

INNOVATIONS

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What's Next for Women's Health Research?

A Conversation with Dr. Janine Clayton

Since creating Women's Health Research at Yale in 1998, we have been changing the landscape of medical research and practice. This change entails ensuring that women are studied, that sex-and-gender differences in health are investigated, and new findings are implemented to improve the lives of everyone. In this work, we have closely collaborated with the National Institutes of Health Office of Research on Women's Health (ORWH), established by Congress in 1990 to ensure that the NIH's federally funded research adequately addresses persisting gaps in knowledge about the health of women.

Together, and with other partners across the country, WHRY and

the ORWH have made significant progress toward advancing the health of women. Yet, challenges remain. The COVID-19 pandemic has again revealed the slim margin of resources available to women, particularly women of color, and the disproportionate social and economic burdens that affect the health of women. The need is clear to invest in the opportunities that research provides and ensure implementation of new findings to improve health outcomes and prepare us for unique challenges.

I have been fortunate in knowing ORWH Director Janine Clayton, M.D., for some years, serving on the NIH Advisory Committee for Research on

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NIH's policy change to consider sex as a biological variable. © The National Institutes of Health

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Women's Health Research at Yale is tremendously grateful to the members of our Legacy Society, who have included WHRY in their estate plans or have made planned gifts through a will or trust.

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Women's Health Research at Yale was founded in 1998 with initial funding from The Patrick and Catherine Weldon Donaghue Medical Research Foundation. Women's Health Research at Yale is a program within Yale School of Medicine. Yale University is a 501(c)(3) nonprofit organization.

What's Next for Women's Health Research? (Continued from front cover)

Women's Health, led by ORWH, and directly seeing the accomplishments of the office. Under Dr. Clayton's leadership and that of the inaugural director, Dr. Vivian Pinn, the ORWH is an essential driver in advancing the health of women.

In reflecting on what we know and looking ahead to next steps, I spoke with Dr. Clayton, who has led the office since 2012.

– Carolyn M. Mazure, Ph.D.
 WHRY Director

Dr. Mazure: In your view, what are the most urgent health care issues for women that research needs to address?

Dr. Clayton: I would point to the greatest causes of death among women – heart disease and cancer – as well as a leading cause of disability – mental health issues. Research has shown that these conditions can present differently in women and men and are often linked to one another or other diseases. The pathways that link such conditions are not fully understood. Consequently, we need scientists and clinicians to study these comorbidities using interdisciplinary approaches and a whole-person perspective. Plus, we need a health care system that is equipped to recognize the complex effects of sex and gender on a person's health, so women are accurately diagnosed and receive the correct treatment earlier in disease progression.

Dr. Mazure: The terms “sex” and “gender” are now being increasingly integrated into our scientific work. Why is this important, and are there other related terms we could be using?

Dr. Clayton: Research has proven that biological sex matters at every level, from a single cell to the societal level. We also know the self-representation of gender can affect symptom expression, disease manifestation, and treatment efficacy. So, if both sex and gender aren't accounted for, clinicians cannot make the best treatment decisions for all patients. As the concepts of sex and gender continue to be understood, our terminology needs to be more inclusive so the expanse of sex and gender can be studied and accurately reported. There also are a lot of domains in which to consider sex and gender. For example, we need to study the intersection of sex, gender, race, and ethnicity. Intersex and nonbinary identities need to be recognized because these, too, have health implications. It is important, as well, for us to work more with our social science colleagues to appropriately integrate their knowledge base as much as possible into our biomedical research questions.

Dr. Mazure: I know that your office is concerned about the mental health and emotional life of women,

especially given the effects of the COVID-19 pandemic on women. What are data revealing about research directions for the ORWH regarding women and mental health?

Dr. Clayton: The bottom line is that pandemics and disasters affect men and women differently. For example, what we are seeing with the COVID-19 pandemic is unique in that women were more likely to lose their jobs because of the closure of so many service jobs populated by women and, because of their gendered caregiving roles and the fact that schools have been closed, women have taken on disproportionate responsibilities for caregiving and homeschooling. With a higher percentage of women out of paid labor positions, and the economic consequences of this situation, it is unclear how this will affect women and their mental health. Research can and should address these matters. This also is a moment in time when we can create a new way for the workforce to serve women, including women in science. The workforce of tomorrow could be better than the workforce of today if we finally take steps to make



Women's Health Research at Yale and the NIH Office of Research on Women's Health work to address persisting gaps in knowledge about the health of women.

systemwide change that more fully accommodates the lives of women and men.

