Public finance of pneumococcal vaccine and pneumonia treatment in Ethiopia:

- *an extended cost-effectiveness analysis*

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Plan

- Burden of pneomococcal disease and pneumonia in Ethiopia
- Health benefits across income groups
- Costs of public finance
- Income equivalent equity weights
- Private expenditures averted
- Financial protection

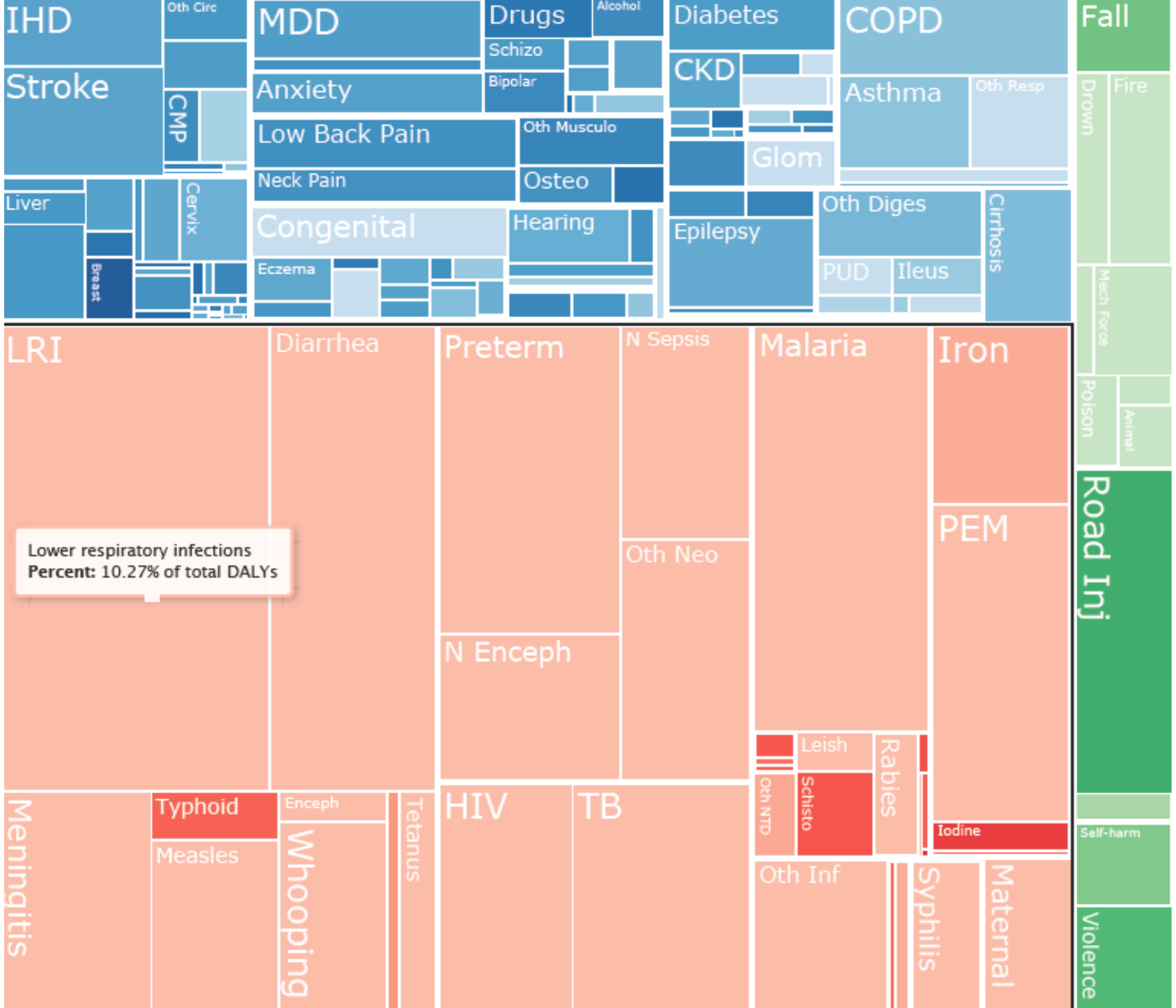
Objective

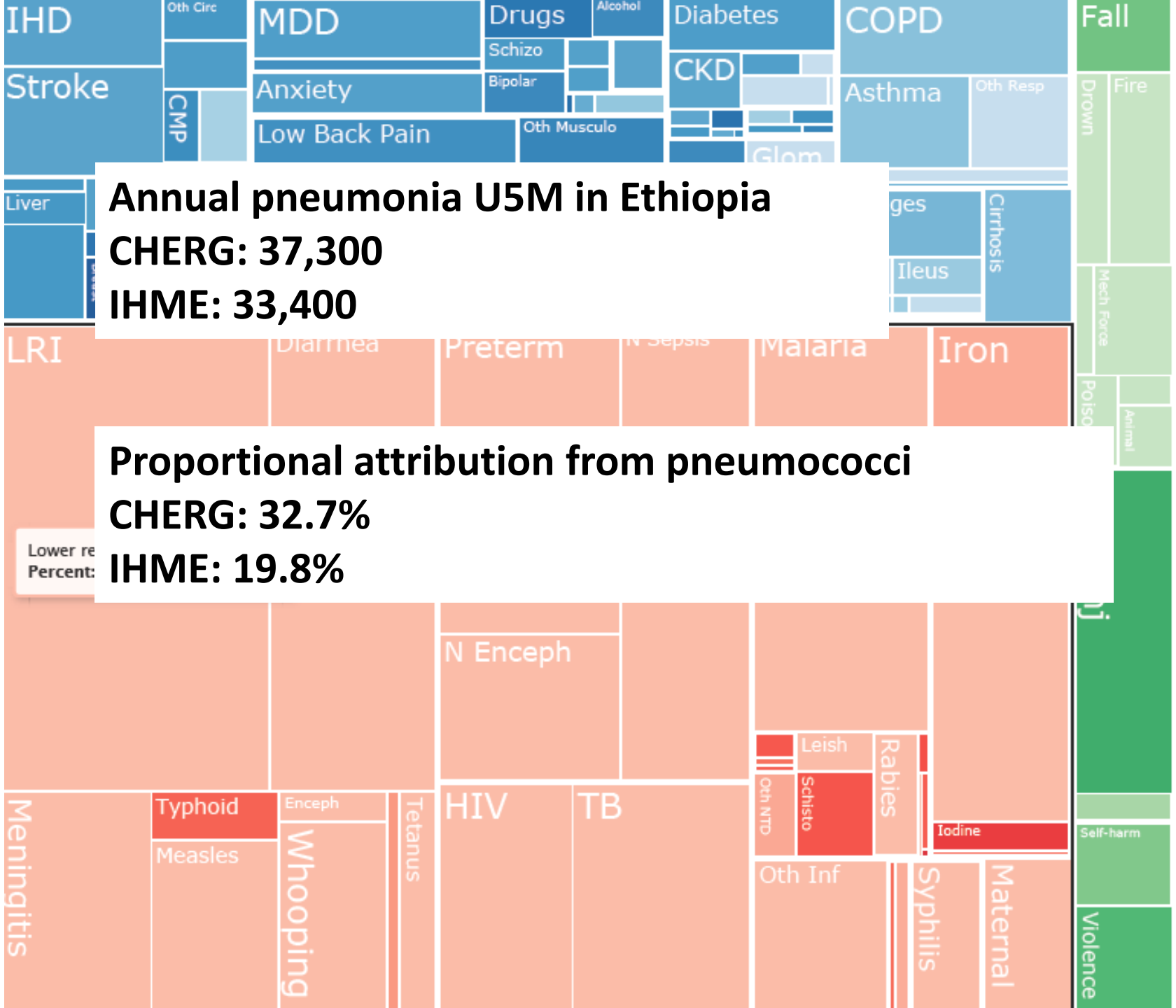
- To evaluate the expected financial protection and health gains of two publicly financed child health programs in Ethiopia, pneumonia treatment and pneumococcal vaccination

