

Global Burden of Typhoid: Estimates, Methods & Challenges

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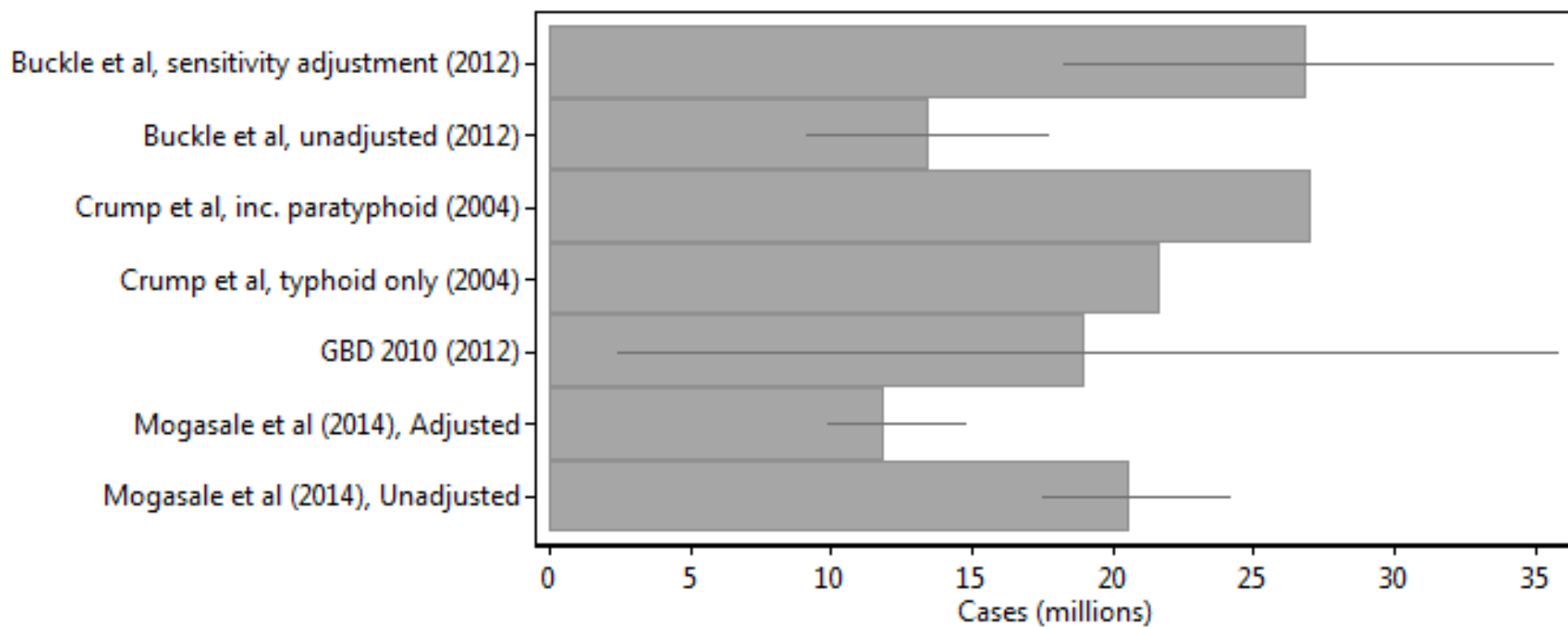


Institute for
Health Metrics
and Evaluation

UNIVERSITY *of* WASHINGTON

Burden estimates...

- Understand importance and trends
- Target interventions
- Understand potential benefit of vaccine use and policy



Methods

Approach: Natural history model

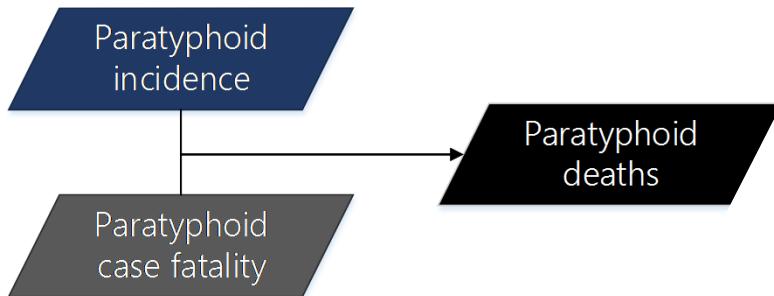
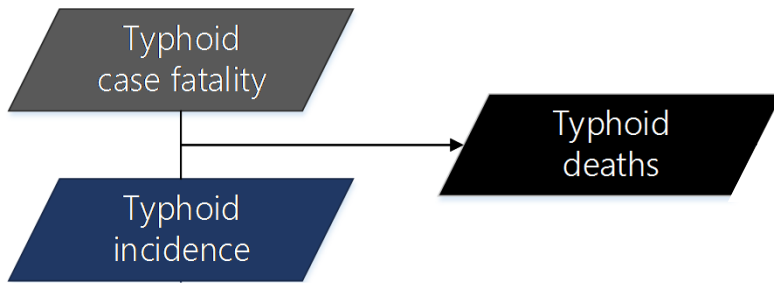
What's new:

- Typhoid- & paratyphoid-specific estimates
- Modeled case fatality
- Updated sequelae

Model
incidence

Model etiological
proportions

Model
case fatality

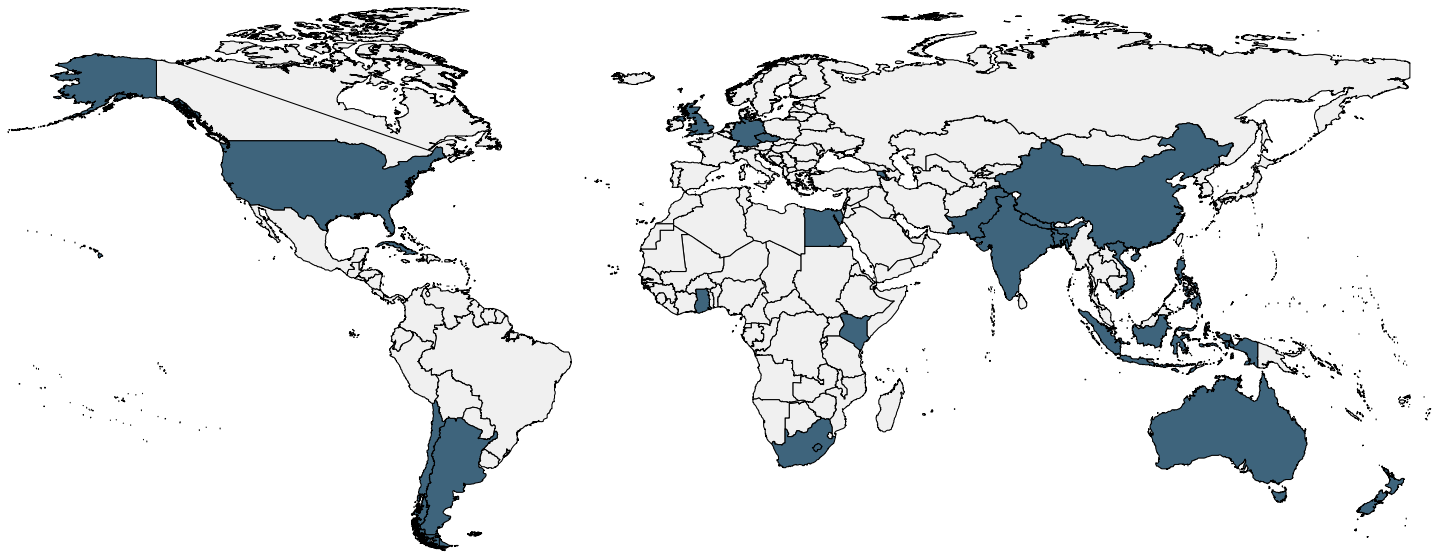


Sequela

Typhoid:

