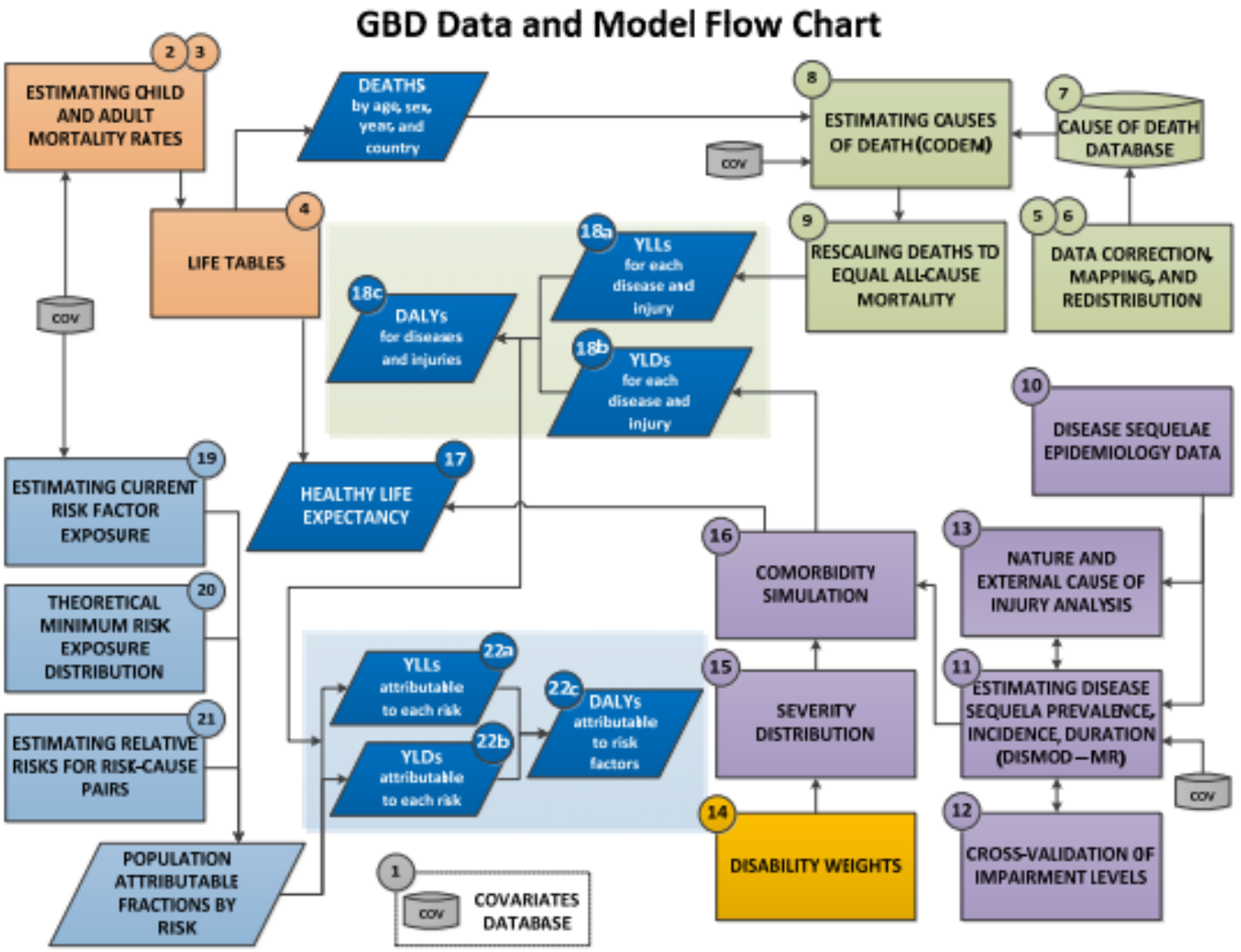
The Burden of Foodborne Disease – an IHME Perspective