Dr. Mazure: Over the years that you have been focusing on the health of women, have you seen change in the research landscape as it relates to studying women and sex-and-gender differences?

Dr. Clayton: I do see more attention to some of the important issues related to the health of women and the influence of sex and gender on health. I also see more attention to the



Dr. Janine Clayton was appointed Associate Director for Research on Women's Health and Director of the Office of Research on Women's Health at the National Institutes of Health (NIH) in 2012. She is the architect of the NIH policy requiring scientists to consider sex as a biological variable across the research spectrum, a part of NIH's initiative to enhance reproducibility, rigor, and transparency. As co-chair of the NIH Working Group on Women in Biomedical Careers with NIH Director Dr. Francis Collins, Dr. Clayton also leads NIH's efforts to advance women in science careers. In 2021, Dr. Clayton was elected to the Board of Directors of the American Association for the Advancement of Science (AAAS). A native Washingtonian, Dr. Clayton received her undergraduate degree with honors from Johns Hopkins University and her medical degree from Howard University College of Medicine.

NIH Policy on Sex as a Biological Variable (SABV) in laboratory studies. Unfortunately, despite this progress, one thing the pandemic has highlighted is that there is still a lot of work to do. With all we know about sex-and-gender differences, women still aren't included to the appropriate extent in clinical studies for all diseases that affect women and men, and the reporting of sex-and-gender-specific results has either stalled or declined in some cases. We need to see study designs that explicitly address sex and gender in their inclusion and exclusion criteria, methods, and analyses so we can understand how interventions work or don't work in women and men distinctly. And many large clinical studies that clinicians depend upon for making evidence-based treatment decisions for patients continue to fall short of reporting sex-and-gender-specific results. Increased awareness, certain policy changes, and the Sex and Gender Equity in Research (SAGER) guidelines, which help direct journal editors and authors on preparing manuscripts, are signs of progress but have not yet translated into the systemic change that is needed.

Dr. Mazure: From your perspective, what are the challenges in focusing on the health needs of women of color?

Dr. Clayton: Women of color are not a monolith but rather a multidimensional group of people who have different health concerns and, indeed, different outcomes. Challenges in serving these women include structural barriers, including bias, lack of recognition of the unique needs of this diverse group, and their low rates of inclusion in biomedical research. Consequently, worse health is the outcome. For example, incidence and mortality of the most aggressive subtypes of breast cancer are significantly higher among Black women compared with all other racial/ethnic groups. Similarly, in a recent

commentary, my colleagues and I discussed maternal morbidity and mortality and COVID-19 in terms of their disproportionate effects on women of color.

These examples highlight the need for more research that seeks to tackle intransigent health disparities experienced by some populations in the United States. To address this, the ORWH leads the U3 program to focus on addressing research gaps among groups of women that are understudied, underrepresented, and underreported in biomedical research. If we don't study the problems, we can't find solutions. Also, NIH recently established the UNITE initiative to become part of the solution by addressing structural racism and promoting equitable representation and inclusion at NIH and throughout the larger biomedical research enterprise.

Dr. Mazure: How does a center like Women's Health Research at Yale advance the goals of the ORWH?

Dr. Clayton: Centers, in general, are a great way to focus attention on important questions. Women's Health Research at Yale specifically addresses the concerns of women in ways that can accelerate research and foster training and mentorship on the health of women. By intentionally funding and supporting sex-and-gender-related differences research and studies that focus on important issues that affect women — ranging from heart disease to mental health — Women's Health Research at Yale is filling the gaps in our knowledge so women can receive the best health care possible. It is a pleasure to see this center expanding, both in terms of its research and education, but also in building and maintaining close relationships with the community and its newest focus on health policy. ◀

Sleeping Smarter for a Healthier Life Early Study Results Show Promise for Women

By the first spring of the pandemic, women had “alarmingly high rates of mental health problems,” including depression and anxiety, according to a study published this spring in the *Journal of Women's Health*. The researchers point to job losses and other severe stressors of the pandemic that have taken a greater toll on women, who make up the majority of essential workers and take on most family care responsibilities. We know that stress can lead to sleep difficulties, and prior research has shown that lack of sleep can contribute to and exacerbate health problems.