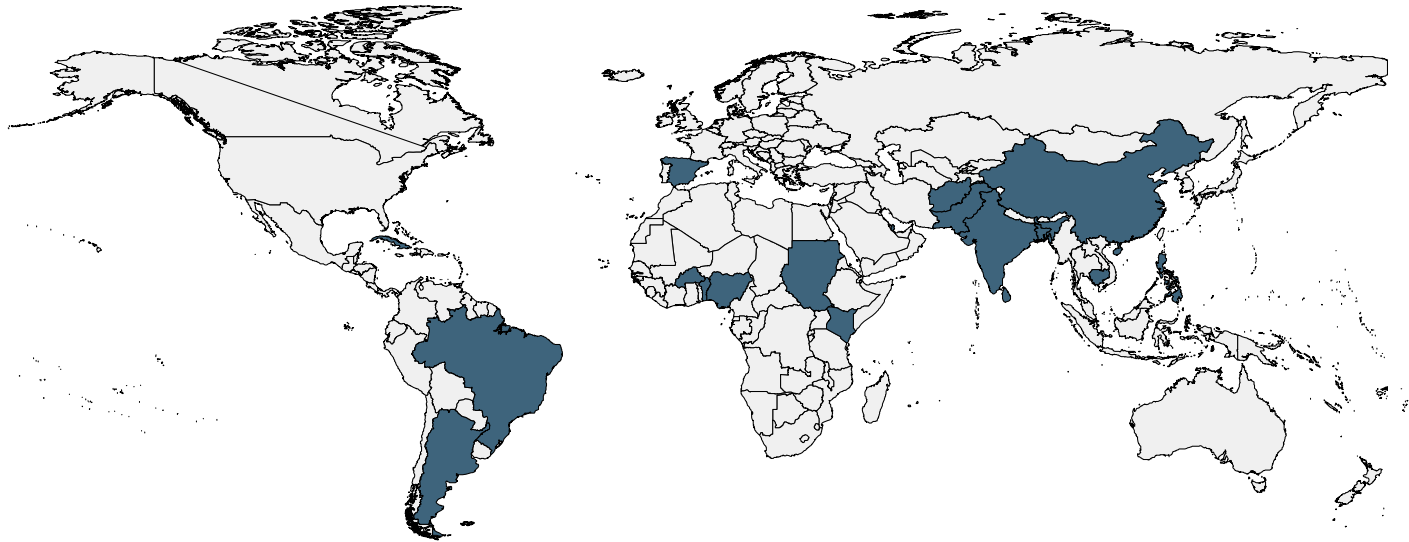
- 35% moderate acute infectious
- 43% severe acute infectious
- 5% gastrointestinal bleeding
- 17% intestinal perforation

Data on incidence



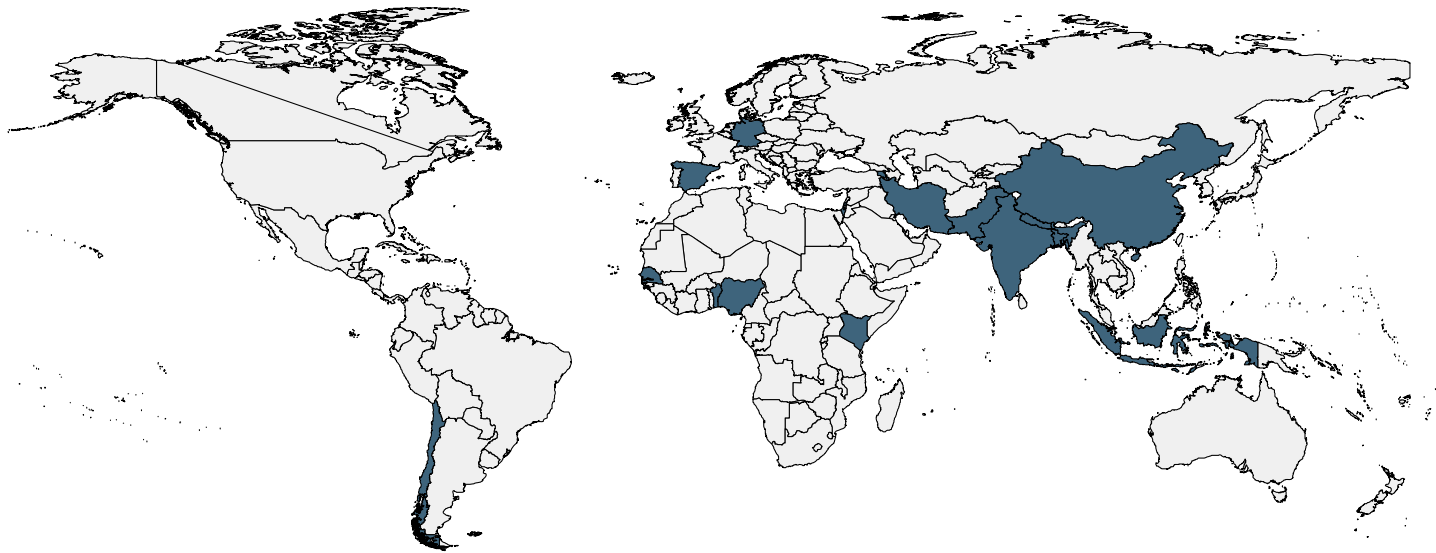
Unique sources	70
Countries	41
Data points	1,667

