

Individuals feel sex-specific symptoms before impending cardiac arrest, study finds

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Investigators from the Smidt Heart Institute at Cedars-Sinai are one step closer to helping individuals catch a sudden cardiac arrest before it happens, thanks to a study published today in *The Lancet Digital Health* journal.

The study, led by [sudden cardiac arrest](#) expert Sumeet Chugh, MD,

found that 50% of individuals who experienced a sudden cardiac arrest also experienced a telling symptom 24 hours before their loss of [heart](#) function.

Smidt Heart Institute investigators also learned that this warning symptom was different for women than it was for men. For women, the most prominent symptom of an impending sudden cardiac arrest was shortness of breath, whereas men experienced chest pain.

Smaller subgroups of both genders experienced palpitations, seizure-like activity and flu-like symptoms.

Out-of-hospital sudden cardiac arrest claims the lives of 90% of people who experience it, marking an urgent need to better predict—and prevent—the condition.

"Harnessing warning symptoms to perform effective triage for those who need to make a 911 call could lead to [early intervention](#) and prevention of imminent death," said Chugh, director of the Center for Cardiac Arrest Prevention in the Smidt Heart Institute and senior author of the study. "Our findings could lead to a new paradigm for prevention of sudden cardiac death."

For this study, investigators used two established and ongoing community-based studies, each developed by Chugh: the ongoing *Pre* diction of Sudden Death in Multi-Ethnic Communities (PRESTO) Study in Ventura County, California, and the Oregon Sudden Unexpected Death Study (SUDS), based in Portland, Oregon.

Both studies provide Cedars-Sinai investigators with unique, community-based data to establish how to best predict sudden cardiac arrest.

"It takes a village to do this work," said Chugh, the Pauline and Harold

Price Chair in Cardiac Electrophysiology Research, medical director of the Heart Rhythm Center in the Department of Cardiology, and director of the Division of Artificial Intelligence in Medicine in the Department of Medicine.

"We initiated the SUDS study 22 years ago and the PRESTO study eight years ago. These cohorts have provided invaluable lessons along the way. Importantly, none of this work would have been possible without the partnership and support of first responders, [medical examiners](#) and the hospital systems that deliver care within these communities."

In both the Ventura and Oregon studies, Smidt Heart Institute investigators evaluated the prevalence of individual symptoms and sets of symptoms prior to sudden cardiac arrest, then compared these findings to control groups that also sought emergency medical care.

The Ventura-based study showed that 50% of the 823 people who had a sudden cardiac arrest witnessed by a bystander or emergency medicine professional, such as an [emergency medicine](#) service (EMS) responder, experienced at least one telltale symptom 24 hours previously. The Oregon-based study showed similar results.

"This is the first community-based study to evaluate the association of warning symptoms—or sets of symptoms—with imminent sudden cardiac arrest using a comparison group with EMS-documented symptoms recorded as part of routine emergency care," said Eduardo Marbán, MD, Ph.D., executive director of the Smidt Heart Institute and the Mark Siegel Family Foundation Distinguished Professor.

Such a study, Marbán says, paves the way for additional prospective studies that will combine all symptoms with other features to enhance prediction of imminent sudden cardiac arrest.

"Next we will supplement these key sex-specific warning symptoms with additional features—such as clinical profiles and biometric measures—for improved prediction of sudden [cardiac arrest](#)," said Chugh.

More information: Kyndaron Reinier et al, Warning symptoms associated with imminent sudden cardiac arrest: a population-based case-control study with external validation, *The Lancet Digital Health* (2023). DOI: 10.1016/S2589-7500(23)00147-4

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