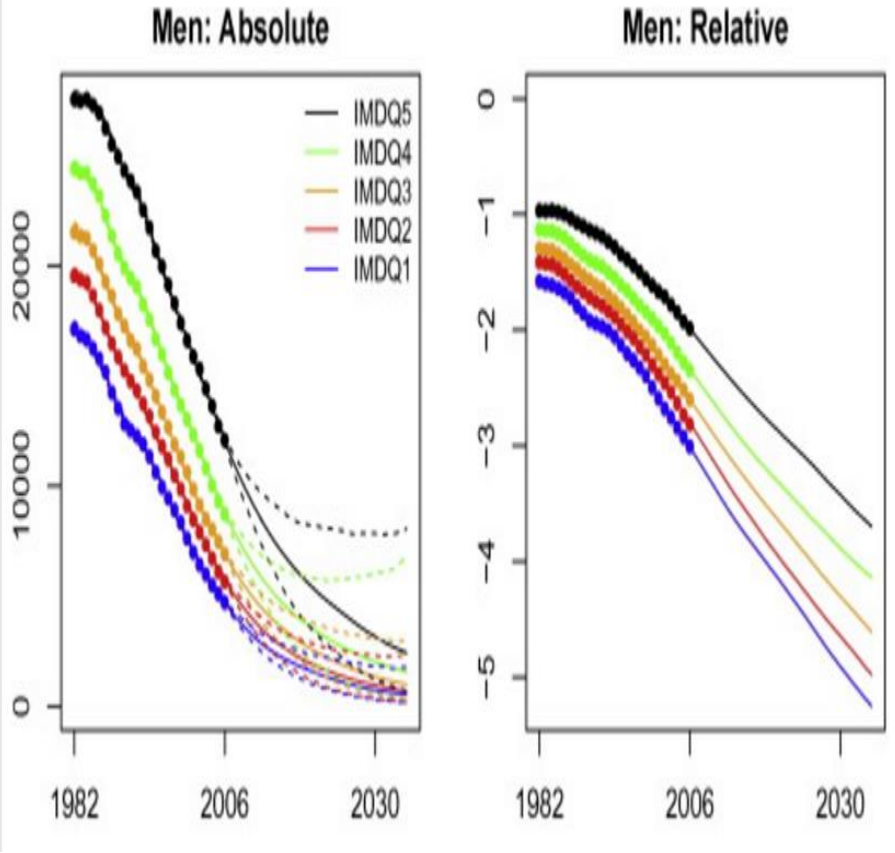
Modelling the effect of food and smoking policies on the unequal distribution of the burden of coronary heart disease: IMPACT models.

Martin O'Flaherty
Senior Lecturer
Department of Public Health and Policy

With thanks to
Allen K, Gillespie D, Guzman-Castillo M, Kypridemos C, Lloyd Williams F, Bromley H, Bandosz Piotr, Pearson Stuttard J and Capewell S.

IMPACT PROGRAMME FOCUS

- Key policy questions:
  - What can be done to reduce social inequalities in health and their social determinants?
    - Specifically, inequalities in Non-Communicable diseases.
  - Elucidating and evaluating pathways on the social production of disease, policies and preventive interventions.



Premature mortality per 100,000 for 1982–2006

(observed: dots) and 1982–2035 (modelled using a Bayesian APC model: lines).

Guzman Castillo et al Plos One 2015: 10(9):e0138044
Allen et al Int J Cardiol. 2016;203:290–7