- Averages will be spread across income groups

BACKGROUND

DISEASE BURDEN AND DEMAND


IHD
Oth Circ
Stroke
CMP
Liver
Cervix
Breast
MDD
Drugs
Alcohol
Schizo
Anxiety
Bipolar
Low Back Pain
Oth Musculo
Neck Pain
Osteo
Congenital
Hearing
Eczema
Diabetes
CKD
Glom
COPD
Asthma
Oth Resp
Epilepsy
Oth Diges
PUD
Ileus
Cirrhosis
Fall
Drown
Fire
Mech Force
Poison
Animal
Road Inj
Self-harm
Violence
LRI
Diarrhea
Lower respiratory infections
Percent: 10.27% of total DALYs
Preterm
N Sepsis
Oth Neo
N Enceph
Malaria
Iron
PEM
Leish
Oth NTD
Schisto
Rabies
Iodine
Meningitis
Typhoid
Measles
Enceph
Whooping
Tetanus
HIV
TB
Oth Inf
Syphilis
Maternal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MDD
Drugs
Alcohol
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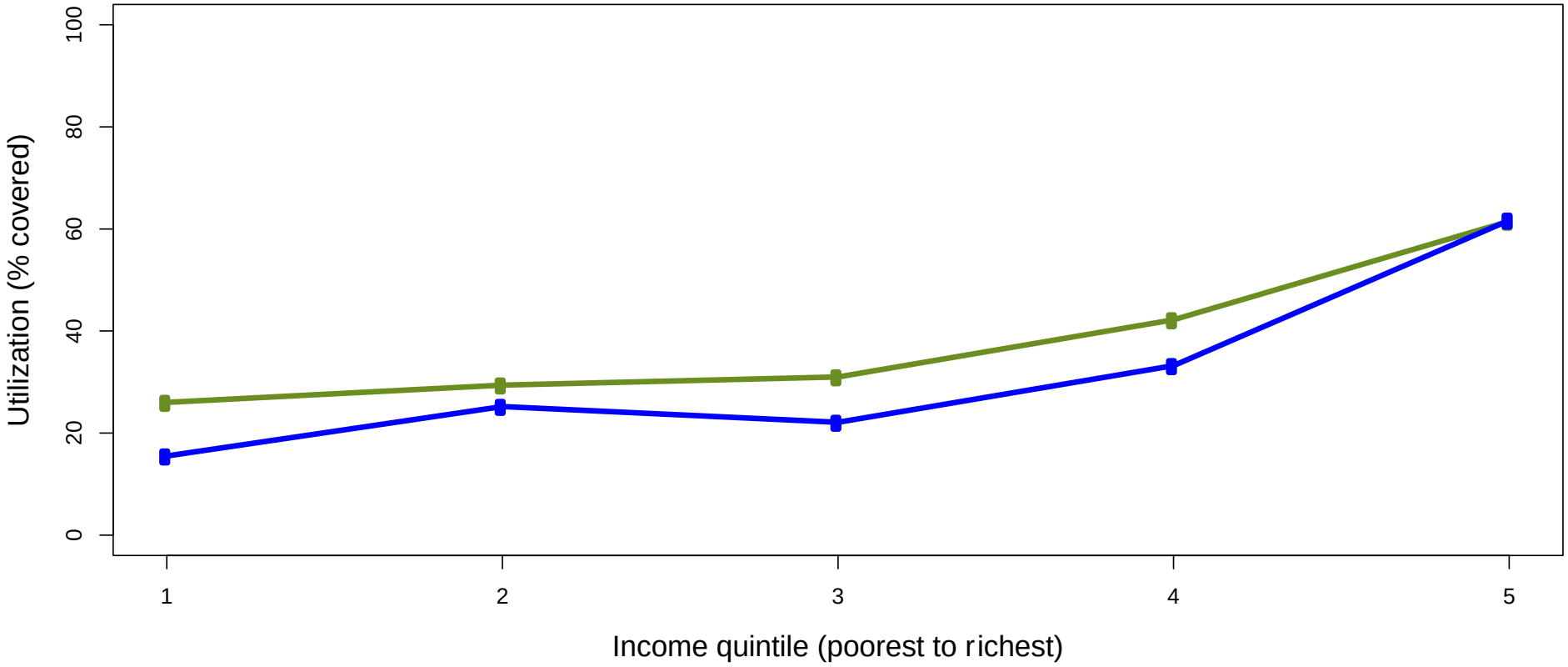
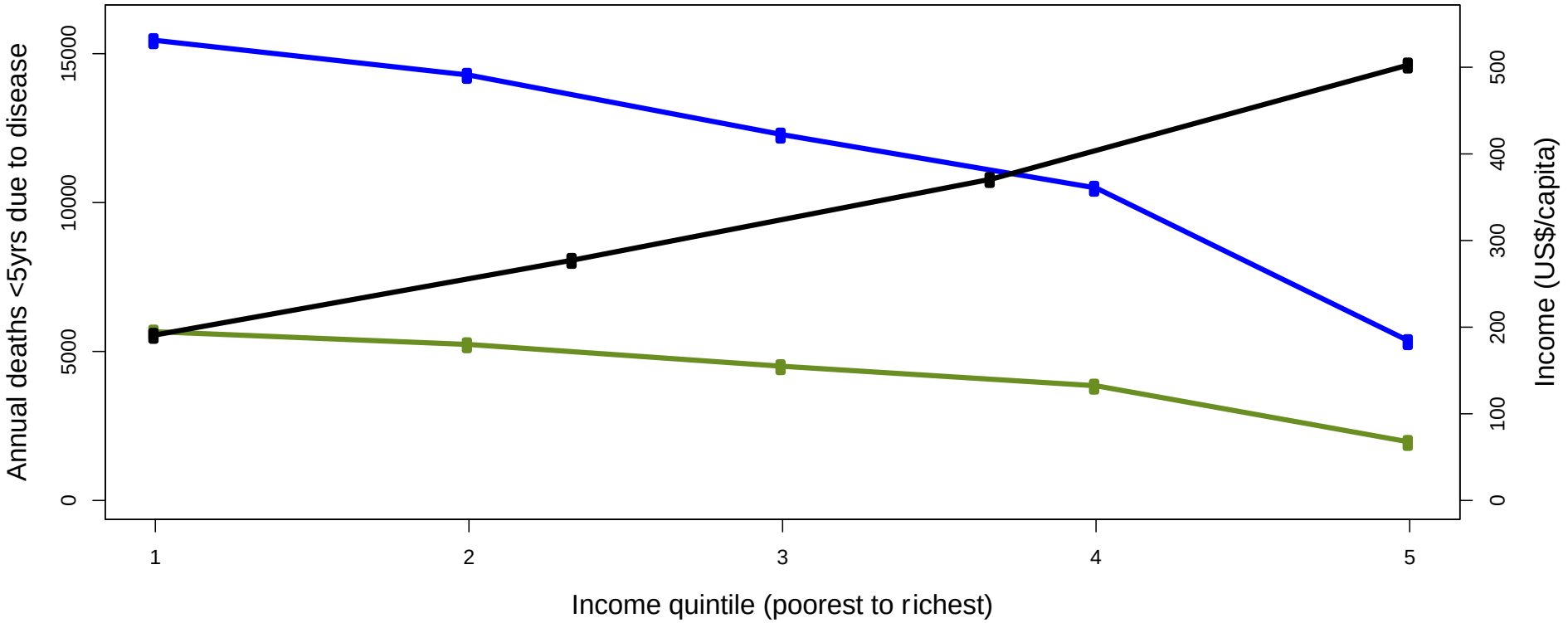
Stroke
CMP
Anxiety
Schizo
Bipolar
CKD
Asthma
Oth Resp
Drown
Fire
Low Back Pain
Oth Musculo
Glom
Liver
ges
Cirrhosis
Ileus
Mech Force
Annual pneumonia U5M in Ethiopia
CHERG: 37,300
IHME: 33,400
LRI
Diarrhea
Preterm
N Sepsis
Malaria
Iron
Poiso
Animal
Proportional attribution from pneumococci
CHERG: 32.7%
IHME: 19.8%
Lower re
Percent:
N Enceph
Leish
Rabies
Oth NTD
Schisto
Iodine
Meningitis
Typhoid
Measles
Enceph
Whooping
Tetanus
HIV
TB
Oth Inf
Syphilis
Maternal
Self-harm
Violence

