by switching to a predominantly plant-based diet enriched with naturally fermented foods and by taking probiotics.

However, studying the microbiome is not simple. Indeed, the complexity is likely to change the way medicine is studied and practiced. Jonathan Livny, Ph.D., another colleague of Dr. Hultgren at the Broad Institute of MIT and Harvard, summed up the situation: “We’ve found that for a complex issue like this, it takes a village to understand it. What’s challenging, but also fun, is that to really understand the microbiome, you need lots of different people, looking at it in different ways, to work together.”

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Inclusion of Women in Clinical Research

Men and women have different chromosomes, hormones, organs, and cultural influences that can affect their health. For clinical research to be truly useful for different kinds of people, it needs to reflect the populations that stand to benefit from the research.¹ ORWH plays an important role in fostering the inclusion of women in clinical research by providing outreach and education to help investigators understand that including women makes results stronger and more robust.

As recently as 25 years ago, few women had the option of taking part in clinical research. Women were excluded from trials of treatments that could have directly benefited their own health as well as that of future generations of women. As a result, our knowledge base about the progression and treatment of many diseases in women was limited.

The 1993 [NIH Revitalization Act](#) changed that.² The Revitalization Act requires that women and minorities be included in NIH-funded clinical research. With the passage of the Act, what had previously been NIH policy became public law. June 10, 2018, marked the 25th anniversary of this legislation.³

Today, more than half of the participants in NIH-sponsored clinical research are women.⁴ While this shows substantial progress, more remains to be done as researchers work toward better health for women across the lifespan.

Case in Point: Cardiology Clinical Trials

ORWH Director Janine A. Clayton, M.D., and co-author Matthew Arnegard, Ph.D., recently published a call to action in *Clinical Cardiology*⁵ that illuminates issues of women's inclusion in clinical research. While Drs. Clayton and Arnegard applaud increased awareness of gender disparities in heart disease research and treatment, they call on the medical community to do more. Due to the fact that they are underrepresented in cardiovascular disease trials, women benefit less than men do from sex- and gender-appropriate evidence-based cardiologic medicine.

In their call to action, Drs. Clayton and Arnegard point to **steps researchers can take toward better representation of women in clinical research**, which include the following:

- Avoid arbitrary age cutoffs in clinical research, especially for conditions most prevalent in older populations.
- Conduct targeted outreach in community settings to educate women about safeguards built into clinical research, participant rights, potential direct benefits to participants, and long-term benefits to women in general, including their daughters and granddaughters.
- Engage more local health care providers in opportunities for clinical research.



- Consider other tactics, such as women-friendly branding; the involvement of female clinicians/researchers; and sites that provide childcare, flexible hours, and options for at-home follow-up.

Because cardiovascular disease incidence varies substantially by race and ethnicity, recruitment approaches need to be culturally competent. For clinical research to be truly useful, it must reflect the populations it intends to help. Clinical research participants should represent those who stand to benefit most from the research.

Beyond Inclusion

To be clear, laws and strategies for the inclusion of women in clinical research are not enough. Trials need to be designed to facilitate data disaggregation by sex, gender, race, ethnicity, and other variables. Consideration needs to be given up front to the infrastructure and funding required to disaggregate data. This process will enable research and analysis to account for individual people's differences, to the benefit of all.

Resources for Researchers

ORWH's website includes links to an array of [Inclusion Policy resources](#). NIH monitors inclusion data through the [Inclusion Management System](#).

- 1 [National Institutes of Health, Office of Research on Women's Health. "Including Women and Minorities in Clinical Research."](#)
- 2 [National Institutes of Health, Office of Research on Women's Health. "Women's Health Research: 25 Years of Progress \(and counting\)."](#)
- 3 [National Institutes of Health, Office of Extramural Research. "NIH Policy and Guidelines on the Inclusion of Women and Minorities as Subjects in Clinical Research."](#)
- 4 [National Institutes of Health, Office of Research on Women's Health. "Report of the Advisory Committee on Research on Women's Health."](#)
- 5 [Clayton et al. 2018. *Clin. Cardiol.* 41:179-84.](#)

Study Finds Disparities in Chlamydia Diagnoses Among Diverse Women in King County, Washington

(Original article by [Chambers et al. 2018. Clinical Infectious Diseases. published March 5, 2018. Epub.Feb.6, 2018; Print. PubMed.](#))

Sexually transmitted infections (STIs) among women continue to show disparities across race and economic status. *Chlamydia trachomatis* is not only the most commonly reported STI in the United States, it can cause significant fertility and reproductive tract complications, such as pelvic inflammatory disease, tubal factor infertility (infertility that occurs when disease, damage, or obstruction in the fallopian tubes prevents the sperm and egg from meeting), and more. Given the high prevalence of chlamydia infections among women and the young age at which they first manifest, as well as the disparity of infection across racial and economic lines, a recent study from King County, Washington, examined the lifetime risk of chlamydia trachomatis diagnosis and reproductive health among diverse women.

The disparity was profound — more than 60% of non-Hispanic black women had experienced at least one chlamydia diagnosis by age 34, a rate that was five times higher than that in non-Hispanic whites. An estimated 1 in 500 non-Hispanic black women develops chlamydia-related tubal factor infertility.

More effective prevention and control measures are needed to prevent transmission as well as to avoid the consequences of chlamydial infection, including providing greater education and linking prevention messages for HIV infection to other STIs. This paper provides data to demonstrate how the interventions attempted in King County appear to have had some success in those populations with the highest rates of chlamydial infection, primarily non-Hispanic black women.

