

# Architecture of the heart different between women and men and with age

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Differences in the shape and texture of men and women's hearts could potentially explain why their risk of heart disease differs, according to research funded by the British Heart Foundation (BHF). The findings are being presented at the European Society of Cardiology (ESC) Congress.

Researchers at Queen Mary University of London, in collaboration with the University of Barcelona and University of Southampton, used new ways to look at the [heart](#) structure of 667 healthy people—309 men and 358 women—from the UK Biobank Imaging study.

The team looked at cardiac magnetic resonance (CMR) scans, a type of heart scan used to diagnose and give information on various heart conditions. They have developed a new heart-specific image analysis 'toolkit', called CMR radiomics, to obtain more detailed information about the heart. The 'toolkit' was applied to scans of the left ventricle—the part of the heart responsible for pumping blood around the body.

When researchers compared numerous measures of heart texture and shape, they found that in men,

the heart muscle was dominated by more coarse textures. Whereas women's hearts had finer grained textures.

They also found significant differences in the overall shape of male and female hearts, including that men had a larger surface area of [heart muscle](#) compared to women, even after accounting for body size.

The heart shape and texture were found to change with age. Participants were categorised into three different age groups: 45-54 years, 55-64 years, and 65-74 years of age.

Differences in heart shape between men and women decreased with age, whilst texture differences remained across all age groups and dominated in older age.

Researchers will now apply this technique to the CMR scans of people with heart and circulatory diseases—including those with diabetes, high blood pressure, high cholesterol, and coronary heart [disease](#). This will hopefully reveal how the more intricate details of the heart structure differs between cardiovascular health and disease.

Dr. Zahra Raisi-Estabragh, BHF Clinical Research Training Fellow at Queen Mary University of London and lead researcher, said:

"The current image analysis tools available in hospitals do not fully encompass the complexity of the heart's architecture. We need to be able to see the heart in much greater detail to be able to truly understand how it changes between men and women, with ageing, and during the development of heart disease. Our technology has great potential to do just that.

"This work is part of a wider research strategy to develop CMR radiomics as a tool to improve patient care. Our ultimate goal is to use our imaging 'toolkit'

to allow faster and more accurate diagnosis of heart disease, improve our estimations of future risk of heart conditions, and better understand the processes underlying cardiovascular disease."

Dr. Sonya Babu-Narayan, Associate Medical Director of the British Heart Foundation, said:

"CMR scans give us a wealth of information about the heart, meaning that we can understand it to greater depths than ever before. But the researchers have dug even deeper to find buried treasure within this routine data, revealing subtler differences that vary more between men and women and by age than what we normally see.

"Next we need to find out if this technology can prove useful to assess cardiovascular risk in both women and men."

Professor Steffen Petersen, Professor of Cardiology at Queen Mary University of London who supervised the project said:

"This innovative work demonstrates the potential of UK Biobank as a powerful research resource and the immense value of cross-disciplinary and international collaborations in advancing knowledge of the heart."

Provided by British Heart Foundation

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