

# Association between cardiovascular health and heart failure in older British men; findings from the British Regional Heart Study

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## Background

With an ageing population heart failure (HF) is emerging as a common cardiovascular condition and is one of the leading causes of mortality and morbidity. The American Heart Association promotes Life simple's 7 (LS7) to improve cardiovascular health (CVH). LS7 consists of seven modifiable health factors: body mass index, blood pressure, glucose, cholesterol, physical activity, smoking and diet. We sought to examine the impact of LS7 on risk of incident HF in older British men as well as the overall CVH trajectory from middle age to older age and subsequent HF risk.

## Methods

In 1998–2000, 20 years after the initial screening of 7735 men aged 40–59 years (The British Regional Heart Study), 4252 men were re-examined when aged 60–79 years, with collection of all LS7 components and follow-up for a median period of 15.8 years. Men with previous history of cardiovascular disease were excluded leaving 3698 men. The composite LS7 score ranges from 0–14 and men were classified as having poor (1–4), intermediate (5–10) and ideal (11–14) CVH score. Four CVH trajectory groups were created based on transition between low and high CVH score from middle to older age: (1) Low-Low, (2) Low-High, (3), High-Low, and (4) High-High. Cox models were used to estimate the risk of HF adjusted for age, alcohol consumption, socioeconomic class and incident myocardial infarction.

## Results

Of the 3698 men 14% (n=522) had ideal CVH score. Ideal CVH was associated with a significant decrease in risk of HF compared to those with a poor CVH score (HR 0.52, 95% 0.31 to 0.88,  $p < 0.016$ ); intermediate CVH was associated with reduced but non-significant HF risk (HR 0.79, 95% CI 0.51 to 1.24,  $p = 0.310$ ). Compared to the Low-Low CVH trajectory group, those who maintained a healthy CVH score (High-High) showed the lowest risk of HF (HR 0.67, 95% CI 0.51 to 0.87,  $p < 0.003$ ); those who moved from high to low showed lower but non-significant risk (HR 0.78 95% CI 0.55 to 1.11,  $p = 0.17$ ); those who moved from low to high showed no benefit (HR 1.01 95% CI 0.76 to 1.33).

## Discussion

Our findings suggest that having ideal CVH reduces the risk of developing HF in older age. LS7 is a simple way to identify high risk individuals however the prevalence of older men with ideal CVH is low. Adopting and maintaining healthy cardiovascular health from middle age to older age confers the most benefit in preventing HF in later life.