

Women's Health Research Institute

Putting Women First

April 2014

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Dear Friend,

There are still significant knowledge gaps regarding sex- and gender-based differences in health, especially at the research level. Despite the knowledge of sex differences in drug reactions being known for nearly 50 years, many scientists still refuse to examine sex as a variable outside reproductive health. It is important to address sex and gender at the earliest part of the research discovery process, as male/female reactions to various drugs and diseases can be dramatically different.

Dr. Teresa Woodruff, the Women's Health Research Institute, and our [Leadership Council](#), have long advocated for the study of sex as a variable in all aspects of health-- from skin, to liver, to heart, to bones and beyond. This month's edition of our newsletter will feature the Women's Health Research Institute's initiatives to combat some of the sex-based barriers now faced in the scientific world. We're excited to share with you our advocacy trajectory, and hope you join us in this campaign towards sex equity in research!

Sincerely,

The Institute Staff

Sex as a Research Variable: Why is this Important?

Every cell has a sex. The treatment and care of men and women must take sex-



based differences into consideration. Sex differences in "incidence, prevalence, symptoms, age at onset, and severity have been widely documented" in several diseases and conditions (1). Specifically, sex-differences have manifested in the study of fields such as cardiovascular disease, neuroscience, and dermatology, among many others. As these fields largely examine the conditions in their primarily male subjects, there is an emerging male bias in the way research is currently being conducted. In cardiovascular disease, female patients often experience fatigue, abdominal discomfort and back, jaw, or neck pain--symptoms which are considered to be atypical because diagnostic standards were primarily established from research on men (1). And, as cardiovascular disease is the leading cause of death for both men *and* women, understanding the warning signs unique to women is a crucial piece to saving lives. Similarly, in the field of neuroscience, researchers have discovered synaptic differences between men and women in the hippocampus, an area of the brain important in "learning and memory, affective disorders, and epilepsy" (2). Finally, a glaring example of this male bias in research is seen in dermatology, where "virtually all research on keratinocytes is done on cells from the male foreskin" with no regard to how estrogen or other chromosomal sex functions respond to skin cells (3).

Sex Differences in Basic Science

At the basic, bench science level, research is still being conducted on primarily male animals. A survey of over 1,200 neuroscience papers published from five top journals from June 2011-May 2012 revealed that studies using rodents "included the sex of the animals in their analysis only 42% of the time" (4). Furthermore, of the studies that did include information on the sex of their animals, females were studied only 24% of the time (4). Research indicates that there is a male bias in 8 out of 10 biological disciplines (5). This bias that researchers have shown against female animals is partly due to concerns of female-only variables such as cyclical reproductive hormones, which would make female animals "unsuitable for use as baseline models" (5). Furthermore, some researchers argue that testing for sex differences (using both males and females in their pre-clinical research) is more costly and time-consuming--essentially, researchers find it cheaper, easier, and less risky to study males only. Yet, *not* accounting for sex differences at the pre-clinical level may lead to even more costly and dire repercussions in the clinical phase.

Sex Differences in Clinical Science

Until the 1990's, males were considered to be the standard model of human biology, and differences in females were "atypical" or "anomalous" (6). It wasn't until 1993, with the passage of the NIH Revitalization Act, that women and minorities were regularly included in clinical research studies. However this Act mandated merely the *inclusion* of women and minorities, and did not mandate studying sex as a variable. This means that research done on both males and females, without considering the different reactions between the sexes, surfaces new treatments that are inadequately studied in each sex and applied to both men

and women without taking sex-based differences into account.

There has been evidence of drug recall due to adverse effects in women for quite some time. Research shows that women have a nearly 2-fold greater risk of developing adverse drug reactions than men, and the removal of drugs and medical devices from the market after approval largely results from adverse events in women (7).

Sex Differences in the News

On February 9, 2014, *60 Minutes* on CBS-TV did a [feature](#) on drug dosage differences between men and women. This was in response to the dosage recall of the drug *Ambien*, a popular sleep drug, that was found to have adverse effects in women last year. In response, the FDA halved the recommended dosage for women taking *Ambien*, since research indicated that women metabolized *Ambien* differently than men.

The Women's Health Research Institute Director, Dr. Teresa Woodruff, and Leadership Council member, Dr. Melina Kibbe, were both consulted in the production of this *60 Minutes* segment.

