
Diarrhea & Rotavirus ECEAs for Ethiopia

Stéphane Verguet, Clint Pecenka, Kjell Arne Johansson,
Ben Anderson, Shane Murphy, Roger Glass,
Richard Rheingans

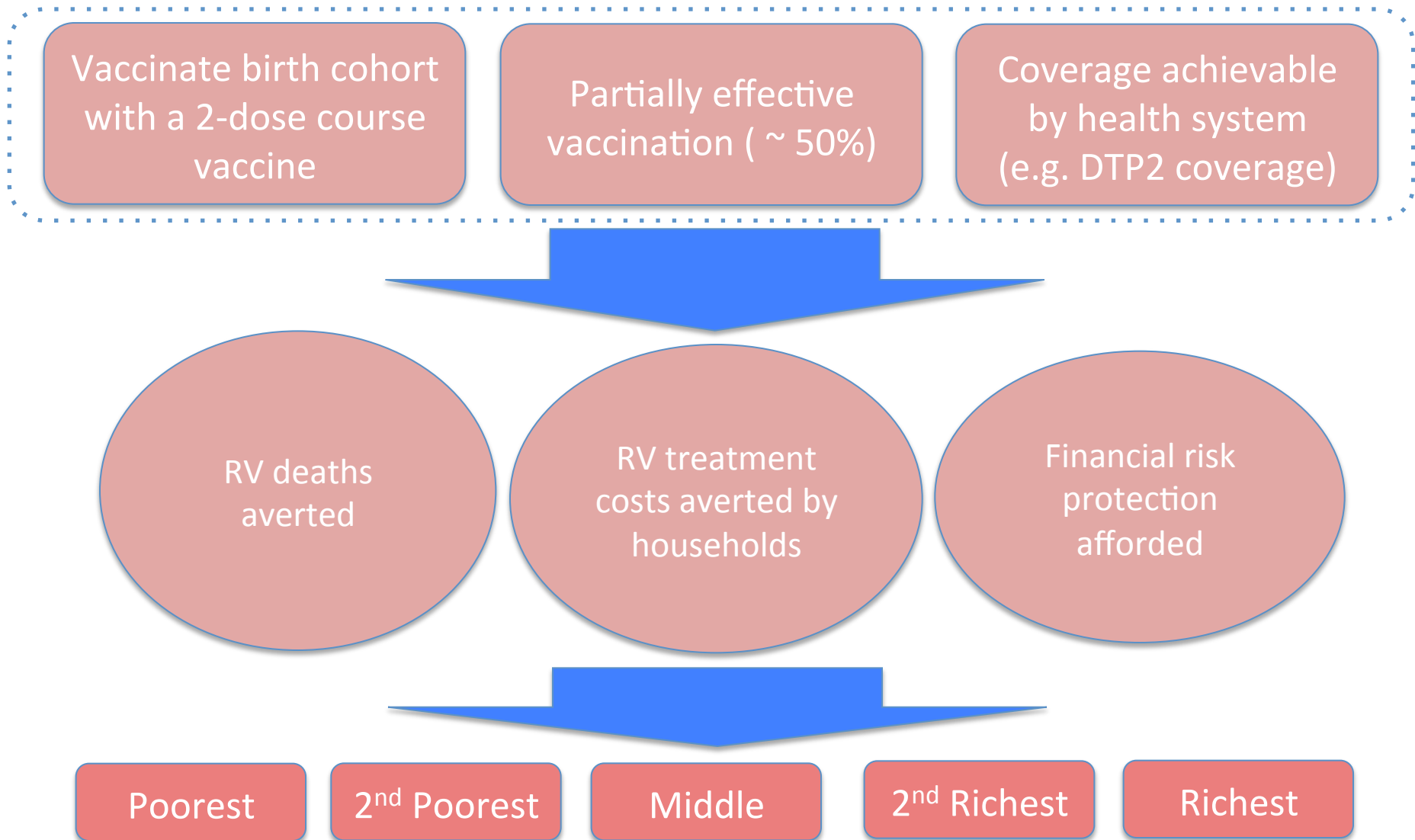
- **ROTAVIRUS VACCINATION**

Background: rotavirus burden of disease

- 5 countries account for > 50% of all rotavirus deaths (200,000 deaths):
 - » D.R. of the Congo
 - » Ethiopia (3% of global rotavirus deaths)
 - » India
 - » Nigeria
 - » Pakistan

(Fischer-Walker, 2013)

Approach (1): public finance program for rotavirus vaccination in Ethiopia



Approach (2): rotavirus deaths averted

- **Rotavirus lives saved** (by income group)

Birth cohort followed-up over 5 years

Depends on:

- Relative risk of under-five rotavirus mortality by income group
- Vaccine effectiveness
- Vaccine coverage
- Total country deaths from rotavirus in under-5 children = 7,000 deaths

Approach (3): financial consequences

Crowding out of household expenditures (treatment costs averted): (by income group)

Depends on:

- Risk of rotavirus treatment visit
- Rotavirus treatment costs
- Vaccine coverage
- Vaccine effectiveness

Total costs of vaccination for government

Depends on:

- Vaccine price
- Vaccine delivery

Approach (4): financial risk protection benefits

- **Different measures of medical impoverishment:**
 - Threshold-based approach
 - Forced asset sales & forced borrowing
 - Number of cases of poverty averted
 - **Money-metric value of insurance provided**

