63rd Meeting of the National Institutes of Health (NIH) Advisory Committee on Research on Women's Health (ACRWH) Office of Research on Women's Health (ORWH) Bethesda, MD June 17, 2025

Members Present

Garnet L. Anderson, Ph.D.
Irene Aninye, Ph.D.
Arthur Arnold, Ph.D.
Ayush Giri, Ph.D.
Stephen Higgins, Ph.D.
Hendrée Jones, Ph.D.
Thelma Mielenz, Ph.D.
Alexandra Noël, Ph.D.
Phyllis Sharps, Ph.D.

ORWH Leadership Present

Janine A. Clayton, M.D., FARVO, Director
Vivian OTA WANG, Ph.D., FACMG, CGC, Executive Secretary, ACRWH; Acting Director, Office of Strategic Coordination; Deputy Director, ORWH
Cindy Caughman, M.P.H., Acting Deputy Director
Chyren Hunter, Ph.D., Associate Director for Basic and Translational Research
Victoria Shanmugam, MBBS, MRCP, FACR, CCD, Director, NIH Office of Autoimmune Disease-ORWH Research in the Office of Research on Women's Health (OADR-ORWH)
Xenia Tigno, Ph.D., Associate Director for Careers

NIH Leadership Present

Nicole C. Kleinstreuer, Ph.D., Acting NIH Deputy Director, Program Coordination, Planning, and Strategic Initiatives; Acting Director, Division of Program Coordination, Planning, and Strategic Initiatives (DPCPSI)
Dina Paltoo, Ph.D., Acting Director of Policy and External Affairs, National Library of Medicine
Belinda Seto, Ph.D., Deputy Director, Office of Data Science Strategy

Special Guests

Jason H. Moore, Ph.D., FACMI, FIAHSI, FASA, Cedars-Sinai Medical Center
Noémie Elhadad, Ph.D., Columbia University and New York-Presbyterian Hospital
Kjiersten Fagnan, Ph.D., Lawrence Berkeley National Laboratory

Call to Order

Vivian OTA WANG, Ph.D., FACMG, CGC, ACRWH Executive Secretary, Acting Director for the NIH Office of Strategic Coordination, and ORWH Deputy Director, called the virtual meeting to order at 9:02 a.m. Committee members introduced themselves. The minutes of the October 8, 2024, meeting were approved with eight votes in favor. The minutes of the December 9, 2024, meeting were approved with nine votes in favor. Dr. OTA WANG congratulated ORWH Director Janine Clayton, M.D., FARVO, on her election to the National Academy of Medicine in October 2024.

Opening Remarks: Division of Program Coordination, Planning, and Strategic Initiatives (DPCPSI) Vision and Priorities

Dr. Clayton introduced Nicole C. Kleinstreuer, Ph.D., Acting NIH Deputy Director for Program Coordination, Planning, and Strategic Initiatives and Acting Director of DPCPSI, who presented an overview of DPCPSI's vision and priorities.

DPCPSI is housed within the Office of the Director at NIH. Leading through synergistic coordination of its Offices and through vital Institute and Center (IC) partnerships, DCPSCI advances biomedical and behavioral science by identifying and catalyzing research to address scientific gaps and opportunities, fostering collaborations, developing methods to enable research goals, and serving as an experimental testbed for innovative NIH-wide activities to improve the nation's health. DPCPSI is a scientific nexus for cross-NIH research, housing NIH Offices that engage across multiple Institutes, Centers, and Offices (ICOs), such as ORWH, the *All of Us* Research Program Office, the Environmental Influences on Child Health Outcomes (ECHO) Program Office, and the Office of AIDS Research, among others.

ORWH is a good example of the cross-cutting programs represented within DPCPSI. For more than 30 years, it has built a robust portfolio that expands and enhances the work of almost all the ICs, promotes career development, and advances Sex as a Biological Variable (SABV). Thus, it is instrumental in addressing many NIH activities and priorities.

NIH Director's Priorities. New NIH Director Jay Bhattacharya, M.D., Ph.D., has established the following priorities for NIH:

- Focus on Improving Population Health: The work of NIH, whether basic or applied, must address the health needs of the American people, including the chronic disease crises that have hampered the well-being of countless Americans.
- Reproducibility and Rigor: The research NIH conducts and supports must be rigorous, reproducible, and unbiased. NIH must address and solve the reproducibility crisis in the biomedical sciences.
- Innovation and Collaboration: NIH must be at the forefront of biomedical innovation. This will involve embracing new technologies, new ideas, and new approaches to old problems.
- Research Safety and Transparency: NIH must ensure that all the experiments it supports pose no risk of harm to human populations and meet the highest ethical standards. NIH must maintain the highest standards of transparency in all its endeavors.
- Academic Freedom: Advances in science require the freedom to think differently from the scientific consensus.

Dr. Bhattacharya pledged to foster an environment where varied perspectives are valued and encouraged at NIH and across the broader scientific community.

DPCPSI Director's Priorities. Dr. Kleinstreuer identified the following priorities for DPCPSI:

- Transformative Science via Strategic Investments: Identify/accelerate emerging areas of biomedical research (e.g., New Approach Methodologies [NAMs]) with strong potential for public health impact through cross-NIH initiatives that focus on scientific excellence and innovation.
- Stronger Partnerships to Amplify NIH Mission: Cultivate and strengthen collaborations across NIH ICOs, federal agencies, and external stakeholders on initiatives that are responsive to national health priorities and leverage shared expertise and resources.

- Data-driven Decision-Making: Integrate real-time data, performance metrics, and horizon scanning into DPCPSI processes to inform resource allocation and program planning and evaluation.
- Workforce Development and Programmatic Leadership: Promote innovative training, cross-disciplinary career development, and leadership opportunities that reflect the evolving needs of DPCPSI, NIH, and science and society at large.
- Accelerate Translation through Practical Solutions: Ensure research funded/coordinated by DPCPSI leads to practical, scalable solutions for disease prevention, diagnosis, and treatment by promoting translational readiness, implementation science, and stakeholder engagement.

Addressing Women's Health. In the United States, women live longer than men, mostly due to lower cardiovascular and cancer deaths attributable to lower smoking rates. Women, however, suffer higher rates of chronic conditions, often experiencing two or more conditions simultaneously. Both biological and environmental factors affect the onset and progression of chronic illness, which is a top priority of the U.S. Department of Health and Human Services. NIH's approach to SABV informs this priority by identifying sex differences in disease. Thus, NIH is poised to be a leader in research on the prevention and treatment of chronic disease. The *NIH-Wide Strategic Plan for Research on the Health of Women* (2024–2028) identifies key cross-cutting themes for research on women's health, including comorbidity and multimorbidity, interdisciplinary collaboration, precision medicine, the inclusion of women and girls in clinical studies, sex differences research, and preventive care and services. Coming soon is the *NIH-Wide Strategic Plan for Autoimmune Disease Research*; women constitute 80% of people with an autoimmune disease.

