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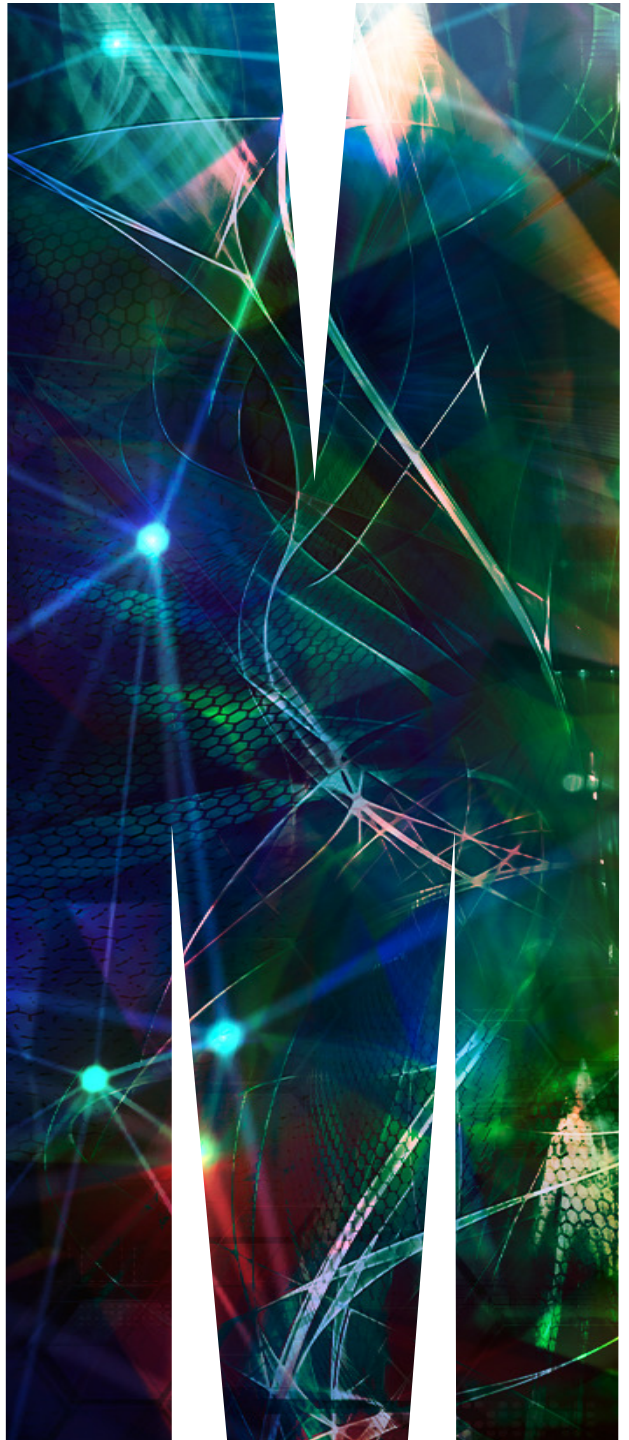
Health Economic Case for Prevention of Cardiovascular Disease



Zanfina Ademi, MPharm, MPH, PhD

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Global Heart Hub, Unite Annual Summit, 8-9th of November, Barcelona