Data on case fatality



Unique sources	35
Countries	18
Data points	115

Data on typhoid : paratyphoid



Unique sources	43
Countries	17
Data points	378

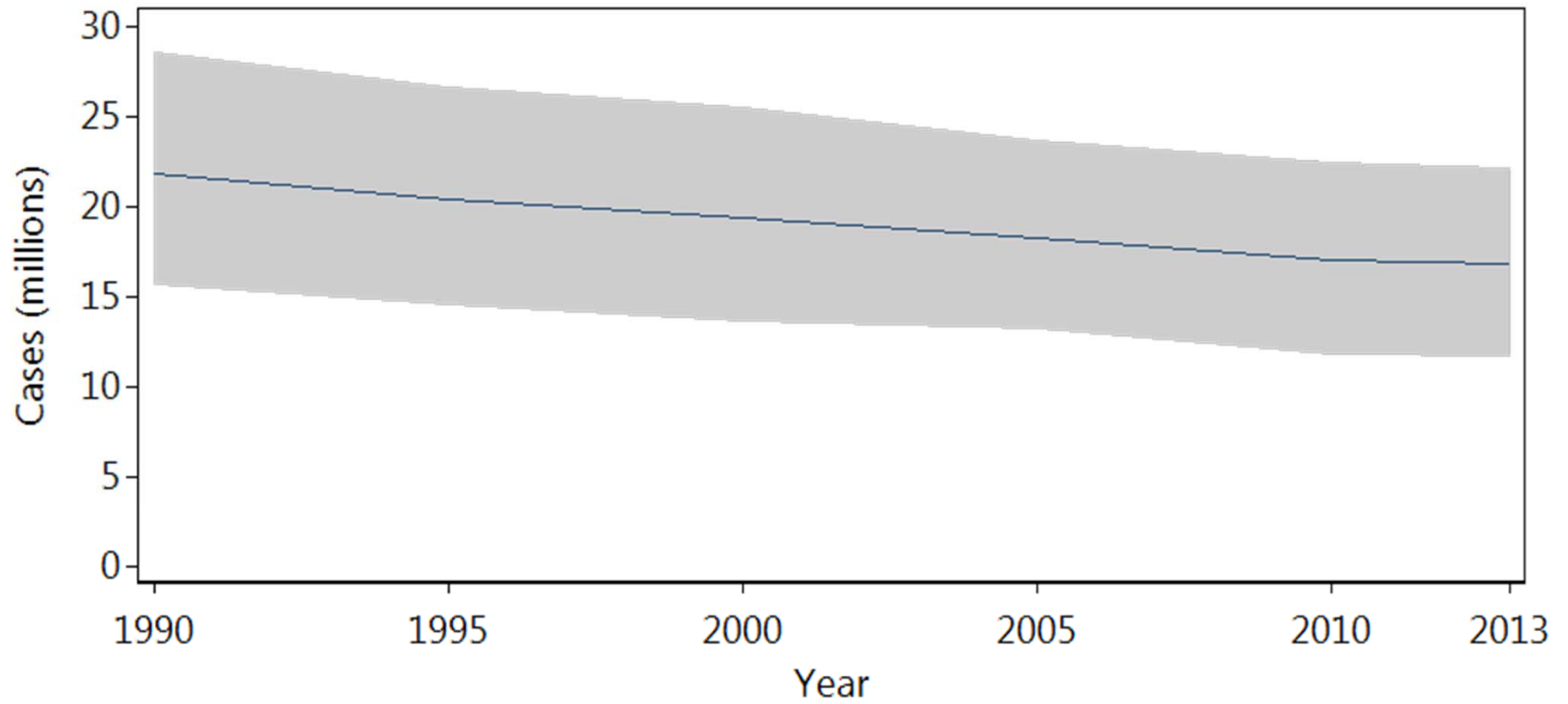
Results

Note...