NIH is addressing chronic disease to improve the health of women via key initiatives such as the HIV and Women Signature Program that uses a data-driven approach to research on HIV and women; The Heart Truth®, the first federally sponsored national health education program to raise awareness about heart disease as the leading cause of death in women; and a Menopause Pathways to Prevention (P2P) Program that is collecting evidence relevant to managing menopausal symptoms and optimizing health in the early postmenopausal phase.

Using New Technologies to Address Women's Health. Artificial intelligence (AI) can help achieve the NIH and DPCPSI priorities outlined above. A number of factors, such as diverse online data sets and improved data standards and operability, are driving the application of AI to health. At the same time, there is a need to ensure patient privacy and protection. A new AI initiative under Dr. Bhattacharya's leadership is the development of an NIH real-world data platform to unite data sources from multiple sources, such as health organizations, pharmacies, and wearable sensors, to obtain broad coverage of the U.S. population. Integration of these data sources via AI and federal partnerships could be used for real-time health monitoring, creation of disease registries, drug development, establishment of longitudinal databases, regulatory approvals, and research competitions.

To reduce the use of animals in NIH-funded research and more accurately model human biology, NIH intends to develop, validate, and scale the use of New Approach Methodologies (NAMs; also referred to as Novel Alternative Methods or Non-Animal Models). NAMs offer unique advantages that can enhance research capabilities when utilized correctly or in combination. NIH's investment in these technologies has been increasing over time and currently include an Interagency Coordinating Committee for the Validation of Alternative Methods (ICCVAM), the National Center for Advancing Translational Science (NCATS) Tissue Chip Program and 3-D Tissue Bioprinting Program, and the NIH Common Fund's Complement Animal Research In Experimentation (Complement-ARIE) Program. As part of this

endeavor, NIH plans to coordinate across ICOs to develop, validate, and scale non-animal research methods; promote the development and application of the principles of 3Rs (**R**eplacement, **R**efinement, **R**eduction) for NIH-funded research; create a hub for interagency coordination and regulatory translation; expand funding and training for human-based approaches; enhance awareness of the value of NAMs in translational research; expand NAMs infrastructure to improve accessibility; train grant review staff to address possible bias toward animal studies and integrate NAMs experts into study sections; and publicly report on research spending to measure progress.

NIH has released two Requests for Information (RFIs) to obtain public comment about the opportunities and risks of using AI for health research: "Inviting Comments on the NIH Artificial Intelligence (AI) Strategy" (NOT-OD-25-117) and "Request for Information on Responsibly Developing and Sharing Artificial Intelligence Tools Using NIH Controlled Access Data" (NOT-OD-25-118). Comments for both RFIs are due in mid-July 2025.

By embracing technological advancements, NIH aims to revolutionize women's health research, leading to more effective interventions and improved health outcomes for women across their lifespans. For example, wearable sensors and enabling analytics allow real-time insight into conditions that affect women and can help identify sex-specific disease mechanisms. These advancements further ensure that women's health needs are treated with rigor and reproducibility. To that end, NIH has launched several initiatives, including the RADx Tech ACT ENDO Challenge to accelerate development of noninvasive technologies to improve diagnosis of endometriosis with a prize shared by two winning teams, and the Design by Biomedical Undergraduate Teams (DEBUT) Challenge to develop technology solutions to unmet needs in any area of health care. Winning projects in the 2024 DEBUT challenge included a vaginal speculum designed to improve visualization during gynecological procedures and a tool that guides magnetic resonance imaging of breasts.

Discussion. Dr. Clayton moderated a discussion following Dr. Kleinstreuer's presentation. Key points included:

- Despite a recent decline in opioid deaths, substance use remains a serious issue. More research is needed on sex differences in addiction, a long-term interest of ORWH, which has partnered for many years with the National Institute on Alcoholism and Alcohol Abuse and the National Institute on Drug Addiction. Some Specialized Centers of Research Excellence (SCORE) on Sex Differences, one of ORWH's signature programs, address sex differences in substance use.
- Rural health populations have specific needs. One NIH initiative addressing rural health issues is the CARE for Health™ program that is testing the feasibility of a network of networks to embed clinical research in primary care settings; many of the providers are located in rural areas. Many projects related to women's health research in the Institutional Development Award (IDeA) Program, supported by ORWH, the National Institute of General Medical Sciences, and other NIH ICOs, are addressing rural health issues.

ORWH Director's Report

Dr. Clayton, ORWH Director and NIH Associate Director on Women's Health, delivered the ORWH Director's report. She highlighted the significant impact of ORWH's grant co-funding over the past 20 years on tangible outcomes related to women's health. Between 1999 and 2024, ORWH co-funded 2,094 grants that resulted in 73,836 publications, 28,467 patent applications that cited at least one of those publications, and 193 drug licenses based on at least one of the patent applications.

NIH and ORWH Updates. NIH has welcomed its 18th Director, Dr. Jay Bhattacharya. Other new leaders at NIH include Matthew J. Memoli, M.D., M.S., NIH Principal Deputy Director, and Dr. Kleinstreuer, Acting NIH Deputy Director for Program Coordination, Planning, and Strategic Initiatives. Within DPCPSI, several leadership transitions were recently announced, including Carolyn M. Hutter, Ph.D., Director of the Office of Strategic Coordination who is serving as the Acting Director, National Human Genome Research Institute; Dr. Ota Wang, ORWH Deputy Director, who is serving as the Acting Director, Office of Strategic Coordination; and Cindy L. Caughman, M.P.H., Director of Strategic Engagement, Office of Portfolio Analysis, who is serving as the Acting ORWH Deputy Director.

Scientific Updates. On January 6, 2025, the *Journal of the American Medical Association* published "Recent Developments in Women's Health Research at the US National Institutes of Health," of which Dr. Clayton was the lead author, with an accompanying podcast. The article noted that women's health research has historically focused on reproductive health and female-specific conditions and now expanded to encompass all aspects of women's health across the lifespan. It highlighted novel insights into how diseases and conditions affect women uniquely, differently, or disproportionately; emphasized the translation of basic science into practical benefits; and provided examples of every NIH Institute and Center's (IC) efforts to improve the health of women. By June 9, 2025, the article had garnered 8,411 views.

Dr. Clayton also highlighted the recent publication of the 2024 *Annual Report to the Nation on the Status of Cancer*, which showed that overall death rates from cancer declined steadily among both men and women from 2001 through 2022 (even during the first two years of COVID-19). However, there were notable sex differences. Among men, overall cancer incidence, measured as the rate of new cancer diagnoses, decreased from 2001 through 2013 and then stabilized through 2021. Among women, overall cancer incidence increased slightly every year from 2003 through 2021, with the exception of 2020. Rates of new cancer cases increased at sites associated with excess body weight, including female breast, uterus, colon, and rectum among adolescents and young adults, as well as pancreas, kidney, and liver among women. Rising rates of estrogen receptor-positive breast cancer were recorded, driven by a reduction in fertility rates, advancing age at first birth, and rises in obesity and alcohol consumption. In addition, rates of new cases and deaths from uterine cancer increased.