Although non-Hispanic black women had the highest rates of chlamydia diagnosis in this study population, their risk declined significantly over the study period even though the risk increased for non-Hispanic white and Hispanic women. (The cumulative

risk for chlamydia by age 24 was 57.3% for black women born between 1980 and 1984; this risk declined to 38.6% for black women born between 1990 and 1994.) This can be attributed to national chlamydial screening programs that took place in King County, including the Centers for Disease Control and Prevention's Infertility Prevention Project, which focused on low-income and minority women.

Perspectives on Sex Differences in Metabolism and Cardiometabolic Disease Across the Lifespan: Designing Preclinical Studies and Identifying Critical Gaps in Research

(Original articles by [Mauvais-Jarvis et al. 2017. Cell Metabolism. 25: 1216-1230](#) and [Reusch et al. 2018. Endocrinology. 159: 9-19.](#))

A common attitude among researchers is that most mammalian physiological systems are fundamentally the same in males and females, and therefore studying one sex — largely male — is sufficient, despite inherent differences in male and female biology. The [NIH Sex as a Biological Variable policy](#) focuses on NIH's expectation that scientists will account for the possible role of sex as a biological variable in vertebrate animal and human studies to correct this bias.

Two articles affirm the NIH policy and posit that studies of sex differences on the physiological processes involved in metabolic homeostasis, when designed appropriately, will identify critical gaps in knowledge, help us understand novel factors reducing metabolic disease from a sex-specific basis, and drive the development of specific treatments for disease.

In a perspective published in *Cell Metabolism*, Mauvais-Jarvis et al. provide a guide for the appropriate experimental design and interpretation of research on sex differences in metabolic homeostasis and disease. The authors also discuss the use of animal models and cells in research, highlighting the rodent model as an especially tractable system for study, not only for research on reproductive behavior and traits across the life course, but — critically — for understanding why disease differs in the two sexes.

Cardiometabolic disease is an example of a disease that differs widely in the two sexes. Cardiovascular disease is the most prevalent cause of death in both men and women. However, much less is known about its effects in women, and current research identifies crucial differences. In an article published in *Endocrinology*, Reusch et al. discuss the current state of research addressing sex differences in cardiometabolic health across the lifespan — an area of research in which more study is needed. This article outlines critical gaps in research that must be addressed and discusses strategies for addressing sex as a biological variable in research to understand disease mechanisms and develop diagnostic and therapeutic modalities.





Excess Cardiovascular Risk in Women Relative to Men Referred for Coronary Angiography Is Associated With Severely Impaired Coronary Flow Reserve, Not Obstructive Disease

(Original article by [Taqueti et al. 2017. Circulation. 135: 566-577.](#))

In the United States, cardiovascular disease (CVD) is the leading cause of death among women, and more women than men die from CVD. Currently, coronary angiography is the standard diagnostic tool for individuals presenting with CVD symptoms, because coronary artery disease (CAD) is the most common type of CVD. However, the obstructive form of CAD is less prevalent among women, and women who experience CVD symptoms are less likely than men to show signs of obstructive CAD on angiography.

Findings from this study, funded in part through the NIH Building Interdisciplinary Research Careers in Women's Health (BIRCWH) Program, suggest that while coronary angiography is an effective way to diagnose obstructive CAD, it may not be the best method for detecting overall CVD risk in women. Measuring coronary flow reserve (CFR), which is not routinely done in clinical practice, may be a more effective way to evaluate CVD risk in women.

The results showed that, in comparison with men, women referred for coronary angiography had a lower burden of obstructive CAD; however, they still demonstrated a similar or greater risk for CVD. Impaired CFR contributed to a significant proportion of this excess risk for CVD in women, and only women with severely impaired CFR showed increased risk for CVD in comparison with men.

By measuring CFR, researchers identified a “hidden biological risk” for CVD in women that couldn't be fully evaluated by a coronary angiography. Further investigation is needed to determine the best methods for evaluating CVD risk in women in order to better diagnose CVD and reduce the rate of CVD death in women.

Clinician Resource Now Available for Simplified Diagnosis of Dry Eye Disease

(Original article by [Clayton. 2018. N Engl J Med. 378: 2212-2223.](#))

Janine A. Clayton, M.D., Director of ORWH and a board-certified ophthalmologist, has developed a resource to help clinicians diagnose and treat dry eye disease. An often painful and debilitating condition, dry eye disease affects nearly 5 million Americans, and affects twice as many women compared with men.

Beyond causing pain, the condition can disrupt vision and affect quality of life, making it difficult for those affected to read, drive, and enjoy leisure activities. People with dry eye disease can encounter additional challenges because the disease is “invisible” — others may not be aware when someone has the disease and may not be understanding when that person requires adjustments to his or her environment, such as avoiding areas of high air flow or taking breaks from computer work.

The term *dry eye disease* describes a series of signs and symptoms associated with inadequate quantity and/or quality of tears to keep the surface of the eye lubricated. The condition is difficult to diagnose due to a wide variety of underlying causes and symptoms. Complicating the diagnosis of dry eye disease, patient-reported symptoms may not correlate with the clinical examination. For example, a patient may report symptoms but not have any visible damage to the surface of the eye, prompting clinicians to treat the symptoms of the disease, offering only temporary relief. Dr. Clayton's article provides a clear overview of the subtypes of dry eye disease to better equip clinicians to diagnose and treat cases.