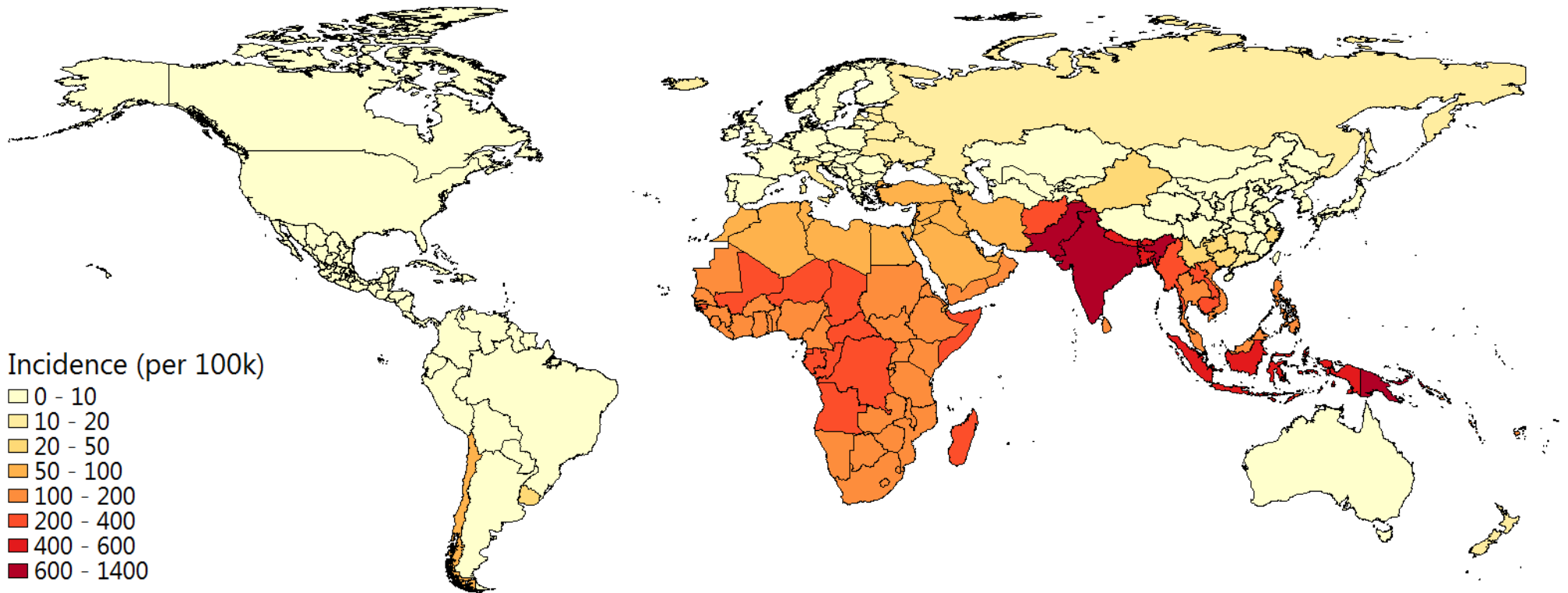
Mortality estimates final

Non-fatal estimates subject to change

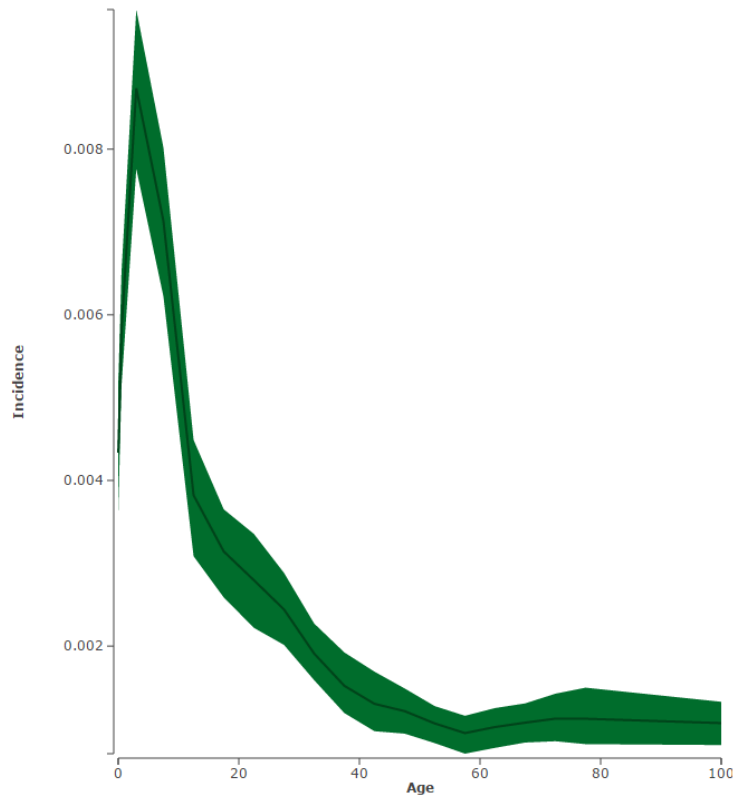
Global cases by year



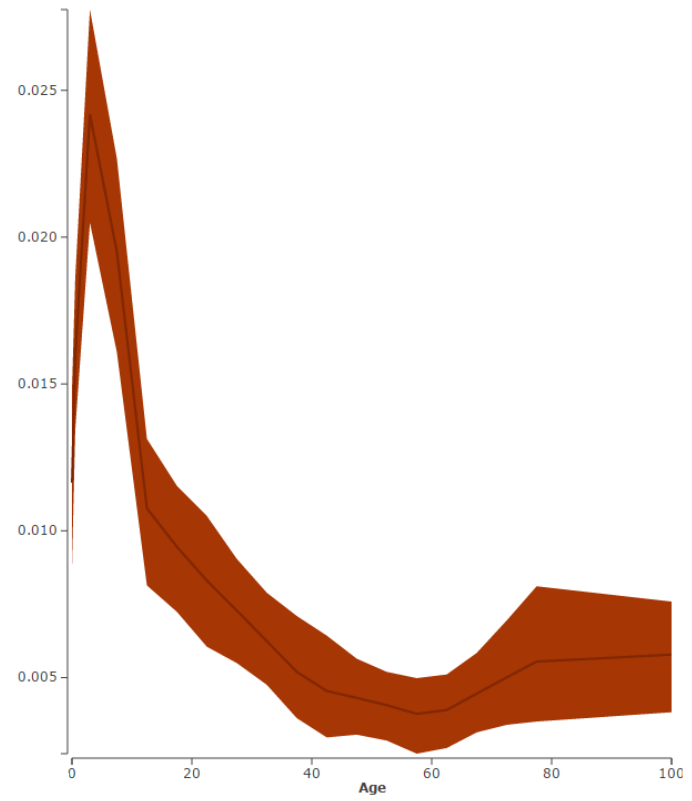
Age-standardized incidence by country, 2013



