

# Gendered Hearts: Unraveling the Biochemical and Diagnostic Biases in Women's Cardiac Health

Cardiovascular disease is the single largest cause of death across the world. Despite this, the way it affects women has often been downplayed or overlooked. Much of medical research, particularly in cardiology, was historically designed around male bodies. The consequences are not small: delayed recognition of symptoms, misdiagnosis, and worse survival rates for women.

## Biological Differences in Women's Cardiac Health

There are clear differences between men's and women's cardiovascular systems. Women tend to have smaller coronary arteries, and hormonal fluctuations across the lifespan alter vascular tone. Estrogen offers protective effects before menopause, but once levels fall, women quickly face increased risks of hypertension, atherosclerosis, and heart failure. Many also experience microvascular dysfunction, which is harder to detect on standard scans such as angiography. This means that in clinical practice, women can be told they have "normal" results despite ongoing disease.

## Symptom Presentation and Delayed Recognition

The classic description of a heart attack—severe chest pain moving into the arm—applies more often to men. Women frequently present differently, with complaints of fatigue, breathlessness, nausea, or back and jaw pain. These are not rare, but they are still too often dismissed as non-cardiac issues. Many women report being told their problems stem from anxiety or indigestion. When recognition is delayed, valuable time is lost, and outcomes are worse.

## Bias in Diagnosis and Treatment

The problem extends beyond biology. Risk calculators, treadmill tests, and even guidelines were validated mostly in male populations. As a result, women's risk scores are frequently underestimated. They are less likely to be sent for angiography, less often prescribed key drugs such as statins, and less likely to receive urgent interventions like stenting. Even when hospitalized with acute myocardial infarction, women are treated more slowly and have higher mortality. These differences are consistent across studies and show a system struggling to adapt.

## Research Gaps and Exclusion

Until the late twentieth century, women were commonly excluded from clinical trials, with the justification that hormonal cycles complicated results. The real effect was that evidence in cardiology leaned almost entirely on male physiology. Although reforms in the 1990s improved participation, women are still underrepresented, and data on women of color is even more limited. This lack of inclusion continues to affect practice, as many diagnostic and treatment guidelines are based on incomplete evidence.



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### **Strategies for Reform and Equity**

Closing the gap requires multiple changes. Training for doctors must emphasize how cardiovascular disease presents differently in women. Clinical trials need balanced recruitment and should report results separately by sex. Policies can reinforce this by directing funding toward women's cardiovascular health. Finally, public campaigns must raise awareness so that women themselves know what to look out for and seek care early.

### **Conclusion**

Women's cardiovascular health has been shaped by both biology and systemic neglect. Their symptoms are not always the same as men's, and their risks cannot be treated as identical. A healthcare system that adjusts to these realities will provide fairer, more effective treatment. Without these changes, women will continue to face preventable disadvantages in outcomes.

# CITATIONS

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