

BLOOD PRESSURE: HOW IT IMPACTS RISK OF HEART ATTACK AND STROKE

both the “top” and “bottom” blood pressure numbers can increase your risk of heart attack and stroke



P *people who forget to look at the bottom number in a blood pressure reading may want to check again.* When uncontrolled, both measures of blood pressure can increase the risk of heart attack and stroke, according to a study published in the **New England Journal of Medicine**.

Blood pressure is the force of blood flow in arteries, veins and capillaries. When that force is too high, it is considered hypertension, defined as having a consistent blood pressure reading greater than 130/80. The top number, called systolic pressure, is the pressure of vessels when the heart beats and pumps out blood, while the bottom number, called diastolic pressure, is the pressure in blood vessels when the heart is at rest and filling up with blood.

Researchers in this study found that high systolic pressure placed patients at greater risk of heart attack and stroke, but that uncontrolled diastolic pressure could also adversely affect cardiovascular health. On average,

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patients with systolic blood pressure of 160 had a 4.8% risk of having a heart attack or stroke, while patients with a diastolic blood pressure of 96 had a 3.6% risk.



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“There has been a pendulum-swing over the years toward the view that systolic hypertension is the only thing that matters,” said Dr. Alexander Flint, the study’s lead author and a stroke specialist at Kaiser Permanente, in an email. “Doctors and patients should make sure that both systolic blood pressure and diastolic blood pressure get attention when it comes to diagnosing and treating hypertension.”

The findings don’t come as a surprise to hypertension experts like Dr. Karol Watson, co-director of the UCLA Program in Preventive Cardiology.

“Fifty years ago, most people thought diastolic BP was more important than systolic BP,” Watson, who was not involved in the study, said in an email. “But diastolic BP has always been important, and increasing levels do confer increased risk. This study verified that.”

The study analyzed existing data on 36 million outpatient blood pressure readings from 1.3 million adults, listed in an electronic medical record. Over the course of eight years, from 2009 and 2016, the researchers determined risk based on whether patients had their first episode of a heart attack or stroke during that time. Researchers also classified people with hypertension using two thresholds -- greater than 140/90 or greater than 130/80 -- to see if the risk of cardiovascular events changed based on the threshold used.

In 2017, the **US guidelines** for high blood pressure changed, dropping the threshold from 140/90 to 130/80 -- a move considered controversial in the medical community.

Almost 19% of blood pressure measurements met the 140/90 threshold, while 44% of measurements met the 130/80 threshold. The risk of a heart attack or stroke was similar across both thresholds, the researchers found.

“People spent a lot of time debating whether the lower threshold made sense,” Watson said. “This study validates the lower threshold.”

But blood pressure that’s too low can be just as dangerous. In the study, people categorized with the highest and lowest diastolic blood pressures were the ones who had the highest risk of heart attack and stroke. Systolic blood pressures of less than 90 are also harmful and can put people into **shock**, a state of low blood flow and oxygen delivery to vital organs including the brain.

“Nothing magic happens at 140/90 or at 130/80. Higher [blood pressure] is worse, and lower is better, until you get too low,” David Goff, Director of Cardiovascular Sciences for the National Heart, Lung, and Blood Institute, said in an email. Goff was not involved in the study. “These results confirm previous findings over the past several decades that the relationship of blood pressure with heart disease risk is graded.”

The bottom line: Systolic and diastolic blood pressures should be “tightly controlled” and follow the 2017 guidelines, Flint said.

The study was observational and could only evaluate the relationship, not the cause, between blood pressure and cardiovascular events.

It also doesn’t directly address the benefit of treating hypertension, Goff said.

There are medicines that can treat both types of hypertension, but **lifestyle factors** are also important in keeping blood pressure in a healthy range. These include avoiding smoking, eating healthy, limiting alcohol use and exercising.

In the US, about one third of adults have hypertension according to the **US Centers for Disease Control and Prevention**. Heart disease is now the leading cause of death worldwide.

“At present, only about half the people in the US with hypertension are controlled.” Goff said. “A major focus for us should be on improving blood pressure control to reduce risk of heart disease and stroke.”