Related Resource: In the study “Web-Based versus Paper Administration of Common Ophthalmic Questionnaires,” the authors found that a web-based ophthalmic, patient-reported outcome questionnaire produced scores equivalent to a paper-and-pencil version, suggesting the use of a web-based form would not hinder patient evaluations. ([Clayton et al. 2013. Ophthalmology. 120: 2151-2159](#))



Featured Research and Perspectives

New Career Outcome Taxonomy Helps Visualize Detailed Postdoctoral Employment Trends

(Original article by [Xu et al. 2018. Nature Biotechnology. 36: 197-202.](#))

As the number of postdoctoral scholars increases and tenure-track positions remain flat, the need for tools to track career outcomes is critical. The authors created a standardized career taxonomy and visualization methodology to track career outcomes of doctoral degree holders from the **National Institute of Environmental Health Sciences (NIEHS)** who were trained as postdocs at NIEHS within the past 15 years. This system was used by the NIH Intramural Research Program in 2014 for the preliminary reporting of the career outcomes of NIH postdoctoral scholars. To demonstrate the system tools, the authors presented the outcomes of the NIEHS postdoctoral scholars, which showed, for example, that more than half entered careers in academia, with only 29% in tenure-track positions. Further, the U.S. postdocs pursued for-profit sector positions at a higher rate than international postdocs. Disciplines representing the highest percentage of tenure-track positions were biostatistics/computational biology (58%) and epidemiology (48%). The authors suggest that the tools would be useful to prospective doctorate holders and postdoctoral scholars to evaluate their career options.



Gender Equality Paradox Is Apparent in Science, Technology, Engineering, and Mathematics Education

(Original article by [Stoet et al. 2018. Psychological Science. 29\(4\): 581-593.](#))

Women are underrepresented in the fields of science, technology, engineering, and mathematics (STEM) worldwide. The authors conducted an analysis of a global education survey, including 472,242 students from 67 countries. In 67% of the countries, girls performed equally or better than boys in general science literacy, yet girls remain underenrolled in STEM college degree programs. Boys report greater self-efficacy and interest in science than girls and perform better in science and math, relative to other subjects. Girls often score higher in science than boys but are even better in

reading. The authors posit that selecting a field of study is influenced by attitudes, motivations, and socioeconomic/contextual factors, but also relative academic strengths. Paradoxically, countries with greater gender inequality have more women STEM graduates compared with more gender-equal countries. This finding suggests that jobs in STEM fields may be a crucial step toward a girl's future economic security. The authors suggest that researchers of STEM studies expand their analyses to consider the broader sociological and economic contexts in which individual students make decisions about their course of study.

Student Evaluations Reveal Gender Bias

(Original article by [Kristina M.W. Mitchell and Jonathan Martin. 2018. Political Science & Politics: 1-5.](#))



Student evaluation of teachers (SETs) can influence university employment decisions, including tenure and raises. However, studies have found evidence of gender bias in SETs for in-person and, more recently, for online courses. The authors conducted a content analysis of student comments on political science course evaluations and an online anonymous instructor rating site, as well as a quantitative analysis of scores for a male and a female instructor of identical online courses. Findings showed significant differences in the language used to evaluate male and female instructors, with students evaluating the women more on personality and appearance and referring to the women more often as "teacher" rather than "professor" as compared with men. Furthermore, for the identical online courses, the male instructor received higher evaluation scores than the female instructor, even on questions that were not instructor-specific, such as those related to course content. These findings provide evidence of the existence of gender bias in SETs within the field of political science, contributing to the growing body of literature that suggests this problem may be systemic throughout academia.

Alicia Zhou, Ph.D.

Dr. Alicia Zhou is the Head of Research at Color Genomics, a Silicon Valley company that provides physician-ordered genetic testing at a low cost. She earned a bachelor's degree in biology from the Massachusetts Institute of Technology (MIT) and a Ph.D. in biological and biomedical sciences from Harvard University. Dr. Zhou worked as a research technician at MIT's Whitehead Institute in the lab of Robert Weinberg, Ph.D.; carried out graduate work at the Dana-Farber Cancer Institute and at the Broad Institute of MIT and Harvard in the lab of William Hahn, M.D., Ph.D.; and completed postdoctoral work at the University of California, San Francisco. Her postdoctoral advisors were Andrei Goga, M.D., Ph.D., and Nobel Prize winner J. Michael Bishop, M.D.



Alicia Zhou, Ph.D.
Head of Research at
Color Genomics

What do you enjoy about being a scientist?

I love being a scientist. I knew I wanted to be a scientist since I was very young. When I was in high school, I loved my biology class and became curious about what it would be like to do research at the bench. I took a chance and applied to be a research intern in an academic research lab while I was still in high school. I was very lucky to be able to work in the lab of Geoffrey Greene, Ph.D., a professor at the University of Chicago who was doing breast cancer research. During the two years I spent in his lab, I learned a lot of the basics of molecular biology. It was in his lab that I validated for myself that I wanted to be a Ph.D. scientist.

How do you manage work/life integration? Do you have tips for young scientists about this?

MIT is highly competitive, and I saw many fellow freshmen fumble in that environment. I did well at MIT and was fortunate to graduate with a 5.0 GPA. When people ask me how I did this, I reply that I couldn't have done it without joining the Taekwondo team at MIT. I started Taekwondo as a beginner during my freshman year at MIT. Over the course of four years, I got my black belt through the MIT Sport Taekwondo Club under the mentorship of Master Dan Chuang. I continued competing after I graduated and eventually became part of the U.S. Collegiate Taekwondo team for two years. My experience in Taekwondo is what grounded me in my academic life. I think that in order to navigate an academically competitive environment, it's important to ground yourself in something that you're passionate about. That something may be intellectual, such as reading books or playing chess, or something physical. Taekwondo anchored me, and I continue to practice to this day. So, the one piece of advice I would give to young scientists is to pick something that anchors you in your life and commit to it. It will help you excel in all the other aspects of your life.