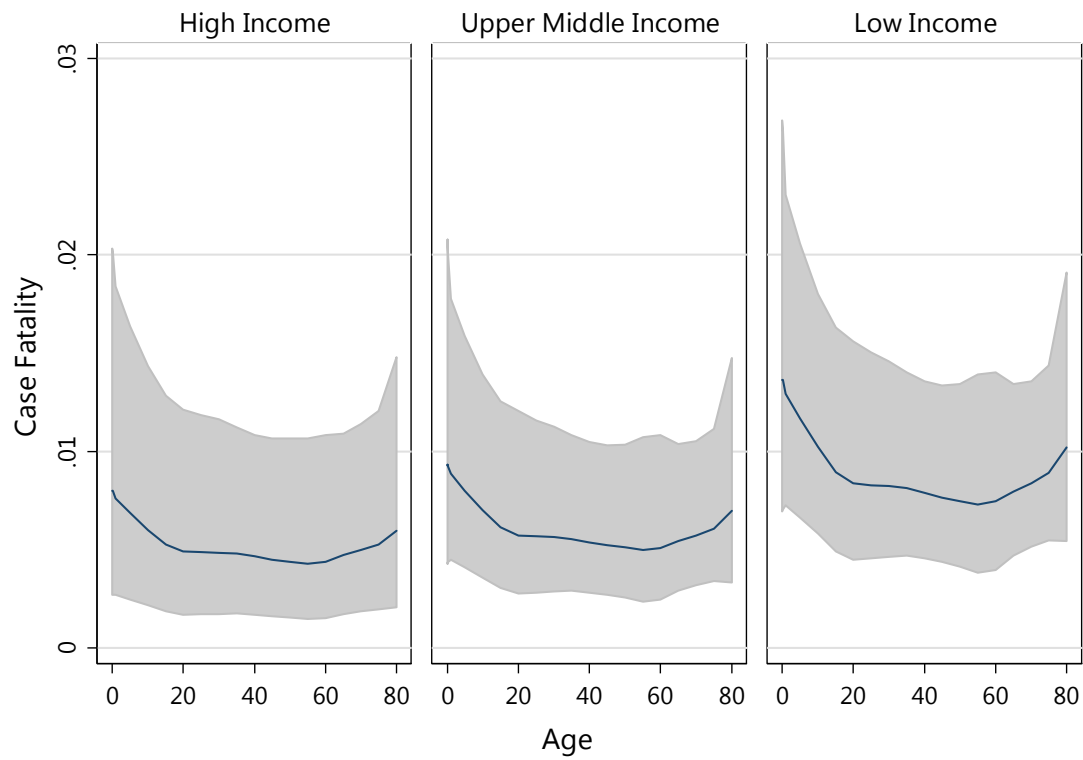
Global



South Asia

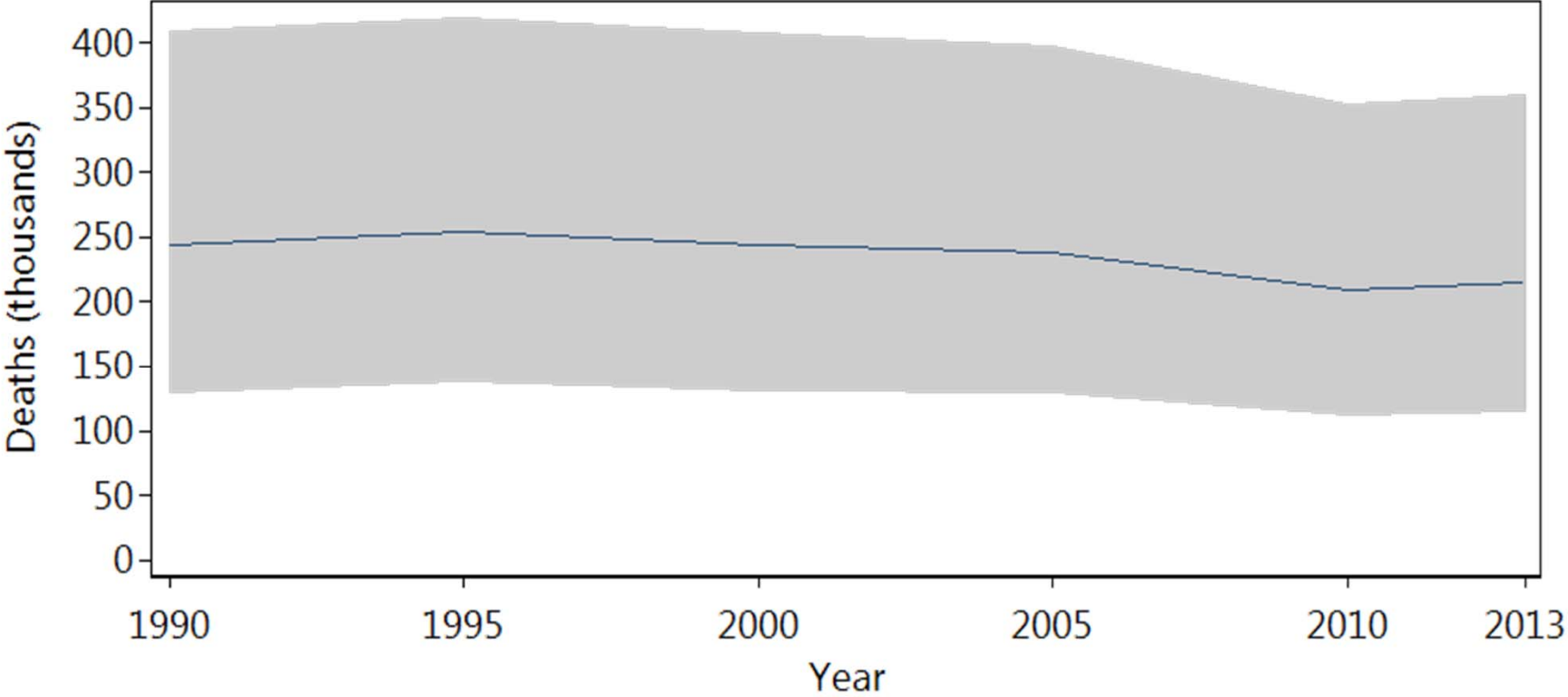


Case fatality



$$\frac{CF_{\text{typhoid}}}{CF_{\text{paratyphoid}}} = 1.89$$

Mortality estimates



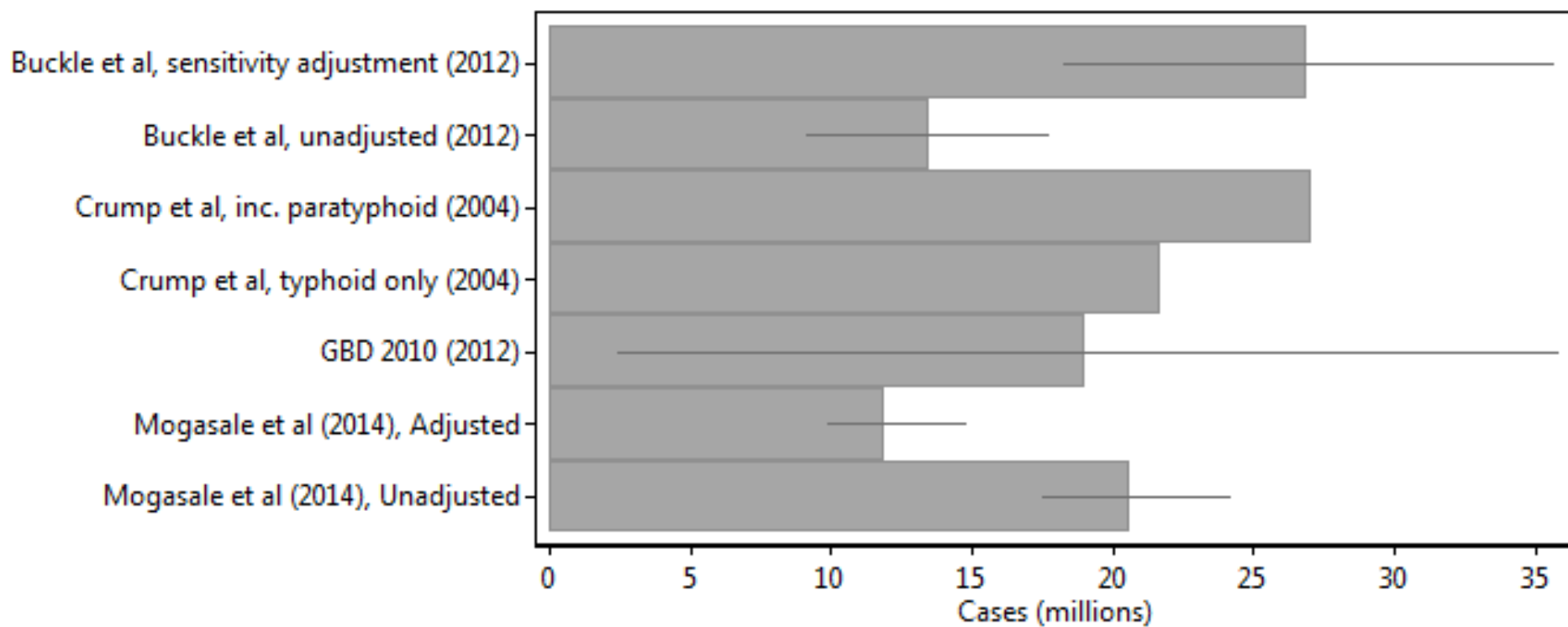
Etiologic breakdown

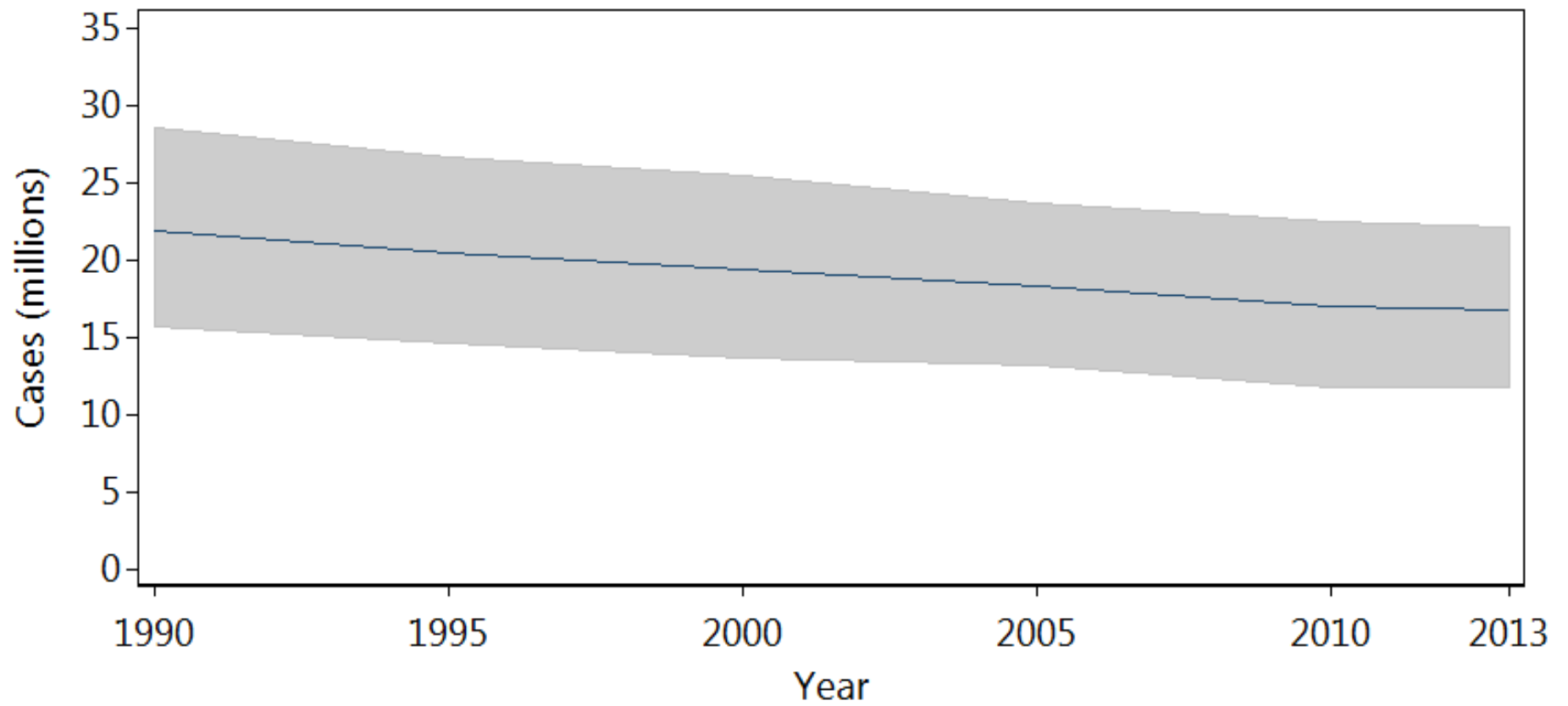
Cases \approx 70% typhoid

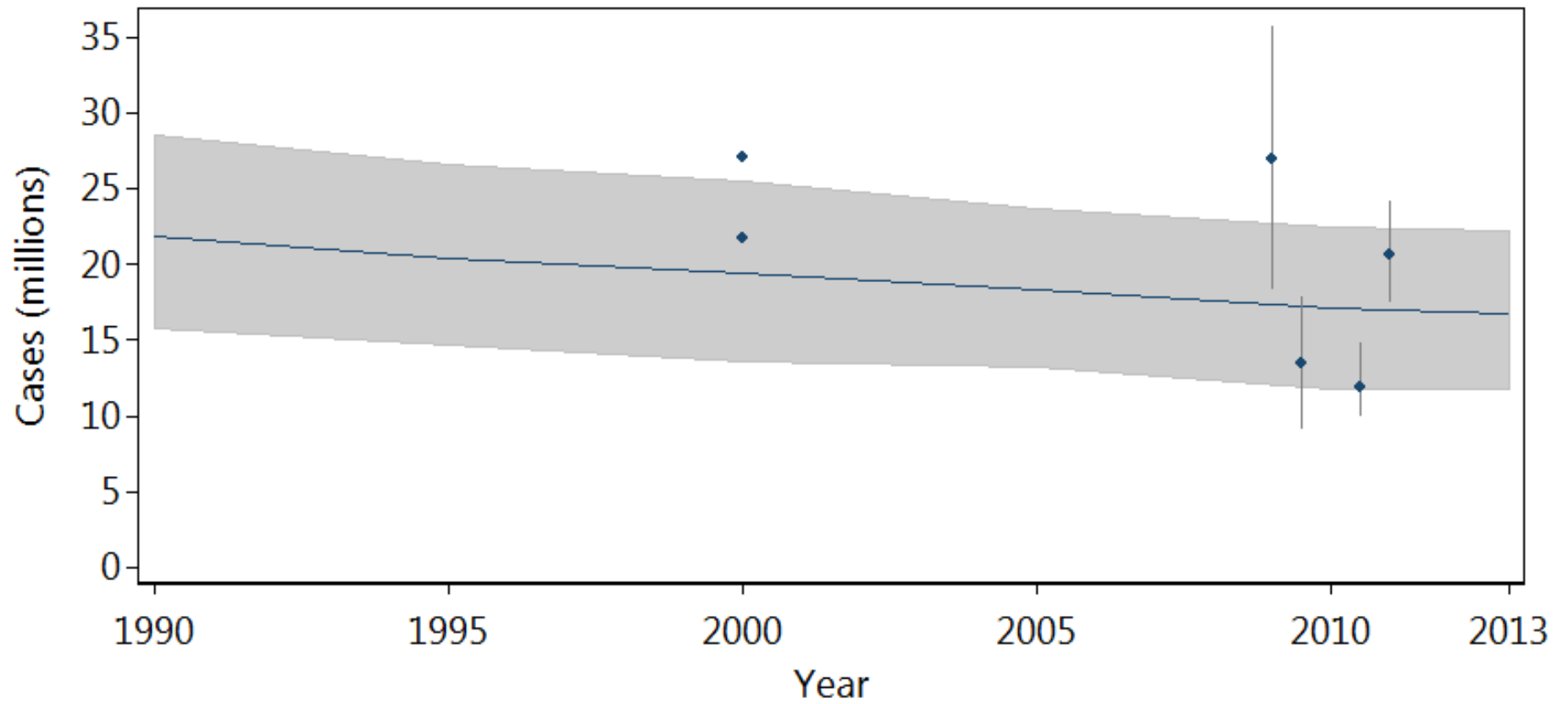
Deaths \approx 75% typhoid

Burden metrics

	1990	2013
YLDs (thousands)	251 (164 – 362)	199 (131 – 282)
