

Variation of cost-effectiveness across the population, treatment cost and adoption decision: a case study in CVD prevention

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Introduction

Despite substantial declines in cardiovascular disease (CVD) incidence and mortality, it remains a leading disease burden across developed economies. High LDL cholesterol (LDL-C) is a key causal risk factor. Statins are effective, low-cost, established first-line treatment reducing LDL-C by 40%-60% and CVD risk by about a fifth per 1 mmol/L LDL-C reduction across patients with and without previous CVD. Newer treatments lowering LDL-C and with proven or expected CVD risk reductions similar to statins are now available but their adoption has been restricted and slow.

- PCSK9 inhibitors: 50%-60% LDL-C reduction; annual cost confidential: 2024 list price £4383-£4438; *confidential discounts*
- Inclisiran: 50% LDL-C reduction, Annual cost confidential: list price £5962 (year 1) & £3975 (years 2+); *confidential arrangement*

2023-24 Prescription cost analysis for England report about 7.8 millions person years on statin treatment, 320 person years on PCSK9 and 10,890 person years on inclisiran.

Aim

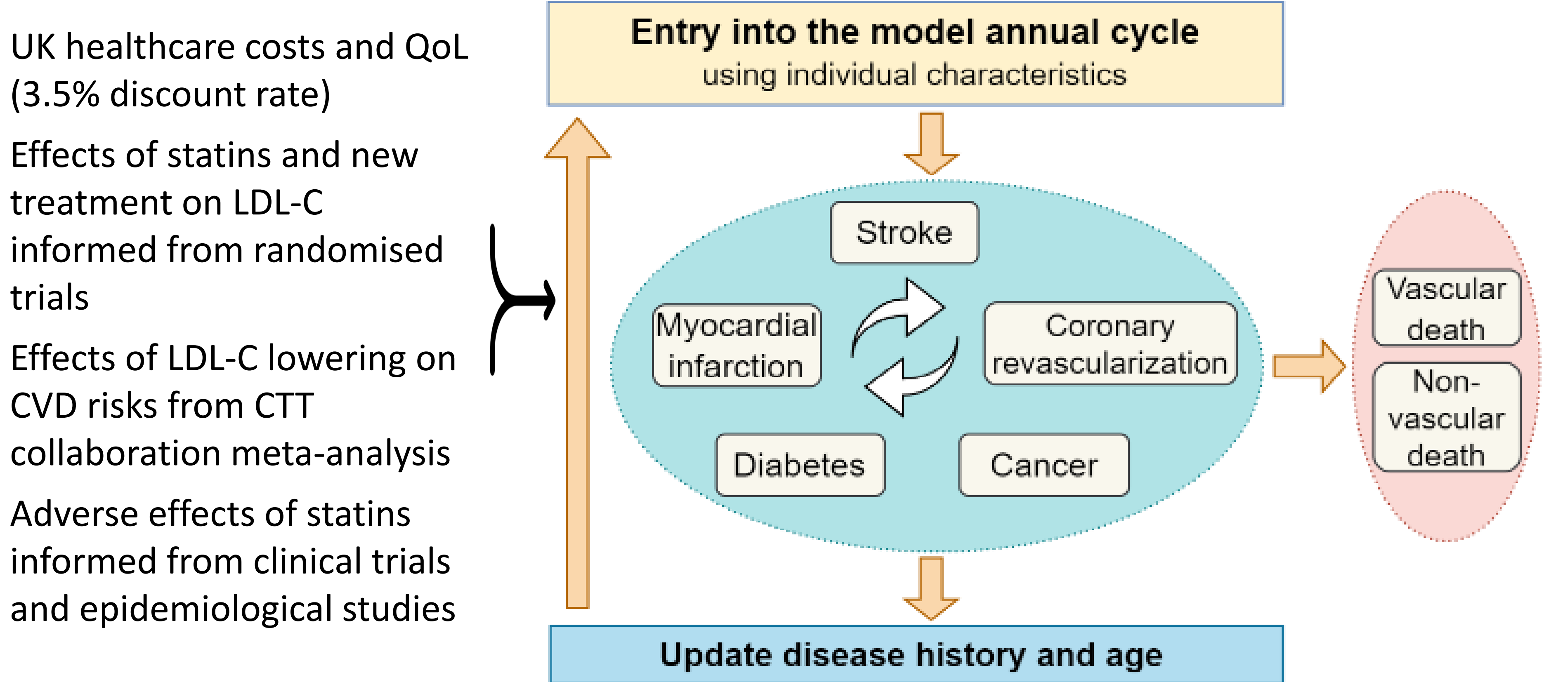
We assess at what cost new LDL-C lowering treatments that halve LDL-C post statin treatment would be good value-for-money across categories of people without previous CVD in UK.