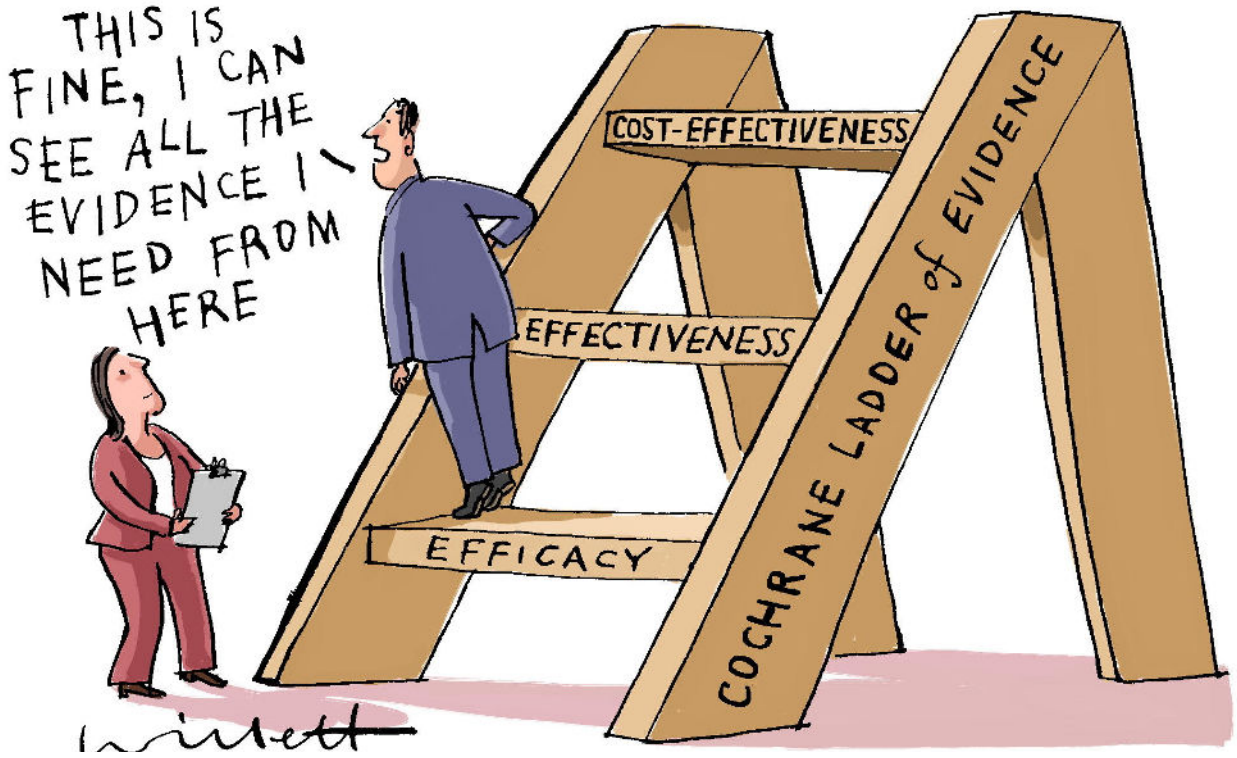
DISCLOSURE

MEMBER - PHARMACEUTICAL BENEFITS ADVISORY COMMITTEE, ECONOMICS SUB-COMMITTEE, DEPARTMENT OF HEALTH AND AGED CARE (AUSTRALIA)

Outline

- Why Health Economics and how do we make decisions?
- The Economic case for FH screening and treatment
- Do cholesterol years matter in the FH population?
- Current knowledge about Screening Strategies for FH
- New initiatives for population genomic screening
- How can we move from reactive to early proactive preventive healthcare in CVD space?
- Do the risk factor years matter in the primary prevention of CVD?
- What does the future hold for CVD?
- Take home message

Why health economics?