Utilization of health services



Disease burden and income distribution in Ethiopia



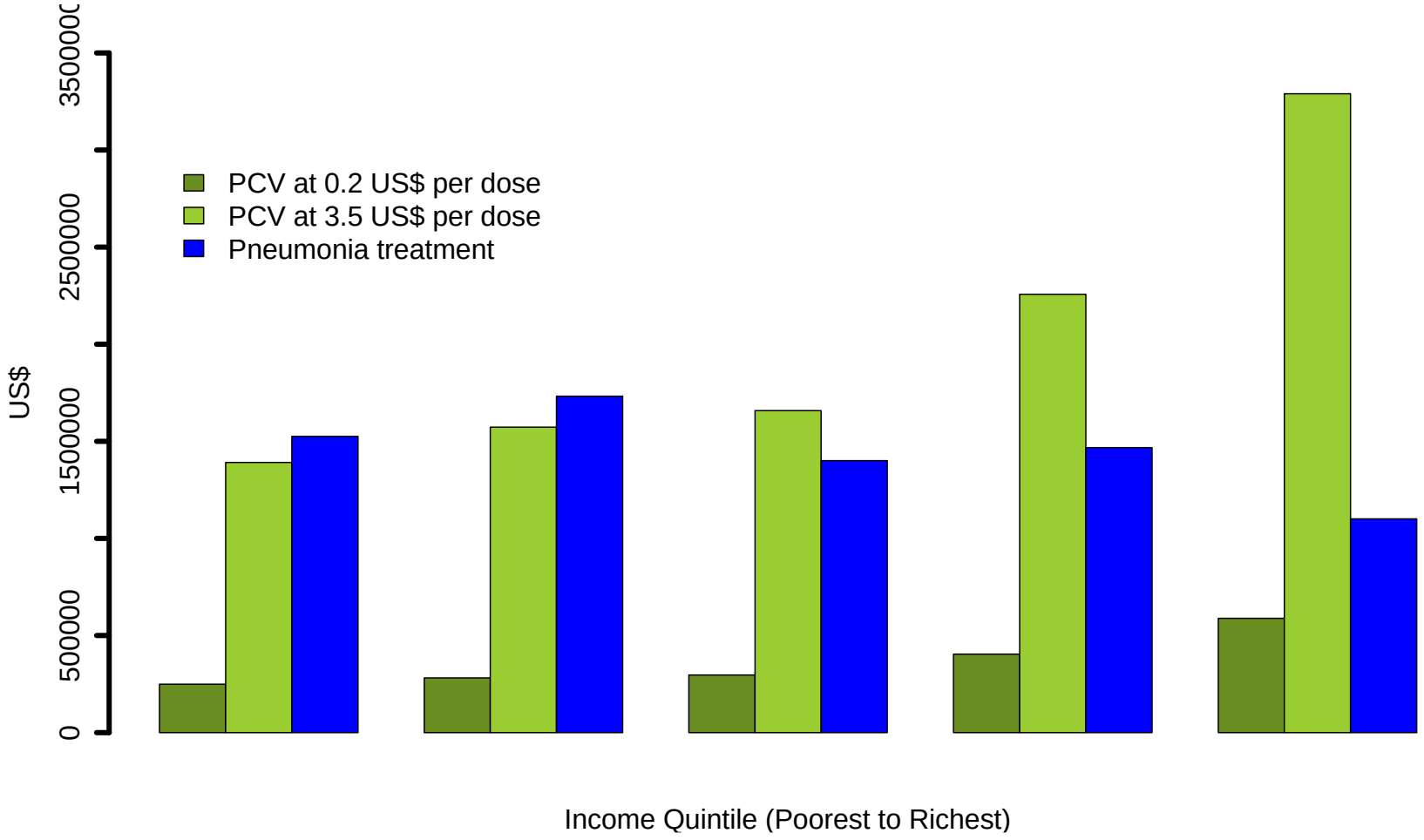
AMC ADVANCE MARKET COMMITMENTS for vaccines

GAVI ALLIANCE

Saving children's lives and protecting people's health by increasing access to immunisation in poor countries

UNIVERSITAS BERGENSIS

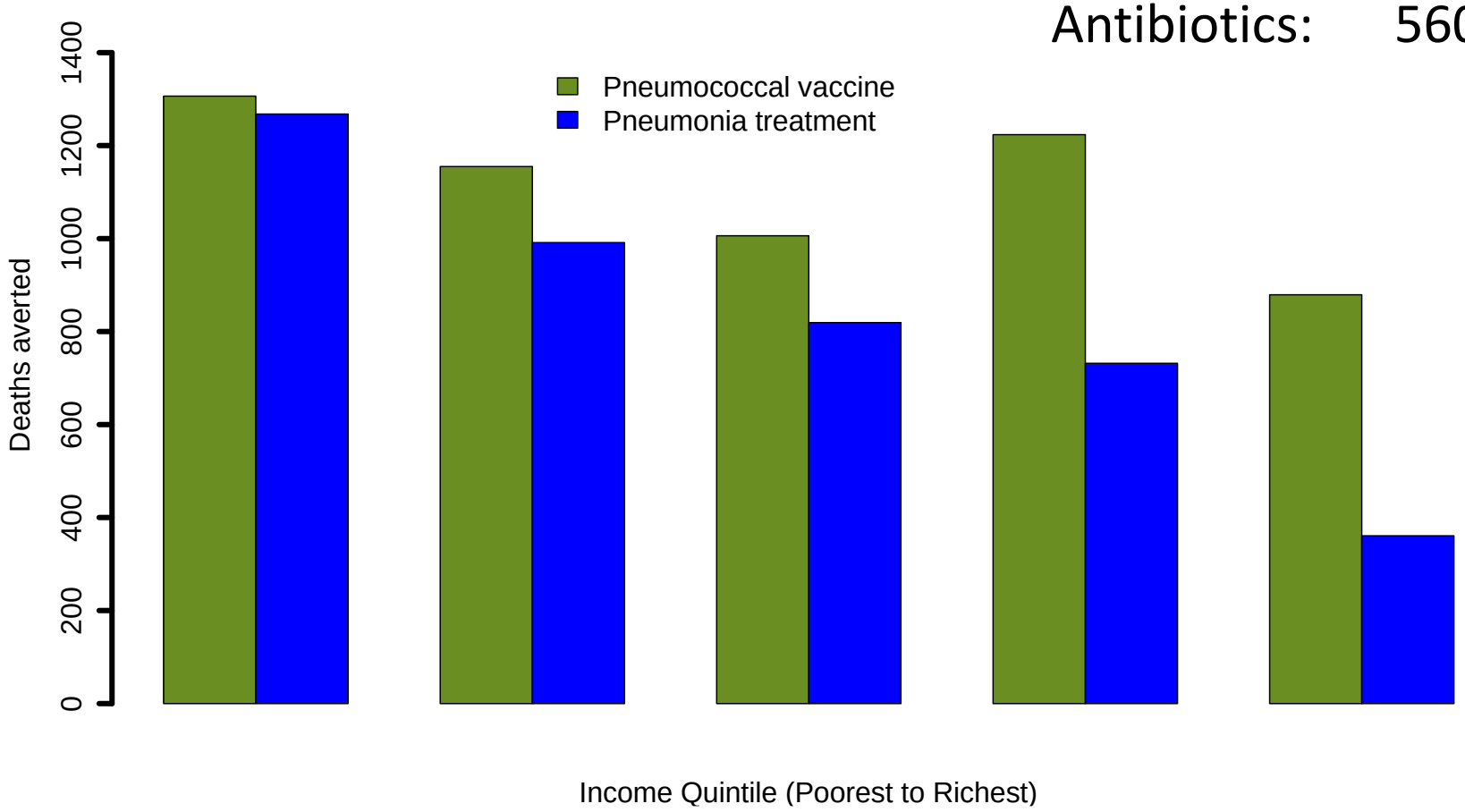
Total costs of public finance of both interventions (close to 40% coverage)