Method

An externally-validated contemporary **UK CVD micro-simulation cost-effectiveness model**¹ assessed lifetime survival and quality of life (QoL), and healthcare costs (2021 UK£) using individual sociodemographic, lifestyle and clinical characteristics of UK Biobank participants without CVD at recruitment (440,000 40-70 years old participants) under the following long-term CVD prevention strategies:

- with **high intensity statin** therapy (atorvastatin 80 mg/day achieving 55% LDL-C reduction; **£22 per year**)², and
- with **a new LDL-C lowering treatment** achieving further 50% LDL-C reduction (e.g. inclisiran/ PCSK9 inhibitor) added to atorvastatin 80 mg/day.

We report the annual cost at which this new treatment would be considered cost-effective at adoption thresholds of £20,000 and £30,000 per quality adjusted life year (QALY) gained, in categories by age, sex, 10-year CVD risk and untreated LDL-C level.



Results

Annual price (£) of new LDL-C lowering treatment to be cost-effective at £20,000 [£30,000] per QALY threshold

		Untreated LDL cholesterol (mmol/L)					3.4-4.1					≥4.1				
		By 10-year CVD risk (%)					By 10-year CVD risk (%)					By 10-year CVD risk (%)				
		<5	5-10	10-15	15-20	≥20	<5	5-10	10-15	15-20	≥20	<5	5-10	10-15	15-20	≥20
Men																
Age (years)	40-49	-2 [14]	10 [31]		28 [59]		11 [33]	23 [50]		46 [85]		28 [57]	44 [82]		97 [162]	
	50-59	-1 [15]	7 [27]	17 [42]	29 [59]	44 [83]	12 [35]	21 [47]	32 [63]	44 [82]	69 [120]	28 [59]	40 [77]	56 [100]	74 [126]	134 [219]
	60-69	n/a	8 [29]	16 [41]	26 [56]	45 [85]	n/a	22 [50]	33 [65]	43 [81]	68 [118]	n/a	42 [79]	54 [97]	68 [117]	124 [203]
Women																
Age (years)	40-49	-13 [-3]	-2 [15]		1 [21]		-5 [10]	7 [28]		16 [43]		7 [28]	27 [59]		55 [104]	
	50-59	-8 [6]	0 [17]	7 [28]	14 [39]	15 [42]	2 [19]	10 [32]	18 [45]	28 [60]	29 [64]	14 [38]	27 [58]	44 [83]	61 [110]	92 [160]
	60-69	-4 [10]	2 [19]	9 [31]	17 [42]	25 [55]	5 [24]	12 [35]	21 [49]	30 [63]	42 [82]	17 [42]	28 [59]	41 [78]	56 [102]	87 [150]

Shading based on annual price (£) at £20,000 per QALY threshold: <20 (red), ≥20, <50 (orange), ≥50, <100 (yellow), ≥100 (light yellow)

Conclusion

Value-for-money varies across patient categories depending on health benefit achieved with implications for treatment cost and adoption. Very large reductions in prices of new LDL-C lowering treatments are needed for them to be considered of good value for primary CVD prevention in UK. Even further price reductions will be needed to meet the marginal production cost per quality-adjusted life year added in the UK health service.

References

1 Wu et al. BJGP 2024; <https://doi.org/10.3399/BJGP.2023.0198>
2.Mihaylova et al. Lancet Regional Health Europe; <https://doi.org/10.1016/j.lanepe.2024.100887>

Acknowledgements

Support by NIHR Barts Biomedical Research Centre (NIHR203330). The study is designed and analysed independently of funders.