Data from the NIH National Cancer Institute (NCI) indicate that the largest increase in cancer death rates among both men and women were for the lung and bronchus. For women, ovarian cancer and non-Hodgkin lymphoma were the second and third leading causes of cancer deaths.

ORWH has successfully collaborated with NCI for many years. NIH's long-term investment in basic science related to virology and human disease has shown an excellent return on investment with the development of a single-dose human papillomavirus vaccination that accelerates cervical cancer prevention by minimizing patient burden while maintaining vaccine effectiveness and also addresses differences in access to cervical cancer prevention resources. Cervical cancer remains an important issue around the world.

SABV in Action. A new NIH study conducted by scientists from the *Eunice Kennedy Shriver* National Institute of Child Health and Human Development (NICHD) and others demonstrates how gene expression, as measured by DNA methylation, varies markedly between male and female placentas. The study identified a total of 2,497 previously unreported DNA sites showing sex-specific methylation patterns. The different patterns were also associated with greater neonatal size in male placentas and greater placental size in female placentas. The study suggested that these placental differences may

contribute to pregnancy complications and set the stage for differences between male and female health later in life.

In another study highlighting the importance of SABV that was funded by multiple NIH ICs, scientists identified a novel role for regulatory T cells in sex-specific pain suppression. For many health conditions, pain is more common in women than in men, and previous studies have suggested that T cells may contribute to differences in pain processing between women and men. Regulatory T (T_{reg}) cells are controlled by a gene located on the X chromosome. This study in mice found that T_{reg} cells inhibit nociception in a sex-specific way. Depleting meningeal T_{reg} (mT_{reg}) cells increased sensitivity to a specific type of pain in female mice, but not male mice. Some mT_{reg} cells produced an analgesic compound with anti-nociceptive action called enkephalin. Female mice had more enkephalin-producing mT_{reg} cells than male mice. Injection of interleukin-2 increased mT_{reg} levels and decreased pain sensing in female mice. These findings suggest that T_{reg} cells may be key regulators of sex-specific nociceptive mechanical pain sensation and explain why men and women differ in their sensitivity to pain.

A Congressionally Directed Medical Research Programs (CDMRP) Directive released by the Defense Health Agency in March 2025 establishes requirements for the consideration of SABV in all CDMRP-funded research at the U.S. Department of Defense (DoD). It extends across the full spectrum of basic, translational, and clinical research (to include clinical trials).

A new article titled "The power—and complexity—of policy to drive advances in women's health" in *Science Advances* (March 5, 2025) reported that over the past two decades, research funders from several high-income countries have introduced policies and statements regarding the incorporation of sex into research studies. SABV policies exist in the Canadian Institutes for Health Research (2006), Horizon Europe (2014), NIH (2016), and the United Kingdom (coming soon). North American sex differences research policies have witnessed an almost threefold increase in the proportion of mixed-sex studies compared to single-sex studies. The article identified sex characteristics as potentially including chromosomes, hormones, or sex organs, and noted that inclusion is not synonymous with consideration. This article showed that NIH's SABV policy is being used as a model for other countries.

The Intersection of Regenerative Medicine and Women's Health: Proceedings of a Workshop—in Brief (2025) summarizes the key findings of a workshop organized by Dr. OTA WANG in collaboration with the DoD and the National Academies of Sciences, Engineering, and Medicine (NASEM). The goal of regenerative medicine is to replace or reboot tissues or organs damaged due to disease, injury, age, or other issues, rather than simply treating symptoms with medication and procedures. Regeneration in humans happens at three levels: molecular, cellular, and tissue. Regenerative medicine can help bridge gaps to better understand the role of sex in health and disease and translate knowledge into improved clinical care. The workshop included a discussion of cellular and non-cellular approaches that relate to NAMs and considered ideas to advance the development of regenerative medicine therapies for women's health, including advancing research, developing therapies, strengthening the workforce, and increasing access to care.

ORWH Program Updates. ORWH hosted the 9th Annual Vivian W. Pinn Symposium on May 15, 2025. This year's theme was Advancing Data-Driven Innovation for the Health of Women. To date, more than 750 individuals have viewed the Symposium, which is available on NIH Videocast.

Bench-to-Bedside and Back Program (BtB) is a long-standing collaboration between ORWH and the NIH Intramural program. This two-year awards program was established in 1999 to integrate the work of basic and clinical intramural scientists. The program expanded in 2006 to partnerships between

intramural and extramural programs. These awards are viewed as seed grants for new translational research projects reflecting partnerships between basic and clinical investigators, many of which led to larger awards with expanded scientific aims. Since 2006, ORWH has co-funded 19 BtB projects at $4.95 million to improve women's health through biomedical and behavioral research aligned with the *NIH-Wide Strategic Plan for Research on the Health of Women*. For example, a 2023 award to study novel gut microbiome factors in pregnancy and early childhood was co-funded by ORWH with the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) and the National Institute of Allergy and Infectious Diseases.

ORWH sponsors the NIH Women's Health Research Scientific Interest Group that convenes the NIH community around updates and developments in women's health research. On June 10, 2025, it coordinated a panel discussion featuring two talks from Bench to Bedside Principal Investigators, who shared insights from their research and discussed the implications of obesity on pregnancy and long-term maternal and offspring metabolic health.

ORWH launched the Military Women's Health Webinar Series in collaboration with the Uniformed Services University's Military Women's Health Research Program. The first webinar on menopause and midlife health occurred on June 12, 2025. Future webinars will be listed on the ORWH Events webpage.

ORWH actively updates NIH ICOs on its ongoing work. Dr. Clayton presented at numerous meetings, including at the National Library of Medicine Board of Regents Meeting on May 14, 2024; the National Advisory Council for Biomedical Imaging and Bioengineering on May 15, 2024; the 128th NIH Advisory Committee to the Director Meeting on June 13–14, 2024; the National Advisory Council on Aging on September 18–19, 2024; and the National, Heart, Lung, and Blood Institute Advisory Council on October 30, 2024.

Dr. OTA WANG provided the opening remarks at the 19th Annual Pain Consortium Symposium on Advances in Pain Research: Sex and Gender Differences in the Neurobiology of Pain, its Experience and Management on May 30–31, 2024. The meeting focused on NIH-funded research in the pain field with a focus on the differences in the experience, management, and treatment of pain based on sex and gender. Topics included sex differences in pain, differences in access in pain management and care, and pain across the lifespan.

In its NIH-wide coordinating role, ORWH is assessing gaps in NAMs research that are relevant to women's health. Dr. Clayton highlighted the importance of NAMs to generate scientific advances to improve human health. She cited four examples of projects involving NAMs that are relevant to the health of women: the Molecular Transducers of Physical Activity Consortium (MoTrPAC), a 10-year Office of Strategic Coordination - Common Fund program that is the largest targeted NIH investment of funds into the mechanisms of how physical activity improves health and prevents disease; a Translational Center for Microphysiological Systems-Based Drug Development Tools for Pregnancy and Women's Health at Texas A&M, College Station and the University of Texas Medical Branch Galveston, as part of NCATS; a Notice of Special Interest (NOT-MH-23-110) from the National Institute of Mental Health to develop explainable artificial intelligence research, including for the design and testing of computational models to imitate sex differences in clinical phenotypes; and a concept clearance titled "Digital Twins for Advancing Innovation and Optimizing Clinical Outcomes in Dental, Oral, and Craniofacial (DOC) Medicine" approved in September 2024 by the National Institute of Dental and Craniofacial Research Advisory Council.