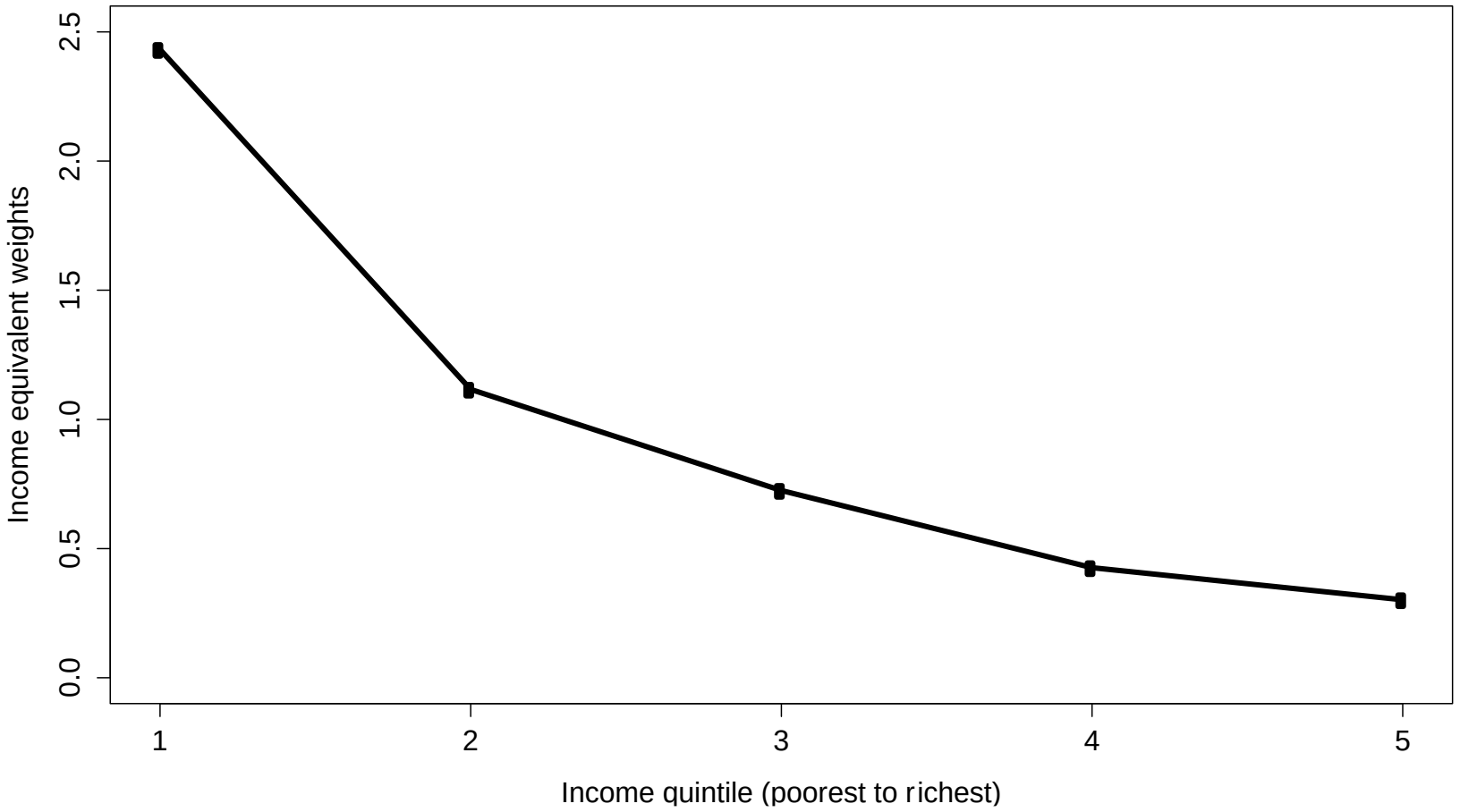
Deaths averted

per 1,000,000 US$:

PCV (0.2 US$): 3010
PCV (3.5 US$): 540
Antibiotics: 560



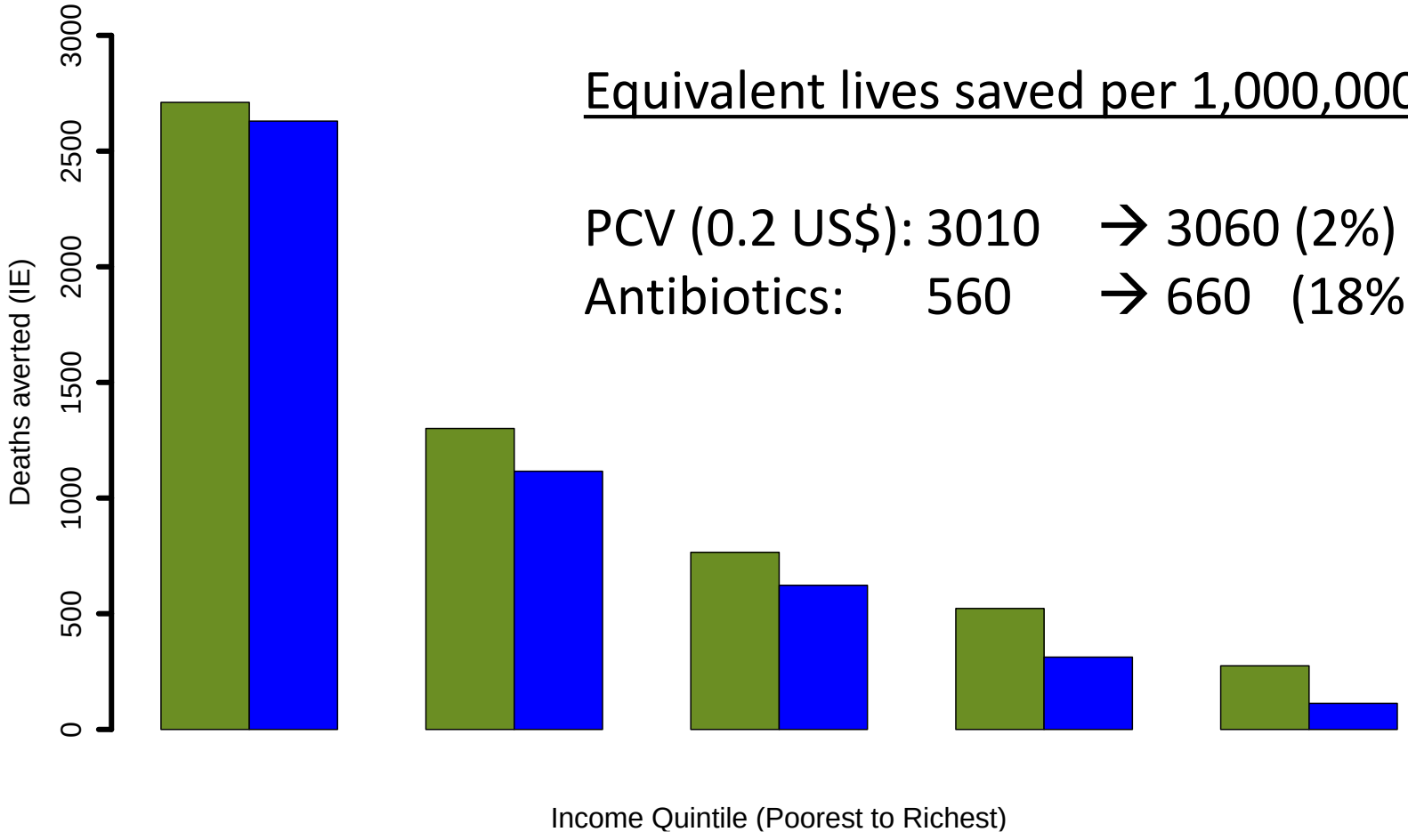
Income equivalent health gains
- *distributive weights applied*