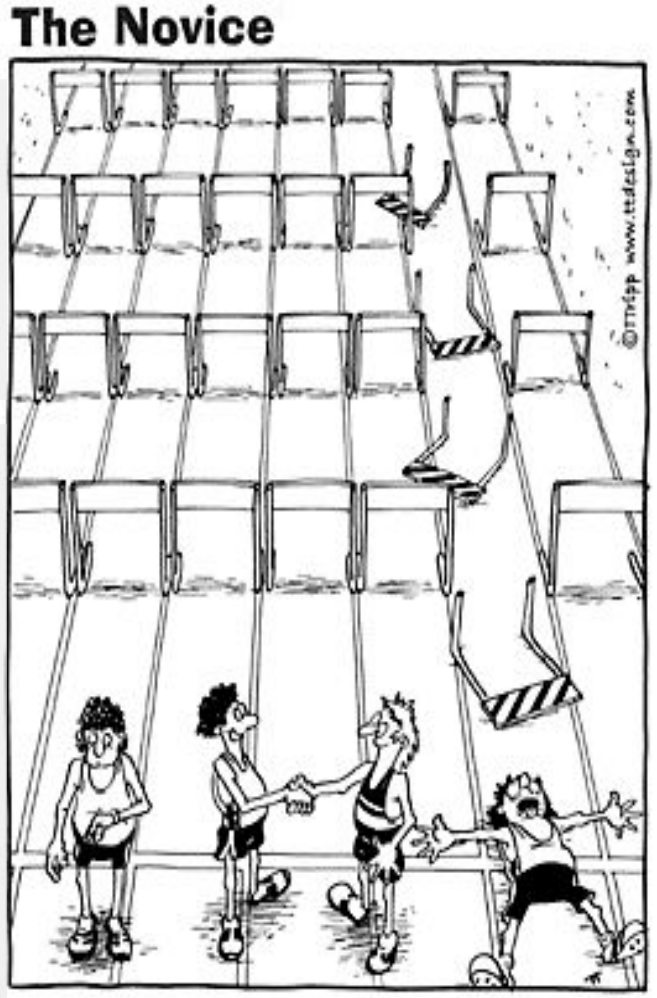


- Not all prevention strategies are effective
- **Choices** and **priorities**, opportunity costs
- Growing gap between what medicine **can do** and what it is **economically feasible** to do
- Importance of health economics

How do we make decisions?

Registration

Price & Reimbursement



Quality / Safety

Immunogenicity / Efficacy

Does it work in a controlled environment?

Effectiveness

Does it work in those patients where it is meant to work in, compared to the right comparator, and using relevant parameters ?

Efficiency (Cost-Effectiveness)

Is it worth doing it, compared to other things, we could do with the same money?

+ Affordability
+ Appropriateness?

What is the budget impact for the payer in a short time horizon? What is the alternative?

And we need to consider the fourth hurdle

The Economic case for FH screening and treatment

***Two aspects*:**

- Identification/Diagnosis
- Management and primary prevention of CVD

Do cholesterol years matter in the FH population?

JAMA Pediatrics | Original Investigation

Cost-effectiveness and Return on Investment of a Nationwide Case-Finding Program for Familial Hypercholesterolemia in Children in the Netherlands

Zanfina Ademi, PhD; Richard Norman, PhD; Jing Pang, PhD; Eric Sijbrands, PhD; Gerald F. Watts, DSc; Barbara A. Hutten, PhD; Albert Wiegman, PhD

Atherosclerosis 304 (2020) xxx–xxx

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journal homepage: www.elsevier.com/locate/atherosclerosis

Health economic evaluation of screening and treating children with familial hypercholesterolemia early in life: Many happy returns on investment?

Zanfina Ademi[a,*], Richard Norman[b], Jing Pang[c], Danny Liew[a], Sophia Zoungas[a], Eric Sijbrands[d], Brian A. Ference[e], Albert Wiegman[f], Gerald F. Watts[c]

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Cost-effectiveness and Return on Investment of a Nationwide; Case-Finding Program for Familial Hypercholesterolemia in Children in the Netherlands and Australia

Heterozygous FH in children

- The Dutch FH screening program was implemented to identify people of all ages with FH
- 10 970 children were cascade screened by 2016, of whom 5613 mutation-positive (51.2%)