ORWH continues to build strategic partnerships to advance women's health research. These include (1) Discover Women's Health Research (DiscoverWHR), an ORWH–National Library of Medicine (NLM) transformative resource that centralizes the latest breakthroughs and funding opportunities in women's health research including fact sheets for: polycystic ovary syndrome (PCOS), lupus, rheumatoid arthritis, menopause, and scleroderma. (2) The addition of new questions on menopause to the 2025 National Health Interview Survey, in collaboration with the U.S. Centers for Disease Control and Prevention (CDC). (3) Menopause Pathways to Prevention (P2P) program that will invite multisector perspectives to prioritize future research areas in midlife health and menopause, ultimately paving the way to a comprehensive research agenda, fostering adoption by the broad scientific community, and providing a catalyzing benefit to the health of women across the lifespan. (4) The Small Business Innovation Research/Small Business Technology Transfer (SBIR/STTR) Funding Opportunity (PA-24-245, PA-24-246, PA-24-247, PA-24-248), now extended to September 6, 2025, a collaboration between NIH, CDC, and the U.S. Food and Drug Administration (FDA). (5) The Simplified Review Framework supports SABV policy implementation as a tool of rigor and reproducibility and new educational materials convey the importance of SABV. Through congressionally mandated annual consultations between the ORWH Director and each NIH IC Director, open feedback on improving SABV implementation has resulted in the sharing of 22 measures with the NIH-wide SABV Implementation Working Group and with all NIH IC Directors.

ORWH and the Office of Research Infrastructure Programs' S10 Shared Instrumentation Program funds the acquisitions of a wide spectrum of commercially available scientific instruments, such as mass spectrometers, radiology, surgery, and monitoring instruments, cell sorters, and biomedical imagers that are critical to the conduct of cutting-edge research in a large number of scientific disciplines. Through shared use of advanced instruments and technologies, the S10 program broadly supports research activities funded by all NIH ICOs, maximizing the efficiency and cost-effectiveness of the research operation. Among broad scientific areas, the S10 program plays a pivotal role in enabling basic, translational, and clinical research on women's health, specifically contributing to research that generated at least 1,032 publications during Fiscal Years (FYs)2022 to 2024 relevant to women's health including advancing our understanding of research topics such as zygotic genome functions, preeclampsia, and gestational hypertension during pregnancy and improving clinical treatments for ovarian and breast cancers. Additionally, the S10 awards have facilitated research relevant to women's health in multiple areas including autoimmunity, placenta dysfunction, pelvic floor dysfunction, and more.

Chronic Disease Research Efforts. In alignment with Congressional interest, ORWH partnered with seven NIH ICOs to sponsor the NASEM report *Advancing Research on Chronic Conditions in Women*, highlighting the biological, social, and structural factors influencing disease prevalence, diagnosis, and management, and providing a multi-dimensional, research-driven approach to understanding chronic diseases in women. This novel framework has provided an approach for NIH to address the chronic health needs of the U.S population including ORWH's co-sponsored funding opportunity for "Understanding Chronic Conditions Understudied Among Women." ORWH and seven NIH ICOs funded 21 applications (9 R01s and 12 R21s) for $8,390,927 in FY24. Of the 21 applications funded, ORWH, including OADR-ORWH, funded 10 applications for a total of $2.8 million. Most of the conditions addressed by the funded research projects are present in both sexes; nine projects addressed female-specific conditions such as menopause, PCOS, and endometriosis. Examples of research projects funded include "Multi-omic Characterization of Chronic Obstructive Pulmonary Disease in Females" at Pennsylvania State University (National Heart, Lung, and Blood Institute- and ORWH-funded); "Targeting Estrogen-Sensitive Hypothalamic Neurons to Reverse Frailty in Aging Females" at the University of

California, San Francisco (National Institute on Aging- and ORWH-funded); and "A sex-biased obesity gene on the X chromosome" at the University of California, Los Angeles (NIDDK- and ORWH-funded).

Specialized Centers of Research Excellence on Sex (SCORE). The 19th annual meeting of the Organization for the Study of Sex Differences (OSSD) on June 1–5, 2025, featured a session on the "SCORE program on sex differences to promote discoveries of women's health research and their translation to the human population." Speakers from three SCORE centers participated in the session, which was moderated by Rajeev Kumar Agarwal, Ph.D., ORWH.

Institutional Development Award (IDeA) States. ORWH has worked over the past five years to build capacity for women's health research in the congressionally mandated Institutional Development Award (IDeA) Program, which was created to enhance biomedical research in states with historically low levels of NIH funding. ORWH, the National Institute of General Medical Sciences, and 14 other NIH ICOs fund women's health research in the IDeA States. Eighty-three (83) administrative supplements, totaling $23.4 million, were awarded from FY20 to FY24. Additionally, in FY24, three Centers of Biomedical Research Excellence on Women's Health (COBREs) were established in the IDeA states. These centers focus on Nutrition and Women's Health (University of Idaho), Leveraging Big Data to Improve Women's Health (University of Kansas Lawrence), and Sex-Based Precision Medicine (Tulane University of Louisiana).

Small Business Innovation Research. Small Business Technology transfer (SBIR/STTR). On June 26, 2024, ORWH collaborated with the NIH Small business Education and Entrepreneurial Development (SEED) Office to host the first in a series of webinars, "Small Business Opportunities for Innovative Women's Health Research," providing an overview of the NIH Small Business Program and Institute-specific interests in women's health small businesses. NIH ICOs co-sponsoring the funding announcement also participated. On October 30, 2024, ORWH hosted the second webinar, with NIH ICO co-funders and the Seed Office. The third and final webinar of the series is scheduled for June 25, 2025. As of June 5, 2025, there were 384 registrants for this final webinar.

Office of Autoimmune Disease-ORWH (OADR-ORWH). OADR-ORWH issued a report that encapsulates the achievements of OADR-ORWH in FY23 and FY24, highlighting progress made toward fulfilling the Congressional directives set forth with its establishment.

Careers. NASEM released a new report on the *Impact of Burnout of the STEMM Workforce* that was co-sponsored by ORWH. Key points include: (1) Burnout comes with many significant consequences for workers who may face physical and mental health challenges; organizations that can suffer from absenteeism, attrition, and diminished engagement, all of which can reduce growth and innovation. (2) In health care settings, the consequences of burnout have the potential to dire. It has been shown that burnout can be related to negative patient outcomes, as individual providers struggle to manage overwhelming caseloads and hours. (3) The uneven effect of burnout is concerning for a thriving **s**cience, **t**echnology, **e**ngineering, **m**athematics, and **m**edicine (STEMM) ecosystem, because it can diminish creativity and innovation that thrives in environments when a broad set of voices are represented. Taken together, these challenges make clear the need for continued attention to burnout and interventions in STEMM fields.