How has mentorship (either as a mentor or mentee) shaped your career?

I've been blessed to have great mentors. It started with Dr. Greene. He saw the potential in me and was willing to take a chance on a 14-year-old to do lab work. Dr. Greene was very nurturing and supportive and really ignited my curiosity for science and research. In addition, my undergraduate mentor, Dr. Robert Weinberg, truly taught me to think like a scientist. He was an amazing role model and an excellent mentor. Even though he is one of the most important cancer researchers in the field, he still made time for trainees in his lab, which is one of the reasons he is a great mentor.

Has the trajectory of your career changed over time?

Yes, it has. Both of my parents are academics, and for my entire life I was pretty sure I would also be an academic. I grew up around university campuses my whole life. When I was a kid, I used to go to my mom's office after school and hang out in the university library to do my homework. I followed the typical academic path of getting my Ph.D., completing my thesis, getting fellowships, and doing postdoc work. It was a surprise to everyone, even me, when I left academia to join Color Genomics. It turned out to be the best career decision I've ever made. I felt that what I was doing in the academic lab was decades away from implementation in the clinic and wanted a more practical way to help people. At Color, people call in and let us know how the tests we've developed have changed their lives. Being able to effect change much closer to the bedside drove my decision to move to the private sector.

What other female scientists do you admire and why?

When I was at MIT, I took a class with Hazel Sive, Ph.D., who is a professor there and a member of the Whitehead Institute. She teaches undergraduate developmental biology. I loved learning from her. She is an incredible teacher and also ran a high-impact, big lab at the Whitehead Institute, while still being an awesome spouse and parent. She was a strong female figure and inspired me to become a female scientist. She showed me that women in science could really have it all.

What are some of the challenges of being a female scientist?

The biggest challenge is that there aren't a lot of female role models. There are more women as undergraduate and graduate students in biology than men, but there are more male faculty members than women. As a young woman in training, it's challenging to look up into the highest echelons of academia and see so many men but not many women.

Do you have advice for young female scientists?

The one thing that I've learned is that believing in yourself and having strong convictions are incredibly important. It's key to own who you are and know where your strengths lie. Also, raise your voice when you feel your opinion should be heard. If you feel your opinion is valuable, instead of shying away, step up and raise your voice.

Continued on page 11

What is a life achievement of which you are most proud?

Personally, marrying my amazing husband and having our awesome (and rambunctious) son. Extracurricularly, it would be making the U.S. Collegiate Taekwondo team and winning a world bronze medal while on the team. And professionally, it would be working with one of the best teams in the world to help people lead their healthiest lives.

Who were your scientific role models?

I've been very lucky to work with some of the best professionals in the field of cancer research. At MIT, I worked with Robert Weinberg, Ph.D., who is the grandfather of cancer biology. In my postdoc, I also got to work with Michael Bishop, M.D., who was awarded the Nobel Prize in Physiology and Medicine in 1989. So, I have had the privilege to work side-by-side with true giants in my field. That's an experience that is both humbling and inspiring, because it motivates you to always reach higher and dream bigger.

INSTITUTIONAL SPOTLIGHT



Yale University positions itself on the cutting edge of medical education, practice, and biomedical research by examining health differences between women and men. From biological differences (such as the impact of alcohol in women's and men's bodies) to sociological differences (such as the predominant number of caregivers being women), health is best viewed through the lens of individual experience. Sex and gender are important parts of the human experience. As such, Yale's NIH-funded program the [Specialized Centers of Research on Sex Differences](#)¹ seeks to examine sex and gender differences and "[train] the next generation of researchers to study the influence of sex and gender on health outcomes."²

Yale prepares medical students to address health holistically and within a sociological understanding of structural inequality. This aligns with Yale's mission to "provide outstanding care and service for patients in a compassionate and respectful manner."³ Access to healthy options and medical care are filtered through the intersections of gender, race, socioeconomic status, and other important biological and sociocultural determinants of health. To truly understand health outcomes, one must understand the patient as more than a body. Njeri Thande, M.D., a cardiologist and Assistant Professor at Yale School of Medicine, advocates for the study of women's health.

Yale School of Medicine Focuses on Sex and Gender in Medical Research and Education

Dr. Thande believes that a comprehensive understanding of patient sex and gender are significant in medicine. She uses her experience as a doctor to educate and inspire medical students.

"Gender is a complex sociocultural identity," Dr. Thande said. "I was never more aware of the complex interplay between gender and health than when I had to discuss the cardiac implications of hormonal therapy with one of my transgender patients who had coronary artery disease. To practice good medicine, physicians and our students need to be sensitive to the complex identities of their patients."⁴

While traditional medical school teaching models study the human body in isolation from sociocultural and biological factors that can reciprocally affect patient health, Dr. Thande advocates a more nuanced understanding. "We want students to understand that sex and gender aspects of health are not to be considered independently," she said. "I hope they learn to adopt a sex and gender lens that impacts every aspect of their medical research or practice. And that won't happen if it's taught separately."⁴

Yale's work in integrating sex and gender into the medical curriculum is further enhanced by gender- and sex-sensitive research. The university's commitment starts at the top, with leaders like Carolyn M. Mazure, Ph.D., Director of the institution's inter-disciplinary research center on health and gender — Women's Health Research at Yale. Dr. Mazure supports sex/gender studies and analyses aimed at improving clinical outcomes and patients' lives

through understanding when and how sex and gender influence health. Dr. Mazure, who is also the Scientific Director of Yale's Specialized Centers of Research on Sex Differences, is currently developing gender-sensitive treatments for tobacco dependence. A member of the NIH Advisory Committee on Research on Women's Health, she believes that "virtually everything that is studied should be studied with an eye toward sex differences."⁴

By examining sex and gender differences, Yale adds to the growing amount of literature on differential health effects based on biology and lived experience. These cutting-edge discoveries, in turn, influence all aspects of Yale medical education.