Approach(5): financial risk protection benefits

- **Money-metric value of insurance:**

Utility-based framework:
$$U(y) = \frac{y^{1-r}}{1-r}$$

y = individual income

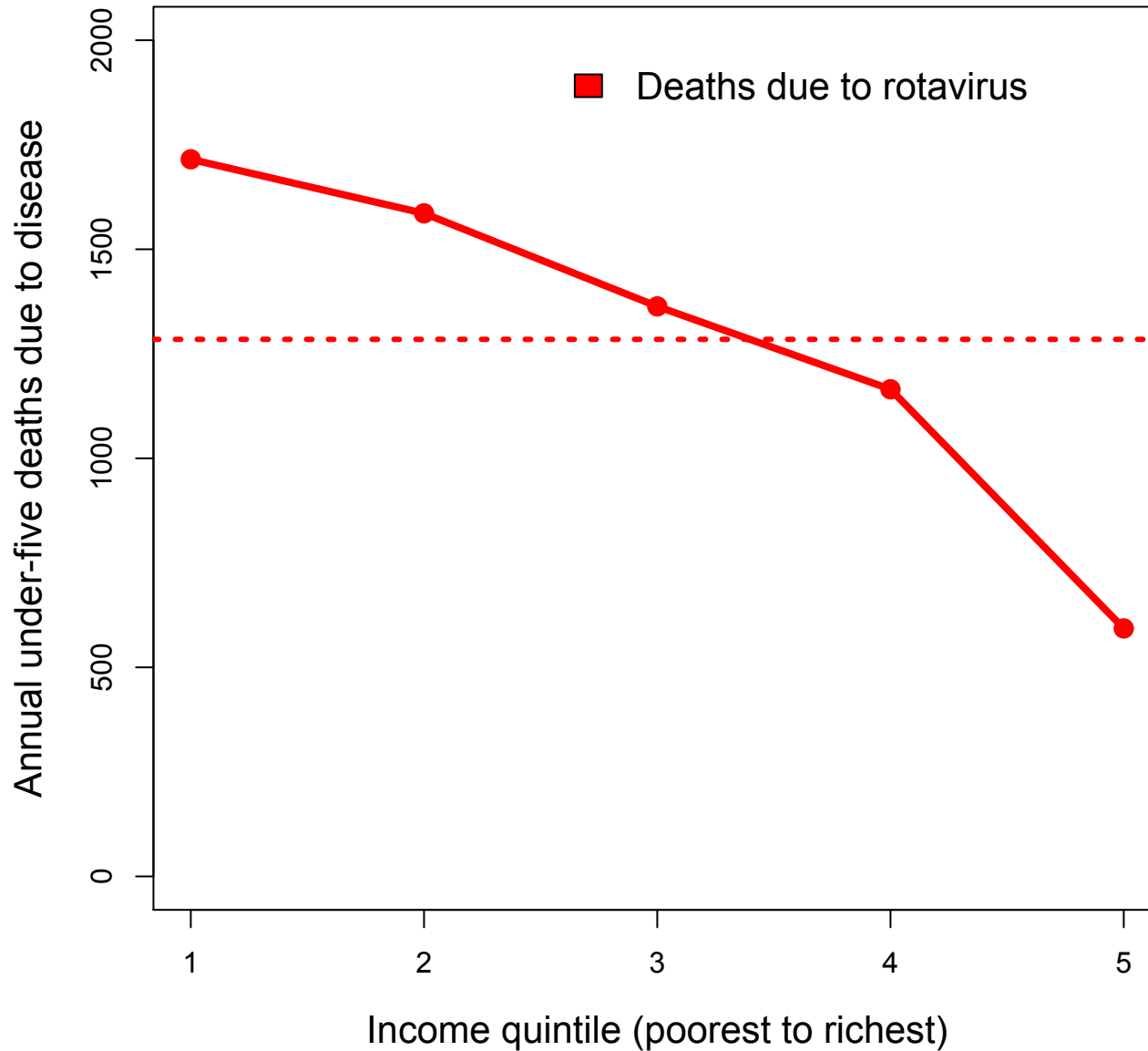
r = coefficient of relative risk aversion

Depends on:

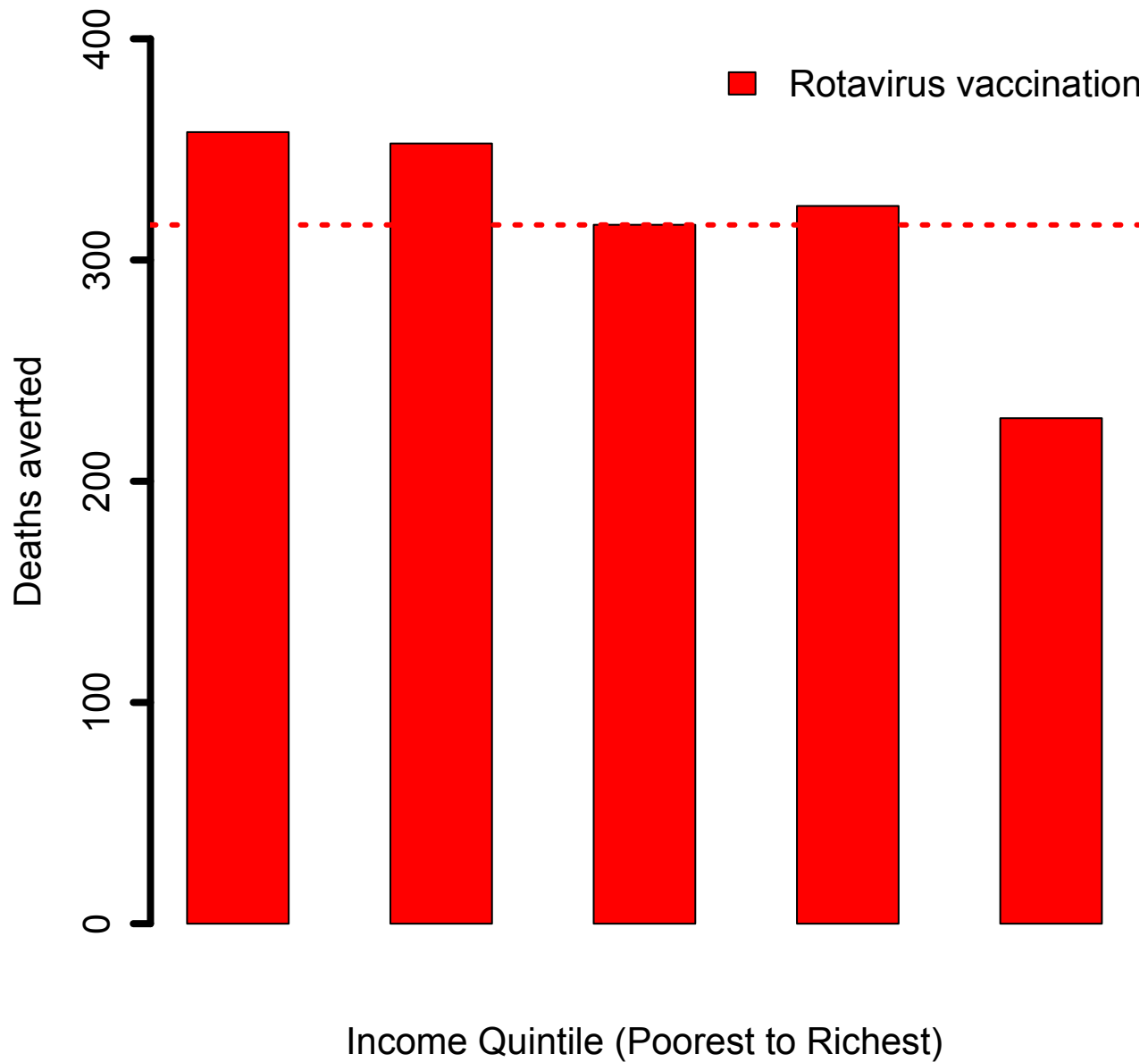
- Risk of rotavirus treatment visit
- Rotavirus treatment costs
- Vaccine coverage
- Vaccine effectiveness
- Individual income