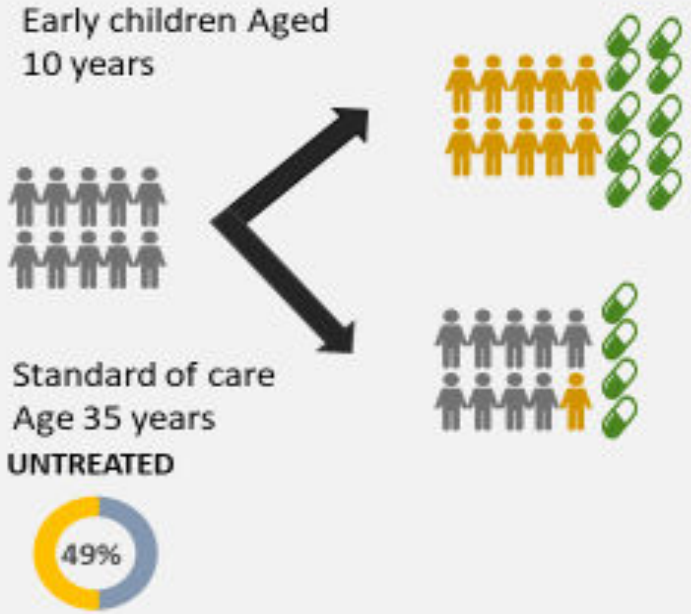
Heterozygous FH in children

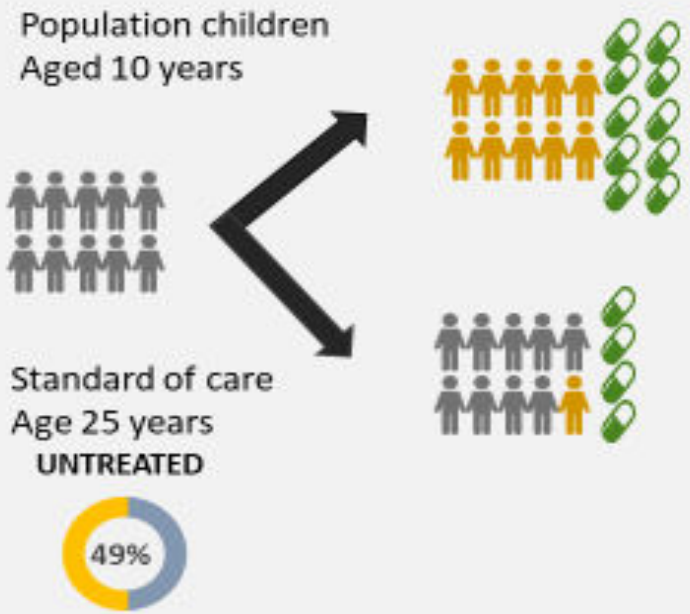
- WA, 244 children identified through cascade screening, 148 were genetically screened and 84 were identified as (M+) (56.8%)

Does cholesterol years matter in childhood over a lifetime?

	Years of Life	Costs
Early Screening	66.4	$180,775
Undiscounted		
Standard of Care	58.6	$193,456

Over a lifetime cascade screening and treatment increases life and decreases disease costs





	Years of Life	Costs
Early Screening	61.6	$224,838
Undiscounted		
Standard of Care	57.4	$524,051

Over a lifetime cascade screening and treatment is cost-saving in the Netherlands

Every € that the Dutch Ministry of Health invested returned €8.38

Ademi et al . JAMA Pediatrics 2023;
and Ademi et . Atherosclerosis 2020

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Current knowledge about Screening Strategies for Familial Hypercholesterolaemia

- 62 strategies were included in this review
- (95%) adopted a healthcare perspective
- All were set in high-income countries.

- Cascade screening (23 strategies)
- Opportunistic screening (13 strategies)
- Systematic screening (11 strategies)
- Population-wide screening (15 strategies).

- Most of the strategies relied on genetic diagnosis for case ascertainment.

- The most common comparator was no screening
- Few studies compared the proposed strategy vs. current screening strategies or vs. the best next alternative.
- Six studies evaluated screening in children while the remaining were targeted at adults.

Marquina and Ademi et al . Systematic Review Cost-Effectiveness of Screening Strategies for Familial Hypercholesterolemia. Pharmacoeconomics 2023 unpublished work

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Current knowledge about Screening Strategies for Familial Hypercholesterolaemia

- Cascade screening was cost-effective in 78% of the studies: incremental cost-effectiveness ratios [ICERs] cost-saving dominant to 2022 USD 104,877)

- Opportunistic screening in 85% (ICERs from US$4,959 to US$41,705)

- Systematic screening in 80% (ICERs from US$2,763 to US$69,969)

- Population-wide screening in 60% (ICERs from US$1,484 to US$223,240)

- Predictors of outcomes in the sensitivity analysis were the long-term cost of lipid-lowering treatment.

Marquina and Ademi et al . Systematic Review Cost-Effectiveness of Screening Strategies for Familial Hypercholesterolemia. Pharmacoeconomics 2023 unpublished work

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New initiatives for population genomic screening

European Heart Journal

ESC European Society of Cardiology
European Heart Journal (2021) **00**, 1–13
https://doi.org/10.1093/eurheartj/ehab770

CLINICAL RESEARCH
Health care policies and economics

Population genomic screening of young adults for familial hypercholesterolaemia: a cost-effectiveness analysis