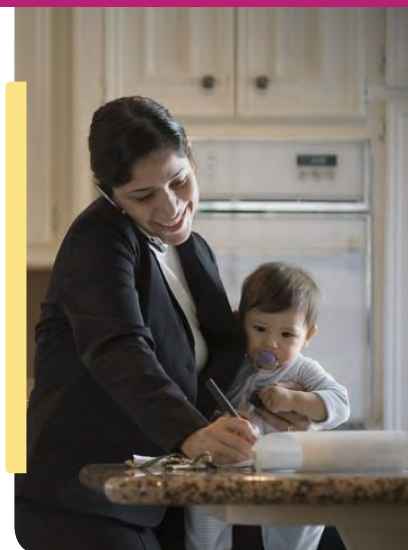
Note: Considering sex as a biological variable and ensuring appropriate analyses by sex and gender are described on the NIH web page "[Inclusion of Women and Minorities as Participants in Research Involving Human Subjects](#)." Guidance for basic and preclinical research is specified in "[Consideration of Sex as a Biological Variable in NIH-funded Research](#)."

1. Yale University is 1 of 11 awardees of the [Specialized Centers of Research on Sex Differences](#) program. The program is funded by ORWH, the National Institute on Aging, the National Institute of Arthritis and Musculoskeletal and Skin Diseases, the Eunice Kennedy Shriver National Institute of Child Health and Human Development, the National Institute of Diabetes and Digestive and Kidney Diseases, the National Institute on Drug Abuse, the National Institute of Mental Health; and the Office of Women's Health at the U.S. Food and Drug Administration.
2. [Yale School of Medicine. "Women's Health Research at Yale: Improving the Lives of Everyone."](#)
3. [Yale School of Medicine. "The YSM Mission Statement."](#)
4. [Yale School of Medicine. "New Opportunities in Medical Education."](#)

Stay-at-Home Parents Face Increased Job Discrimination When They Are Ready to Go Back to Work

(Original article by [Kate Weisshaar](#). *Harvard Business Review* n.p., February 22, 2018.)

Job applicants who have temporarily left the workforce to care for children face more employment discrimination when attempting to reenter the workforce than those who have been laid off or who are seeking new employment. In fact, stay-at-home parents, disproportionately women, are nearly half as likely to get a callback for a job interview as unemployed parents and one-third as likely as employed parents. In a study published in *American Sociological Review*, Weisshaar hypothesizes that lapses of unemployment “signal” a decline of worker capacity and violate an ideal of time commitment and availability outside scheduled working hours. While “opting out” — or choosing to exit the labor force due to the pressure of balancing care and work demands — affects all parents, mothers fare far worse. Opt-out employees are viewed by employers as less capable, less reliable, less deserving of a job, and less committed to work compared with unemployed applicants. In an experiment, human resource professionals reviewed identical resumes that only differed in terms of “signaled” genders and gaps in employment. Only 4.9% of stay-at-home mothers received a callback for an interview as compared with 9.7% of employed mothers and 8.8% of unemployed fathers. Inflexible and demanding work cultures not only drive parents out of the workforce, they can also delay or prevent reentry. Occupational norms and expectations for working parents need to change to address economic inequality; capture talent; and ensure healthy, productive workers.



Women Show the Cost of the Harassment Tax in Academia

(Original article by [Lydia Zepeda](#). 2018. *Science*. 359(6371): 126.)



In a personal narrative, Lydia Zepeda details the impact sexual harassment had on her and her female-identifying colleagues in the university. Based on her experience, she argues that the near constant occurrence and fear of future harassment diminishes female roles in academia by taxing women’s motivation, energy, and productivity. Inappropriate sexualized comments and sexual advances cause emotional and physical stress and take time away from women’s professional advancement and scientific contributions. The author posits that feeling unsafe from these comments and advances at work has caused women to turn down jobs, quit jobs, or retire early. One way to protect women in academia is to ensure that Title IX* investigations are transparent and nonshaming. In addition, women need the support of all bystanders, especially men, to speak up every time harassment occurs and show that this behavior is unacceptable.

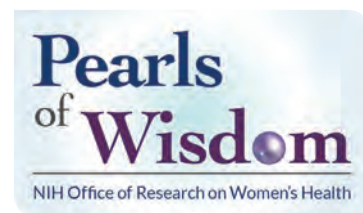
* Title IX of the Education Amendments of 1972 is a Federal civil rights law that protects people from discrimination based on sex in education programs or activities that receive Federal financial assistance. It states, “No person in the United States shall, on the basis of sex, be excluded from participation in, be denied benefits of, or be subjected to discrimination under any education program or activity receiving federal financial assistance.”¹

1. [U.S. Department of Education](#). “Title IX and Sex Discrimination.” Accessed 08-June-2018.

DID YOU KNOW?