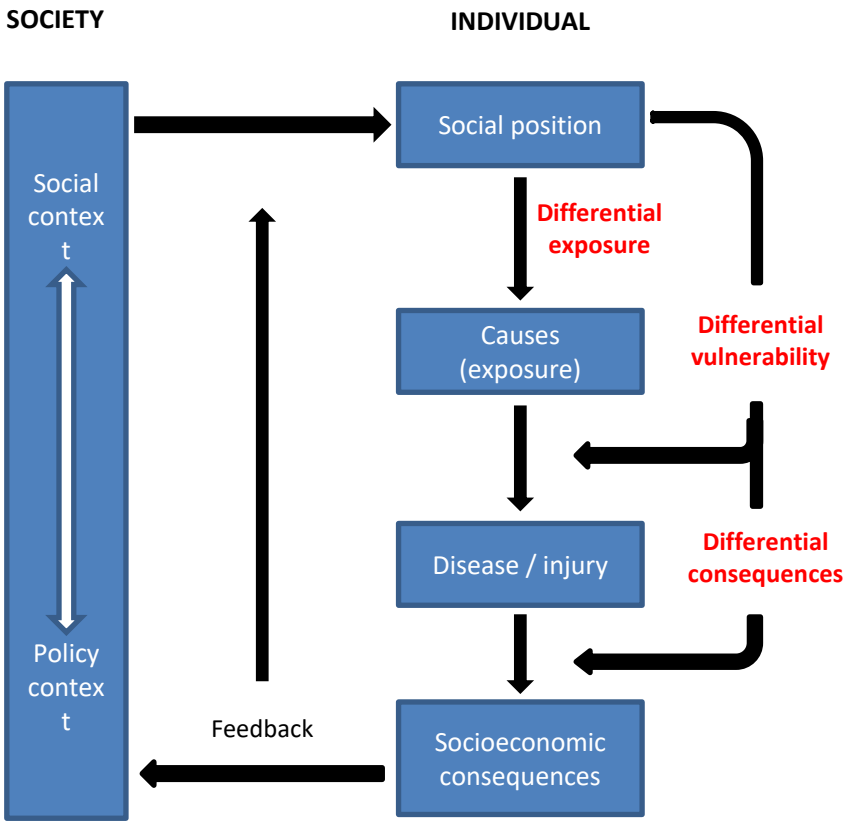
A “suite” of models

- IMPACT CHD, SEC and Food model:
  - A comparative risk assessment tool
- IMPACT NCD
  - A novel microsimulation approach
- Other models (Not in this presentation)
  - Diabetes Prevalence forecast model for mediterranean countries
  - IMPACT Better ageing model (Dementia and CVD)

Modelling impact of policies on socioeconomic differentials:

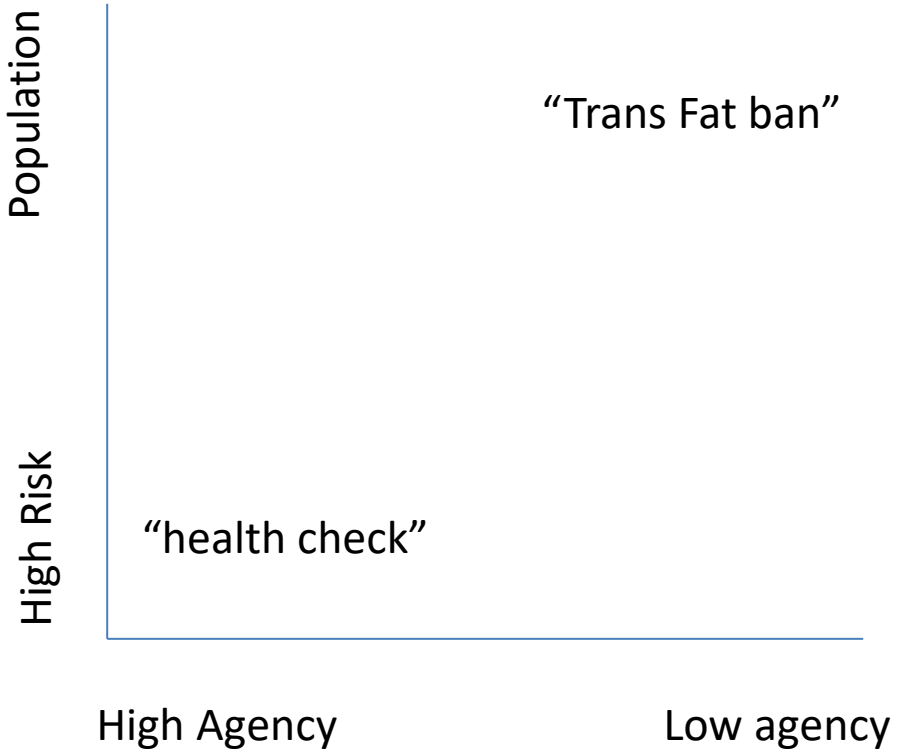
Two conceptual frameworks to use

Diderichsen Model :
social production of disease
(Diderichsen 2001)