Travel Awards. ORWH recently awarded two Science Policy Scholar Travel Awards to support the development of junior investigators focused on women's health or sex differences and interested in research policy. Each recipient received $3,000 to cover the costs of attending and presenting on their research at the OSSD 19th Annual Meeting held June 1–5, 2025 in Albuquerque, NM. Amanda Koire,

M.D., Ph.D., from Brigham and Women's Hospital gave a presentation on "Sex differences in clinical trial enrollment in the United States across psychiatric disorders," while Nefia Chacko, a third-year medical student at New York Institute of Technology College of Osteopathic Medicine, presented on "Vascular dysfunction is associated with elevated asprosin levels in postmenopausal mice."

ORWH also awarded two Junior Investigators Travel Awards for the Menopause Society Annual Meeting on October 21–25, 2025, in Orlando, FL. Recipients were Madeline Wood Alexander, University of Toronto, who will present on "Inflammation and APOE ε4 genotype modify the link between earlier menopause and memory decline," and Sonia Raghuram, University of California, Los Angeles, who will address "Advancing Person-Centered Menopause Care: Development and Implementation of a Novel Facilitated Group Care Model."

ORWH Budget. Dr. Clayton reviewed the ORWH budget from 1991 to 2024, noting that the increase in FY02 was due to increased funding for the **B**uilding **I**nterdisciplinary **R**esearch **C**areers in **W**omen's **H**ealth (BIRCWH) program and that the increase in FY23 was due to the funding for OADR-ORWH. She also reviewed the FY24 budget across ORWH signature programs and the number of NIH IC co-funders for major ORWH initiatives, noting that ORWH works with all of the NIH ICs across its programs.

Reiterating her opening remarks, Dr. Clayton noted that ORWH is a key focal point for collaboration across NIH to advance women's health research. It continues to be a small office with a big impact, as evidenced by the number of publications, patents, and drug licenses that have emerged from its investments in women's health.

Events. Dr. Clayton urged ACRWH members and others to save the date for these upcoming events:

- Small Business Opportunities for Innovative Women's Health Research Webinar, June 25, 2025, 11 a.m.–1 p.m.
- NIH Women's Health Research Roundtable: Vaginal Microbiome and Implications for Women's Health, July 17, 2025, 3 p.m.–4 p.m.
- Launch of the NIH-Wide Strategic Plan for Autoimmune Disease Research (2026–2030), July 21, 2025, 1 p.m.
- 64th Meeting of the Advisory Committee on Research on Women's Health (ACRWH), with a 35th Anniversary Session, October 7, 2025, 9 a.m.–4 p.m.
- Specialized Centers of Research Excellence (SCORE) on Sex Differences 2025 Annual Meeting Keynote and Capstone Addresses, November 3, 2025, 8 a.m. – 5 p.m.
- Building Interdisciplinary Research Careers in Women's Health (BIRCWH) Annual Meeting, November 4, 2025, 8 a.m.–5 p.m.
- P2P Menopause Workshop: A workshop on management of menopausal symptoms in late 2025

Discussion. Dr. Clayton moderated a discussion following her presentation. Key points included:

- ORWH staff have worked hard throughout the years and have created an impressive record, as evidenced by the number of publications from grants it has co-funded.
- ACRWH raised the question of whether recent transitions at NIH, resulting in currently unfilled positions, might impact ORWH's ability to move forward. ORWH is continuing to pursue its unique and critical role, focusing on its signature programs as its top priority. There are new partners both within and outside NIH to support ORWH's mission. ORWH will continue to update ACRWH members as the landscape evolves.
- Epigenetic sex differences are understudied and represent an area of opportunity for further research. This is an issue for all NIH ICOs that address chronic diseases, and SABV plays a critical

role in increasing understanding of the etiology of sex differences and the underlying pathophysiology of the consequences of those differences in gene expression.

NLM: Fostering Biomedical Discovery and Data-Powered Health to Support Research on Women's Health

Dr. Clayton introduced Dina Paltoo, Ph.D., M.P.H., Acting Deputy Director of Policy and External Affairs at NLM, who presented an overview of NLM's work to support women's health research at the intersection of data science and information. To provide context to women's health research today, Dr. Paltoo noted that up until the women's right movement emerged in the 1970s, research on women lagged behind research on men and entrenched sex-related disparities limited access to health. These disparities remain even today. For example, in 2019, women accounted for only 40% of the participants in clinical trials on cancer, cardiovascular disease, and psychiatric disorders. Further, many previous clinical trials did not account for the intersection of sex and race. Key legislation, such as the NIH Revitalization Act in 1993 and the 21st Century Cures Act in 2016, increased federal mandates for the inclusion of women. In 1993, FDA was required to include women in clinical research, and in 1994, NIH revised its clinical research guidelines to include women and minorities. In 2023, Congress directed the creation of OADR in ORWH. NLM has played a vital role in these developments, including maintaining ClinicalTrials.gov and contributing to the development of OADR-ORWH's strategic plan.

NLM is one of NIH's 27 ICs. Its mission is to "Acquire, collect, preserve, and disseminate biomedical data and information for research, medicine, and public health." NLM is a leader in biomedical informatics and computational health data science research, maintains the world's largest biomedical library (including physical, digital, and exhibition collections), and is a developer of advanced biomedical information services. Both its digital collections and exhibition collections are available on the NLM website. Both have featured women's history content, such as the history of women physicians in the Rise, Serve, Lead! exhibition.

NLM Products and Services. NLM maintains multiple databases and services that connect everyone with health information. Of these, the most widely used is PubMed®, a site that supports search and retrieval of biomedical and life sciences literature across more than 37 million citation records. MedlinePlus® connects patients and families to reliable articles, videos, and resources from NIH and other expert organizations. PubMed Central® archives full-text biomedical and life sciences journal literature, containing more than 9 million articles, manuscripts, and more. ClinicalTrials.gov is a free public resource with up-to-date information about ongoing and completed clinical trials.

Health Data Standards. NLM develops and applies standards for improved access to biomedical information resources. This responsibility includes developing, promoting, and distributing data standards and terminology resources for health care and research.

Biomedical Data Repositories. NLM stores, preserves, and organizes biomedical data, including repositories for human data and health (ClinVar, Database of Single Nucleotide Polymorphisms [dbSNP], Database of Genotypes and Phenotypes [dbGaP], and Pathogen Detection), as well as sequence and chemical information, including genomes, genes, transcripts, and proteins. For example, GenBank® is a data repository that collects, preserves, and provides public access to assembled and annotated nucleotide sequence data from all domains of life. It contains more than 4.75 billion records. Sequence Read Archive (SRA) is the largest publicly available repository of raw, unassembled genetic sequencing data with more than 33 million records.

