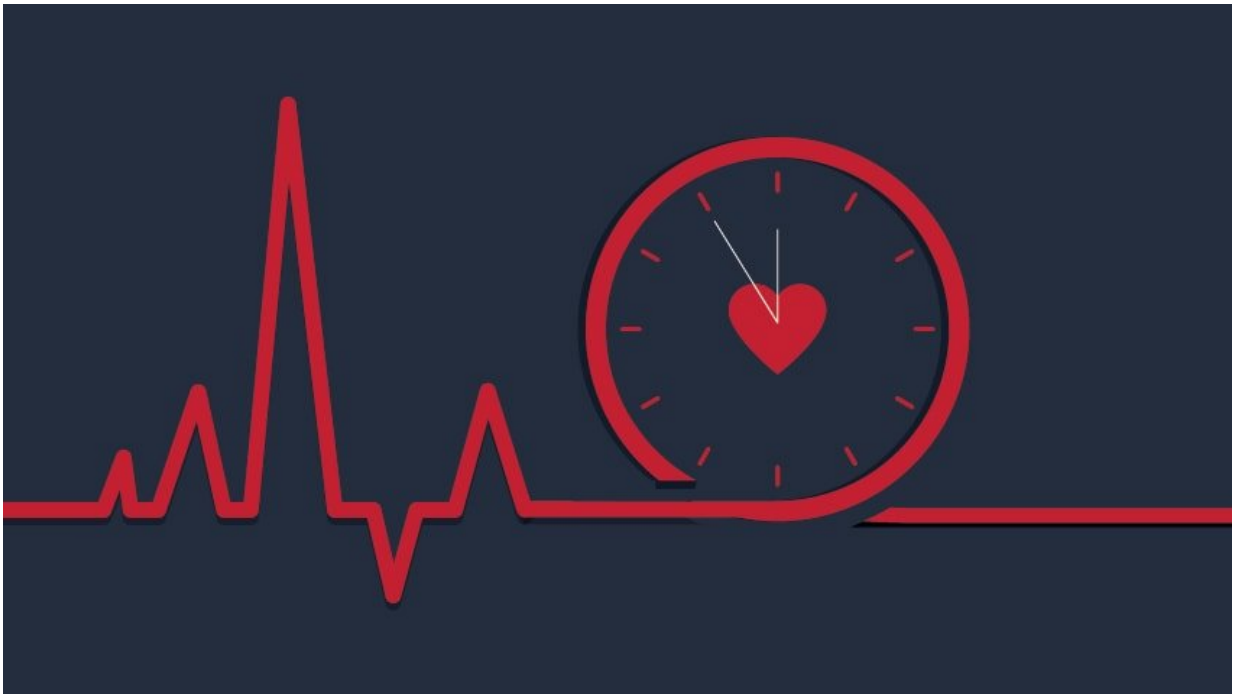


# New blood test for diagnosing heart attacks: A 'big deal,' with caveats

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Credit: University of Michigan

When diagnosing a heart attack, accuracy and timing are everything.

A new test designed to better measure levels of troponin, a protein released when the heart muscle is damaged, could help emergency department physicians provide faster diagnosis and appropriate treatment.

Known as high-sensitivity troponin (hsTn) assays, these blood tests became available for clinical use in Europe in 2010. One type was approved by the U.S. Food and Drug Administration in January 2017.

Assays to measure troponin have been commonplace procedure for nearly 30 years. They're part of a standard range of diagnostics, including electrocardiogram and coronary angiography, which help doctors confirm a heart attack.

But the high-sensitivity blood tests, says Frederick Korley, M.D., Ph.D., can measure very low quantities of troponin and can therefore tell doctors whether a patient is having a heart attack or not shortly after symptoms begin.

Existing tests are less accurate in the initial hours after a heart attack begins, which can delay crucial intervention and clog waiting rooms as patients have to wait for repeat testing to be able to definitively rule out a heart attack.