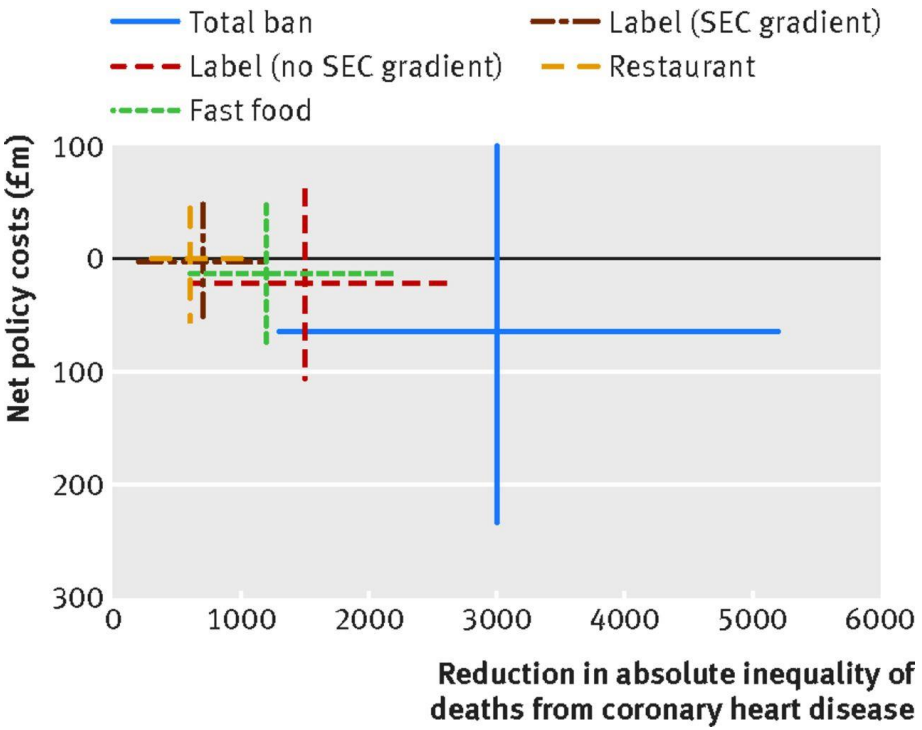
Equity effects of interventions

(McLaren 2010; Graham 2011; Adams 2016)



IMPACT SEC FOOD model: TF policies

- Explore different policy options for reducing TF intake
- Estimates mortality reductions attributable to TF reduction using a population impact fraction approach
- Converts number of deaths averted to Life years gained using median survivals for patients groups.
- Takes into account that mortality rates are already declining over the time horizon 2015-2020
  - (Allen et al Int J Cardiol. 2016;203:290–7)

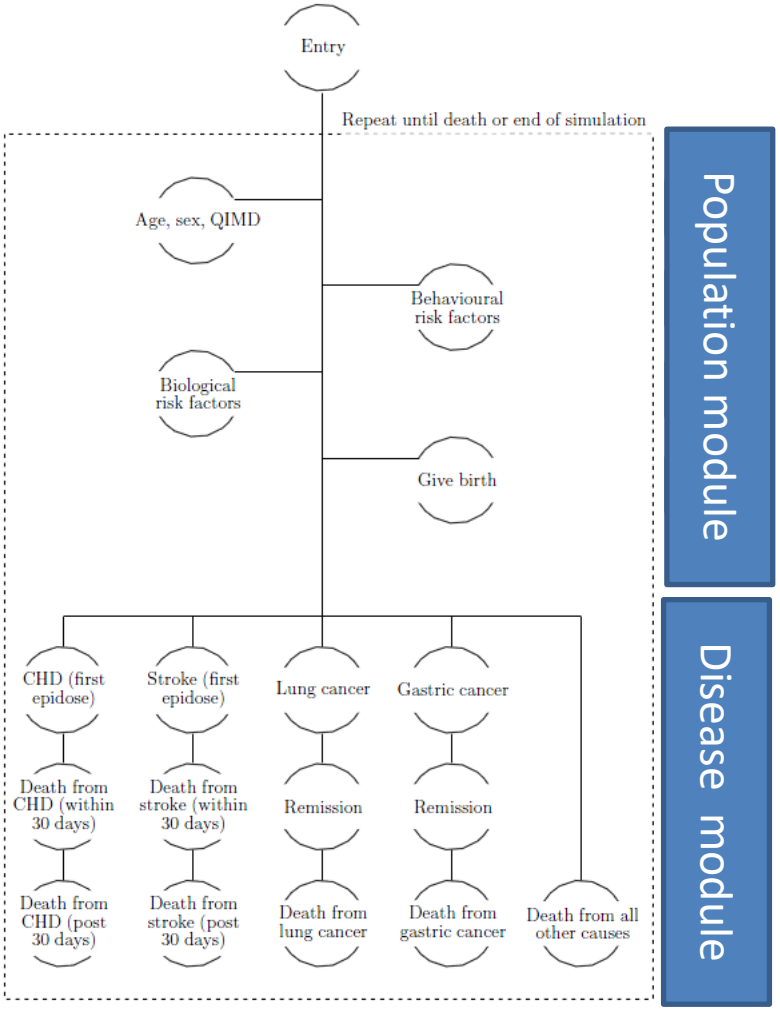


Allen et al BMJ 2015; 351:h4583

IMPACT NCD:

High Agency vs Low Agency, Population vs High risk

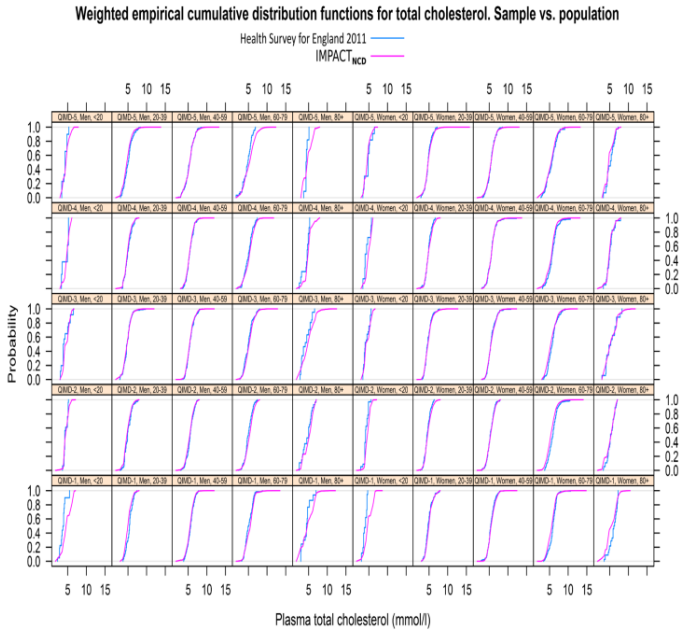
- Microsimulation
- Population module:
  - Close to reality “synthetic population”
  - Follows life course
  - Tracks risk factors over time
  - Stratified by IMD.
- Disease Module
  - It Models:
    - competing risk of developing disease
    - Competing risk of mortality (disease specific, all other causes)



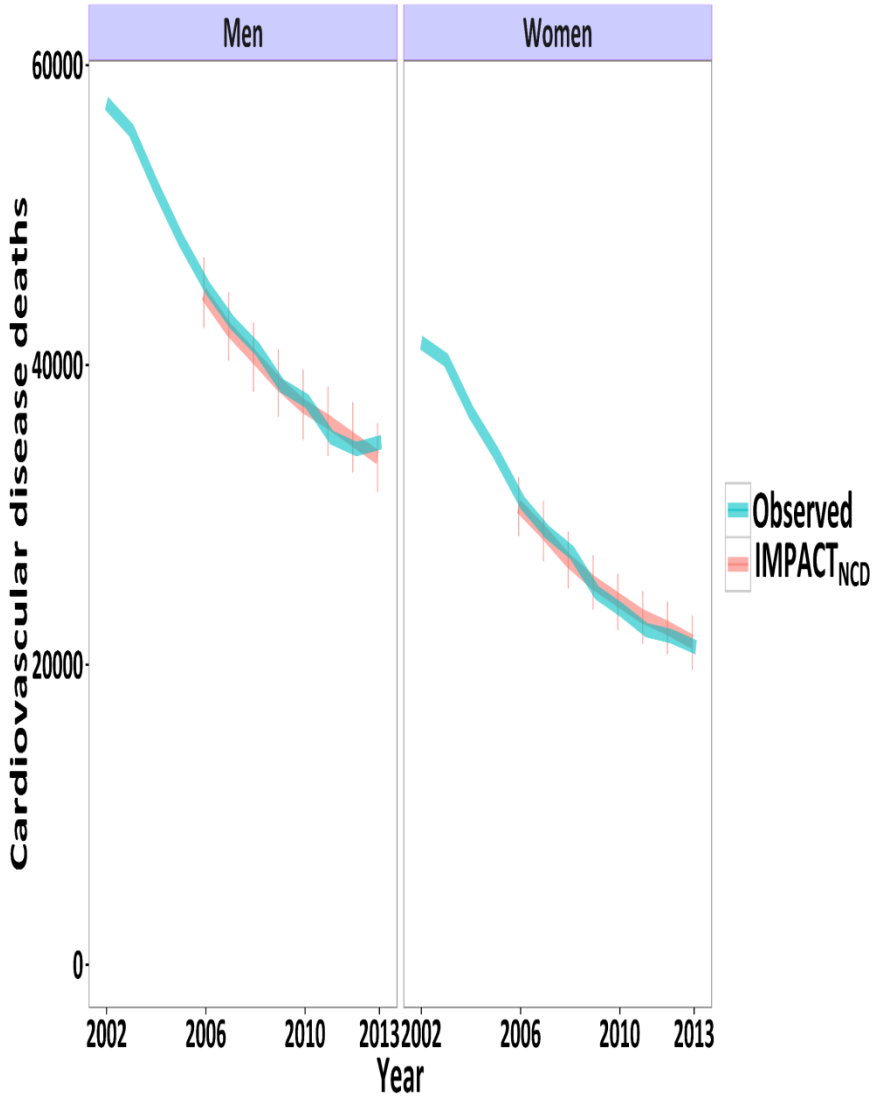
Kypridemos et al BMJ 2016;353:i2793

Validation

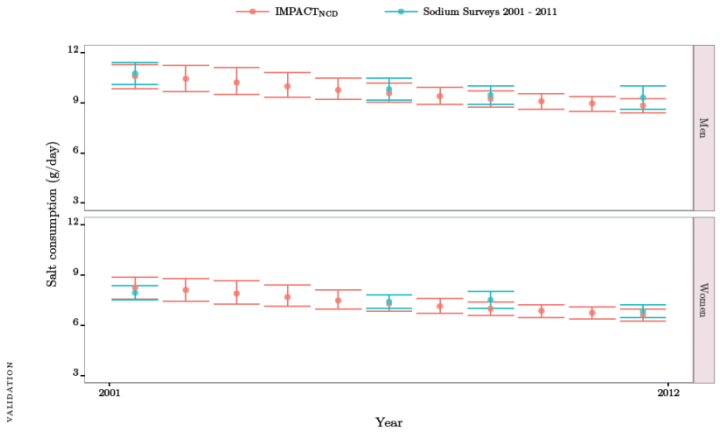
Close to reality Population?



