



ADVANCING WOMEN'S HEART HEALTH

The National Heart, Lung, and Blood Institute (NHLBI) is committed to reducing the impact of heart disease on women.

The NHLBI Has a Long History of Including Women in Cardiovascular Studies

Women and men do not share the same heart disease signs, symptoms, or disease progression, nor do they respond to interventions in the same way. Since its establishment in 1948, the NHLBI has been a leader in improving inclusion of women in research. For example, NHLBI's Framingham Heart Study, which was also launched in 1948, was one of the first epidemiological studies to address cardiovascular disease and was designed from the beginning to include women and men.

Having women well represented in NHLBI-funded research studies, especially clinical trials, is critical for improving our understanding of how sex differences affect health and diseases and for development of safe and effective treatments and better health outcomes for everyone. As part of our continuing efforts to address cardiovascular disease (CVD) in women, the NHLBI monitors enrollment in the clinical research we fund. In fiscal year 2017, women made up about 60 percent of participants in

NHLBI-funded trials on cardiovascular disease, including NHLBI's landmark Women's Health Initiative (WHI).

Strategically Addressing Women's Health

NHLBI's Strategic Vision, released in August 2016, sets the stage for supporting innovative approaches to addressing women's health across our broad research portfolio.

Strategic Vision Objectives and Their Application in Women's Health

- Understand normal biology—Effects of aging and reproductive biology on heart function across the lifespan.
- Investigate pathology—Mechanisms of myocardial infarction and poor outcomes in younger women; effects of sex hormones on blood clot formation.
- Individualize treatments (precision medicine)—Genomic and molecular data and their impact on CVD (NHLBI TOPMed Program and NIH *All of Us* Research Program).

Cardiovascular Disease by the Numbers

- Research supported by the NHLBI has helped reduce cardiovascular deaths by more than 70 percent over the past 40–50 years.
- Despite these efforts, heart disease remains the leading cause of death in the United States for both men and women. In 2016, one in five American women died of heart disease.
- Racial and geographic disparities for CVD persist.
- Deaths from heart disease are more prevalent among African American, Native American, and Hispanic women than white women—as are some of the factors that increase the risk of developing heart disease, including high blood pressure, diabetes, and obesity.



A Strong Legacy of Improving Women's Health

Launched in 1993, the WHI is a long-term national health study that focuses on strategies for preventing heart disease, breast and colorectal cancer, and osteoporosis in postmenopausal women. These chronic diseases are the major causes of death, disability, and frailty in older women of all races and socioeconomic backgrounds. Although hormones were thought to protect women from heart disease, we learned from the WHI that hormone therapy—estrogen plus progestin or estrogen alone—does not prevent heart disease in postmenopausal women and may actually increase their risk of heart attack and stroke. The original WHI study completed data collection in 2005, but the WHI continues to advance women's health through extension studies and ancillary studies. The WHI and its findings have changed women's health and medical practice around the world by helping women and their healthcare providers make more informed decisions.

Sharing Our Science for Public Health Impact

It takes an estimated 17 years for health research evidence to reach clinical practice. NHLBI's Center for Translation Research and Implementation Science (CTRIS) supports research and training to more rapidly move evidence-based interventions into clinical and public health settings in the U.S. and abroad.

The NHLBI also supports a variety of community outreach and educational programs for women that raise awareness about heart disease and its risk factors and to empower them to reduce their risk. This includes *The Heart Truth*[®], NHLBI's national education program for women that raises awareness about heart disease and its risk factors and educates and motivates them to take action to prevent the disease. Additionally, the NHLBI organizes national activities each year during American Heart Month.

New Frontiers in Women's Health Research

The NHLBI continues to expand its research on women's health as new opportunities and challenges arise.

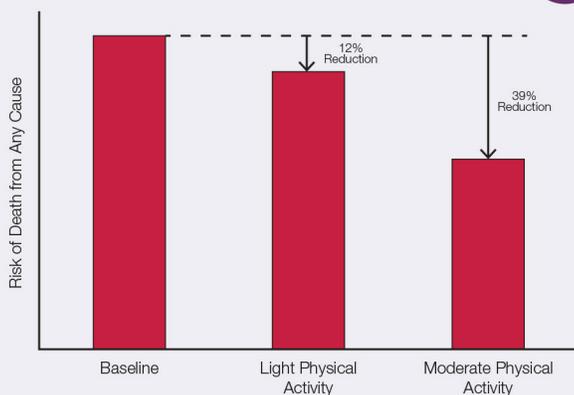
Women's Health During and After Pregnancy. The NHLBI is committed to addressing women's unique health risks, including complications of pregnancy. New studies are underway to examine the impact of sleep disorders and hypertension during pregnancy on women's heart health over the short and long term.

- The nuMoM2b Sleep-Disordered Breathing study, funded by the NHLBI and the *Eunice Kennedy Shriver* National Institute of Child Health and Human Development (NICHD), found that women with sleep apnea have an increased risk of hypertension and diabetes during pregnancy. The NHLBI is continuing to advance research with the nuMoM2b cohort.
- There is a lack of consensus about whether to treat mild chronic high blood pressure during pregnancy, as treatment carries risk for both the mother and the developing child. The Chronic Hypertension and Pregnancy (CHAP) trial will evaluate the efficacy and safety of treating pregnant women toward the same blood pressure target recommended for non-pregnant adults (<140/90 mm Hg).

Role of Hormones in Thrombosis. Studies have linked increased sex hormone levels, such as during pregnancy or oral contraceptive (OC) use, with an increased risk of thrombosis—blood clotting that can cause a heart attack or stroke. In 2017, the NHLBI launched a program to better understand the mechanisms of hormone-induced thrombosis. Grants funded in 2018 are looking at how platelets (clotting cells) are activated during pregnancy and OC use, new biomarkers for predicting thrombosis, and potentially protective mechanisms.

Research Spotlight

Older women who exercise live longer.
Just 30 mins/day makes a difference.



The Objective Physical Activity and Cardiovascular Health Study (OPACH), which includes WHI participants, is using wearable devices to measure the effect of physical activity on cardiovascular health in older women.

The study found that both light-intensity and moderate to vigorous physical activity (PA) measured by accelerometer are associated with lower mortality among older women (ages 63–99). With each 30 additional minutes of light PA per day, the women had a 12 percent lower risk of death from any cause. And with every additional 30 minutes of moderate PA (brisk walking/bicycling), their risk was 39 percent lower. This study will inform the latest update of the Physical Activity Guidelines, expected to be published in late 2018. The WHI Strong and Healthy (WHISH) trial, involving some 50,000 women from the cohort, is now testing whether an intervention to increase their daily PA can reduce major cardiovascular events over 4 years of follow-up.