Women's Health Research at Yale, with support from WHAM! Investigators Fund, sought a practical way to help older women improve their sleep and in doing so reduce health risks linked to insufficient sleep, such as depression, cardiovascular disease and Alzheimer's disease.

WHRY partner Dr. Hilary Blumberg, the John and Hope Furth Professor of Psychiatric Neuroscience and Director of Yale's Mood Disorders Research Program, adapted a tested sleep intervention known as SLEEP-SMART to focus on helping older women with sleep problems and develop it for remote administration. In doing so, she was able to demonstrate a unique method for providing this population of women with strategies to improve their sleep health in a way that is accessible and potentially scalable for wide distribution.

“Even before COVID-19, women have had higher rates of sleep disturbances than men, which are more likely to worsen with age,” Blumberg said. “What we have seen during the pandemic is the emotional, cognitive, and physical cost to women when routines and then sleep become more irregular.”

As the country shut down last year and people isolated themselves to slow the virus' spread, another aspect of SLEEP-SMART's forward-thinking design showed that sessions of the intervention led by trained therapists could be mostly delivered via videoconferencing. In addition, recent advances in digital wearables, such as wrist “actigraphy” devices, provided her research team the capacity to study 24-hour patterns of activity.

“These technologies can help us reach women where they live, automatically collect data when they are in their natural environments, and maintain regular personal connections with therapists that reinforce the intervention's goals,” Blumberg said.

Preliminary data indicate SLEEP-SMART can improve sleep patterns, show associated reductions in symptoms of depression and anxiety, and improve the functioning of brain circuits important in emotional and cognitive health. Participants also reported a capacity to create more consistent routines and fall asleep more easily that resulted in a clearer, more alert mind.

Dr. Blumberg plans to continue testing SLEEP-SMART and its potential for broad use. ◀



A WHRY-funded study has shown promising results for an intervention to help older women improve their sleep and reduce associated health risks. © Milkos/bigstock.com

What is SLEEP SMART?

SLEEP SMART, or Sleep Self-Monitoring And Regulation Therapy, is a 12-week intervention to regularize sleep and other daily rhythms that Dr. Hilary Blumberg, with colleagues at Yale and the University of Pittsburgh, adapted from an existing therapy called Social Rhythm Therapy.

The intervention is administered by a trained therapist working with individuals on strategies to promote healthier patterns of daily activities and sleep, such as setting a consistent bedtime with a comfortable room temperature and shutting off devices before lying down.

Tomorrow's Teachers WHRY Undergraduate Fellows Carry Lessons Forward

Students participate in Women's Health Research at Yale's Undergraduate Fellowship for one and sometimes two years. But even after graduation, we are thrilled that they stay in touch with us and that their experience with WHRY continues to shape their careers.

Here is a look at what five of our former students are doing now and how they are carrying forward the work they began with WHRY.

Ben Fait, '17

As a WHRY fellow, Ben Fait worked as part of our communications team in developing public health videos and scientific essays for a general audience. Currently in his third year of a Ph.D. program at Rockefeller University in New York City focusing on uncovering how spinal cord injuries lead to loss of movement, he now writes, as a scientist, about the value of researchers speaking directly to the public about science.

In January, Ben co-authored a paper published in the online journal *Science and Diplomacy* on the importance of building a more demographically representative scientific workforce. He makes the point that scientists must be ready to engage with and earn the trust of the public and to counter widespread misinformation of the type that has damaged efforts to contain the COVID-19 pandemic.

"This journal is read by those who are in charge of educational policy and oversee the experience of students who are interested in science policy," he said. "We can help make a change in the way students of science are trained by helping each other become more comfortable with and committed to talking with the community about our work."