- Relevant outcomes?



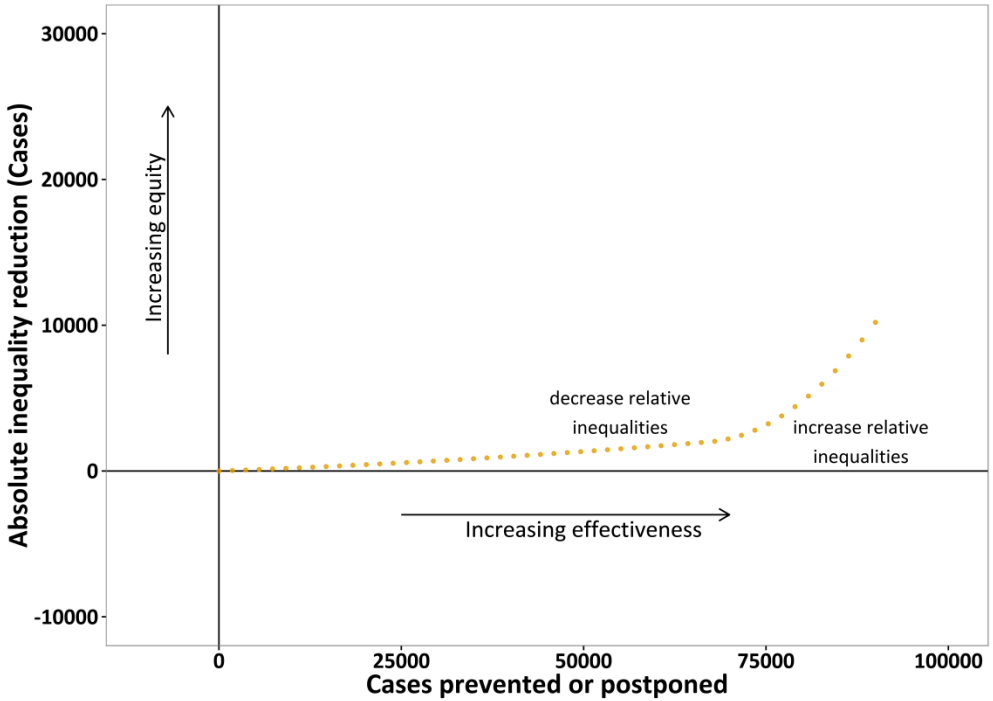
Tracking Risk factors?



High Agency vs Low Agency, Population vs High risk

- NHS Health checks vs structural options to improve diet and reduce smoking.

- Scenarios:
  - HEALTH CHECKS
  - "TARGETED HEALTH CHECKS": by deprivation
  - POPULATION LEVEL:
    - Sugar Tax
    - Mandatory salt reformulation
    - Fruit & Veg subsidies
    - Smoking: Full compliance with FCTC.
  - Marmot's proportionate universalism:
    - TARGETED + POPULATION LEVEL