YLLs (millions)	17.2 (9.2 – 29.0)	14.8 (7.9 – 24.6)
DALYs (millions)	17.5 (9.4 – 29.3)	15.0 (8.1 – 24.8)



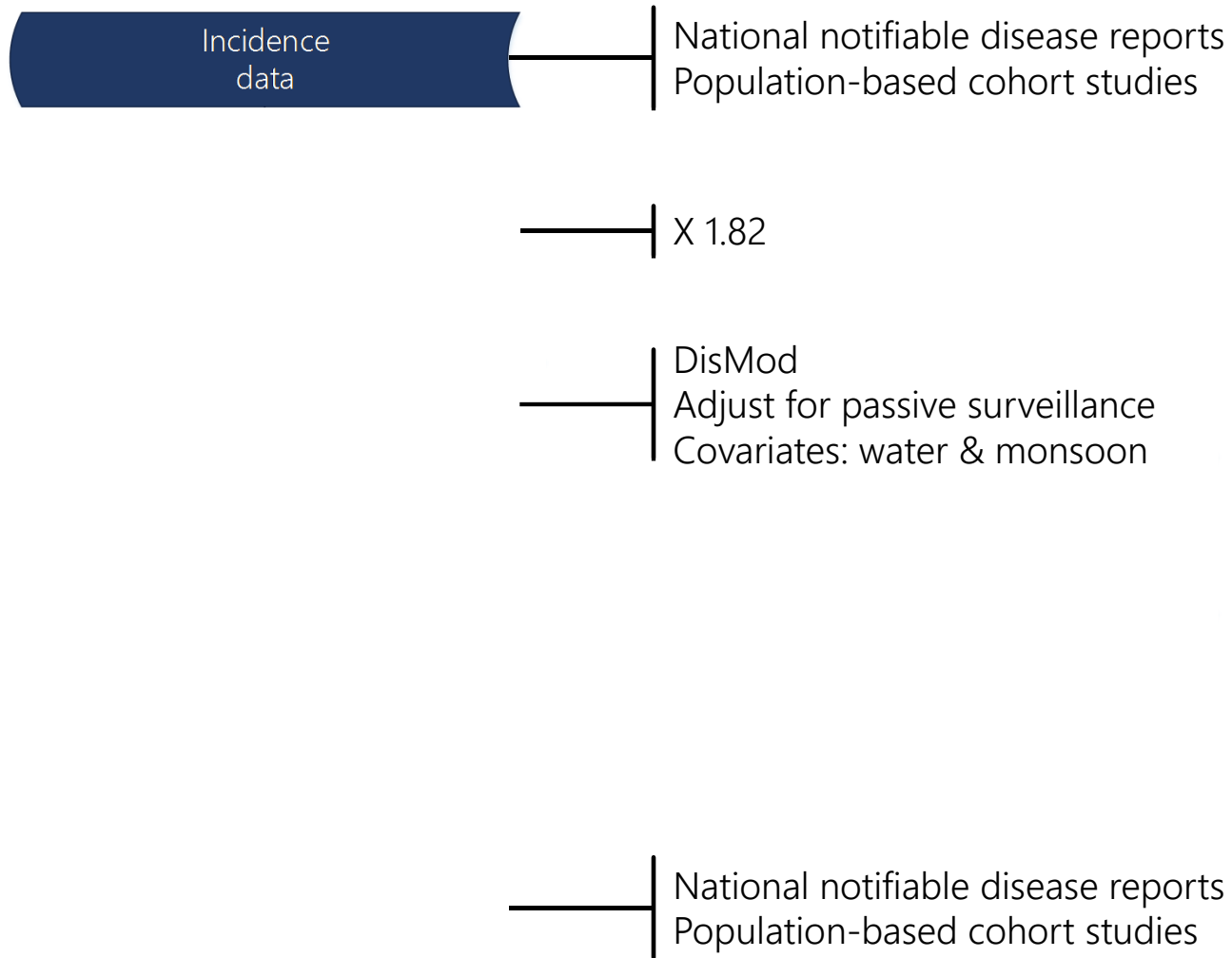




Acknowledgements

- Coalition Against Typhoid
 - Imran Khan
 - Nicole Bradstreet
- IHME Team
- GBD Collaborators:
 - John Crump
 - Zulfiqar Bhutta
- BMGF:
 - Anita Zaidi
 - Gretchen Meller
- IVI
 - Vittal Mogasale

Questions ?





Challenges

Challenges...

Limited data

Questionable data

Challenges...

Limited data

Questionable data

Questionable data...

