

## Lipid-Related Atherosclerotic Risk



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For nearly 60 years, blood cholesterol levels have been the primary tool for identifying individuals at high risk of cardiovascular disease (CVD). However, a new large-scale study led by researchers at Chalmers University of Technology in Sweden and Harvard University suggests that two specific lipoprotein markers could provide a more accurate assessment—potentially saving lives through earlier and more precise detection.

According to the World Health Organization, CVDs are the leading cause of death globally. Most cases are preventable through lifestyle changes such as quitting smoking, improving diet, and increasing physical activity. Early identification of those at risk is therefore critical for effective prevention and management.

This is the largest study of its kind to date. For the first time, researchers show the relative importance of the three main families of lipoproteins in predicting heart disease risk.

Cholesterol becomes harmful when present in excess, leading to plaque buildup in arteries—a key contributor to heart attacks and strokes. In the bloodstream, cholesterol is transported by lipoproteins.

There are four main classes of lipoproteins. Three of these contain apolipoprotein B (apoB), a surface protein associated with cholesterol deposits in blood vessels—these are commonly labelled as “bad cholesterol.” The fourth class helps remove excess cholesterol, often termed “good cholesterol.”

Traditionally, doctors assess CVD risk by measuring total cholesterol levels. However, cholesterol cannot cause damage without its lipoprotein carriers. This has prompted a growing interest in directly measuring the number of apoB-containing lipoproteins as a more accurate indicator of risk.

Researchers analysed blood samples from more than 200,000 individuals in the UK Biobank who had no prior history of heart disease. They measured the number and size of various lipoproteins, focusing on those containing apoB. Over a follow-up period of up to 15 years, they tracked the incidence of heart attacks and identified which lipoprotein profiles were most strongly linked to future CVD risk.

The study found that apoB levels were the strongest predictor of heart disease risk. Standard cholesterol tests still perform well, but in about one in twelve patients, they may underestimate risk.

Since 20 to 40% of first-time CVD events are fatal, even small improvements in risk prediction matter. Measuring apoB provides a clearer picture and could help prevent these outcomes.

While the number of apoB-containing particles was the most important factor overall, researchers also highlighted the role of another lipoprotein—lipoprotein(a), or Lp(a). Though it represents less than 1% of total bad cholesterol particles in most people, elevated levels—typically inherited—can significantly increase heart disease risk in a subset of the population.

Study findings support using both apoB and Lp(a) measurements for better risk assessment. These tests are already commercially available and

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affordable, making them feasible for widespread use in clinical practice.

The study concludes that routine testing for apoB and Lp(a) could improve cardiovascular risk prediction and help personalise prevention strategies more effectively than traditional cholesterol tests alone.

Source: [Chalmers University of Technology](#)

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