Be Inspired by *Pearls of Wisdom*

Meet more than a dozen accomplished women in science and medicine — from research institutes and health care facilities to academia and professional associations — as they impart valuable life lessons in **ORWH’s *Pearls of Wisdom*** video series. Each vignette offers a unique perspective on some aspect of life and career, such as how to overcome obstacles, set and achieve goals, or stay motivated. Viewers are encouraged with candor, compassion, and wit, to see “barriers as stepping stones,” to always be prepared with “plan B,” and to “stay true” to oneself. The video series is produced in collaboration with the National Medical Association and will feature additional professionals in upcoming segments. Visit the [NIH Women in Biomedical Careers website](#) or the [ORWH Facebook page](#) for the most recent videos.



Sex Differences in Vaccine Efficacy

On March 20, 2018, the **ORWH** Women's Health Seminar Series presented *Sex Differences in Vaccine Efficacy*, with Sabra Klein, Ph.D., Associate Professor in the Department of Molecular Microbiology and Immunology at Johns Hopkins University and Johns Hopkins Center for Women's Health, Sex, and Gender Differences. Dr. Klein presented her work on uncovering the mechanisms mediating how males and females differ in immune responses to viral vaccination and infection. She presented data pertaining to sex differences in vaccine-induced immunity and protection, mechanisms underlying those differences in immune responses, and sex differences in immunity over the life course. Dr. Klein explained that, in animal models, females typically mount more robust immune responses than males, which can be beneficial for clearance of viruses. However, that response, she pointed out, can also be detrimental by leading to auto-immune diseases. A video of this event is available on the [NIH VideoCasting and Podcasting website](#).



45th Meeting of the NIH Advisory Committee on Research on Women's Health (ACRWH)

ORWH hosted the 45th meeting of the NIH Advisory Committee on Research on Women's Health on April 18, 2018. **ORWH** Director Janine A. Clayton, M.D., described office programs, activities, and collaborations with NIH Institutes, Centers, and Offices (ICOs) on sex- and gender-specific research. She also highlighted current funding of **ORWH** programs and developments in the implementation of the NIH Sex as a Biological Variable policy. **ORWH** Legislative Policy Analyst Paris Watson, M.S.L., explained new requirements under the 21st Century Cures Act, such as the fact that the NIH Coordinating Committee on Research on

Women's Health must now be composed of the ICO Directors or their senior-level staff designees. **ORWH** Associate Director Margaret Bevans, Ph.D., RN, AOCN®, FAAN, gave an update on the development of the Trans-NIH Strategic Plan for Women's Health Research. Scott Hultgren, Ph.D., Professor of Molecular Microbiology at the St. Louis-based Washington University School of Medicine, discussed antibiotic-sparing solutions to urinary tract infection, research supported by the **National Institute of Diabetes and Digestive and Kidney Diseases** and an **ORWH Specialized Centers of Research on Sex Differences**

grant. Diana W. Bianchi, M.D., the new Director of the **Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD)**, gave an update on NICHD's activities, stressed the importance of including pregnant/lactating women in research, and discussed the [Task Force on Research Specific to Pregnant Women and Lactating Women](#), which will be issuing a report soon. A video of the meeting is available on the [NIH VideoCasting and Podcasting website](#). The next NIH ACRWH meeting will be held October 23, 2018, on the NIH Main Campus in Building 31, 6C/Room 10.

Symposium on Addressing Health Challenges of Women Across the Life Course



On May 3, 2018, **ORWH** held a symposium, titled "Addressing Health Challenges of Women Across the Life Course," just before the 2018 Women's Health Conference of the Academy of Women's Health. **ORWH** Deputy Director Elizabeth Spencer, RN, opened the symposium by highlighting **ORWH**'s multidimensional, life-course approach. Victoria Cargill, M.D., M.S.C.E., **ORWH** Associate Director for Interdisciplinary Research, described the nature of interdisciplinary, multidisciplinary, and transdisciplinary research. All these approaches can be used to create novel conceptual, theoretical, methodological, and translational innovations that integrate aspects of each discipline and yet move beyond discipline-specific approaches. Kara Hall, Ph.D., Director of the Science of Team Science at the **National Cancer Institute**, discussed the advantages of team science strategies, which are typically not addressed in traditional education and training programs. These strategies,

which may take time to coordinate and launch, are often more productive than traditional approaches. The keynote speaker, Kathleen T. Brady, M.D., Ph.D., Vice President for Research and Director of the Clinical and Translational Research Institute at the Medical University of South Carolina and an **ORWH Specialized Centers of Research on Sex Differences** Principal Investigator, presented a detailed summary of the many issues that underlie the pressing epidemic of opioid use and abuse among women. She also highlighted the sex differences between men and women with respect to response to opioid use and risk of becoming opioid dependent. A summary of this meeting is being developed and will be made available on the **ORWH** website.

3rd Annual NIH Vivian W. Pinn Symposium: Leveraging the Network to Advance Women in Science

The 3rd Annual NIH Vivian W. Pinn Symposium was held May 16, 2018. **ORWH** sponsors this symposium to bring attention to National Women's Health Week. A distinguished selection of speakers discussed mentoring and networking strategies to advance women in science and shared their experiences with mentorship.

- P. Kay Lund, Ph.D., Director of the Division of Biomedical Research Workforce in the **Office of Extramural Research at NIH**, discussed the importance of networking, pathways to advancement, considering non-academic jobs, professional communication, and receiving credit for one's contributions.
- Daniel Ford, M.D., M.P.H., Director of the Institute for Clinical and Translational Research at Johns Hopkins University and Principal Investigator of the university's Building Interdisciplinary Research Careers in Women's Health award, explained how success in the workforce is associated with stress management, sense of identity, and resilience.
- Rachele Heller, Ph.D., a computer science professor at the George Washington University School of Engineering and Applied Science, described mentoring not as a one-size-fits-all activity but one that requires structure, training, appropriate matching, confidential communication, monitoring, and a designated time frame.

