

Sex matters in biomedical research: Many conditions affect men and women differently

April 29 2022, by Monica de Paoli



Until recently, most biomedical studies did not consider sex or gender. Credit: Pexels/Magda Ehlers

[Biomedical research](#)—a broad term covering studies on subjects ranging from cells to experimental animal models—is the starting point for understanding how diseases develop and how we might prevent or treat them. Once such studies have been performed successfully, similar tests can be carried out in humans. These clinical trials form the highest branch of biomedical research.

Biomedical studies have traditionally used [male animals and men as research subjects](#), and the knowledge we have obtained from this research has been applied to both sexes on the assumption that what works for males must also work for females.

Until recently, these studies hardly ever [considered sex—the biological attributes of humans and animals](#)—or gender, the socially constructed characteristics of men, women and gender-diverse people.

That is a problem for everyone, because there are [sex differences in how many diseases affect people](#).

Sex differences in health conditions

Pre-[menopausal women](#) are [less likely to develop diabetes than men or post-menopausal women](#). Differences like these are critical, given that the elevated levels of blood glucose that define diabetes can lead to life-threatening stroke and heart attacks.

Another significant difference is that women don't necessarily experience the symptoms of a [heart attack](#) that are typical in men—like [chest pain](#)—but could [instead feel nauseated, light-headed or unusually tired](#). Without studying women and men, we wouldn't know about these differences and understand what to look for when diagnosing patients.

Researchers still haven't figured out exactly how pre-menopausal women are protected from diabetes and how this illness increases the risk of stroke and heart attacks. This is the main focus of [research carried out in our lab](#), where we actively study the mechanisms of this protection and how these diseases develop and progress using male and female animal models.

On average, [women live longer than men](#). That seems to suggest women

have some kind of health advantage, which is not necessarily accurate.

Although it's true [women are less prone to diabetes, heart attack, stroke and infection](#), they are likely to face other kinds of illness. Most [individuals with autoimmune diseases, for example, are women](#), as we see with arthritis and multiple sclerosis. In these disorders, the [immune system](#), which is supposed to protect us against external invaders such as viruses and bacteria, attacks the body.

It's clear that research that only looks at male subjects is not telling the whole story. There is a need to evaluate research by how—and on whom—studies are carried out. Can we really generalize a finding when 50 percent of the population isn't represented in the study?

Including both sexes in research

The good news is that in recent years, and in light of the observations of sex differences in the development of diseases, researchers are taking significant steps to ensure [biomedical research](#) is more authentic and complete.

In fact, the major research funding agencies in North America now [require that studies in humans include female subjects](#), and that in scientific research using cells and animals, the results should feature both sexes.

Such steps are enormously important because they help researchers better understand the mechanisms and trends they observe and the influence that sex and gender can have on everyone's health. A more inclusive approach to research will lead to better preventive, diagnostic and therapeutic strategies and fewer health risks.

Though men, women and gender-diverse people share many similarities,

understanding how [sex differences](#) are expressed through physical health is paramount to improving everyone's quality of life.

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