Monetary value = Expected value of income – Certainty equivalent

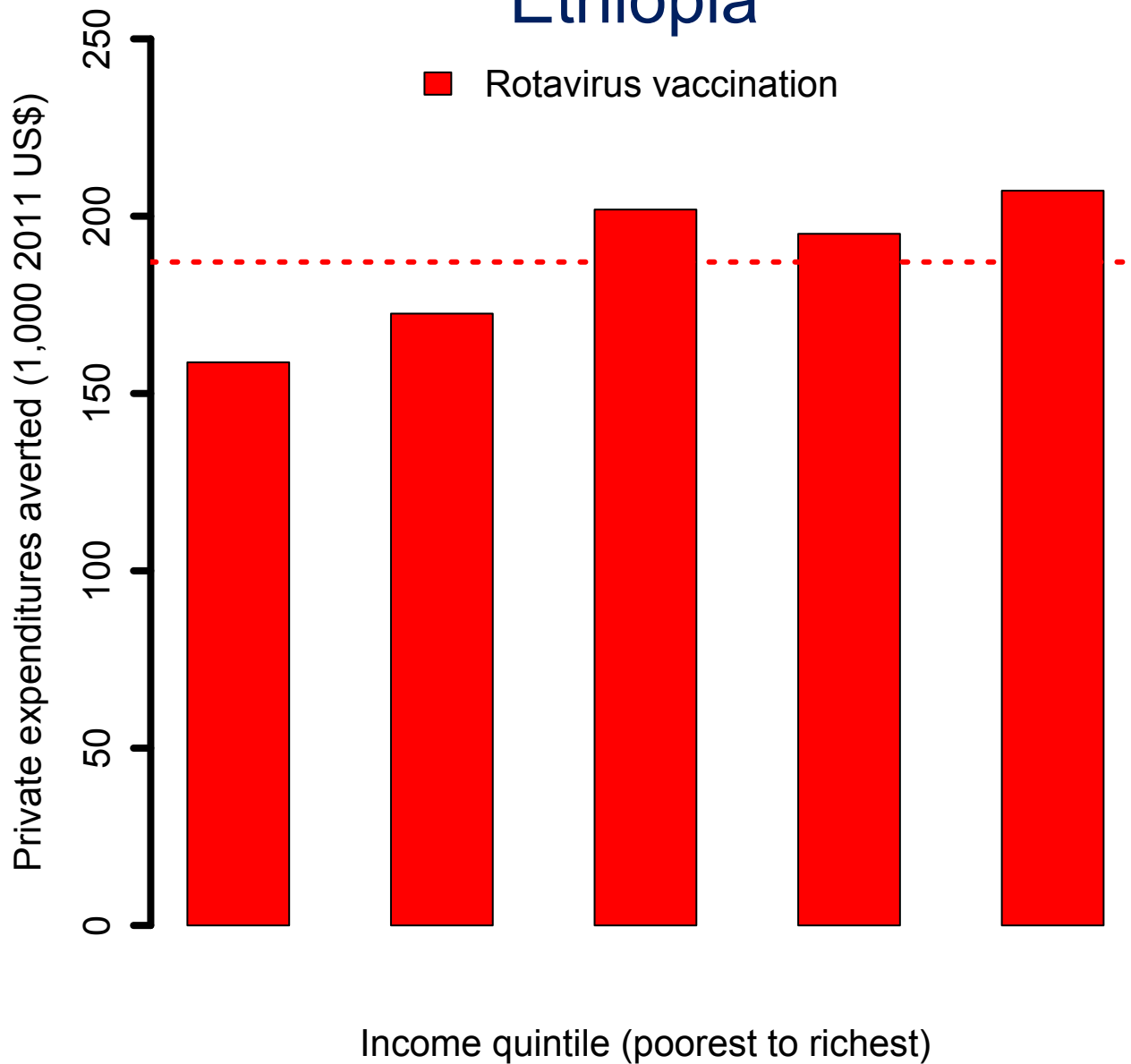
Results (1): rotavirus deaths before vaccination, Ethiopia