In the article, he listed his impressive



When interviewing with medical schools, Suyeon Hong described her time with WHRY as one of her most meaningful undergraduate experiences. She starts at Yale School of Medicine in August.

credentials, including his time as a Fulbright Researcher at Universitat Pompeu Fabra in Spain, as well as identifying himself as a former WHRY fellow, a meaningful acknowledgment shared with us here at WHRY.

"Working with WHRY was a great opportunity for me," he said. "I always bring up the need to study sex and gender in seminars I attend and in conversations with colleagues."

Suyeon (Sue) Hong, '20

In her first of two years with WHRY, Suyeon Hong became the second student to author the WHRY blog, "Why Didn't I Know This?" (now published on the WHRY website). After sharing her research and insights into significant issues facing the health of women, including her own drawings to illustrate the concepts expressed in the blog, she then shifted in her second year to advancing the center's project of integrating research findings on the impact of sex and gender into the medical school's curriculum.

Her significant contributions to these efforts mirrored the quality of

her academic work as reflected in earning the Pauli Murray College Prize for Outstanding Achievement in Academics. In her gap year after graduation, Sue continued at Yale, working in the Department of Psychiatry with Dr. Kimberly Yonkers and Dr. Ariadna Forray on a project investigating two models of support in treating pregnant women who have an opioid use disorder.

This spring, she was accepted to attend Yale School of Medicine. On her application, she described WHRY as one of her most meaningful college experiences.

"WHRY has shaped my view of medical research and how there are not enough data on sex-and-gender differences," she said. "That's something I would want to work toward correcting, in whatever specialty I'm in."

Devyn Rigsby, '19

As a WHRY fellow three years ago, Devyn Rigsby learned firsthand what it was like to care for women with cardiovascular disease under the

mentorship of cardiologist Dr. Lisa Freed. After graduating from Yale with highest honors, Devyn spent a gap year working at a global health nonprofit organization specializing in sustainability of international aid programs. In this position, she led two research projects, financed by the Gates Foundation and the Global Fund, focusing on building middle-income countries' domestic capacity to fund and manage their national family planning and HIV programs. Through her work, she interacted with stakeholders on all inhabited continents and traveled to five countries.

Devyn continues to follow her passion for global women's health as a medical student at the Perelman School of Medicine at the University of Pennsylvania, where she began her studies last year. She serves as a student coordinator at her school's free clinic for refugee women, providing reproductive health screening and counseling to newly resettled female refugees.

She is quick to raise the need to consider sex-and-gender differences in medical education and practice, and she values the examples set for her at WHRY in her work with Dr. Freed and

WHRY Director Carolyn M. Mazure, Ph.D. "The relationships I had with Dr. Freed and Dr. Mazure were invaluable," she said. "Seeing those individuals succeed in their fields showed me how science and medicine by women and for women can be done and done very well."

Anjali Walia, '21

As a WHRY fellow, Anjali focused on health communications and expanding the readership of the WHRY student blog. At the outset of the pandemic, she also published an op-ed in *The Hartford Courant*, drawing on research from past viral outbreaks to stress the need for understanding how the new coronavirus affects women and men differently.

Starting in August of this year, Anjali will attend the University of California, San Francisco School of Medicine, seeking to build upon the foundational interests she cultivated working with WHRY and The Reproductive Justice Action League at Yale College.

"Physicians have such a unique political voice, and I want to effect change as widely as possible," she said. "Not just through practicing medicine, but advocacy work and research."

When interviewing with medical

schools, she often highlighted her work at WHRY.

"I would talk about how I became aware of the need to better understand and share knowledge about sex-and-gender differences in health," she said. "As I move forward in my education and career, I definitely want to build upon the work I did and ensure that, as a physician, I both attend to and advocate for my patients' needs."

Dhiksha Balaji, '18

Dhiksha Balaji, who launched WHRY's popular student blog, aims to pursue not just medicine, but advocacy, writing, and research — with the understanding that the health of women as well as the sex-and-gender differences in health must be considered.