"Now, we can give you that answer in a shorter timespan," says Korley, an assistant professor of emergency medicine at the University of Michigan Medical School.

The new tests, not yet in widespread domestic use, aren't perfect, says Korley, who wrote a *JAMA Cardiology* editorial about their potential and limitations. Greater precision, he notes, also could lead to overdiagnosis and undue hospitalization.

Still, "it's a big deal," says Korley, "and it's going to be paradigm-shifting."

## **Why is this new test significant?**

*Korley:* The high-sensitivity assay is able to measure tenfold lower concentrations of troponin—much smaller amounts than the current assay is able to. It takes some time for the proteins to leave the heart and get into the bloodstream, so this new test can tell us a lot sooner whether you're having a heart attack or not.

It's also a lot more reliable: If you measure a value now and you repeat that measurement again with the same blood sample, it doesn't change very much compared to the old assays where there was a larger amount of analytical change.

Another potential benefit is greater prevention of cardiovascular disease. A recent [study in JAMA Cardiology](#) found that people with higher levels of troponin, even without having a heart attack, are more likely to develop heart failure. Your annual physical might one day include a routine check of troponin levels. If you have a big bump, that raises a warning flag.

## **How do current troponin tests for diagnosing heart attack fall short?**

*Korley:* Up until now, most of the existing assays were only able to accurately measure troponin levels in the blood about six hours after the onset of injury, when the measurements get more reliable. If you had a measurement before six hours and it's negative, you can't be confident it's truly negative. The first test may miss it.

If it's positive, you're done; it's easy. But if it's negative, we have to wait anywhere between three to six hours and then repeat the test—depending on when a patient's symptoms started—before we can confidently say we don't see signs of a heart attack.

## **How do accuracy levels differ between the two tests?**

*Korley:* About 70 percent of people having a heart attack are going to have a positive result on the first blood draw (using the current troponin test). If it's a big heart attack, we're going to see it. Those having smaller heart attacks or those with a lot of blockage may have more delay.

Suffice to say, we're in the business where 70 percent is not good enough. This [new test](#) is a lot higher: About 82 percent of those having a heart attack have elevated troponin levels even if the initial blood test is measured within six hours of onset of symptoms.

## **Beyond prompting heart attack treatment, how else does greater speed aid the process?**

*Korley:* It's closely tied to patient satisfaction, but also for the safety of other patients. As emergency physicians, the people we worry about the most are the people in the waiting room who we haven't yet seen.

A significant proportion of emergency department visits are for chest pain. By being able to reduce the amount of time we spend answering whether a patient has had a heart attack, we're able to focus a little bit more on other patients and decrease our wait times.

## **What are the downsides to high-sensitivity troponin testing?**

*Korley:* In the past, very few people had noticeable elevations. Some time ago, we could only measure [troponin levels](#) in people having a big heart attack. Now, the assays are so sensitive we can measure it in healthy people. Most people have small amounts of circulating troponin.

With this test, then, we have to understand that elevations may sometimes be acute; some are chronic. For example, if someone has had uncontrolled blood pressure for a long time, that may cause damage to the heart. Therefore, if that person has an elevated troponin level, they might not require hospitalization. What they need is a good primary care doctor who can help them get their blood pressure down. Stress from an infection and injury to the brain can injure the [heart](#) as well.

As clinicians, we are going to need to be savvy in interpreting the results and not necessarily think that if someone's [troponin](#) value is high the person is having a [heart attack](#). Institutions have to learn how well the [test](#) is operating in their hands—and how best to use it to derive the benefits. The rollout has to be cautious.

**More information:** Frederick K. Korley, The Wait for High-Sensitivity Troponin Is Over—Proceed Cautiously, *JAMA Cardiology* (2017). [DOI: 10.1001/jamacardio.2017.4626](https://doi.org/10.1001/jamacardio.2017.4626)

Provided by University of Michigan

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