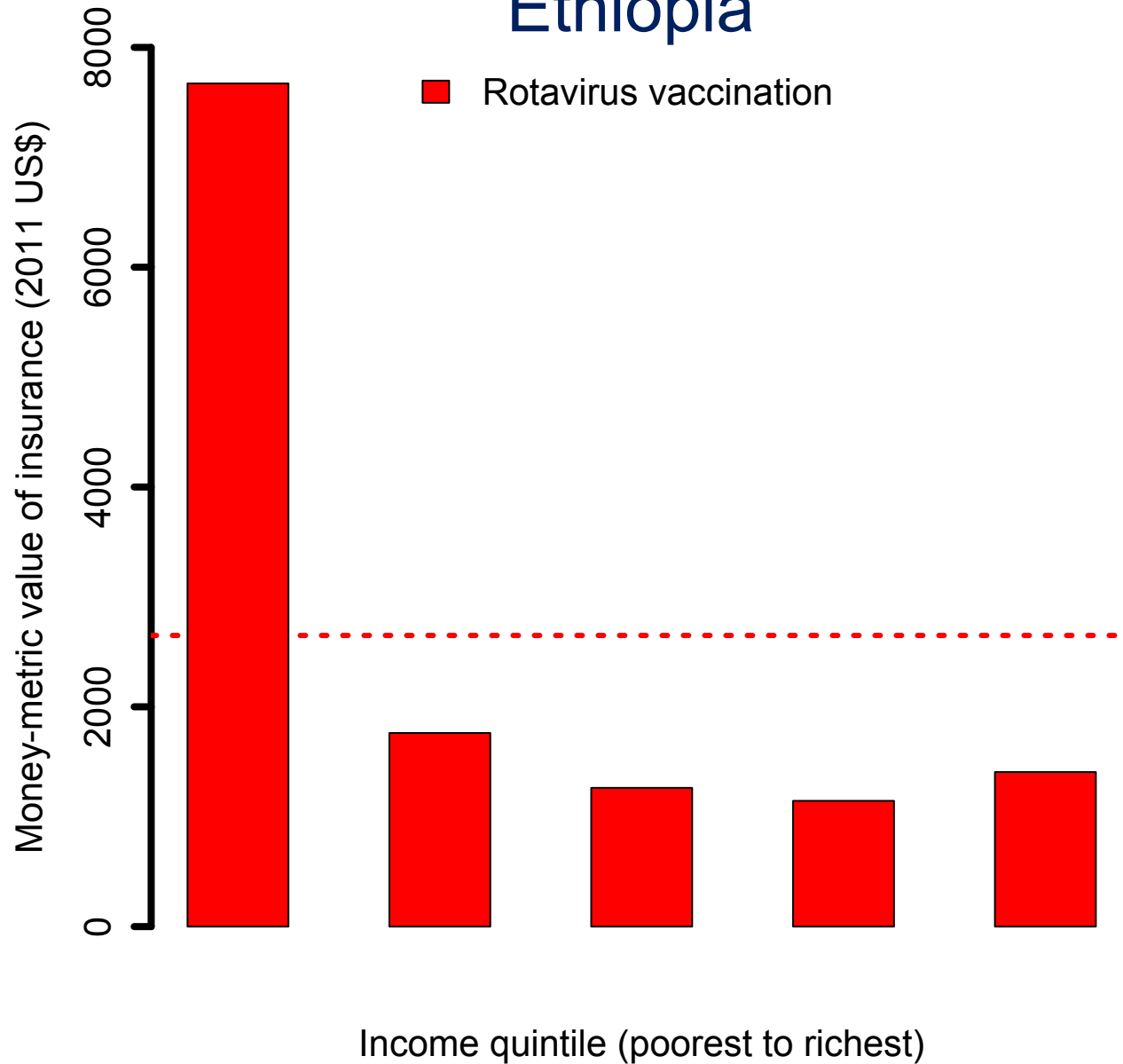
Results (2): rotavirus deaths averted, Ethiopia