Clara Marquina[1†], Paul Lacaze[1†], Jane Tiller[1], Moeen Riaz[1], Amy C. Sturm[2], Mark R. Nelson[1,3], Brian A. Ference[4], Jing Pang[5], Gerald F. Watts[5,6,7], Stephen J. Nicholls[1], Sophia Zoungas[1], Danny Liew[1], John McNeil[1], and Zanfina Ademi[1*]

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Clara Marquina[1*] Paul Lacaze[1*] Jane Tiller[1] Moeen Riaz[1] Amy C Sturm[2] Mark Nelson[1] Brian Ference[4]

Jing Pang[4] Gerald Watts[4,5] Stephen Nicholls[1] Sophia Zoungas[1] Danny Liew[1] John McNeil[1] **Zanfina Ademi[1]**

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Population genomic screening of young adults for familial hypercholesterolemia: A cost-effectiveness analysis

ESC European Society of Cardiology

Background

- Heterozygous FH 1:250 prevalence
- Patients with HeFH can have 2x the risk of CHD
- Treatment with statins is safe and cost-effective
- Delaying treatment further increases the CHD risk in FH patients

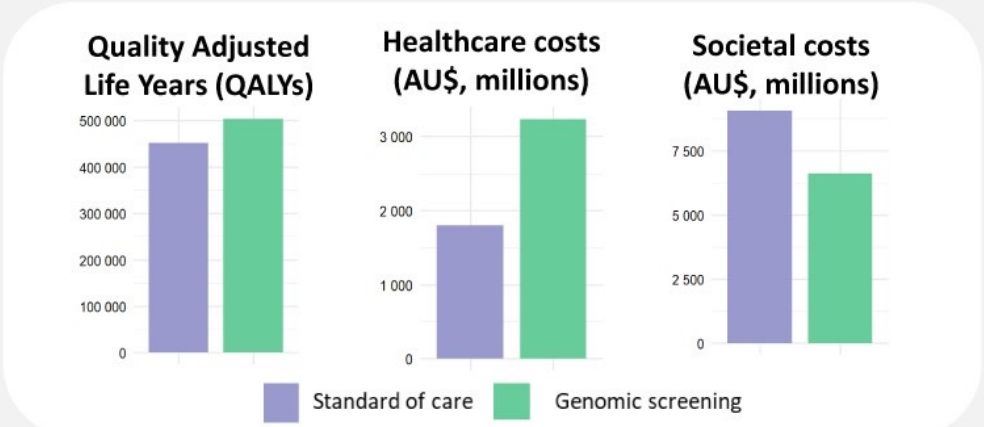
UNDETECTED **UNTREATED**

Statin treatment can reduce the risk up to 76%

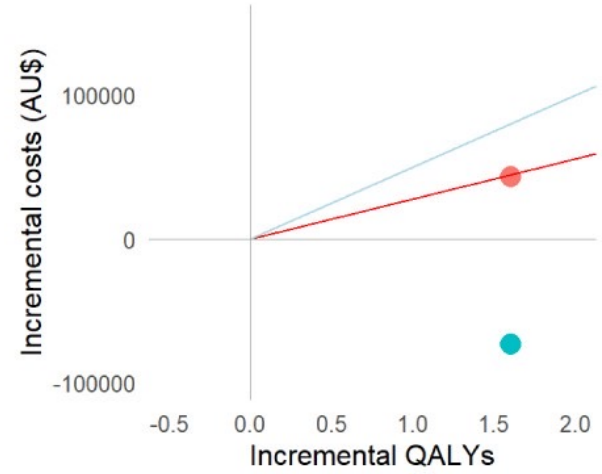
Marquina and Ademi et al . Eur Heart J, Volume 43, Issue 34, 7 September 2022, Pages 3243–3254, https://doi.org/10.1093/eurheartj/ehab770

Methods & Results

- Life-table model adults aged 18-40 years



Results



Estimated ICERS (cost-adaptation)

US$40,446	EUR8,918	EUR18,087	EUR8,244
EUR 7,698	EUR14,552	EUR17,786	GBP12,171

Conclusion

With a cost-per-test of AU$250, population genomic screening for FH could be cost-effective from a healthcare perspective and cost-saving from a societal perspective

New initiatives for population genomic screening

- Monash University initiated in 2022 the world-first DNA Screen pilot study, which has almost completed genomic screening for 10,000 young adults aged 18-40 in Australia
- Around 1 in 75 people are at high genetic risk of one of these conditions, but most are unaware - and therefore not getting access to the live-saving interventions