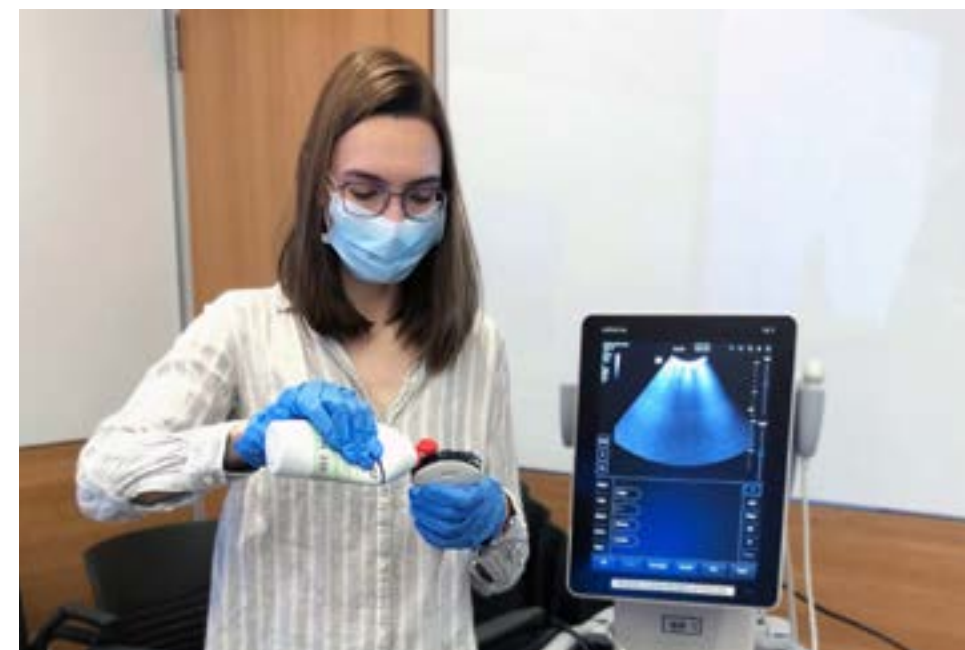
As Dhiksha finishes her second year at the Case Western Reserve University School of Medicine in Cleveland, she wants to keep her focus on the need to study and use what she knows about sex-and-gender differences in health.

"Recently, I reached out to Dr. Mazure because I felt I was missing a piece of medicine that I want to be part of my future clinical thinking," she said. "She very kindly sent me current research articles and names of prominent scientists who are advancing the field and whose work I could follow."

Dhiksha said the fellowship introduced her to many aspects of health and medicine she had never encountered in her classes as a pre-med student or in the media.

"Dr. Mazure and the rest of the team helped me meld my passions with WHRY's work," she said. "I can say unreservedly that the fellowship was a highlight of my Yale experience." ◀

Devyn Rigsby, a second-year student at the Perelman School of Medicine at the University of Pennsylvania, prepares to conduct an ultrasound. She often discusses the need to consider sex-and-gender differences in health with colleagues.



Women's Health in the Time of COVID-19 By Ke'ala Akau

On an endlessly rainy March evening, as I stared at a screen for the fifth hour of back-to-back remote seminars, a dull pain drummed my temples, and my hip flexors ached in a once-comfortable chair. A wave of anxious energy quickly consumed me as my mind returned to questions about whether I was being productive enough, whether my family back home was safe and healthy, and when the pandemic would finally end.

As a college student, I have seen the effects of the pandemic's physical and emotional toll manifest clearly in the experiences of my friends, classmates, and professors. As a fellow with Women's Health Research at Yale, I have learned that the impact may be felt more by women.

In an analysis published by the Kaiser Family Foundation in April, nearly 70 percent of women ages 18-29 reported that feelings of worry or stress related to the pandemic have had a negative impact on their mental health, compared with 50 percent of men in the same age group. Similarly, 55 percent of women of all ages reported a negative impact on their mental health, compared to the 38 percent of all men who reported a negative impact.

In my work researching and writing articles with WHRY on the health of women, I have also discovered

illustrations of how various aspects of health can be linked, and that these links can show sex-and-gender differences. For example, I have written about how women's heart health, which has historically been under-emphasized, is related to mental health. Evidence suggests chronic mental disorders such as depression and anxiety may increase cardiovascular risk factors in both men and women. However, as the pandemic aggravated already existing mental health challenges, which are generally more prevalent in women, the connection it may have on heart health is especially significant.