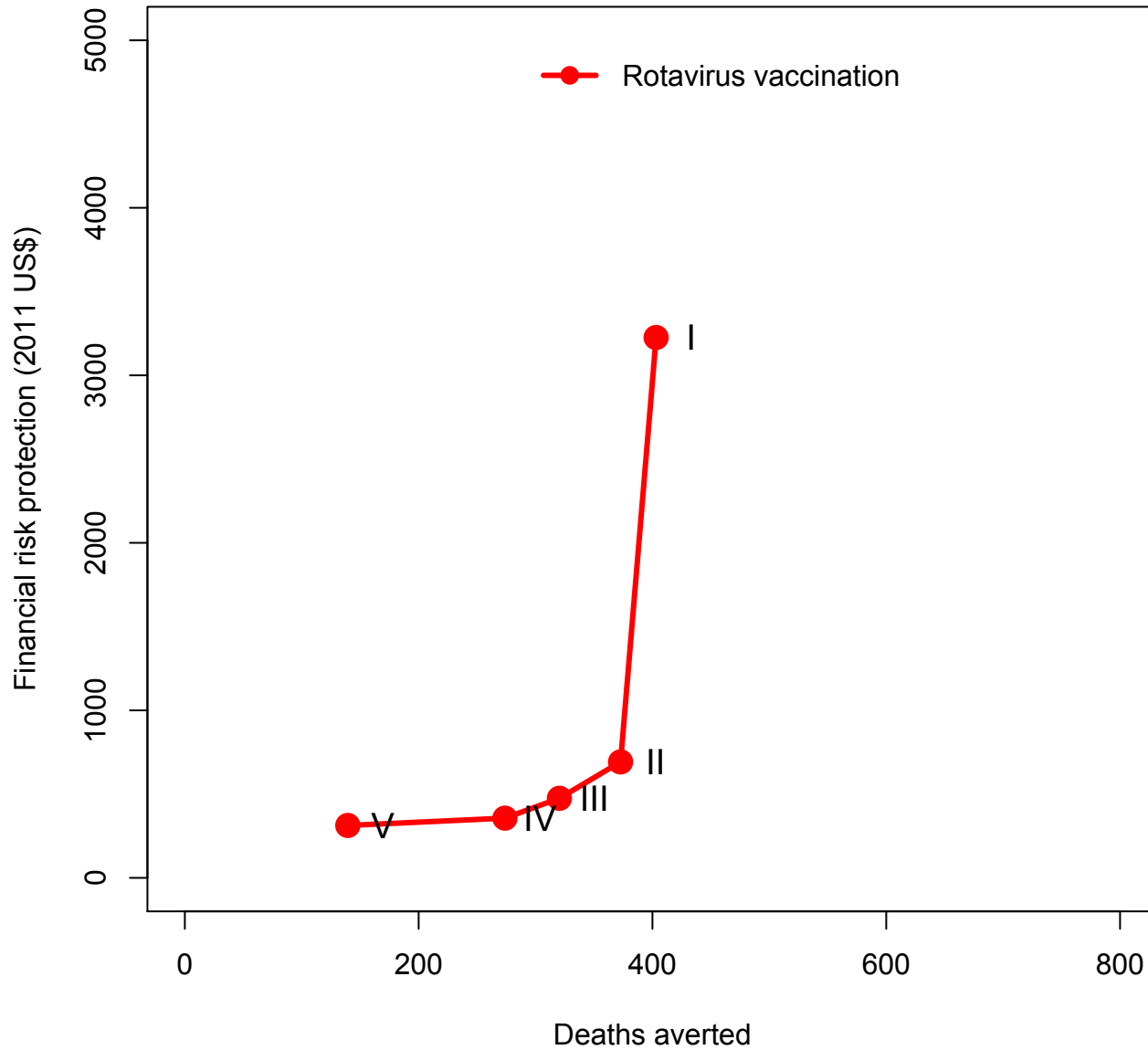
Results (3): private expenditures crowded out, Ethiopia



Results (4): financial risk protection benefits, Ethiopia

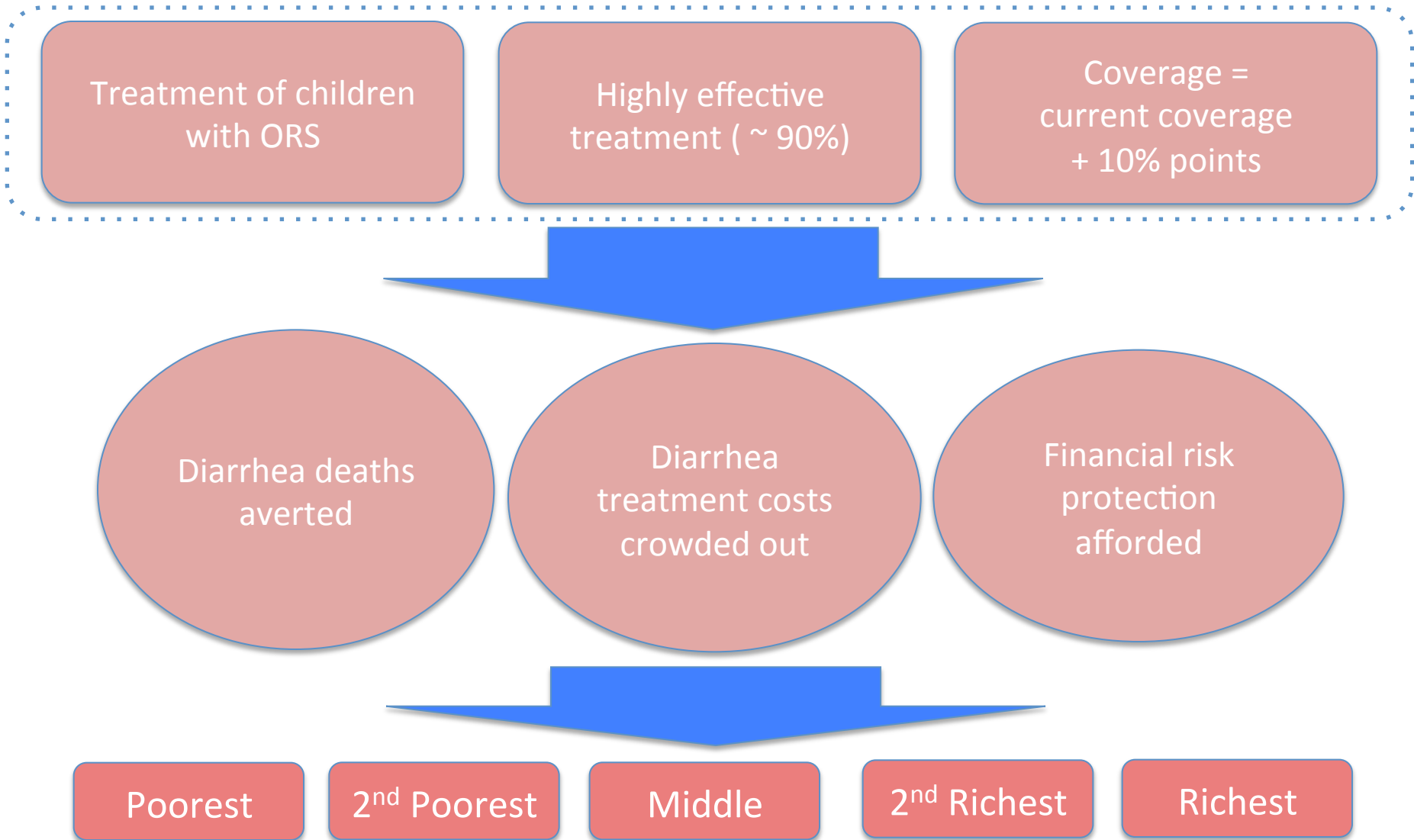


Results (5): policy benefits, per \$1M spent, Ethiopia



- **DIARRHEA TREATMENT**

Approach (1): public finance program for diarrhea treatment in Ethiopia



Approach (2): diarrhea deaths averted

- **Diarrhea lives saved** (by income group)

