

Difference in blood pressure between arms linked to greater death risk

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Robust evidence from a large international study confirms that a difference in blood pressure readings between arms is linked to greater risk of heart attack, stroke and death.

Led by the University of Exeter, the global INTERPRESS-IPD Collaboration conducted a meta-analysis of all the available research, then merged data from 24 global studies to create a database of nearly 54,000 people. The data spanned adults from Europe, the US, Africa and Asia for whom [blood pressure readings](#) for both arms were available.

Funded by the National Institute for Health Research (NIHR) and published today in *Hypertension*, the study is the first to conclude that the greater the inter-arm [blood pressure](#) difference, the greater the patient's additional health risk.

Currently, international [blood pressure](#) guidelines advise health professionals to measure blood pressure in both arms when assessing cardiovascular risk, - yet this is widely ignored. The new study provides a new upper limit of 'normal' for an inter-arm difference in blood pressure, which is

significantly lower than the current guidance. The research could lead to a change in international hypertension guidelines, meaning more at-[risk patients](#) could be identified and receive potentially life-saving treatment.

In a methodology that put patients at its heart, working with a patient advisory group at every step of the research, the team analysed data on inter-arm blood pressure difference, and tracked the number of deaths, heart attacks and strokes that occurred in the cohort over 10 years.

Lead author and GP Dr. Chris Clark, of the University of Exeter Medical School, said: "Checking one arm then the other with a routinely used blood pressure monitor is cheap and can be carried out in any healthcare setting, without the need for additional or expensive equipment. Whilst international guidelines currently recommend that this is done, it only happens around half of the time at best, usually due to time constraints. Our research shows that the little extra time it takes to measure both arms could ultimately save lives".

"We've long known that a difference in blood pressure between the two arms is linked to poorer health outcomes. The large numbers involved in the INTERPRESS-IPD study help us to understand this in more detail. It tells us that the higher the difference in blood pressure between arms, the greater the cardiovascular risk, so it really is critical to measure both arms to establish which patients may be at significantly increased risk. Patients who require a blood pressure check should now expect that it's checked in both arms, at least once."

Blood pressure rises and falls in a cycle with each pulse. It is measured in units of millimetres of mercury (mmHg), and the reading is always given as two numbers: the upper (systolic) reading represents the maximum blood pressure and the lower (diastolic) value is the minimum blood pressure. A high systolic blood pressure indicates

hypertension. This affects one third of the adult population and is the single leading cause globally of preventable heart attacks, strokes and deaths. A significant difference between the systolic blood pressure measurements in the two arms could be indicative of a narrowing, or a stiffening, of the arteries, which can affect blood flow. These arterial changes are recognised as a further risk marker for subsequent heart attack, stroke or early death, and should be investigated for treatment.

The researchers concluded that each mmHg difference found between the two arms, elevated predicted 10-year risk of one of the following occurring by one percent; new angina, a heart attack or stroke.

At the moment, both UK and European guidelines recognise a systolic difference of 15 mmHg or more between the two arms as the threshold indicative of additional cardiovascular risk. This new study found that a lower threshold of 10 mmHg was clearly indicative of additional risk, which would mean that far more people should be considered for treatment if such a difference between arms is present. To this end, the research team has created a tool that is easy for clinicians to use, to establish who should be considered for treatment based on their risk, incorporating the blood pressure reading in both arms.

Research co-author Professor Victor Aboyans, head of the department of cardiology at the Dupuytren University Hospital in Limoges, France, said "We believe that a 10 mmHg difference can now reasonably be regarded as an upper limit of normal for systolic inter-arm blood pressure, when both arms are measured in sequence during routine clinical appointments. This information should be incorporated into future guidelines and clinical practice in assessing cardiovascular risk. It would mean many more people were considered for treatment that could reduce their risk of [heart attack](#), stroke and death."

An interarm difference of greater than 10 mmHg occurs in 11 percent of people with high blood pressure (hypertension) - itself a known health risk—and in four percent of the general population.

The paper is entitled "Associations Between Systolic Interarm Differences in Blood Pressure and Cardiovascular Disease Outcomes and Mortality. Individual Participant Data Meta-Analysis, Development and Validation of a Prognostic Algorithm: The INTERPRESS-IPD Collaboration."

More information: *Hypertension* (2020). [DOI: 10.1161/HYPERTENSIONAHA.120.15997](https://doi.org/10.1161/HYPERTENSIONAHA.120.15997)

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