

# Clinical decision support app helps improve quality of life and longevity for heart failure patients

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A clinical decision support application developed by Intermountain Healthcare researchers that more quickly identifies when heart failure becomes advanced and a heart patient's care needs have changed is successful in helping to improve patient's quality of life and longevity, according to a new study. Credit: Intermountain Medical Center

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The new app, which monitors [heart failure](#) patients' medical tests and health status and promptly notifies clinicians, was developed by a multidisciplinary team of Intermountain Healthcare medical informatics specialists, home health experts, and clinicians from the Intermountain Medical Center Heart Institute in Salt Lake City.

Using the app during the study, researchers found that it led to significantly improved detection of

disease advancements. For instance, intervention patients' survival rates increased. More intervention patients were alive compared to a control group at key intervals: 30 days (95% vs. 92%), 60 days (95% vs. 90%), 90 days (94% vs. 87%) and 180 days (92% vs. 84%).

Findings of a study on the effectiveness of the new app are published in the *Journal of Cardiac Failure*.

"We found that clinical decision support can facilitate the early identification of patients needing advanced heart failure therapy and that its use was associated with significantly more patients visiting specialized heart facilities and longer survival," the study said.

More than six million Americans have heart failure, which means their heart fails to adequately pump blood. That results in an array of symptoms that include fatigue, shortness of breath, swelling, and a fast or erratic heartbeat.

"Heart failure is progressive, and when it becomes advanced, standard therapies are no longer adequate and quality of life plummets," said study lead author R. Scott Evans, MS, PhD, Medical Informatics director at Intermountain Healthcare. "The sooner advanced heart failure is diagnosed and patients begin to receive advanced, specialized treatment, the better they tend to do."

"But patients typically aren't monitored every day and it's hard for doctors to stay up to date on all the research regarding heart failure," he said. "Plus, no single test says the disease has progressed and often patients don't end up in advanced heart failure clinics when they should."

Frustrated by seeing heart failure patients weeks or even months after their symptoms progressed,

cardiovascular specialists from the Intermountain Medical Center Heart Institute teamed up with technology experts to create a computer program that would monitor heart failure patients to determine when they need advanced care.

Dr. Evans said the advanced heart failure specialists used their own clinical expertise, along with 2013 American College of Cardiology Foundation/American Heart Association criteria for advanced heart failure, then worked with informatics experts to create and refine three algorithms the computer could apply as it monitored patients daily.

Using heart failure patients in Intermountain Healthcare's Salt Lake County community, the computer first identified those with new echocardiograms that showed a left ventricular ejection fraction of less than 35 percent, which is the cut-off that indicates a patient's condition is deteriorating.

The computer app then begins to monitor their records for relevant signs of progression, such as visits to the hospital or emergency department, lab tests, use of diuretics, technological assistance like left ventricular support, data from EKGs, and more. The mined data was then applied to the algorithms.

When computer monitoring indicates a patient likely has advanced heart failure, the app automatically sends a secure email to the patient's doctors—such as the primary care physician, cardiologist, or the provider who ordered the left ventricular ejection fraction test.

The email includes the recommended therapy and all the relevant information that triggered the alert, and provides a link to a secure Intermountain web-based page that provides further information. It also lists phone numbers and links so doctors can easily connect the patients with advanced [heart failure](#) specialists.

Doctors who don't want further notification about a specific patient (who is no longer their patient or who has chosen palliative care, for example) are easily removed from the notification.

Negative reaction has been rare, Dr. Evans said. "No one's asked to be removed because it's a nuisance or not valid information," he said. "Instead, more patients were directed into advanced therapy, where their condition and longevity improved compared to the control group."

For controls, the researchers looked at [patients](#) from the previous two years—who would have been the subject of the [clinical decision](#) support app, had it existed, but who were instead retrospectively identified—and compared their outcomes.

Provided by Intermountain Medical Center

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