Under-five children followed-up over 1 year

Depends on:

- Relative risk of under-five diarrhea mortality by income group
- Treatment effectiveness
- Treatment coverage
- Total country deaths from diarrhea in under-5 children = 24,000

Approach (3): financial consequences

Crowding out of household expenditures (treatment costs averted): (by income group)

Depends on:

- Risk of diarrhea treatment visit
- Diarrhea treatment costs
- Intervention coverage

Total costs of vaccination for government

Depends on:

- Intervention price
- Before individuals pay 34% OOP, after 0%

Approach(4): financial risk protection benefits

- **Money-metric value of insurance:**

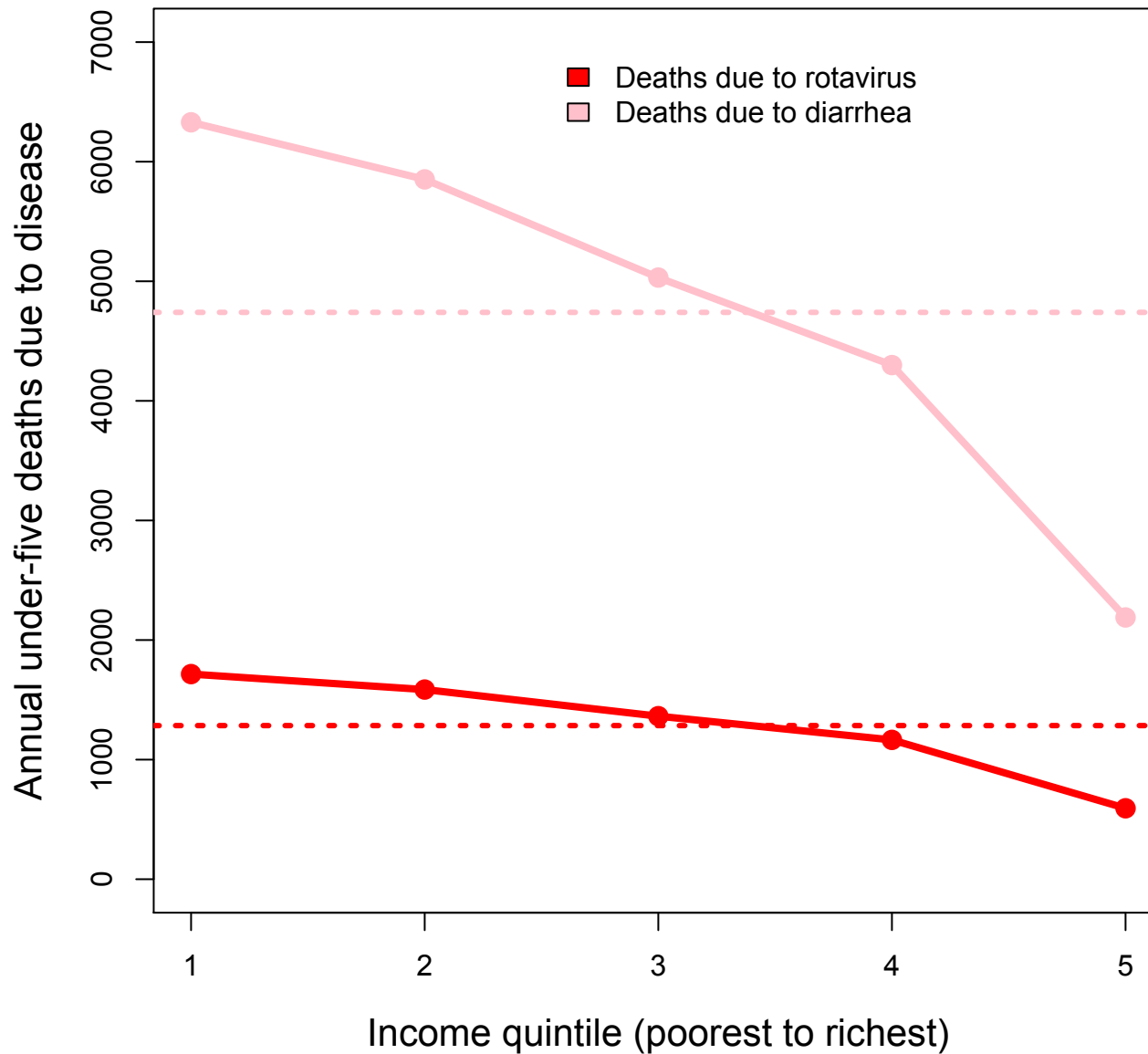
Utility-based framework

Depends on:

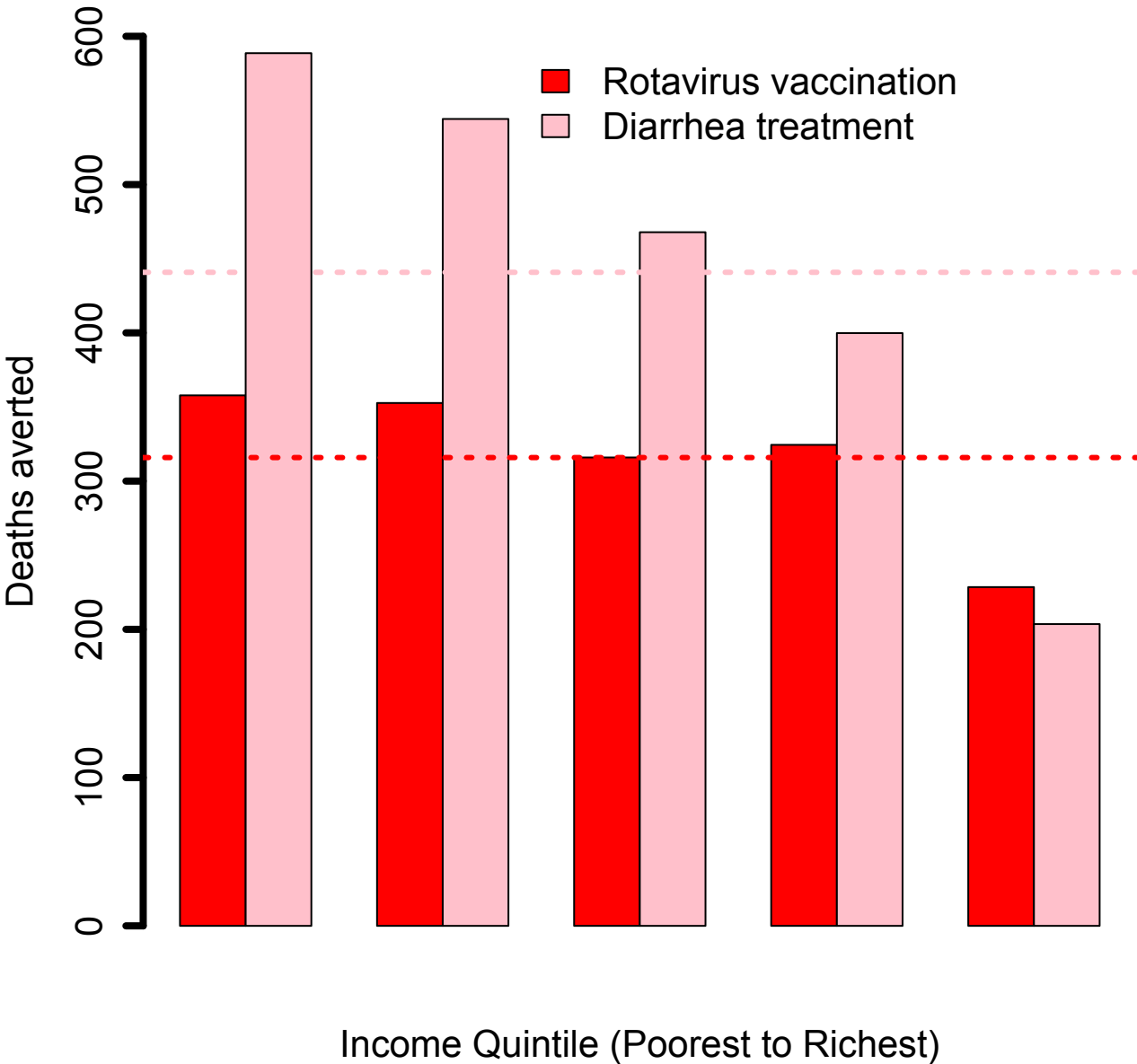
- Risk of diarrhea treatment visit
- Diarrhea treatment costs
- Intervention coverage
- Individual income

Monetary value = Expected value of income – Certainty equivalent

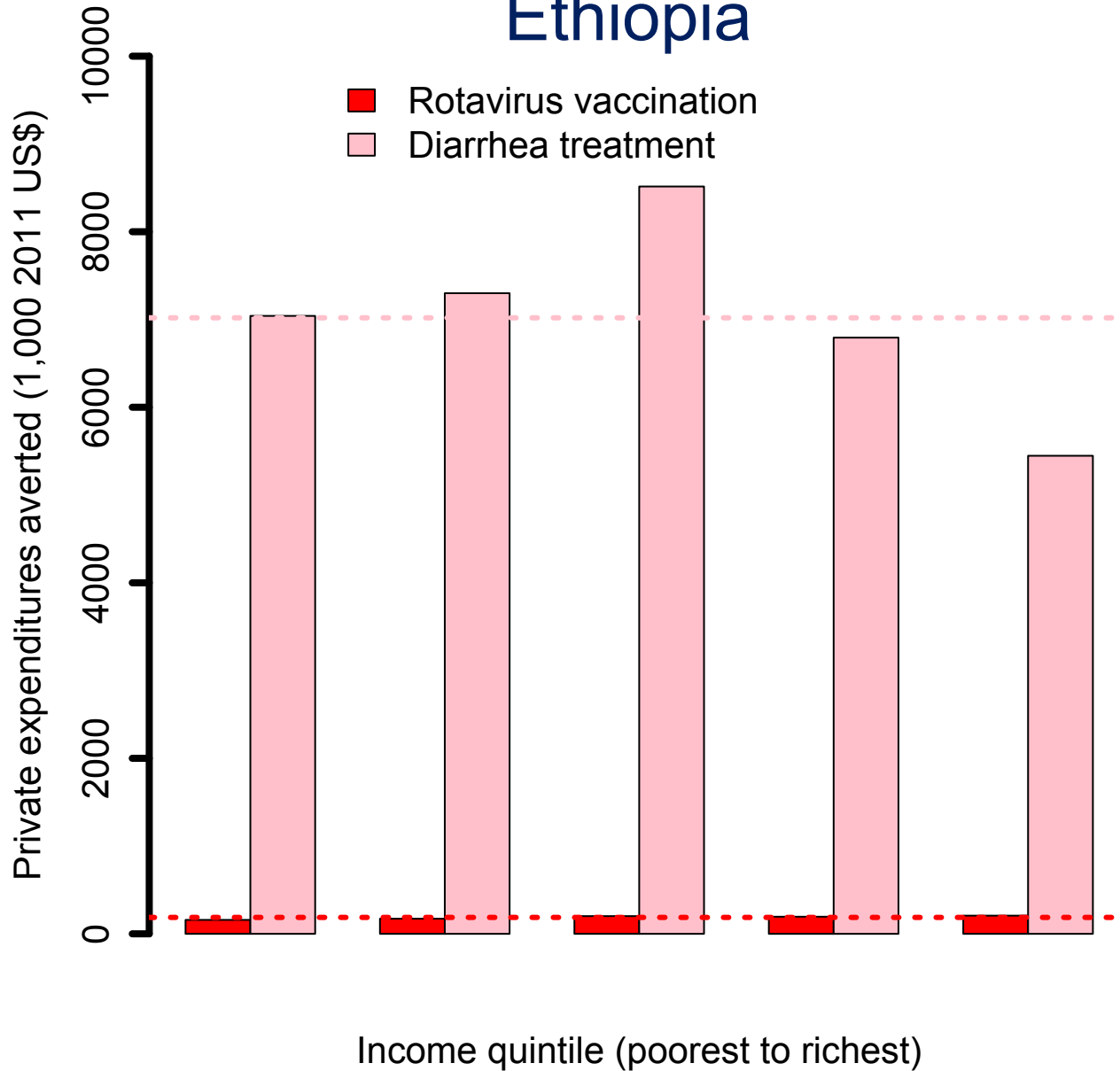
Results (1): deaths before policy, Ethiopia



