

A redefining moment for heart failure

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When they're not treating patients with heart disease, Drs. Nihar Desai and Tariq Ahmad are hard at work revising the definition of heart disease.

Ahmad, an assistant professor in the section of cardiovascular medicine at the Yale School of Medicine, focuses his clinical work on caring for patients with end-stage [heart failure](#). Desai is a Yale associate professor

and associate chief of clinical affairs within the section of cardiovascular medicine.

Not only do they share overlapping research interests, they're also best friends, having met as interns at the Brigham and Women's Hospital in Boston in 2006.

At Yale, their work in precision medicine helps some of the most medically vulnerable patients—those with heart failure. An important part of that work, they said, is pointing out the need to update common classifications of heart failure now used by the medical profession.

Ahmad and Desai talked with YaleNews about their work. Interview edited and condensed.

Why are definitions of heart failure important for treatment?

Ahmad: The way an ailment is defined lays the foundation for how it is managed by clinicians and how therapies are developed. Heart failure has existed since diseases were first described, and we have known for decades that it is not a single disease. Rather, it is a syndrome that encompasses many different diseases.

Yet as a profession, we're still defining heart failure by patient classifications that are 100 years old, such as the New York Heart Association (NYHA) classification system, or longstanding guidelines for such factors as the percentage of blood that leaves the left ventricle when the heart contracts (known as left ventricular ejection fraction, or LVEF).

Neither of these descriptors appropriately captures individual patient

risk or the diversity of causes for disease.

What has your research found?

Desai: Our most recent papers examined the clinical implications of the most common descriptors—NYHA and LVEF. We showed that NYHA classifications correlated poorly with objective measures of heart failure and showed unacceptable variability between studies. Importantly, NYHA's association with adverse outcomes was all over the place.

For the LVEF study, we examined its ability to predict the risk of death in more than 40,000 heart patients and found it to be about as accurate as a coin toss. We've also demonstrated that a precision medicine approach—based on simultaneous considerations of [disease](#) causes, the presence of multiple disorders, and biomarker levels such as natriuretic peptides—is far superior to using bedside classifications.

Ahmad: Our group and others have shown that when we use readily available clinical data and apply advanced analytics to it, we can dramatically improve our predictive capabilities and describe heart failure in ways that are far more clinically meaningful than the current classifications.

What are the next steps?

Desai: We must move beyond these outdated definitions and bring precision medicine to patients with heart failure. We need an intelligent, evolving health care system in which research and care delivery are integrated—and advanced analytics, along with state-of-the-art biomarker testing, are able to continually augment our ability to make personalized decisions for individual patients. We articulated this in a recent editorial.

Are there specific ways you are putting this approach to the test?

Ahmad: The Yale-New Haven Health System is the perfect place to take our findings from the bookshelf to the bedside. We have created a unique registry of all patients with heart failure within the delivery network and are in the process of conducting several pragmatic trials aimed at applying these principles to improve quality of care and outcomes.

One trial that is ongoing is called REVEAL-HF. It is testing, for the first time, how prognostic information impacts clinical decision making in heart failure cases. We are incredibly excited by the implications of our studies and believe they will play an important role in leading the charge in [heart](#) failure precision care.

More information: César Caraballo et al. Clinical Implications of the New York Heart Association Classification, *Journal of the American Heart Association* (2019). [DOI: 10.1161/JAHA.119.014240](https://doi.org/10.1161/JAHA.119.014240)

Tariq Ahmad et al. Machine Learning Methods Improve Prognostication, Identify Clinically Distinct Phenotypes, and Detect Heterogeneity in Response to Therapy in a Large Cohort of Heart Failure Patients, *Journal of the American Heart Association* (2018). [DOI: 10.1161/JAHA.117.008081](https://doi.org/10.1161/JAHA.117.008081)

Tariq Ahmad et al. The Trifecta of Precision Care in Heart Failure, *Journal of the American College of Cardiology* (2018). [DOI: 10.1016/j.jacc.2018.07.009](https://doi.org/10.1016/j.jacc.2018.07.009)

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