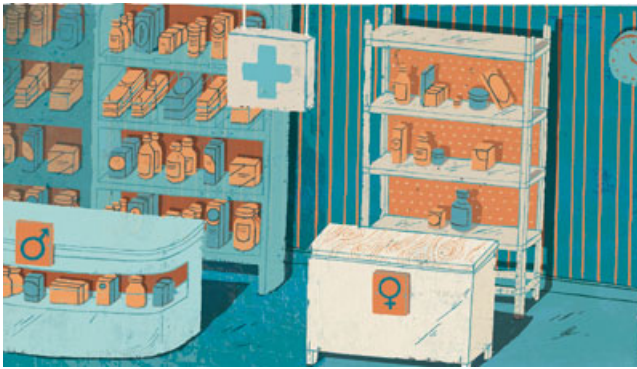
Researchers interviewed for this feature emphasized that *Ambien* is just the tip of the iceberg. If sex differences can lead to differing metabolism between men and women in sleeping pills, what's to say these sex differences don't extend to other drugs as well? The segment concluded with a call to re-examine previously approved drugs to test for harmful effects in women--though the FDA is far from approving this. The FDA's action in the *Ambien* case, which created the first ever sex-specific labeling that recommends a lower dose for women, is a step in the right direction, but more needs to be done.



Click Video above to View a Preview of the 60 Minutes Feature: Sex Matters

Women's health advocates celebrated the recent announcement from the National Institutes of Health about a [new partnership between the NIH, drug companies, and nonprofit organizations](#). This partnership was formed to target Alzheimer's disease, type 2 diabetes, rheumatoid arthritis, and lupus--conditions which are of particular concern to those who are advocates for women's health. More women than men have Alzheimer's disease, two-thirds of patients with arthritis are women, the prevalence for lupus favors women 9:1, and the relative risk for fatal coronary heart disease associated with diabetes is 50% higher in women than it is in men (8-11). This partnership is a welcome opportunity to address the importance of sex and gender in research, as it is a reminder of conditions that affect men and women differently and, therefore, research on these conditions should be done by sex.

The Women's Health Research Institute's Call to Action



The Women's Health Research Institute has launched a campaign to draw attention to the importance of sex-based research. Following the WHRI November 2013 Research Forum featuring Dr. Janine Clayton, Director for the NIH Office of Research on Women's Health, conversations on improving the quality of sex-based research have fueled action.

Starting out 2014 with a bang, Leadership Council members Teresa Woodruff, PhD, Melina Kibbe, MD, Amy Paller, MD, Fred Turek, PhD, and Catherine Woolley, PhD wrote ['Leaning in' to Support Sex Differences in Basic Science and Clinical Research](#) that was published in the January 2014 issue of *Endocrinology*. This piece informed readers of the continued gap in sex-based research and called on the National Institutes of Health to "ask basic scientists to indicate the sex of animals studied under the auspices of government-funded research." Another piece, a pending Op-Ed in *PNAS* (Proceedings of the National Academy of Sciences of the United States of America), will feature Dr. Teresa Woodruff's thoughts on areas to improve equity in women's health research and care. Furthermore, the WHRI Leadership Council's recently [submitted letter to Dr. Francis S. Collins](#), Director of the National Institutes of Health, is beginning to gain traction. Dr. Teresa Woodruff states "fueling the conversation on sex differences in research can only get us so far; government support is essential" in this sex-based research campaign. Finally, in Dr. Woodruff's role as President of the Endocrine Society, she has submitted a [testimony on NIH funding](#) through the House Committee on Appropriations Subcommittee on Labor, Health and Human Services. In this testimony, the Endocrine Society urges the NIH to acknowledge sex differences as a "critical biological variable," which would greatly improve the quality of science.

The Women's Health Research Institute is beginning to make significant strides towards sex- and gender- parity in scientific research. Ultimately, researchers, providers, industry, and citizens must unite to advocate for processes that include sex in research design and drug testing. Only then will health care be tailored to the unique needs of both men and women, cultivating an improved health system for all.

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 9. [Office On Women's Health: Lupus Fact Sheet](#)
 10. [Centers for Disease Control and Prevention](#)
 11. [BMJ Group](#)

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What Can You Do?