Ref: Fleurbaey M et al. Health Econ. 2012

Fair evaluation of PCV/antibiotics

- income equivalent weights applied



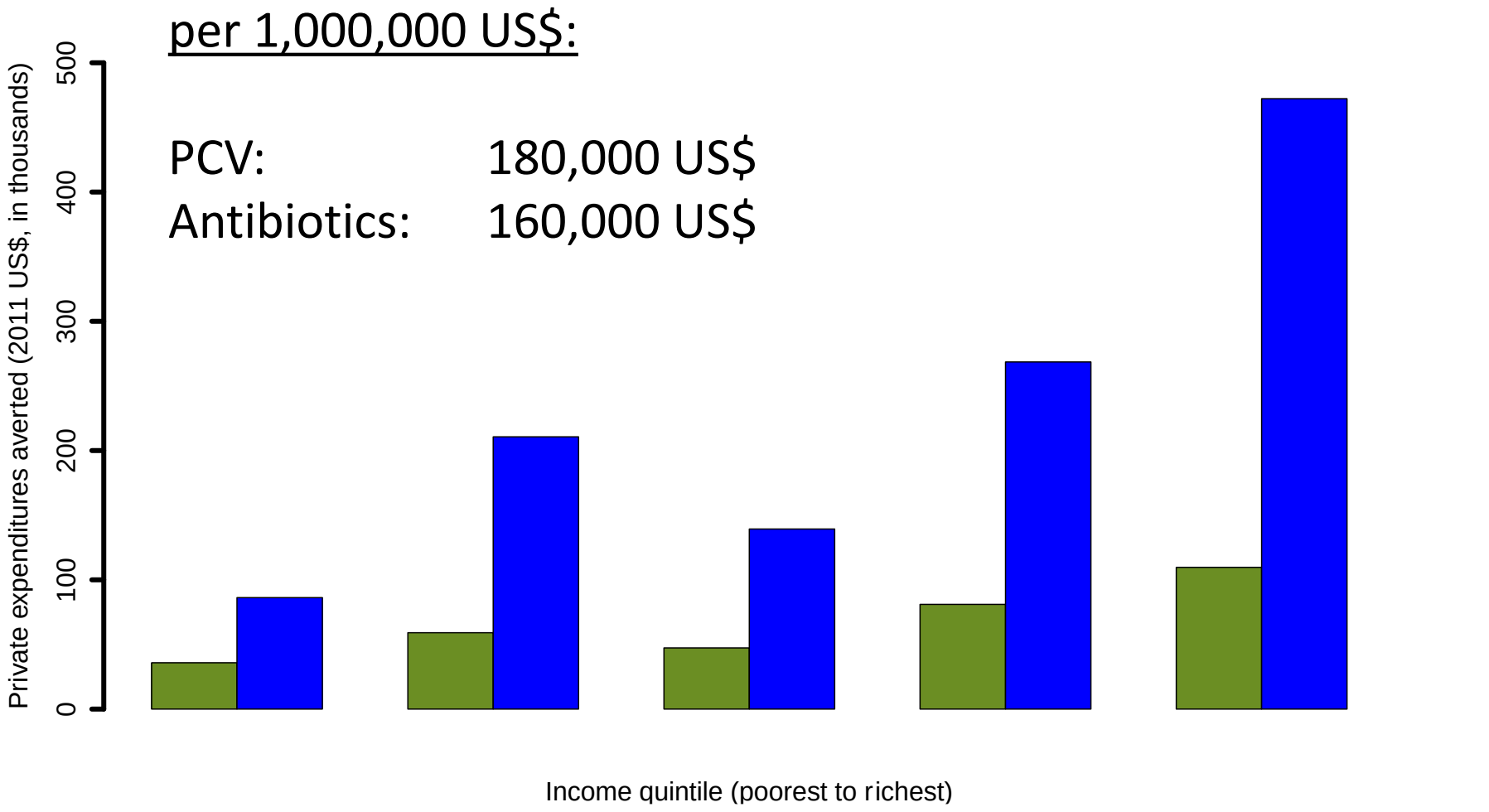
Equivalent lives saved per 1,000,000 US$:

PCV (0.2 US$): 3010 → 3060 (2%)

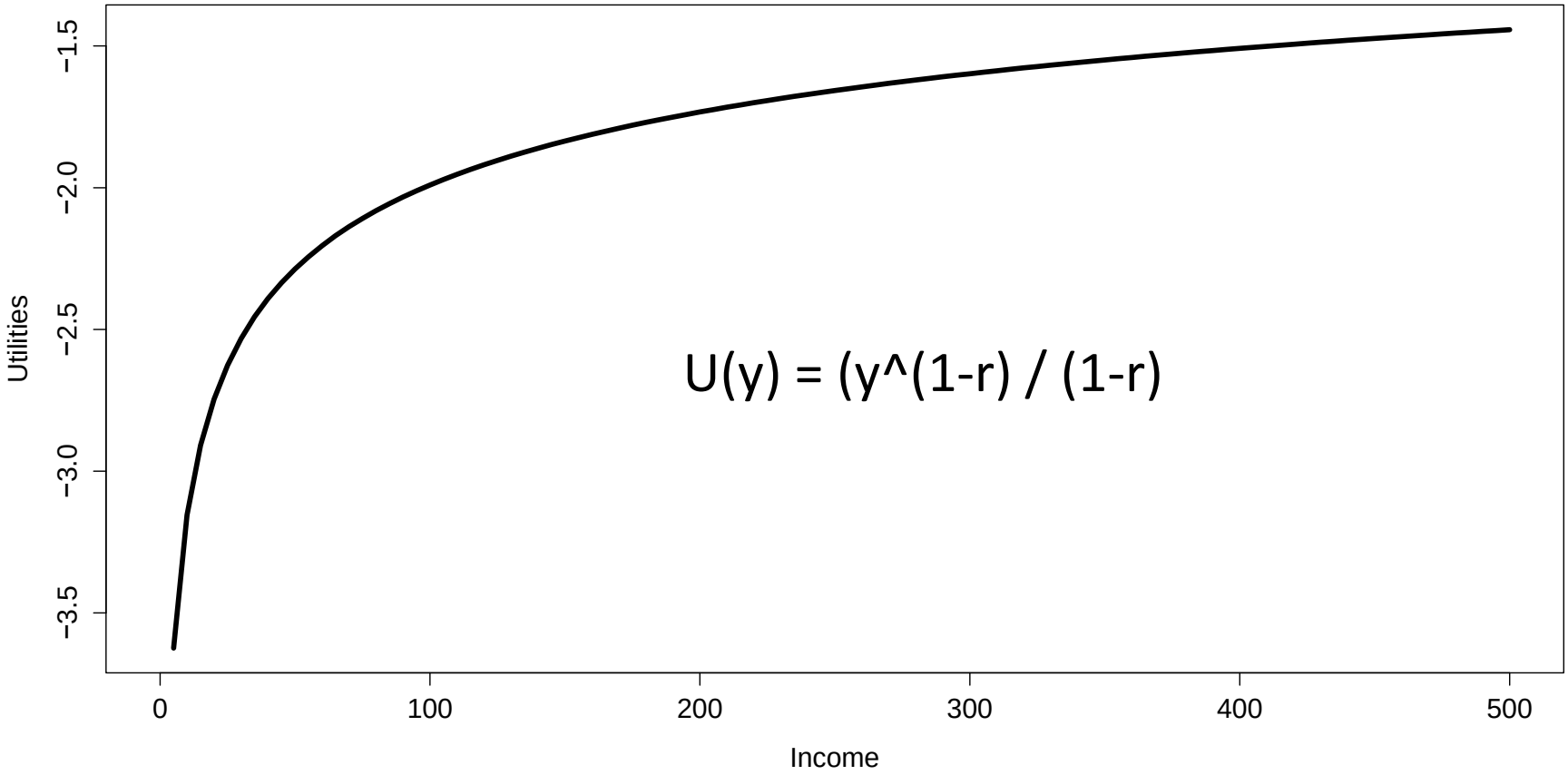
Antibiotics: 560 → 660 (18%)

Financial protection

Household expenditures averted



Utility curve for financial protection



Ref. Finkelstein A., McKnight R. Journal of Public Economics. 2008; McClellan M, Skinner J, Journal of Public Economics. 2006;