David Pigott

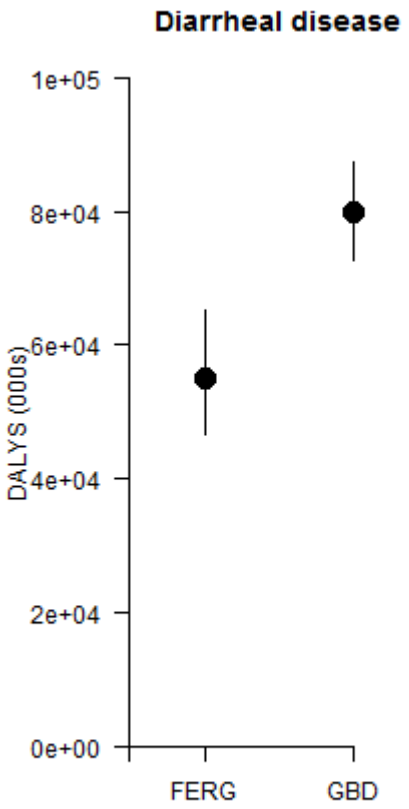
A brief recap of the GBD process

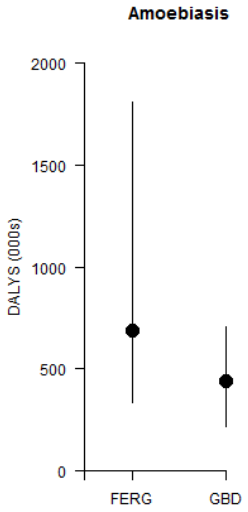


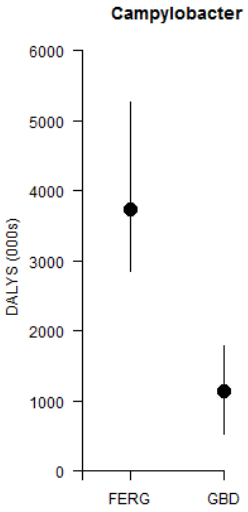
Overarching methodological differences

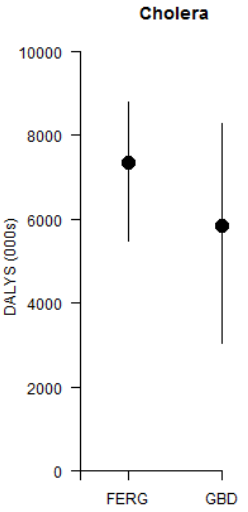
- Prevalence .v. Incidence
- Imputational differences
- Assumptions of sex ratios, age profiles, life tables, disability weights etc.
- All-inclusive analysis .v. specific focus on foodborne