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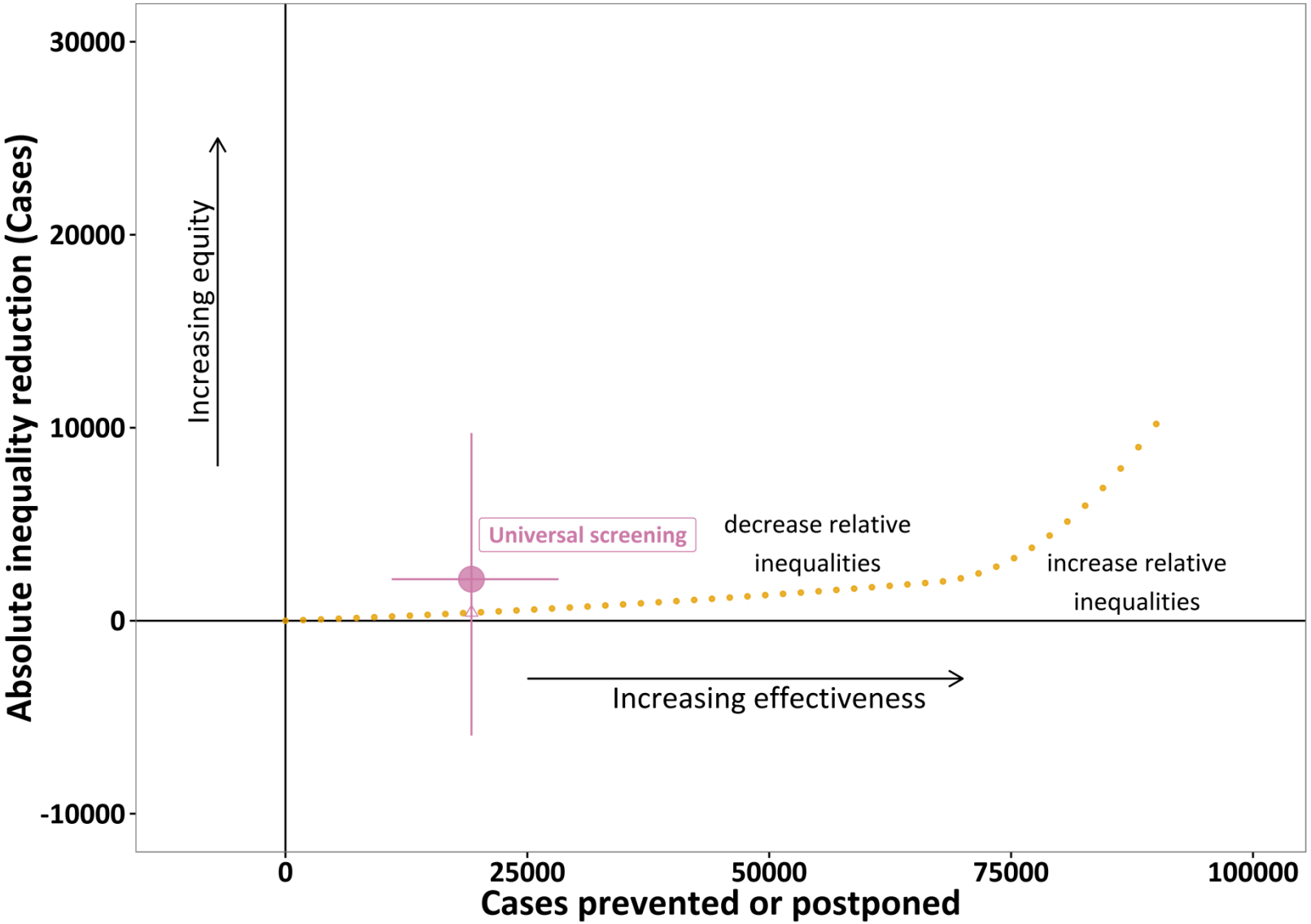

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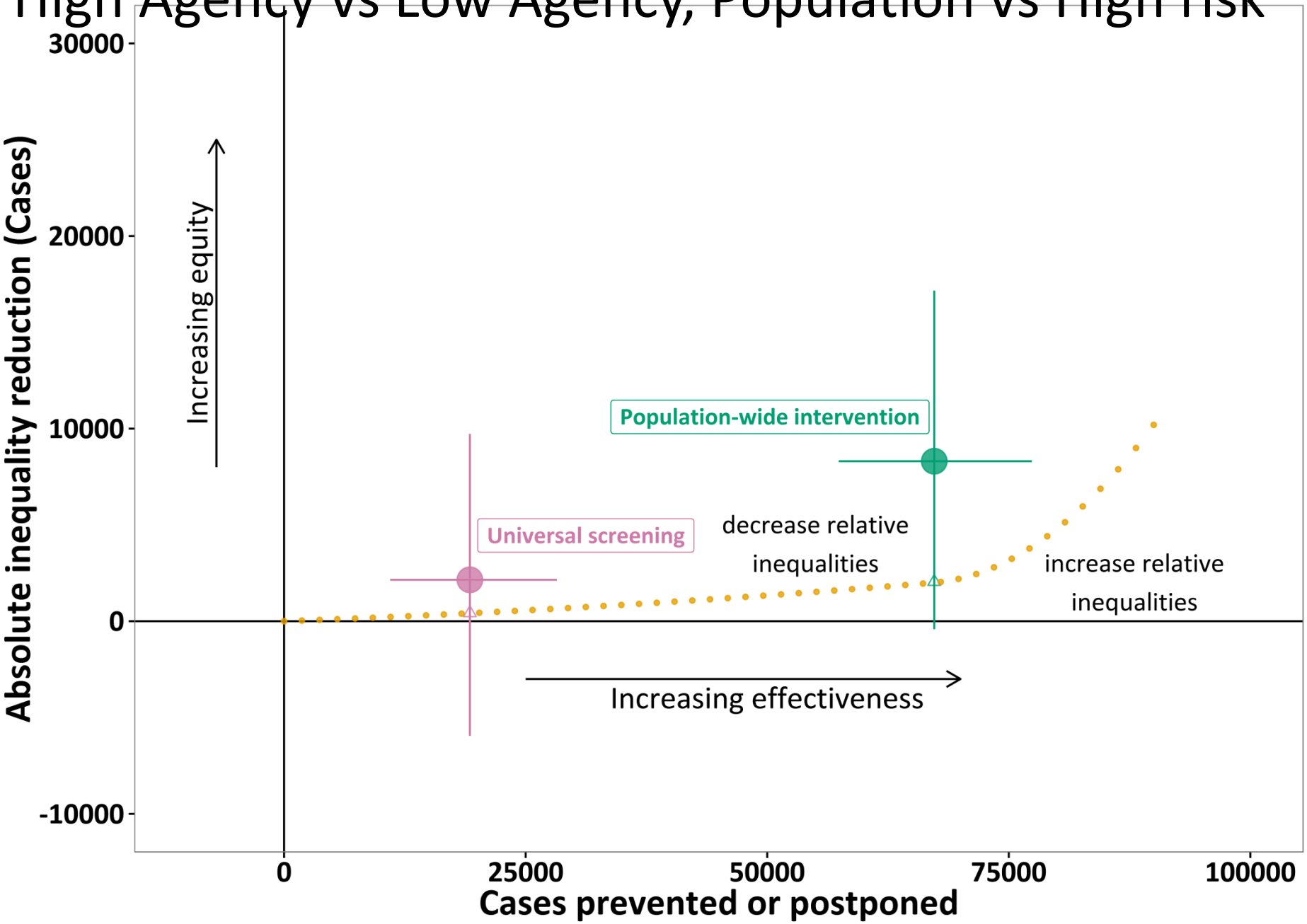