Now that you've learned about gender- and sex-differences in research, you may want to take steps to best keep track of your health and the health advancements of other women across the country. Here are some things that you can do today:

1. Get involved in our Illinois Women's Health Registry!

There has yet to be a significant uptick in female participation in non-sex specific clinical studies (women enrollment remains below half, at 43%) and outcome by sex is not reported in 64% of studies (1). Our Illinois Women's Health Registry was created to increase female participation in clinical studies. As more women participate in research studies, researchers come closer to identifying the sex differences between women and men that affect the prevention, diagnosis, and treatment of disease. If we want to improve the knowledge about women's health for ourselves, our daughters, our granddaughters, and many generations beyond, then we need to assist medical researchers in finding the answers. Join the 7,149 women already enrolled in our Registry and help women and medical professionals in Illinois find out why diseases affect women differently than men. Visit our [Registry Website](#) to learn more.

2. Stay informed on sex differences in the news!

Our [Women's Health Research Institute Blog](#) is a great resource on sex-differences in conditions, symptoms, and treatment. We provide up-to-date posts of the latest news about women's health. Please leave comments on our blog posts to further fuel the conversation.

3. Keep track of your health and monitor your body carefully!

The Women's Health Research Institute has many [health resources](#) available to you to help you monitor your health. This page has information on clinical services for women--from arthritis, to breast cancer, to fertility preservation and more. If you are in the stage of menopause, please visit our [Menopause Website](#) (Menopausenu.org) where you can take a confidential self-assessment to learn

how to turn your symptoms into solutions.

References:

1. Woodruff, T.K., Kibbe, M. R., Paller, A.S., Turek, F.W., Woolley, C.S. (2014). 'Leaning in' to Support Sex Differences in Basic Science and Clinical Research. *Endocrinology*. 10.1210/en.2014-1068.

INSTITUTE HAPPENINGS

Success of The Women's Health Research Institute's Panel Discussion with the Cast of *The How and The Why*



In a unique fusion of science and art, the Women's Health Research Institute hosted an evening panel event with TimeLine Theatre on March 25 to discuss the themes and barriers of women in science academia. With an audience of nearly 100, our panelist members shared their own stories and experiences as female scientists after watching selected scenes performed live by the actresses of TimeLine Theatre's *The How and the Why*. Attendees tackled the difficult topic of lingering biases against women in science and discussed possible initiatives to combat these barriers. We'd like to thank everyone who was able to join us for the event and we encourage everyone to help us keep the conversation going and serve as advocates for women in science!

TimeLine Theatre Company & The How and the Why



The Women's Health Research Institute was pleased to partner with TimeLine Theatre Company for its recent, sold-out production of **The How and the Why**, which hit upon many issues that are part of the daily life of women clinicians and scientists. Whether you saw the production or not, we encourage you to check out this award-winning Chicago theatre dedicated to exploring stories inspired by history that connect to the social and political issues of today. You can learn more at the **TimeLine Theatre website** or receive

updates about upcoming productions and events by signing up for their [mailing list](#).

WHRI Will Host Annual 'Celebrating Women's Health' Forum on May 15, 2014

Join us during National Women's Health Week for our extended forum featuring women's health exhibitors, women's health research posters, and Dr. Mercedes Carnethon's keynote presentation entitled "Metabolically Healthy Obese: Reality or Fantasy?" This event will run from 11:00am-1:30pm on Thursday, May 15, 2014 in Prentice Women's Hospital (250 E. Superior Street), 3rd Floor Conference Room, L South.

If you are a non-profit or for-profit exhibitor who would like a women's health informational table on display, please fill out our [Information Table Application](#) by May 3, 2014.

If you are a researcher who would like to display a poster on a topic important to women's health, please fill out our [Abstract Submission Application](#) by May 3, 2014.

If you would like to attend our Celebrating Women's Health Forum, please [register today](#) to reserve your seat and lunch!

Now Recruiting High School and Medical Student Applicants for Summer 2014 Academy

This accomplished citywide STEM education program is looking forward to the beginning of WHSP 2014. We are now accepting applications for high school students as well as medical student mentors. The WHSP application deadline for 2014 is Monday, May 12, 2014. The Summer 2014 WHSP academy will be held from 8:00am-4:00pm June 23-27. Additionally, there will be an orientation on Friday, June 20th. Applicants must be available for the full week of WHSP in order to apply. For further details please click on the respective application.

Click [HERE](#) for the CPS student application.

Click [HERE](#) for the Medical Student Mentor application

UPCOMING EVENTS

[In lieu of our April Research Forum, the WHRI is co-hosting: Improving Health and Legal Outcomes for Immigrants with The Women's Center, April 8, 2014](#)

[National Women's Health Week Research Forum featuring Dr. Mercedes](#)

Carnethon presenting "Metabolically Healthy Obese: Reality or Fantasy?" May 15, 2014

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