Following their presentations, the speakers participated in a panel session moderated by Janet Bandows Koster, MBA, Executive Director and Chief Executive Officer of the [Association for Women in Science](#).

After the symposium, guests and speakers engaged in a networking opportunity called Catalytic Connections, which connected current and aspiring scientists with potential mentors. Participants were encouraged to keep in touch to continue the discussions that began at the event. A video of the symposium is available on the [NIH VideoCasting and Podcasting website](#).



Sex and the Head-Heart Connection

Sex and gender play important roles in diseases of the brain and heart, such as Alzheimer's, stroke, depression, and other diseases and disorders. To raise the visibility of sex differences in these co-morbidities, the **ORWH Women's Health Seminar Series** hosted a meeting on June 7, 2018. This meeting was designed to improve knowledge about (1) sex differences in heart and brain disease comorbidity; (2) how sex differences over the life course affect risk for and resilience against diseases of the heart and brain; (3) shared causes and pathophysiology of brain and heart diseases and how these differ by sex; and (4) current efforts and gaps in sex-specific research, education, and policies, and what is needed to improve health outcomes nationally and globally.

Nakela Cook, M.D., M.P.H., Chief of Staff and Senior Scientific Officer at the **National Heart, Lung, and Blood Institute**, gave the keynote presentation, titled "Heart-Brain Connection: Implications of Sex Differences Across the Life Course." Three panel presenters participated in this event.

- Jill M. Goldstein, Ph.D., Executive Director, Women, Heart, and Brain Global Initiative, Massachusetts General Hospital, and Professor of Psychiatry and Medicine, Harvard Medical School, presented a talk titled "Impact of SeXX on the Comorbidity of Depression and Cardiovascular Disease."
- Virginia Miller, Ph.D., Director, Sex Differences Research Lab at the Mayo Clinic, and **ORWH Specialized Centers of Research on Sex Differences** Principal Investigator, presented "An Integrated Research Approach to Reducing Cardiovascular and Cognitive Comorbidities in Women."
- Ana Langer, M.D., Director, Women and Health Initiative, and Professor, Practice of Public Health at Harvard T.S. Chan School of Health, presented "What Does the Growing Burden of Non-communicable Diseases Mean for Women Globally? Current Trends, Future Challenges, and Opportunities."

ORWH Deputy Director Elizabeth Spencer, RN, moderated a lively question-and-answer session with all four speakers to round out the session. A video of this meeting is available on the [NIH VideoCasting and Podcasting website](#).

The next ORWH Women's Health Seminar Series meeting will be held Thursday, December 6, 2018, on the NIH Main Campus in the NIH Clinical Center's Masur Auditorium. Check the [ORWH website](#) for the latest information.

Understanding Traumatic Brain Injury in Women: Workshop Summary and Video Recording Now Available

The summary and video recording of the workshop “Understanding Traumatic Brain Injury in Women” are now available. The workshop brought together researchers and clinicians to identify knowledge gaps, best practices, and target populations related to research on women and/or sex differences within the field of traumatic brain injury (TBI). The event focused on the existing knowledge regarding sex differences in TBI research and how those differences can be incorporated in future preclinical and clinical study efforts.

The sessions included (1) “Sex Differences in TBI Across the Lifespan,” (2) “TBI as a Consequence of Intimate Partner Violence,” (3) “Lost in Translation: Sex Differences in Preclinical and Clinical Research,” (4) “Sex Differences Following Sports-Related TBI,” (5) “Military Perspective: Sex Differences in TBI Among Service Members and Veterans,” (6) “Sex Differences in Diagnosis, Prognosis, and Management of TBI,” and (7) “Prioritization of Research Needs.”

The event was organized and sponsored by the **National Institute of Neurological Disorders and Stroke** in collaboration with the Center for Neuroscience and Regenerative Medicine of the Uniformed Services University, National Center for Medical Rehabilitation Research of the **Eunice Kennedy Shriver National Institute of Child Health and Human Development**, ORWH, and Defense and Veterans Brain Injury Center.

Click here for [Workshop summary](#) and [Video recordings](#).



PregSource® is an online platform to improve knowledge of how women experience pregnancy and new motherhood. Led by the **Eunice Kennedy Shriver National Institute of Child Health and Human Development** — in partnership with ORWH and other organizations — PregSource® asks pregnant women to share what they are seeing, thinking, and feeling during pregnancy and after giving birth. All responses are captured securely through a free, confidential website. This crowdsourcing project promises to help researchers answer questions about pregnancy and improve care for future moms-to-be. For more information, visit the [PregSource® website](#).

TEAMING UP FOR WOMEN'S HEALTH

Annual J. Edward Rall Cultural Lecture: “Taking Women’s Health to Heart: An Afternoon With Barbra Streisand”



World-renowned recording artist, actress, director, and philanthropist Barbra Streisand visited NIH on May 15, 2018, to present the [Annual J. Edward Rall Cultural Lecture](#). The annual lecture, which is part of the Wednesday Afternoon Lecture Series, honors

the memory of J. Edward Rall, founder of the NIH Clinical Endocrinology Branch (now within the **National Institute of Diabetes and Digestive and Kidney Diseases**) and the first Deputy Director for Intramural Research.