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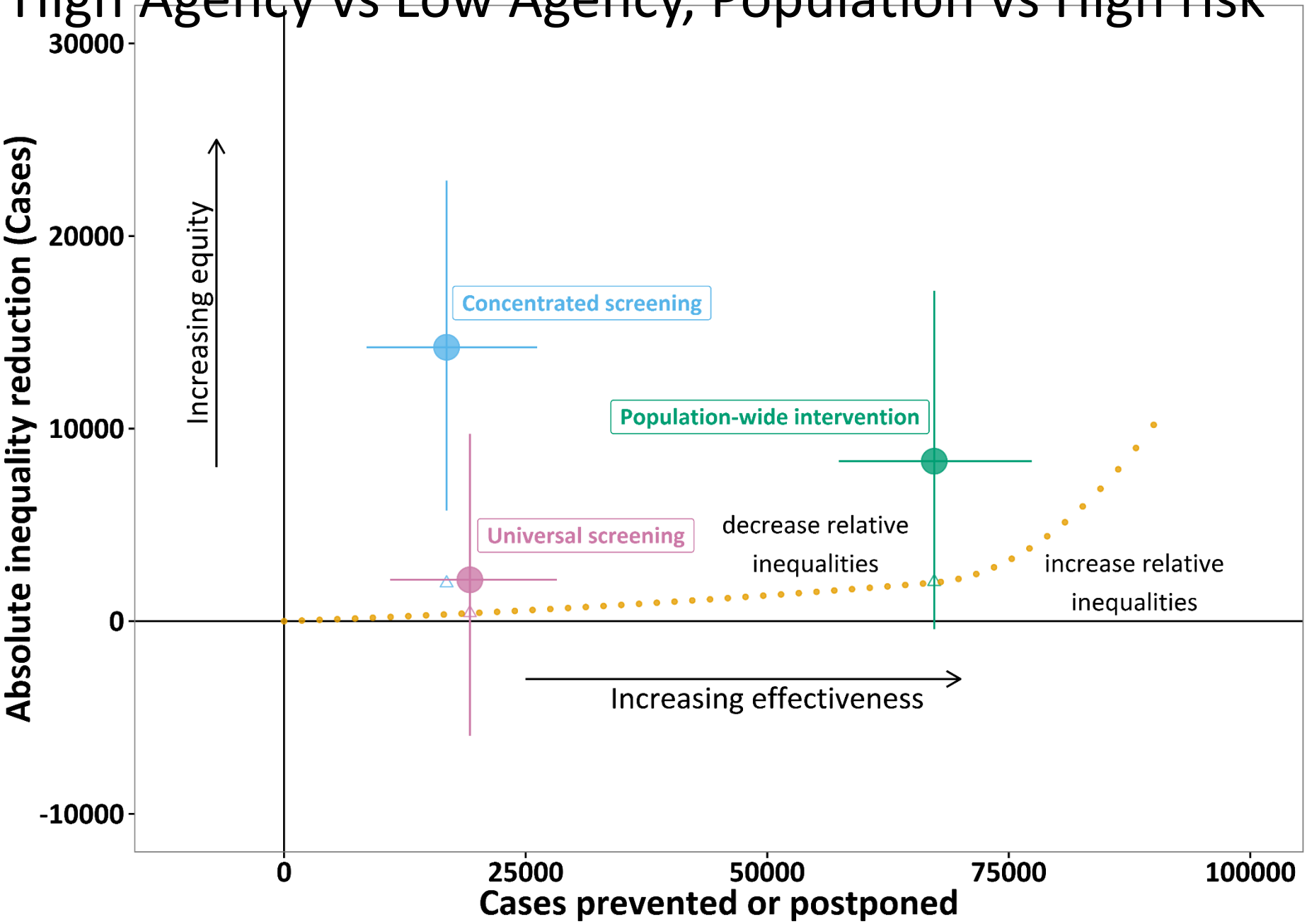