Surveillance & reporting quality

Representativeness

Hospital- & surveillance-based case fatality

Reported proportions biased by severity

Challenges

Age pattern by income

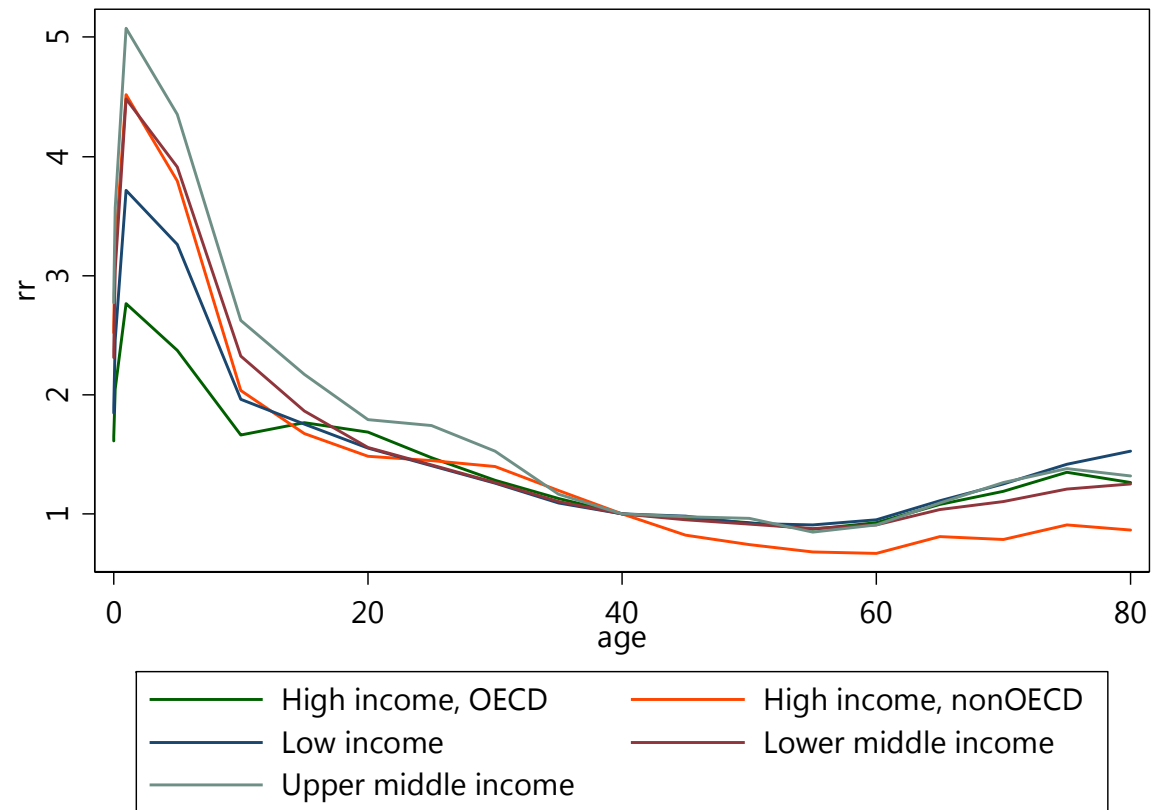


Chart Model Plots

Sequela Typhoid and paratyphoid f...

Model 24400 10/02/2014 09:0...

Plot Cascade **Age** Year

Type Incidence

Country Indonesia

Year 2005

Sex **Male** Female

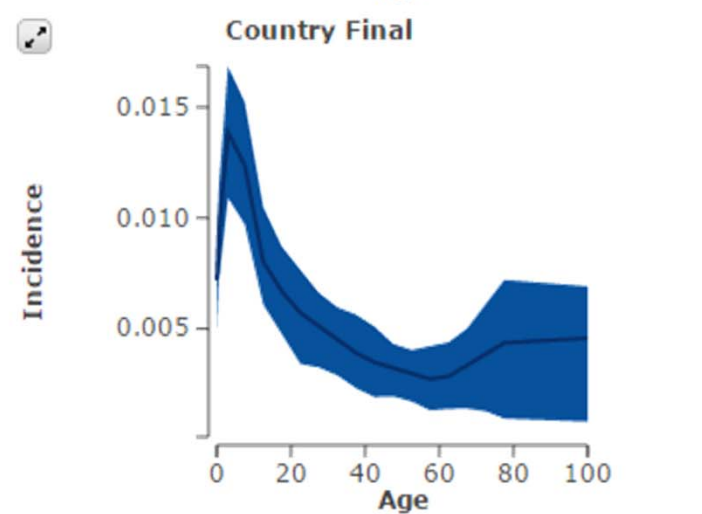
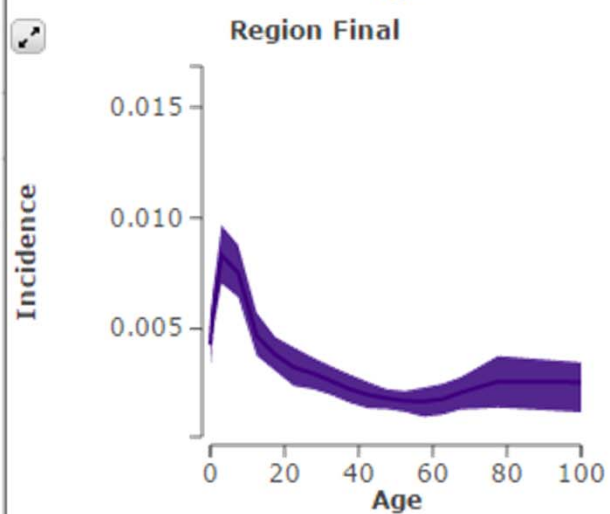
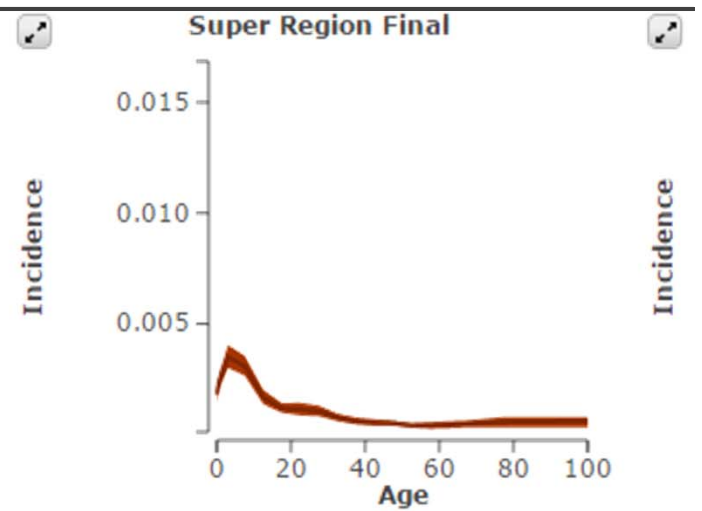
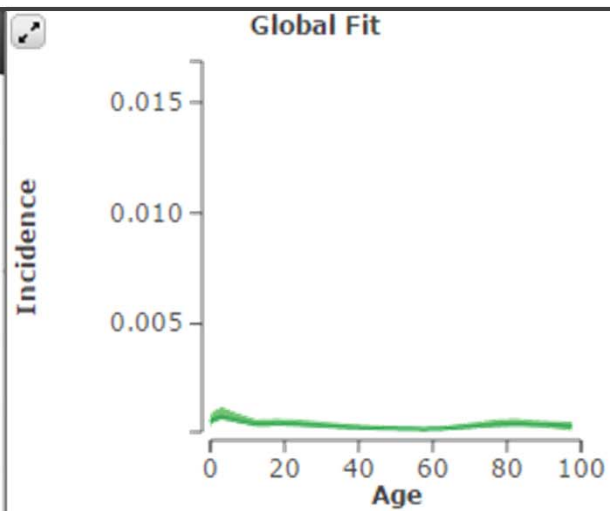
y-scale **Locked** Unlocked **Linear** Log

