

# Modifiable risk factors found to be responsible for half of cardiovascular diseases

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Scientists of the Global Cardiovascular Risk Consortium under the auspices of the Department of Cardiology at the University Heart &

Vascular Center of the Medical Center Hamburg-Eppendorf (UKE) and the German Center for Cardiovascular Research (DZHK) have proven that the five classic cardiovascular risk factors—excess weight, high blood pressure, high cholesterol, smoking, and diabetes mellitus—are directly connected to more than half of all cardiovascular diseases worldwide. High blood pressure is the most significant factor for the occurrence of heart attacks and strokes.

The study's results were published August 26 in the *New England Journal of Medicine* and are based on the data from 1.5 million persons from 34 countries.

Cardiovascular diseases cause approximately a third of all deaths worldwide. They often develop silently over decades. Frequently without being recognized, the vascular walls change, giving rise to arteriosclerosis, in the wake of which [coronary heart disease](#) may occur, including complications such as heart attacks, acute cardiac death, or strokes.

"Our study clearly shows that over half of all heart attacks and strokes are avoidable by checking and treating the classic risk factors. These results are of the highest significance for strengthening prevention in this area. At the same time, approximately 45% of all cardiovascular cases cannot be explained with these risk factors; they should motivate us and the academic funders to further research efforts," says Professor Doctor Stefan Blankenberg, the medical director of the University Heart & Vascular Center at the UKE.

The Global Cardiovascular Risk Consortium assessed the individual-level data of 1.5 million persons who took part in 112 [cohort studies](#) and originate from the eight geographical regions North America, Latin America, Western Europe, Eastern Europe and Russia, North Africa and the Middle East, Sub-Saharan Africa, Asia and Australia. The objective

of the study was to gain a better understanding of the global distribution, the significance of the individual risk factors and their effects on cardiovascular diseases, and overall mortality in order to derive targeted preventive measures.

"In principle, the five classic risk factors that we examined are modifiable, and thus responsive to preventive measures. So far, the proportion of preventable risk attributed to these five risk factors is still matter of debate," lead author and associate professor Dr. Christina Magnussen, Department of Cardiology at the University Heart & Vascular Center of the UKE, explains.

## **Regional differences in risk factors**

The study showed differences in the eight global regions regarding the frequency of the risk factors. The scientists saw the highest rates for overweight in Latin America, and the highest values for high blood pressure and high cholesterol in Europe. The risk factor smoking is particularly decisive in Latin America and Eastern Europe, diabetes mellitus in North Africa and in the Middle East.

All five risk factors combined (excess weight, high blood pressure, high cholesterol, smoking, and [diabetes mellitus](#)) amount to 57.2% of women's cardiovascular risk and to 52.6% of men's. Thus, a substantial share of cardiovascular risk remains unexplained. In comparison, the five risk factors merely account for about 20% of the risk to die (overall mortality).

Furthermore, the study also clearly shows a linear relation between high blood pressure, and high cholesterol, and the occurrence of cardiovascular diseases. The higher the values, the higher the likelihood of the occurrence of cardiovascular diseases. This result applies to all examined regions in the world. The scientists also identified a

remarkable connection between [cholesterol levels](#) and overall mortality: Very low as well as [high cholesterol](#) levels increase overall mortality.

The significance of all risk factors decreases with age; e.g., high blood pressure is more damaging to a 40 year old than an 80 year old. The [body mass index](#) (BMI) is the only exception and remains equally significant at any age. "This raises the question to which extent the target values for treating cardiovascular [risk factors](#) for the most elderly should be identical with those for the middle to older age bracket," says Professor Blankenberg.

## **Study identifies extensive range of starting points for preventive measures**

The study provides an extensive dataset to avoid cardiovascular diseases or reduce their effects for at-risk persons, or patients with cardiovascular diseases, by improving their lifestyle and by lowering blood pressure or cholesterol.

"High systolic blood pressure accounts for the largest share of cardiovascular risk. We should place a particular focus on the therapy of patients with [high blood pressure](#) to avoid cardiovascular diseases as much as possible," says associate professor Dr. Magnussen.

**More information:** Global Effect of Modifiable Risk Factors on Cardiovascular Disease and Mortality, *New England Journal of Medicine* (2023). [DOI: 10.1056/NEJMoa2206916](https://doi.org/10.1056/NEJMoa2206916)

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