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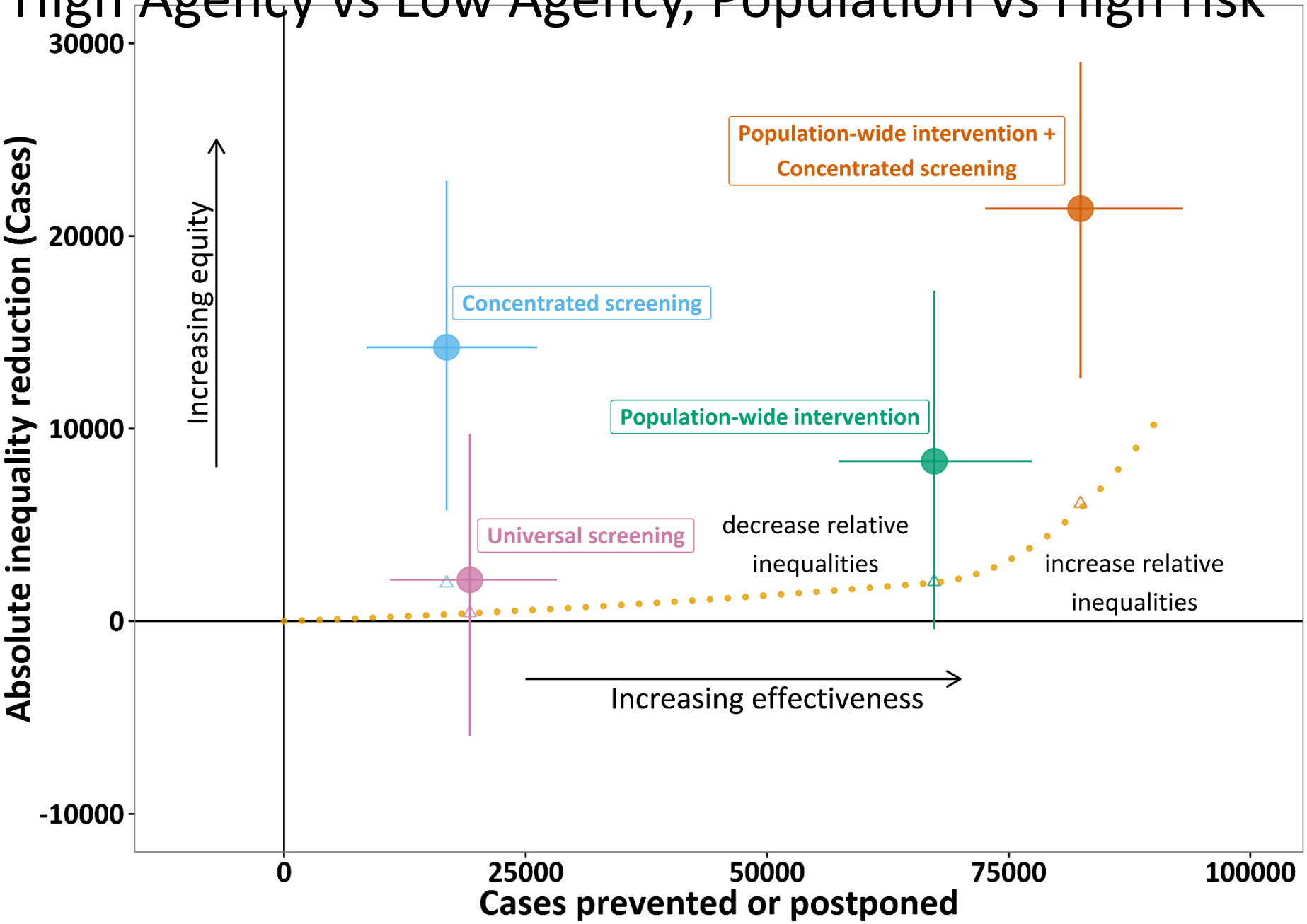

Key Insights

- Structural, low agency policies better than high risk, high agency interventions
  - the overall disease and economic burden
  - its unequal social distribution

- ***But the policy answer is not simple.***
  - most equitable strategy would be the combination of the population-wide intervention and concentrated screening, followed by concentrated screening alone and the population-wide intervention.

Engaging with Stakeholders

- Highlights
  - NICE Guidance PH25 & CMG45 (IMPACT model)
  - Close interaction with AHA Policy Research Unit (ongoing)
  - NHS Health Checks: Expert Scientific and Clinical Panel (ongoing)
  - Liverpool City Council (ongoing, funded by LCC):
    - Local modelling for Liverpool to explore options for CVD prevention
    - Adding health economics analysis from a societal perspective.
    - Engage stakeholders in scenario design and result interpretation

THANK YOU!