Expected value of income

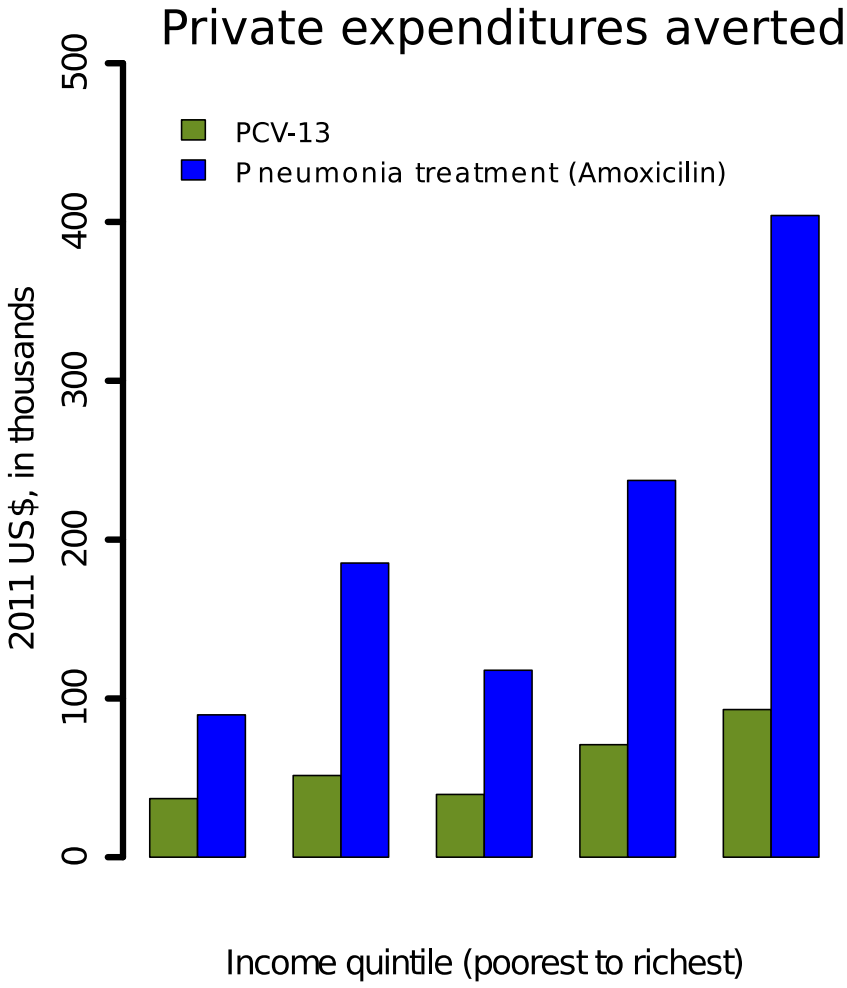
$$E(y) = (1 - I_0(y))y + I_0(y)\,(y - C_{treatment})$$