DNA Screen
POWERED BY MONASH UNIVERSITY

Combined population genomic screening for three high-risk conditions in Australia: a modelling study

Paul Lacaze,[a,n,*] Clara Marquina,[b,n] Jane Tiller,[a] Adam Brotchie,[a] Yoon-Jung Kang,[c] Melissa Merritt,[c] Robert C. Green,[d] Gerald F. Watts,[e,m] Kristen J. Nowak,[f,g] Ranjit Manchanda,[h,i] Karen Canfell,[c] Paul James,[j,k,l] Ingrid Winship,[k,l] John McNeil,[a] and Zanfina Ademi[a,b,**]

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Marquina. Lacaze and Ademi et al . Combined Population Genomic Screening for three high-risk conditions in Australia: a modelling study. eClinicalMedicine. The Lancet 2023

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Was the widespread preventive genomic screening for multiple diseases cost-effective from an Australian healthcare perspective?

		Total healthcare costs	Screening costs	QALYs gained	
Widespread DNA screening	4047 deaths saved 2612 cancer cases 542 CHD cases	$2.41 billion	$832 million	31,094	$23,963
Status-quo		$2.33 billion	$6.9 million		

Marquina. Lacaze and Ademi et al . Combined Population Genomic Screening for three high-risk conditions in Australia: a modelling study. eClinicalMedicine. The Lancet 2023

