

## Abstract

# The Partial Substitution of Processed Meat with Plant-Based Foods and the Risk of Cardiovascular Disease <sup>†</sup>

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**Abstract:** Background and objectives: Cardiovascular diseases (CVD) are the leading cause of death globally. A shift from animal-based diets to more plant-based diets is likely to reduce the risk of CVD. This modelling study aimed to assess the impacts of the partial substitution of processed meat with plant-based foods on CVD risk. Methods: We used pooled data from five Finnish cohorts ( $n = 42868$ , 78% men, aged  $\geq 25$  years at baseline, 7.9 years median follow-up time with 4421 incident CVD cases). Diet was assessed using a validated food frequency questionnaire at baseline and CVD cases were ascertained from national health registers. In the substitution models, 50 g/week of processed meat were substituted with similar amounts of plant-based foods (legumes, vegetables, fruits, cereals, or a combination of these). Cohort-specific hazard ratios (HRs) were calculated using a Cox proportional hazards multivariate model adjusted for relevant confounding factors. Pooled HRs were estimated from the cohort-specific HRs using a random-effects model. Results: There was a small yet statistically significant reduction in CVD risk when processed meat was partially substituted with legumes (men: HR 0.96, 95% CI 0.93–1.00,  $p = 0.03$ ), vegetables (men: HR 0.99, 95% CI 0.99–1.00,  $p < 0.001$ , women: HR 0.98, 95% CI 0.96–0.99,  $p < 0.01$ ), fruits (women: HR 0.98, 95% CI 0.96–0.99,  $p < 0.01$ ), cereals (women: HR 0.96, 95% CI 0.94–0.98,  $p < 0.01$ ), or a combination of plant-based foods (women: HR 0.98, 95% CI 0.96–0.99,  $p < 0.01$ ). Discussion: The modelled partial substitution of processed meat with several plant-based foods was associated with lower CVD risk. Our findings suggest that even a small change towards a more plant-based diet may contribute to cardiovascular health at the population level and, moreover, environmental sustainability.

**Keywords:** cardiovascular disease; diet; sustainability



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**Data Availability Statement:** The data is available upon request through the Findata permit procedure at <https://www.findata.fi/en/>.

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