This is why the work that WHRY does to support research in sex-and-gender differences is so important — it shows where we must focus to reduce the increased risk of certain disorders in women, but it also identifies where we must address health problems found in men, thus working to improve the health of everyone.

In taking on issues directly related to COVID-19, WHRY also directly supported research that has been instrumental in understanding the impact of sex-and-gender differences resulting from the pandemic.

Dr. Akiko Iwasaki illuminated how sex differences in immune response to COVID-19 can affect patient



outcomes, while Drs. Sarah Lowe and Robert Pietrzak are examining how women and men who are health care providers may have different ways of showing psychological resilience.

We must accelerate this type of work across all health conditions that affect women and forge a better path where we examine sex-and-gender differences to benefit everyone.

Thanks in large part to vaccines, we will soon be free from constant Zoom meetings and the immediate threats of COVID-19. This pandemic has presented unprecedented challenges. Let's use this opportunity to make science better for everyone. ◀

Read more posts from our student blog — "Why Didn't I Know This?" — by visiting <https://medicine.yale.edu/whr/training/blog/wdikt> or scanning the QR code below.



Trust in Science By Rick Harrison

If you can believe it, a 1999 Gallop poll showed 6 percent of Americans thought the 1969 moon landing was a hoax. A 2016 poll conducted by the National Science Board found that 27 percent of respondents incorrectly believed the sun revolves around the Earth. Recent surveys have also shown that between 1 and 2 percent of people believe the Earth is flat.

Such false beliefs are understandable. This is what can happen in a large country with unequal education, growing skepticism or outright hostility to institutions, and misinformation and disinformation spread with accelerating technological ease targeted to splintered audiences with shrinking attention spans.

As we have seen, false beliefs about the legitimacy of elections or the dangers of a global pandemic can carry dire consequences. For example, people who have been skeptical about the efficacy of masks to slow the spread of COVID-19 often point to the shifting advice offered by public health experts. Or they bring up one or more proposed treatment that ultimately proved ineffective or unsafe. They ask: Why believe them now when they said something else earlier?

This is a valid question. Here is the answer: This is how science evolves and works. Following the science

is how this pandemic will end. And science is where we need to continue placing our trust.

To clarify, I primarily mean science as a discipline. It's the method you might have learned about in grade school, in which hypotheses are tested to determine a series of facts that might align into a theory and explain something about how our world works. Notably, this doesn't always work in a straight line. New knowledge can replace prior understanding. Progress is the point.

I also mean science as a collective endeavor, practiced by individuals and institutions around the world in pursuit of knowledge and — in the case of medical science — the capacity to improve and save lives. This, too, can get messy. People make mistakes, experimental designs can be faulty, and findings from different labs can contradict.

But this structure — the systematic, careful pursuit of verifiable facts — offers our only path forward. Disagreement, unexpected results, collaboration, complexity, inspiration, innovation. These are both the tools and products of an endeavor that dates to the first humanoids capable of questioning something about themselves and their environment.

Science is why we have multiple safe and effective COVID-19 vaccines.



It is why we know that masks and physical distancing help prevent the spread of the virus behind this terrible disease. It is how we landed on the moon and currently navigate our planet with phones connected to orbiting satellites. It is how Aristotle determined the Earth was spherical more than 2,300 years ago.

Science is how Women's Health Research at Yale has uncovered critical aspects about the health of women and sex-and-gender differences that make lives better for everyone. And we must continue to make science better. Not because scientists are always correct or should replace elected leaders to make policy decisions. But because we and our leaders should make decisions based on the best available information. And for that, science is the best source. ◀



From Council Chair to Chair Emerita Carol Ross Looks Back and Ahead



Growing up with her mother and two sisters, Carol Ross learned from an early age that women could do anything.

"I became a strong feminist," Ross said. "It seemed natural to me that we should be striving as a country to do more to help women, particularly concerning health."