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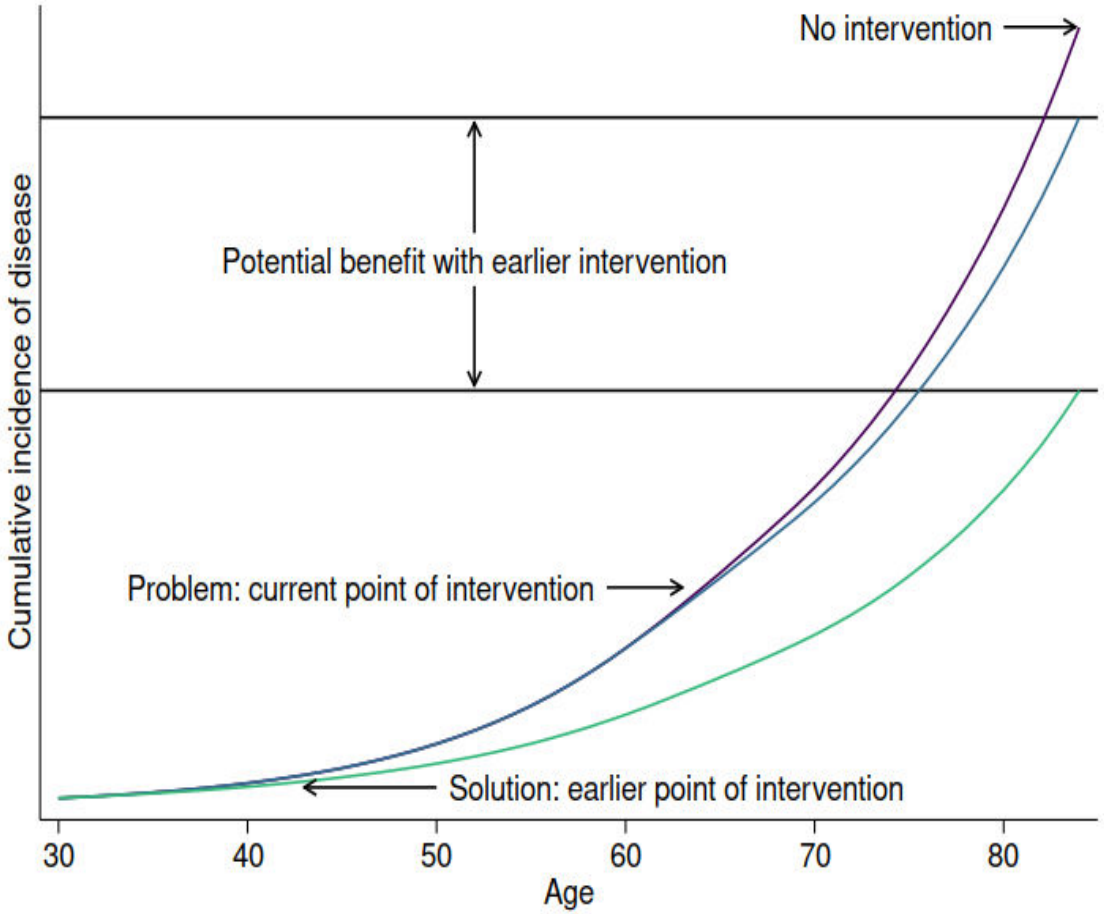
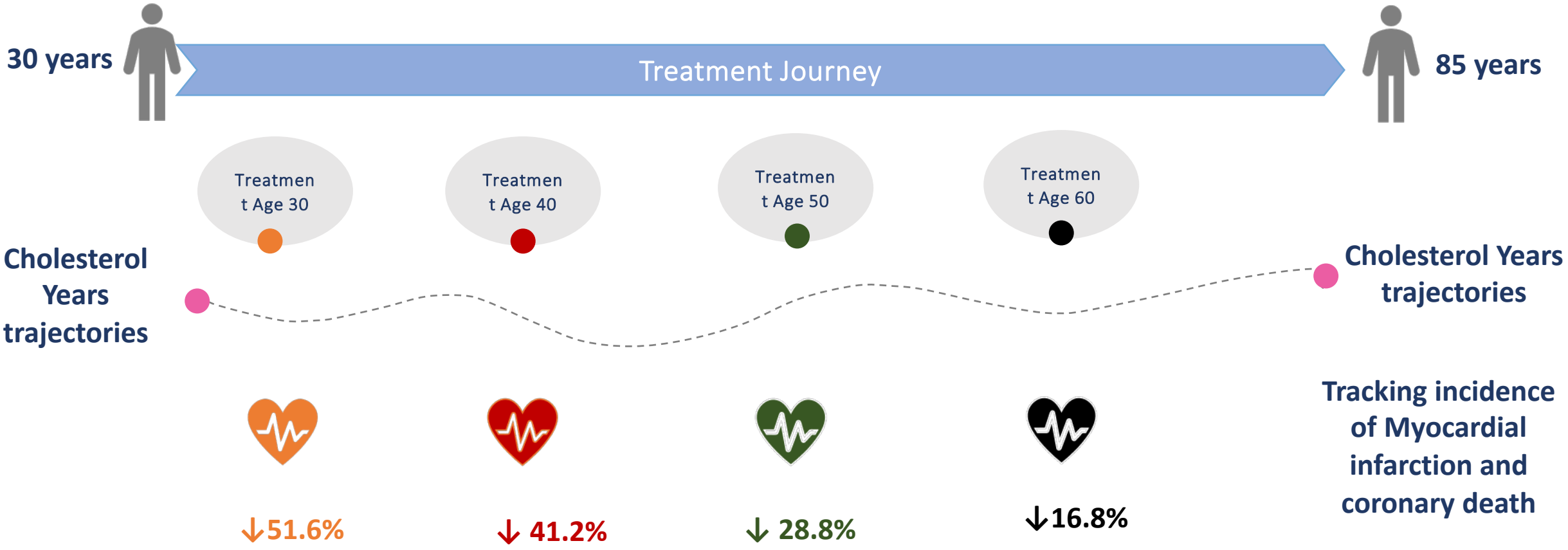
How can we move from reactive to early proactive preventive healthcare in CVD space?

- Current prevention approaches are mostly initiated late in the pre-disease trajectory
- Current clinical tools bias decisions toward short-term decision-making.
- Risk scores are influenced by age and sex, while modifiable risk factors have a much smaller impact on the equation.



Morton JI, Ademi Z. Lipid-Lowering Strategies for Primary Prevention of Coronary Heart Disease in the UK: A Cost-Effectiveness Analysis. Pharmacoeconomics. 2023 Aug 22.

Do the risk factor years matter in the primary prevention of CVD?



Morton JI, Ademi Z. Lipid-Lowering Strategies for Primary Prevention of Coronary Heart Disease in the UK: A Cost-Effectiveness Analysis. Pharmacoeconomics. 2023 Aug 22.