NLM Intramural and Extramural Research Programs. NLM's Division of Intramural Research conducts research in evolutionary genomics and biomolecular structure, health information standards and discovery, image processing, natural language processing, networks, gene regulation, and chromatin, as well as statistical methods. Dr. Paltoo cited two studies to illustrate their Intramural Division's work related to women's health. "An Observational Study of Deep Learning and Automated Evaluation of Cervical Images for Cancer Screening" utilized images from cervical cancer screenings to train large language models, which could potentially help detect cervical cancer earlier and more easily. "Regulatory risk loci link disrupted androgen response to pathophysiology of Polycystic Ovary Syndrome (PCOS)" has the potential to lay the groundwork for novel diagnostics, experimental validation, and drug discovery, ultimately leading to the development of improved diagnostics and treatments for PCOS.

NLM's Division of Extramural Research supports research in biomedical informatics and data science, informatics resources for biomedicine and health, and health information for health professionals and the public. For example, "Prediction of preterm birth in nulliparous women" has identified several genetic data elements that help predict indications for preterm birth in first-time pregnant people. The goal of "Partnering with Women with Disabilities to Develop a Health Information Website" is to meet the needs of women with disabilities and empower them to manage their health care. Investigators working on "Decision-Making Modeling for Treating Intimate Partner Violence" are developing a decision-making tool for clinicians that will reduce the disparities faced by people experiencing intimate partner violence.

NLM has issued an RFI "Inviting Comments on the Future of the National Library of Medicine Biomedical and Data Science Extramural Research Programs" (NOT-LM-25-002) to understand gaps, transformative opportunities, and underexplored areas for its extramural research program, such as bold strategies for biomedical informatics, emerging AI methodologies, and frameworks for scalable and innovative data sharing and interdisciplinary collaboration. The deadline for comments is July 14, 2025.

Women and Biomedical Informatics. NLM supports grant opportunities for women and biomedical informatics to improve decision-making and women's health. In 2019, NLM sponsored its first initiative to bring together women researchers and coders from diverse technical backgrounds in a collaborative codeathon to create software to solve relevant problems for the biomedical community. Projects included OVARIE: Open-CRAVAT VARiant Interpretation Expansion, Find All New ICDs Package (FANI-Pack), and Viral Alignment, Variant Discovery, and Annotation Pipeline (Viral-VDAP).

NLM-ORWH Collaborations. NLM and ORWH have intertwined missions that are integral to advancing women's health initiatives and have collaborated on several projects, such as the Myositis Common Data Elements Consensus Conference in 2024 to develop common data elements for myositis, a group of rare autoimmune diseases. NLM also participated in planning and moderating the 2025 Vivian W. Pinn symposium, which featured DiscoverWHR, an ORWH–NLM collaboration.

DiscoverWHR is an innovative resource to advance women's health research. It simplifies the search for NIH women's health research resources by providing a single place to find funding opportunities, information about literature, and ongoing research projects and health issues that uniquely, disproportionately, and/or differently affect women across their lifespan. Currently, information is available on menopause, autoimmune diseases (lupus and rheumatoid arthritis, scleroderma), and PCOS. Resources for each topic area include awarded projects from NIH RePORTER, clinical trials from ClinicalTrials.gov, scientific literature from PubMed, health topic summaries from MedlinePlus, and common data elements from the Common Data Elements (CDE) Repository (coming soon). Future focus

areas will include Alzheimer's disease, cardiovascular disease, cervical cancer, chronic pain, endometriosis, HIV, obesity, ovarian cancer, and uterine fibroids, among others. To date, DiscoverWHR has been visited by 25,616 unique users from 120 countries for 56,657 views since its launch on September 2024.

Discussion. Dr. Clayton facilitated a discussion about Dr. Paltoo's presentation. Key points included:

- In response to a question about the inclusion of pregnancy-specific phenotypes in DiscoverWHR, Dr. Paltoo said that NLM defers to ORWH and NIH experts about what topics to include. There is a "Give Feedback" button on the site where users can make recommendations about needed content.
- AI will be used to update and enhance PubMed but will not replace any existing elements.
- NLM acknowledges that it needs to do more to highlight its work. One suggestion was made to have a counter on the website to identify the real-time number of users, topics, etc.

Open Discussion

Dr. Clayton moderated an open discussion among ACRWH members. Key points included:

- Maternal morbidity and mortality (MMM) continues to be an important area of women's health. Dr. Clayton explained that NICHD is the MMM lead at NIH. The centerpiece Initiative for MMM at NIH is the Implementing a Maternal health and PRegnancy Outcomes Vision for Everyone (IMPROVE) Initiative that includes centers of excellence around the country. There also are efforts led by NIH ICs within their respective missions. ORWH's role has been to provide a scientific and programmatic framework for women's health over the lifespan to help guide the work of the NIH ICs.
- ORWH is currently updating several of its e-learning modules to help advance sex differences research. The Society for Women's Health Research has moved into the e-learning area and is embedding it more and more in other activities. ORWH is seeking to avoid duplication of efforts and identify additional partners with whom to collaborate on the e-learning courses. Dr. Clayton will announce the updated courses when they become available.
- An article in *JAMA* in January reported that the prevalence of long COVID was higher among women than men, which highlights the importance of sex disaggregation in health data. The NIH RECOVER website may have more up-to-date information on this topic.
- Suggested topics for future meetings included MMM; mammography of dense breasts; dementia and Alzheimer's disease; and the integration of technology into the study of women's health across diverse communities.

Panel: Data Science and Women's Health

Dr. OTA WANG introduced Belinda Seto, Ph.D., Deputy Director of Data Science Strategy at NIH, who moderated a panel discussion about data science and women's health.

Challenges of Biomedical Data Science for Women's Health

Dr. Seto introduced Jason H. Moore, Ph.D., FACMI, FIAHSI, FASA, Chair of Computational Biomedicine and Director of the Center for Artificial Intelligence Research and Education at Cedars-Sinai Medical Center and Editor-in-Chief of *BioData Mining*, who addressed the challenges that scientists face in dealing with data in the age of AI.

Dr. Moore began with a definition of learning health systems: "A system in which science, informatics, incentives, and culture are aligned for continuous improvement of the healthcare delivery experience"

(IOM 2015), noting that ideally science leads to evidence that then leads to improved care. In a learning health system, informatics can play an important role in tightening the pipeline between science and clinical care.

Data Challenges. Learning from data is challenging because data are expensive, often static, messy, private, and difficult to integrate, analyze, and operationalize. He examined each of these realities in turn. For example, data sources may include electronic health records (EHRs), imaging, and genomics, which are often expensive and time-consuming to collect and manage. Further, these data are often static, that is, a snapshot of a single point in time, and can be misleading. Wearables, in contrast, can provide continuous data that are dynamic in space and time.

Data, especially omics and EHR data, are messy. There are often missing data and outliers, requiring data scientists to make decisions about how to manage them. In addition, data are difficult to integrate because of a lack of standardization across multiple sources (e.g., lab tests, pharmacy records, billing codes, genetics and environmental data). The establishment of common data elements and common data models is needed.

Data privacy concerns lead to the dilemma of whether to use a centralized or federated approach to analytics in multi-site studies. A common approach is to de-identify data records and then perform a centralized analysis. Here, the data are in one place, but the submitting hospital loses control over its data and the data could become compromised. Dr. Moore favors the use of federated analytics in which each hospital analyzes its own data and then shares the data with others.