NIH Director Francis S. Collins, M.D., Ph.D., opened the lecture and introduced Ms. Streisand, highlighting some of her great achievements — for women’s rights and on the silver screen. Dr. Collins also talked about the importance of women’s health and stated, “For me, now as the NIH Director ... the way in which we have figured out how to prioritize a focus on women’s health is one of the most important things we’ve done in the last 30 years.”

Ms. Streisand spoke about her personal experiences with gender inequality in Hollywood, her passion to ensure that women get the same chances in life as men, and her advocacy for women’s heart health. She co-founded the Women’s Heart Alliance to help prevent women from needlessly dying from heart disease and stroke and to keep “women’s hearts on everyone’s minds.” The Alliance recognizes that, biologically, men and women aren’t the same and it advocates for including women in medical research. “Better understanding of sex differences will not only fill in critical gaps in women’s health but can improve men’s health as well,” Ms. Streisand said. She commended the REPRIEVE (Randomized Trial

to Prevent Vascular Events in HIV) trial for actively recruiting a racially and ethnically diverse group of women alongside men and making sex differences a key part of the study. “Our hope is that well-designed studies, such as REPRIEVE, will be the norm, not the exception,” she commented.

Following her speech, Ms. Streisand and Dr. Collins talked more about the importance of telling the story of women and heart disease, enrolling women in clinical trials, considering sex as a biological variable in biomedical research, and having more women in biomedical careers. In closing, she offered this advice to the audience: “Nothing is impossible: Here’s to more women in science, in film, and in colleges. Make it happen!”

After the lecture, **National Institute of Allergy and Infectious Diseases** Director Anthony Fauci, M.D., guided Ms. Streisand on a tour of the **NIH Clinical Center**, where she spoke with several clinical trial volunteers from the REPRIEVE trial.

At the end of her visit, Ms. Streisand and representatives from the Women’s Heart Alliance further discussed women’s health, particularly about advancing women’s heart health, with Dr. Collins, ORWH Director Janine A. Clayton, M.D., and **National Heart, Lung, and Blood Institute (NHLBI)** Director Gary Gibbons, M.D., as well as George Mensah, M.D., FACC, and Nakela Cook, M.D., M.P.H., also of NHLBI.

A video of this event is available on the [NIH VideoCasting and Podcasting website](#).



National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS) Community Outreach Bulletin

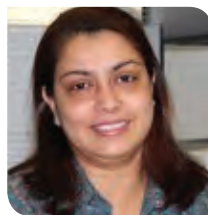
The *NIAMS Community Outreach Bulletin* is an online digest designed to inform community advocates and health professionals about resources for diverse audiences on conditions of the bones, joints, muscles, and skin and ways to stay healthy. It is produced and distributed by the **NIAMS Office of Science Policy, Planning, and Communications**. [Subscribe \(http://eepurl.com/6wECv\)](http://eepurl.com/6wECv) to receive the *Bulletin* via email.

STAFF UPDATES



Samia Noursi, Ph.D., joined **ORWH** in April 2018 as the Associate Director for Science Policy, Planning, and Analysis. She earned her doctoral degree in applied developmental psychology from the University of Maryland and did a postdoctoral fellowship

at the **Eunice Kennedy Shriver National Institute of Child Health and Human Development**, where she studied the effects of domestic violence on children's development. She proceeded to work on several additional projects focused on children's development. Dr. Noursi joined the **National Institute on Drug Abuse** in 2006 as a health scientist administrator. In addition, she held the role of the Women and Sex/Gender Differences Research Deputy Coordinator and Acting Deputy Branch Chief of the Services Branch, directing grants focused on treatment programs for women.



Rajasri Roy, Ph.D., M.P.H., joined **ORWH** in April 2018 as a health scientist administrator. She received her doctoral degree in applied psychology from India's University of Calcutta Science and Technology and her Master of Public Health degree from

George Washington University. Before joining **ORWH**, Dr. Roy was an epidemiologist at the **National Cancer Institute (NCI)**, where she managed data analysis processes for extramural grant activities, determined appropriate designs for statistical analyses of cancer-related diseases, and contributed to annual reports. She represented the NCI inclusion management group that developed reports on data trends on the inclusion of women and minorities in clinical research and phase III clinical trials. Dr. Roy came to NIH originally from the U.S. Department of Defense Patient Safety Center, where she reviewed, analyzed, and deployed research projects related to an adverse event reporting system.

UPCOMING EVENTS

National Conference on Women's Health Research

September 26-28, 2018
University of Colorado, Denver
Event starts 3:30 p.m. (Mountain Time) on September 26.

FDA Scientific Conference: Opioid and Nicotine Use, Dependence, and Recovery – Influences of Sex and Gender

September 27-28, 2018
8:30 a.m. – 4:00 p.m. (Eastern Time)
FDA White Oak Campus
Silver Spring, Maryland

National Heart, Lung, and Blood Institute (NHLBI) 2018 Research Conference on Sleep and the Health of Women

October 16-17, 2018
7:00 a.m. – 5:00 p.m. (Eastern Time)
NIH Main Campus, Building 45,
Natcher Auditorium
Event time is subject to change.

NIH Advisory Committee on Research on Women's Health (ACRWH)

October 23, 2018
9:00 a.m. – 2:30 p.m. (Eastern Time)
Building 31, 6C, Room 10
Event time is subject to change.

Sex and Gender in Health and Disease (SGHD) Scientific Interest Group (SIG)

November 20, 2018
3:00 p.m. – 4:00 p.m. (Eastern Time)
Location to be determined.

Women's Health Seminar Series

December 6, 2018
More details to come.

For more details, visit www.nih.gov/women.