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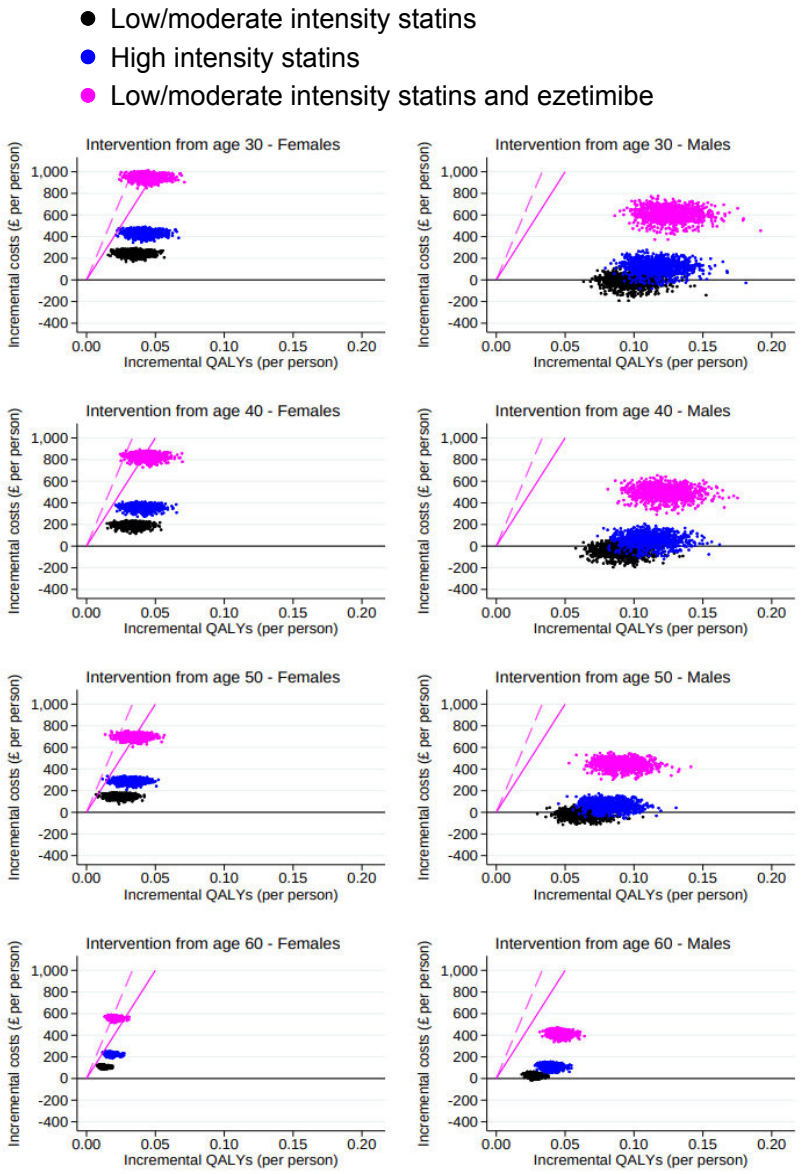
Risk factor years in the primary prevention of CVD. Is it cost-effective approach?

LDL-C lowering interventions from early ages are more cost-effective than late ages.

Cost effectiveness improved with increasing LDL-C and was more cost-effective for male individuals than female individuals (groups with a higher lifetime risk of CHD).



Morton JI, Ademi Z. Lipid-Lowering Strategies for Primary Prevention of Coronary Heart Disease in the UK: A Cost-Effectiveness Analysis. Pharmacoeconomics. 2023 Aug 22.

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What does the future hold for CVD?

- Global Initiatives such as LP (a) Task force.
- Generate new evidence about Lp(a) as a major inherited CVD risk factor
- Generate health economic evidence on broader benefits of early screening in LP (a) population
- Improve management of CVD in the population

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Take home message

Novel strategies, including population-wide screening, may be cost-effective in combination with cascade screening to raise overall detection

Reconsideration of current approaches to primary prevention of CVD that focus on a 10-year absolute risk and instead focus more on early and sustained lowering of risk factors for people with a higher lifetime risk of CVD. Using risk factor years in the equation.

Global Initiatives such as LP (a) Taskforce. Transform the landscape for CVD prevention


Thank you!
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