Manual **Automatic**

x-scale EN - 95

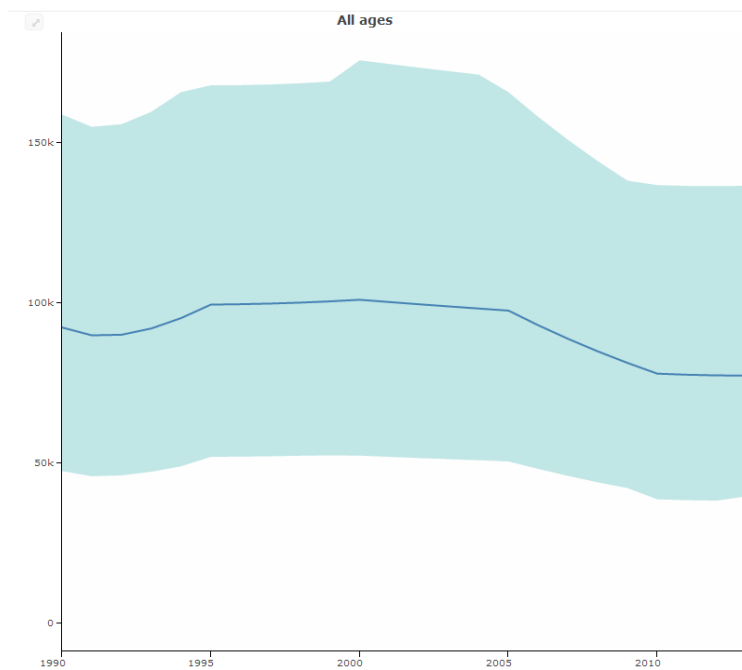
Overlays

- Global Fit
- Super Region Final
- Region Final
- Country Final
- Super Region Prior
- Region Prior
- Country Prior
- Input data

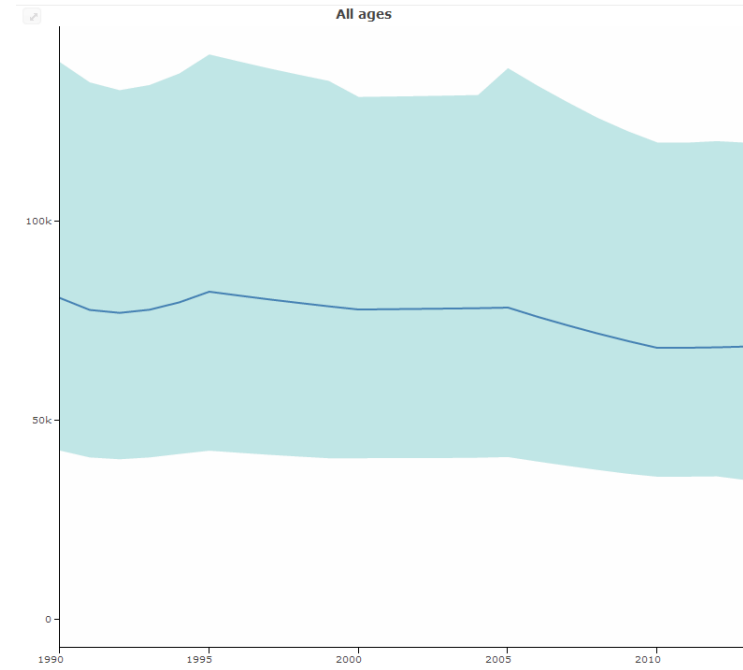


Typhoid deaths by year

Males



Females



Typhoid MRs by age (males, global)

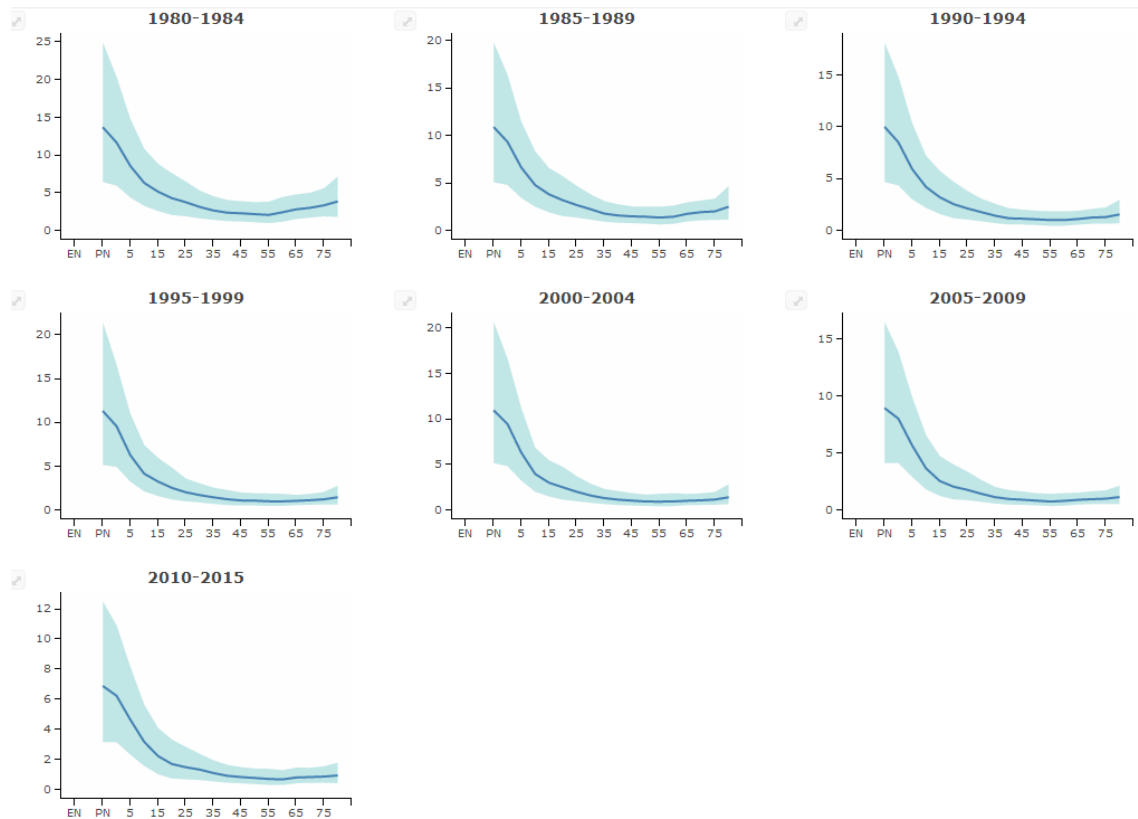


Chart Model Plots

Sequela Typhoid and paratyphoid f...

Model 24400 10/02/2014 09:0...

Plot Location **Age** Year

Type Incidence

Region South Asia

Year 2005

Sex **Male** Female

y-scale Locked **Unlocked** Linear Log

x-scale EN - 95

Overlays

- Input data
- Unadjusted
- Adjusted
- Residual
- Country Final
- Country Fit
- Country Prior
- Region Final
- Region Fit
- Region Prior
- Super Region Final
- Super Region Fit
- Super Region Prior
- Global Final
- Global Fit
- Mesh lines

Models Edit model View effects