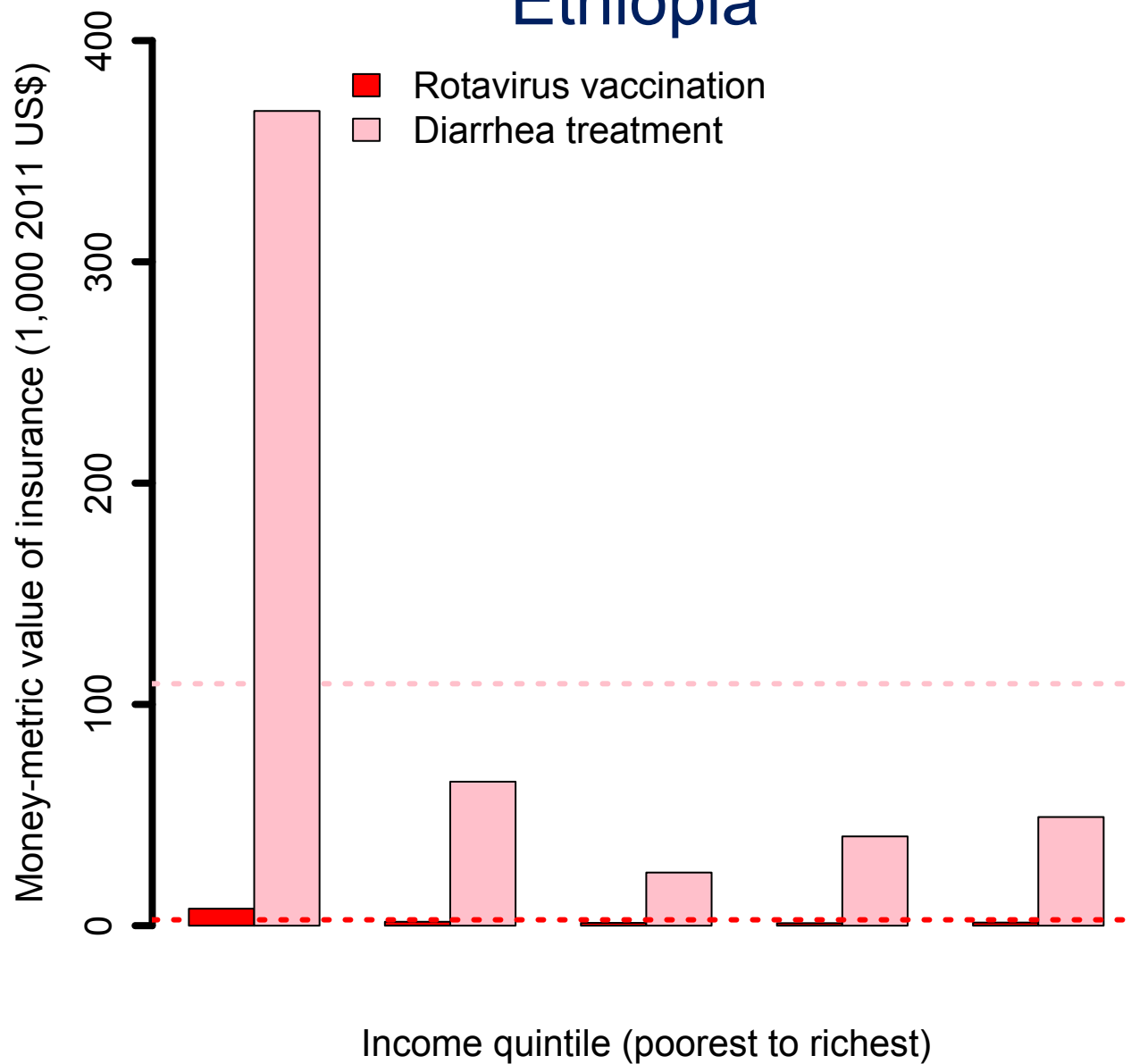
Results (2): deaths averted, Ethiopia



Results (3): private expenditures crowded out, Ethiopia



Results (4): financial risk protection benefits, Ethiopia



Results (5): policy benefits, per \$1M spent, Ethiopia

