

Size, strength of heart's right side differs by age, gender, race/ethnicity

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The size and pumping ability of the right side of the heart differs by age, gender and race/ethnicity, according to the first large imaging study of the right ventricle.

The study, reported in *Circulation: Journal of the American Heart Association*, also suggests that understanding the fundamental differences in the right side of the heart gives doctors and researchers a basis for determining what is abnormal. The researchers think that changes in [right ventricle](#) size and function may be a sign of cardiopulmonary disease (conditions that involve both the heart and lungs).

"The right ventricle pumps blood to the lungs to pick up [oxygen](#), so all types of lung diseases — chronic obstructive pulmonary disease (COPD), pulmonary fibrosis, pulmonary hypertension, and sleep apnea — can affect the right side of the heart," said Steven Kawut, M.D., M.S., study author. "These results show underlying differences in people without clinical heart disease and could explain the variability of the right ventricular response in people with cardiopulmonary disease."

The researchers found that the right ventricle is:

- smaller but pumps harder in older adults.
- larger in men than women.

- smaller in African-Americans and larger in Hispanics, compared with Caucasians.

In most studies on the heart, researchers have focused on the more-easily-imaged [left ventricle](#), the region of the heart affected by systemic high blood pressure and other common conditions. Some of the relationships between gender, age and race/ethnicity found in the new study are different from what's known about the left ventricle. For example, the left ventricle increases in mass with age and is larger in African-Americans than Caucasians.

"It's not surprising that the relationships are different, since the right and left ventricles differ in their development in the embryo, their shape, and the area of the body they serve," said Kawut, associate professor of medicine and epidemiology and director of the pulmonary vascular disease program at the Perelman School of Medicine at the University of Pennsylvania in Philadelphia.

The researchers examined magnetic resonance images of the right ventricles of 4,204 men and women, average age 61.5, participating in the Multi-Ethnic Study of Atherosclerosis (MESA). MESA is a multicenter research project tracking the development of cardiovascular disease in 6,814 Caucasians, African-Americans, Hispanics and Chinese-Americans who did not have clinically-diagnosed heart disease at the beginning of the study.

Using norms derived from the study, 7.3 percent of the participants would be considered to have right ventricular hypertrophy and 5.9 percent to have dysfunction of the right ventricle.

If validated in future research, the norms can help physicians identify patients with abnormal right ventricle structure or function.

"If right ventricle abnormalities are found, it should heighten suspicion for underlying cardiopulmonary disease," Kawut said.

When the right ventricle loses its pumping ability, blood can back up into other areas of the body, producing congestion (right-sided [heart failure](#)). The new findings may help test effectiveness of treatments that could be developed for right ventricle dysfunction.

"This study is a first step, but we need to see how the right ventricle changes over five to 10 years in these 'normal' people, many of whom have COPD, sleep apnea and other common [lung](#) problems," Kawut said.

Provided by American Heart Association

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