Data are often difficult to analyze, because many measures may organize themselves into pathways and control structures, which are ignored when researchers select a single biomarker from a genome-wide association (GWAS) study and ask whether it is associated with a clinical endpoint. Scientists need to embrace data complexity; AI and machine learning can support complex analyses.

Finally, data are difficult to operationalize. It takes time to develop, replicate, and disseminate a data model that is trustworthy, fits within the workflow of a health care organization, and complies with federal and state regulations. Once in use, data must be continuously audited and updated to ensure its safety and effectiveness. Thus, creating an effective clinical model is a lengthy and complicated process.

AI Challenges. Dr. Moore is interested in creating an ecosystem for explainable AI (EcoXAI) for non-data scientists to increase access and democratize AI by making it easy for people to do complex machine learning analyses. He and his colleagues at Cedars-Sinai Hospital have created a model in which curated data, public knowledge about genes and disease and drugs, and code and research results are merged into a graph that links the disparate inputs and shows the relationships between all the entities. They have built large language models (LLM) tools that enable querying of the data. The system is based on an ontology that models the relationships between code, knowledge, results, and annotations. Dr. Moore and his colleagues have recently published a paper in *Bioinformatics* on ESCARGOT, the AI agent in this system, which they have shown is capable of answering biomedical questions with 80% to 90% accuracy—a far better rate than more general-purpose tools, such as ChatGPT.

A Roadmap for AI-Powered Women's Health

Dr. Seto introduced Noémie Elhadad, Ph.D., Chair and Associate Professor, Department of Biomedical Informatics, Vagelos College of Physicians and Surgeons, Columbia University, and Director of Medical Information Services at New York-Presbyterian Hospital, who presented a roadmap for AI-powered women's health.

Dr. Elhadad began noting that data, AI, and technology can elucidate the role of sex differences in health, identify new knowledge about women's health, and create supportive solutions for women, though they also add complexity. Leading the EVEN initiative for data-powered women's health at Columbia University, Dr. Elhadad's roadmap explores AI techniques to address biases in women's health data, human-centered AI approaches to align solutions with the needs and values of individuals and populations, and the value of team science. The roadmap covers menstrual health, oral contraception, PCOS, and menopause, among other topics. Focusing on endometriosis, Dr. Elhadad noted delays in diagnosis, as well as complex self-management. AI can assist in its characterization, potentially leading to early detection and individualized recommendations for management of individual patients.

Dr. Elhadad described three types of new insights about endometriosis from recent data. These include: (1) human-centered insights, i.e., people with stigmatized conditions may want to contribute to science under specific conditions; (2) AI and tech insights, highlighting the power of mobile health to provide day-to-day data, and the ability of AI methods to identify data artifacts and complex, non-linear patterns in the data; and (3) specific insights into endometriosis as a systemic, heterogeneous condition with high temporal variations.

Citizen Endo and Phendo. Citizen Endo, a research project founded by Dr. Elhadad and her team at Columbia University and funded by NLM and the Endometriosis Foundation of America, partners with patients to (1) build datasets reflecting women's lived experiences with endometriosis and that advance scientific knowledge of the condition and (2) build tools to support disease management. Involving more than 19,000 patients, of whom approximately 9,000 are based in the United States, Citizen Endo uses citizen science and participatory design principles to educate and engage with the public. It created Phendo, an app to collect and track endometriosis data, which are stored on Health Insurance Portability and Accountability Act (HIPAA)-certified servers.

Phendo addresses the lack of biomedical literature on women's daily experience with endometriosis by creating a pain map based on the reports of 10,000 women. Findings show over one-half (57.8%) of study participants reported pain in the pelvis, with significant reports of pain in the back (43.9%), ovary (38.2%), abdomen (37.3%), vagina (26.3%), legs (25.7%), and hips (21.5%). Weekly variability in symptom intensity suggests that the menstrual period does not determine endometriosis-associated pain intensity, contrary to previously published reports.

Ability to diagnose and estimate the disease burden of endometriosis is limited by the current phenotype definition based on laparoscopic surgery with pathology confirmation. The 2022 European Society of Human Reproduction and Embryology endometriosis guidelines (2022) are symptom-based. Data from 500,000 women reveal subtypes within the endometriosis phenotype reflecting heterogeneity in phenotype definition. A recent report based on nine EHR databases (Observational Health Data Sciences and Informatics) estimated that that 2.11 million of 188 million reproductive-age women have been diagnosed with endometriosis. The lag between symptom onset and diagnosis of endometriosis is typically 10 years. Citizen Endo research suggests that endometriosis could be diagnosed 2 to 5 years sooner with 71% accuracy and offers an intervention within Phendo to refer undiagnosed woman with abdominal or pelvic pain to specialists.

Dr. Elhadad emphasized the benefit of providing individualized support by co-designing AI solutions with patients and providers. These solutions should ensure principles such as human autonomy and control, privacy, trust, and safety.

Dr. Elhadad concluded her presentation by advocating for an AI roadmap for women's health that: (1) Adopts AI techniques that account for biases in women's health data; (2) Employs human- and population-centered AI approaches; and (3) Utilizes team science to bring together different disciplines and insights.

Towards an Integrated Biological and Environmental Data Infrastructure

Dr. Seto introduced Kjiersten Fagnan, Ph.D., Chief Information Officer, U.S. Department of Energy (DOE) Joint Genome Institute (JGI) at Lawrence Berkeley National Laboratory, which provides the global research community with free access to the most advanced integrative genome science capabilities in support of the DOE energy and environmental research mission. JGI supports more than 10,000 data users and has contributed to over 29,000 studies in the biosciences and other disciplines.

The emergence of data-hungry algorithms such as AlphaFolds and generative AI models such as GPT-4.5 is driving AI research and scientific breakthroughs. Dr. Fagnan noted the need for data curation alongside building data portals to produce meaningful, useful and trustworthy output.

Improving Data Access. DOE's Biological and Environmental Research (BER) program funds projects in energy and resources in the biological sciences, maintaining databases such as the Microbiome Data Collaborative (sample metadata, standardized data products), ESS-DIVE (biogeochemical measurements, sensor data), EMSL (proteomics, metabolomics, imaging), JGI ([meta]genomics, transcriptomics, metadata), and KBase (predictive biology). Dr. Fagnan described an initiative that seeks to prototype a unified data access layer allowing for a common search entry point across these five data structures. The components of the unified data access layer consist of BERtron, a global search tool that is supported by standard application programming interfaces (APIs) to enable users to find and reuse data, and a data transfer service that maintains provenance and propagates credit.

DOE has conducted user research with scientists, facility users, and the research community, revealing that users are generating more data, spending increasing resources on data management and building their own infrastructures, resulting in a greater number of disconnected data resources. There is a strong desire for automation of data management activities to allow greater focus on science rather than data management. Gaps exist in the current data repository infrastructure, including for analysis-derived data products.

