# Population genomic screening of all young adults in Australia to detect familial hypercholesterolemia: a cost-effectiveness analysis

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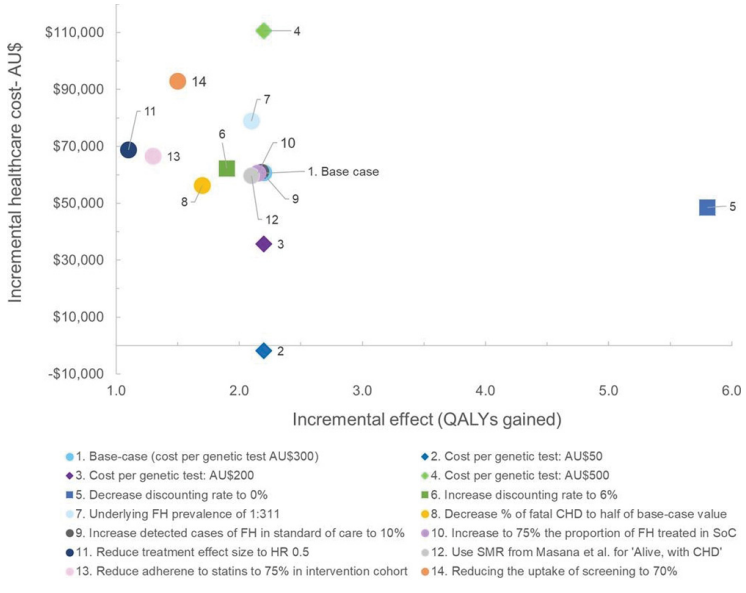
**Background:** Heterozygous familial hypercholesterolemia (FH) is a highly-penetrant, autosomal dominant monogenic disorder that causes elevated plasma low-density cholesterol (LDL-C) levels and risk of premature coronary heart disease (CHD). To date, the cost-effectiveness of the emerging strategy of genomic screening of adult populations for FH has not been investigated.

**Purpose:** To assess the impact and cost-effectiveness of offering population genomic screening to all young adults in Australia to detect heterozygous familial hypercholesterolemia (FH).

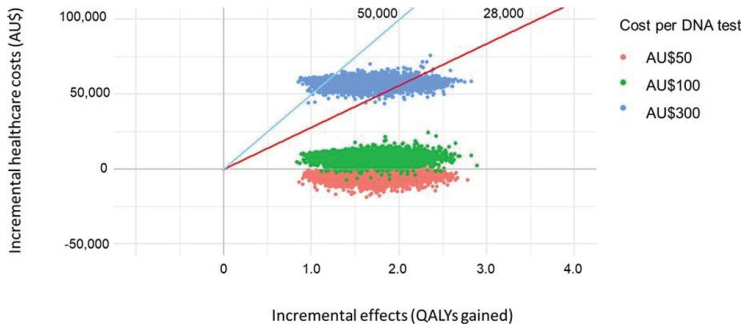
**Methods:** We designed a decision analysis model to compare the current standard of care for heterozygous FH diagnosis in Australia (opportunistic cholesterol screening and genetic cascade testing) with population genomic screening of adults aged 18–40 years to detect pathogenic variants in the LDLR/APOB/PCSK9 genes. The model captured morbidity/mortality due to coronary heart disease (CHD) over a lifetime horizon, from a healthcare perspective. Risk of CHD, treatment effects, prevalence, and healthcare costs were estimated from published studies. Outcomes included quality adjusted life years (QALYs), costs and incremental cost-effectiveness ratio (ICER), discounted 5% annually. Sensitivity analyses were undertaken to explore the impact of key input parameters on the robustness of the model. The model structure was designed to be transferable to countries with different healthcare systems.

**Results:** Over the lifetime of the population (4,167,768 men; 4,129,961 women), the model estimated a gain of 62,722 years of life lived and 73,959 QALYs due to CHD prevention. Population genomic screening for FH would be cost-effective from a healthcare perspective if the cost per test was ≤AU$300 (~US$233) which would yield an ICER AU$28,000 cost-saving.

**Conclusion:** Based on our model, offering population genomic screening to all young adults to detect FH could be cost-effective in the Australian healthcare system, at testing costs that are currently feasible.




Results from scenario analyses




Results from Monte Carlo simulations