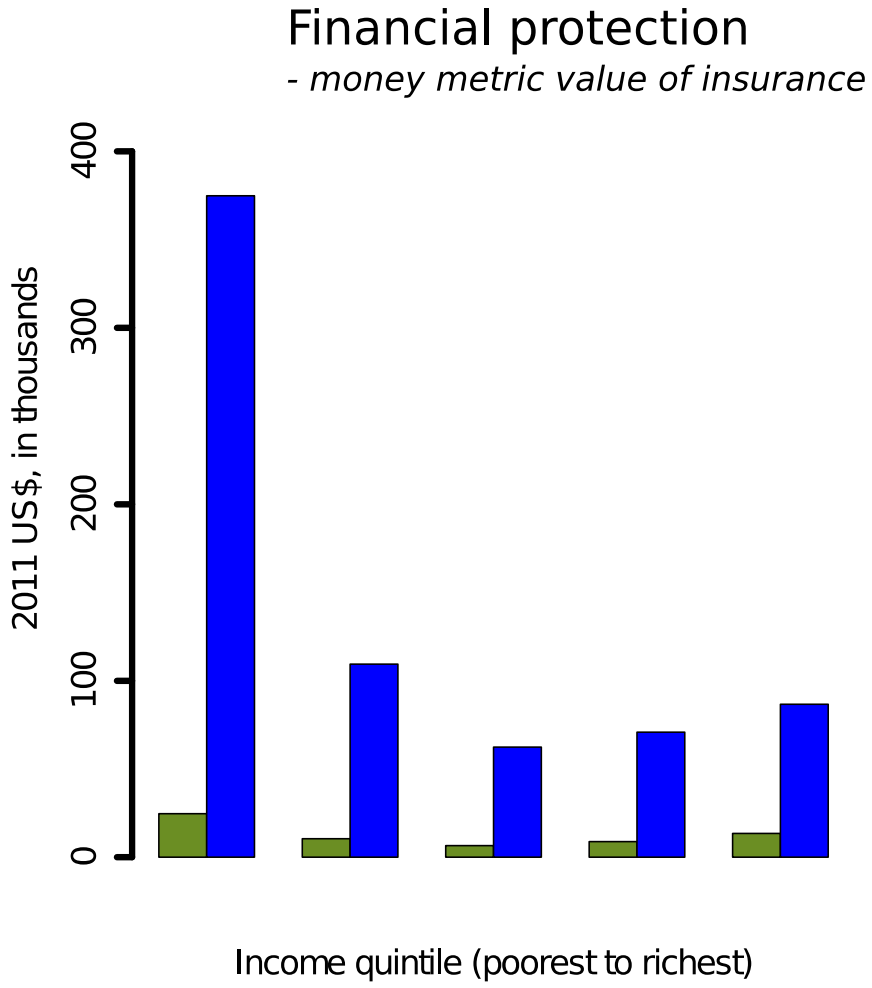
Expected value of utility

$$E_u(y) = (1 - I_0(y))u(y) + I_0(y)\,u(y - C_{treatment})$$

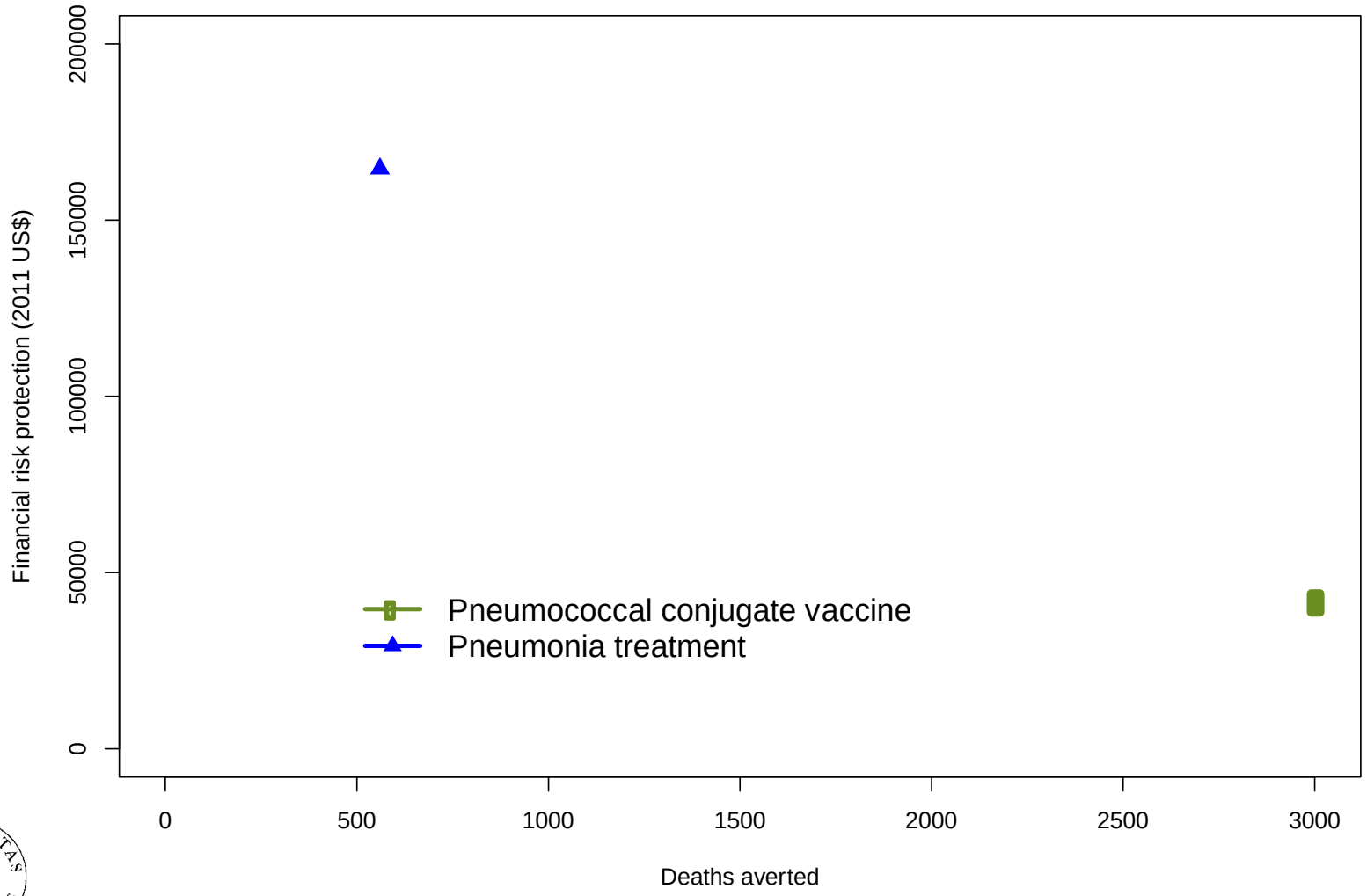
Insurance value / certainty equivalent

$$V(y) = E(y) - u^{-1}[E_u(y)]$$

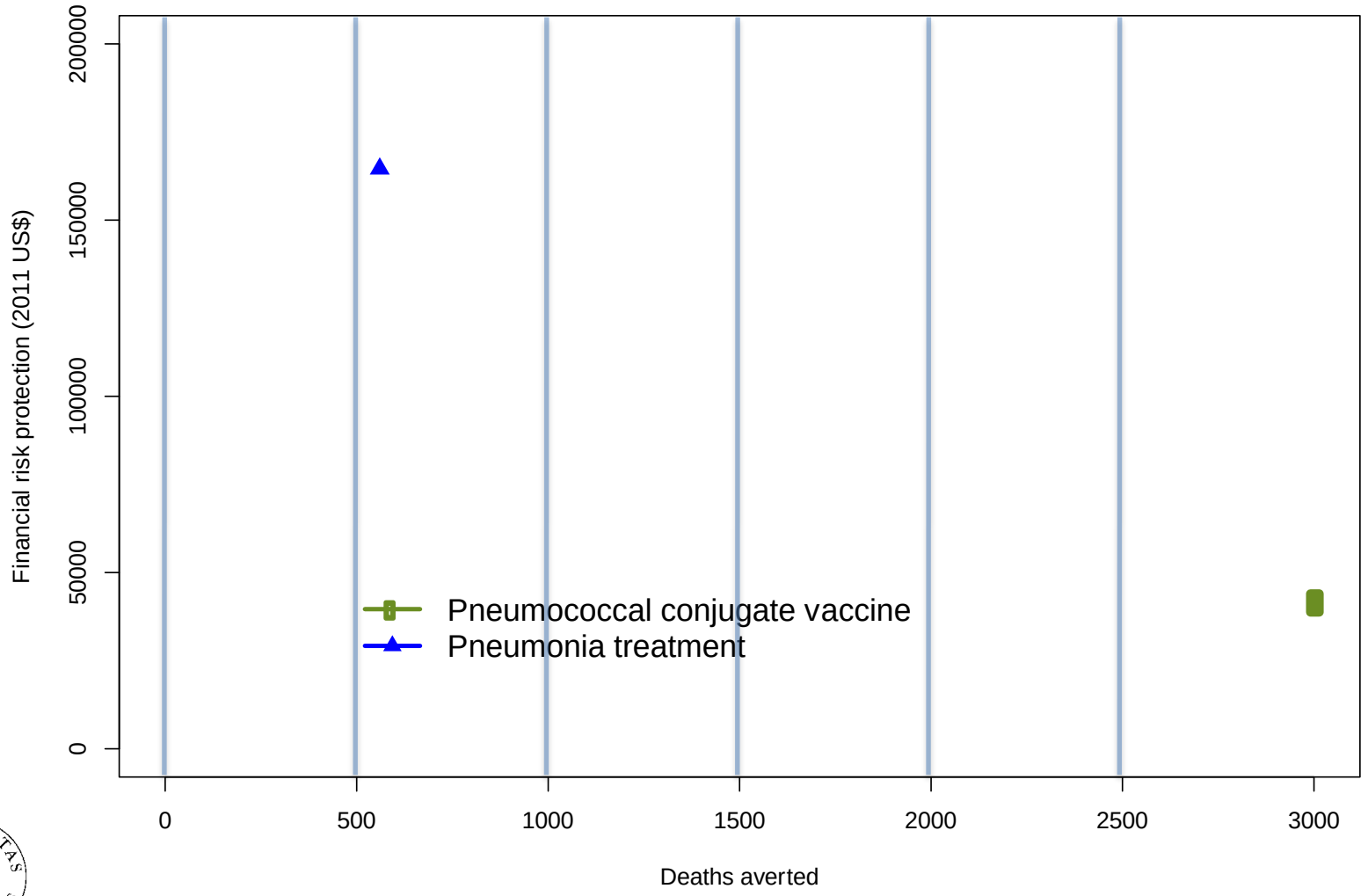

Private expenditures averted
PCV-13
Pneumonia treatment (Amoxicilin)
2011 US$, in thousands
0
100
200
300
400
500
Income quintile (poorest to richest)


Financial protection
- money metric value of insurance
2011 US$, in thousands
0
100
200
300
400
Income quintile (poorest to richest)