Harmonization of metadata across the five BER data sets is critical. Dr. Fagnan's team created a shared data model and mapped connections among data sets, creating a "ground zero" API that spans multiple data sources. Users harmonize and integrate the data themselves, though the data sets can continue to be searched on their own. Data harmonization occurs through the cross-resource data model catalog. Additional efforts are needed to optimize reliance on human agents to correct errors and to reduce the time required for subsequent data harmonization and creation of data models.

Dr. Fagnan concluded with these key points: (1) Achieving 80% unified data access is easy; the final 20% cannot be done alone. (2) Data harmonization is challenging, essential, and can be facilitated by AI

agents and LLMs; making them powerful for science requires collective effort (3) Team science cannot be overlooked.

Discussion. Dr. Seto moderated a discussion following the panel presentations. Key points included:

- There is a critical need to establish a single sign-on method to access multiple datasets. Using a library analogy, a process of patron identification and accountability for following rules (e.g., fines for late returns) is in place before individuals can borrow materials. Also needed is a shared identity or passport based on user credentials to simplify access to multiple systems. Privacy, copyright, and the amount of data allowed to flow through unsecured systems are among the key issues that must be addressed as these systems continue to develop.
- The trustworthiness of data accessed from LLM systems is a significant issue; commercial data vendors are often unwilling to allow health systems to examine their source code to ensure data validity. In the absence of AI regulation, governance is important and patients and research participants contributing their data need to understand that governance. Researchers are developing a deeper understanding of how to operationalize the robustness in health-related AI, aiming to assess the credibility of results and establish best practices that ensure applicability across diverse populations. However, further work is needed in this area. Providers and researchers need education on how to use AI effectively, rather than simply accepting search results at face value. Learning to think about the question being asked is important because data-related problems will be associated with each question. Data harmonization and management to enhance data quality and accuracy are expensive, and funding is scarce.
- Most AI models available to the public are not trained on clinical health data and are therefore likely to provide inaccurate answers to health-related queries. A technique called retrieval augmented generation (RAG) involves providing a curated database of biomedical information to which an LLM might not otherwise have access. RAG can help enhance the accuracy of the AI's response to a health-related query. However, development of an interface wherein a human is judging the accuracy of the response is also a valuable strategy. Similarly, in a clinical setting, clinicians should make clinical decisions with AI as a decision support tool.
- An example of how LLMs can be useful in a hospital learning system is an LLM-based app developed at Cedars-Sinai called CS Connect to help individuals navigate the health system. After a user enters their health information, the app asks additional questions and then provides a preliminary diagnosis of the user's condition. A button pops up that connects the user immediately to a live doctor for further clarification. The app can help the user schedule an appointment with a physician, and at the time of first encounter, the provider will have a summary of what AI has already learned about the user. Cedars-Sinai has successfully used the app to good reviews for the past 18 months; it dramatically improves the patient experience, facilitates getting them into the clinic, and saves clinician time.
- Mobile health itself is not a significant concern for the endometriosis patients in Citizen Endo. The women who participate are more concerned about who will have access to their personal reproductive health data and express a general mistrust of the pharmaceutical industry, which is perceived as being more interested in developing drugs to treat symptoms rather than in searching for a cure.
- The terms "algorithmic fairness" and "AI general" can both be used to refer to AI models that make predictions equally across all people, regardless of their demographic characteristics. This area of AI is understudied.

- One approach to protecting people's privacy while maintaining the ability to research sensitive but understudied health topics, such as menstruation, is to build synthetic data sets that contain AI-generated false health data that look very similar to what women have actually reported.
- Agentic AI is a new and useful concept in which multiple AI agents independently tackle different parts of a problem to solve a larger challenge.
- Multimodal AI that incorporates multiple data types, as well as its use in health care settings, remains in the early stage of development. Many new data types, such as patient data from wearables, would be useful to incorporate into the health care system as multimodal AI evolves.

Open Discussion. Dr. Clayton opened the floor to questions and suggestions for future meetings from ACRWH members. She also announced an exciting, late-breaking announcement: Beginning with FY24, NIH's methodology in the Research, Condition, and Disease Categorization (RCDC) system for recording the category of women's health research will shift from manual to automatic coding, thereby ensuring improved accuracy.

Oral Comments

Per Federal Advisory Committee Act (FACA) regulations, any member of the public is permitted to file a written statement and/or submit a letter of intent if interested in presenting oral comments to the Committee. Dr. OTA WANG acknowledged the written comments received from the Physicians Committee for Responsible Medicine and opened the floor for an oral comment from the American Urogynecologic Society. Dr. OTA WANG introduced Milena M. Weinstein, M.D., FACOG, FACS, Chief, Urogynecology and Reconstructive Pelvic Surgery and Co-Chair, Center for Pelvic Floor Disorders at Massachusetts General Hospital, and Associate Professor of Obstetrics, Gynecology, and Reproductive Biology at Harvard Medical School, who provided comments on behalf of the American Urogynecologic Society (AUGS).

Dr. Weinstein emphasized the importance of understanding and evaluating the conditions that women face throughout their lives, including conditions that become more prevalent in post-reproductive years. AUGS strongly supports increasing research funding dedicated to holistic women's health, focusing on studies related to urologic and gynecologic disorders, including pelvic floor disorders (PFDs). Urologic disorders, including PFDs, affect 25 million individuals annually and are very common in older women. Many pelvic floor disorders become chronic conditions and require ongoing medical attention.

In 2023, AUGS released a National Urogynecology Research Agenda for advancing the treatment and management of PFDs. The research agenda identified knowledge gaps and research priorities across six specific topics: lower urinary tract symptoms, urinary incontinence, pelvic organ prolapse, fecal incontinence, recurrent urinary tract infections, and sexual health in women with pelvic floor disorders, bladder pain, interstitial cystitis, and myofascial pain syndrome.

Dr. Weinstein focused her remarks on pelvic organ prolapse. The pathophysiologic mechanisms underlying the development and progression of prolapse are not well understood, and no effective preventive strategies exist against prolapse. AUGS recommends exploring (1) normal and abnormal functional anatomy and biomechanics; (2) molecular, cellular, genetics, and biomechanical factors; (3) therapies for prevention, treatment, failure, and recurrence; (4) societal impact; and (5) financial burden for treatment of disabilities. AUGS strongly supports increased funding to address research gaps in the full female lifespan and improved delivery of care for PFDs and urogenital conditions.

Closing Statement

Dr. Clayton thanked the presenters for their excellent presentations. She thanked Dr. OTA WANG and ORWH staff for their efforts. She stated she looks forward to seeing ACRWH members in person at the 64th ACRWH and 35th ORWH anniversary celebratory meeting on October 7, 2025. Dr. Clayton adjourned the meeting at 2:32 p.m.

Certification

We certify that the contents above are accurate and complete.

Janine A. Clayton -S Digitally signed by Janine A. Clayton -S Date: 2025.09.15 10:59:36 -04'00'

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

Date _____

VIVIAN OTA WANG -S Digitally signed by VIVIAN OTA WANG -S Date: 2025.09.10 10:21:39 -04'00'

Vivian Ota Wang, Ph.D., Executive Secretary
Advisory Committee on Research on Women's Health

Date _____