Ross first learned of Women's Health Research at Yale through various friends and in attending an event in which she was impressed by WHRY Director Carolyn M. Mazure's presentation on the center's work to achieve equity in research and health care. Carol subsequently was asked to join WHRY's Advisory Council in 2009 and became the chair two years later.

This summer, after serving as Council Chair for Women's Health Research at Yale for a decade, Ross will welcome Vice-Chair Susanna Krentz as the new Chair to lead the council. Ross will assume the role of Chair Emerita.

"It's been a wonderful experience," said Ross, a longtime New Haven resident. "We've developed a relationship of trust with the community that ultimately facilitates our mission of translating research findings to improve the lives of women. It's been a great privilege to serve as chair for the last 10 years."

Prior to becoming an essential part of WHRY, Ross had a long and distinguished career as a teacher of Greek and Latin with positions at The Foote School, Wilbur Cross High School, and Choate Rosemary Hall.

Carol Ross, a beloved educator, joined WHRY's Advisory Council in 2009.

She also has a cultivated love of music, plays piano and the recorder, and has led the boards of the National Guild of Community Schools of the Arts and the Neighborhood Music School in New Haven.

"I suppose it's not often you find someone who taught Latin and Greek leading a council on women's health research," she said. "But I quickly found this was where I belonged. I could be a voice for women."

Dr. Mazure praised Ross for her steady hand in helping to solidify the center's finances that allowed for the launch of dozens of research studies, and in expanding council membership across the country.

"We are so grateful for Carol's leadership, her friendship, and her commitment to advancing the health of women," Mazure said.

Ross said she looks forward with great confidence to seeing how Krentz steers the council.

"Her expertise in communication will be helpful for us — she's terrific at that," Ross said. "We are doing so many amazing things, and it's important to let the world know."

Krentz said she hopes to continue to expand the council, diversify its membership in terms of geography and backgrounds, and ensure that members feel rewarded while adding value. She lauded Ross' thoughtfulness, attention to detail, and personalized approach to the council and WHRY's donors, as practiced through regular phone calls and handwritten notes.

"My ambition is to keep that personal touch," Krentz said. "As we go forward, I will have Carol in mind as a true role model." ◀

The Next Discovery

Over this trying and sometimes surreal year, we have all been reminded that scientific breakthroughs are the result of committed action and, very often, enduring effort. For example, apparent rapid developments, like the COVID-19 vaccines, are built on years of careful progress and investment in understanding our immune systems.

Our mindset at Women's Health Research at Yale for the past 23 years has been committed action to uncover and use new findings to advance health, while also continuing to set the stage for the next major breakthroughs.

Right now, we are setting that stage by building a new classification strategy to better recognize heart attacks in women. We are exploring how CBD, a non-intoxicating component of cannabis largely used by women, affects the brains of women; seeking non-addictive alternatives for pain relief; determining how genetic mutations lead to breast cancer; identifying biological markers to allow the early diagnosis and treatment of colon cancer; figuring out the relationship of stress to psychological resilience in health care providers; and so much more.

Over the years, WHRY has discovered that a product of the

body's immune system associated with the disease lupus can penetrate cancer cells, offering a new path for treating cancers that develop from certain gene mutations. We were the first to test a behavioral therapy for girls with autism spectrum disorder that is now in clinical use. We demonstrated how beneficial bacteria in the body can lead to autoimmune disease, providing a promising target to advance treatment options.

We do this because today's investigations lead to both findings we can use now and to tomorrow's discoveries.

It is why we build collaborations across medical disciplines, share our findings with the public and medical communities, train the next generation of researchers and medical practitioners, and establish support for data-based policies to improve the health of everyone.

All this is possible because of your generous support and commitment to better science and better lives. Thank you!

At WHRY, we often say, "We don't know what we don't study." If the challenges of the past year have taught us anything, it is that we must continue working to understand all that we can



about health and disease. And when it comes to sex and gender, we should not wait for the next crisis before addressing these critical components of our health. ◀

With the greatest appreciation for your generous support,

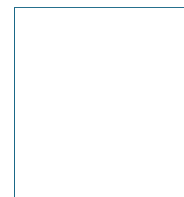
Barbara

Barbara M. Riley
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