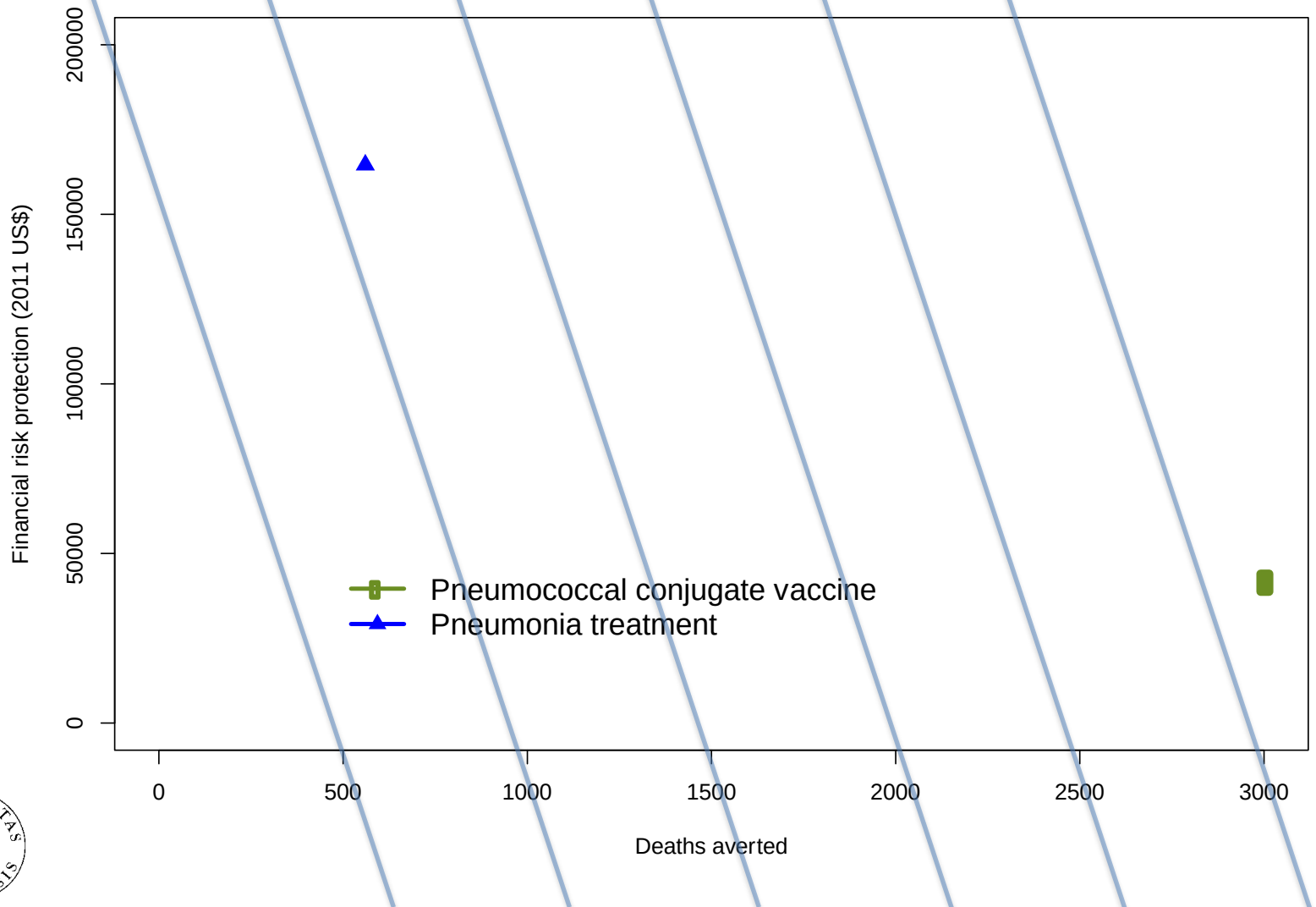
Health gains & FRP
- per $1M spent



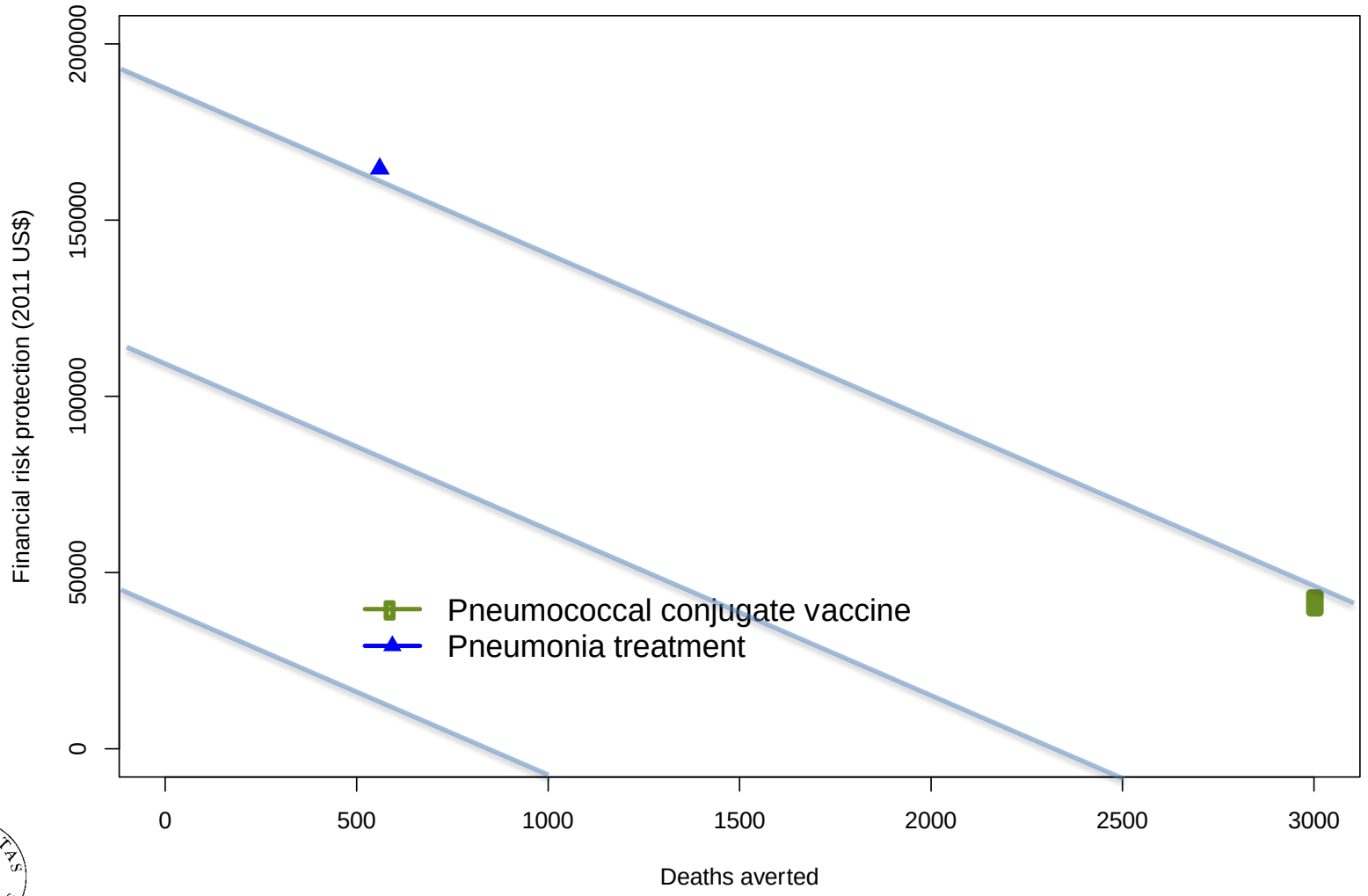
Health gains & financial protection - *per $1M*



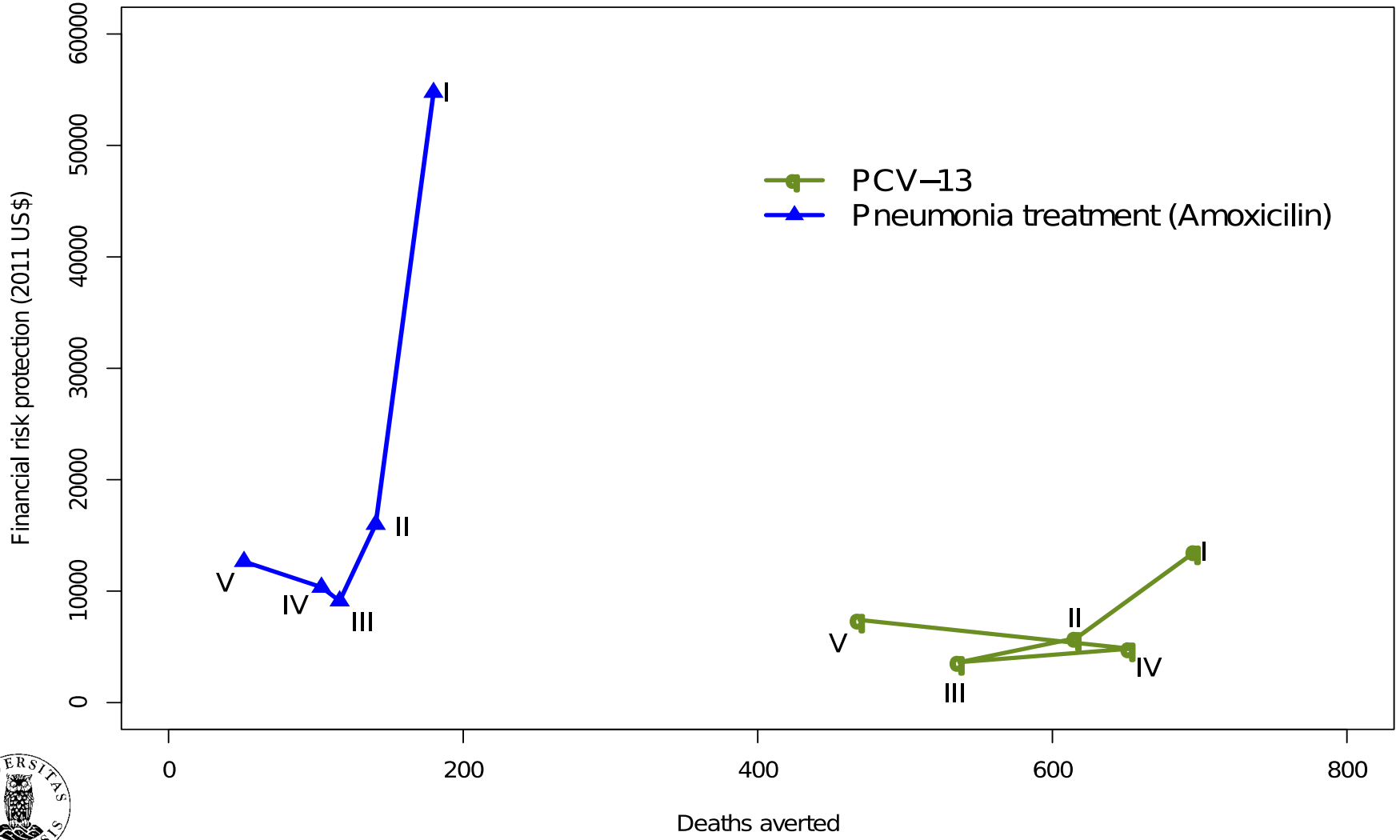
Health gains & financial protection - *per $1M*



Health gains & financial protection - *per $1M*



Expected distribution of health gains & FRP (*per $1M spent)*



Summary

- Health distribution

  PCV saves most lives. Equivalent health gains improves the expected utilities the most for pneumonia treatment by giving more weight to health benefits to the poor

- Financial protection

  Pneumonia treatment improves financial protection the most, especially for the poor

- Normative problem

  Save the most lives (PCV) vs. improving financial protection the most (pneumonia treatment)