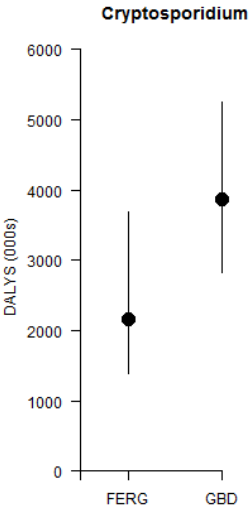
Diarrheal disease

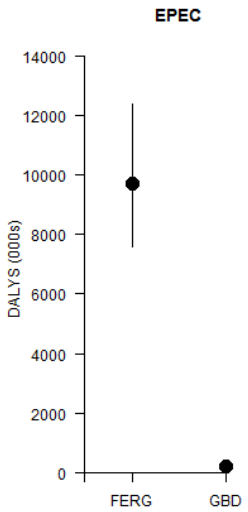


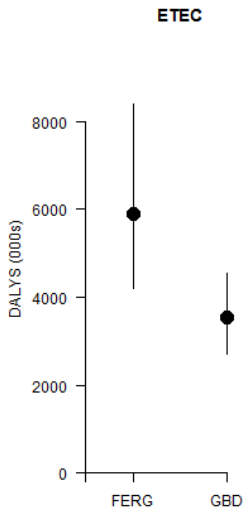


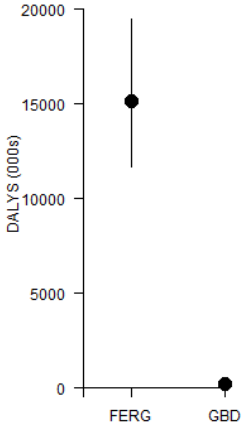


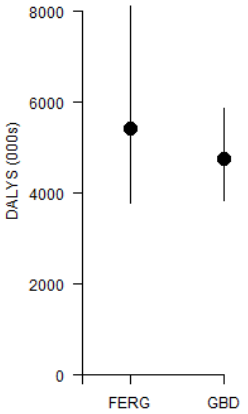






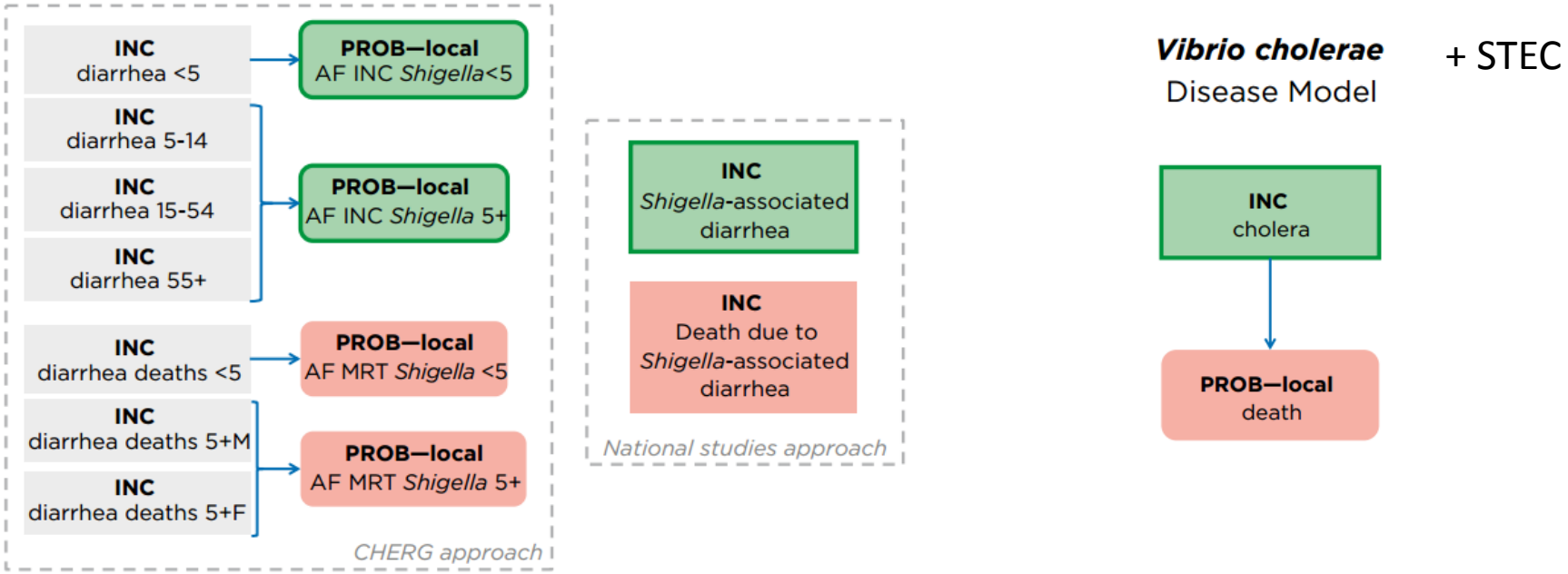






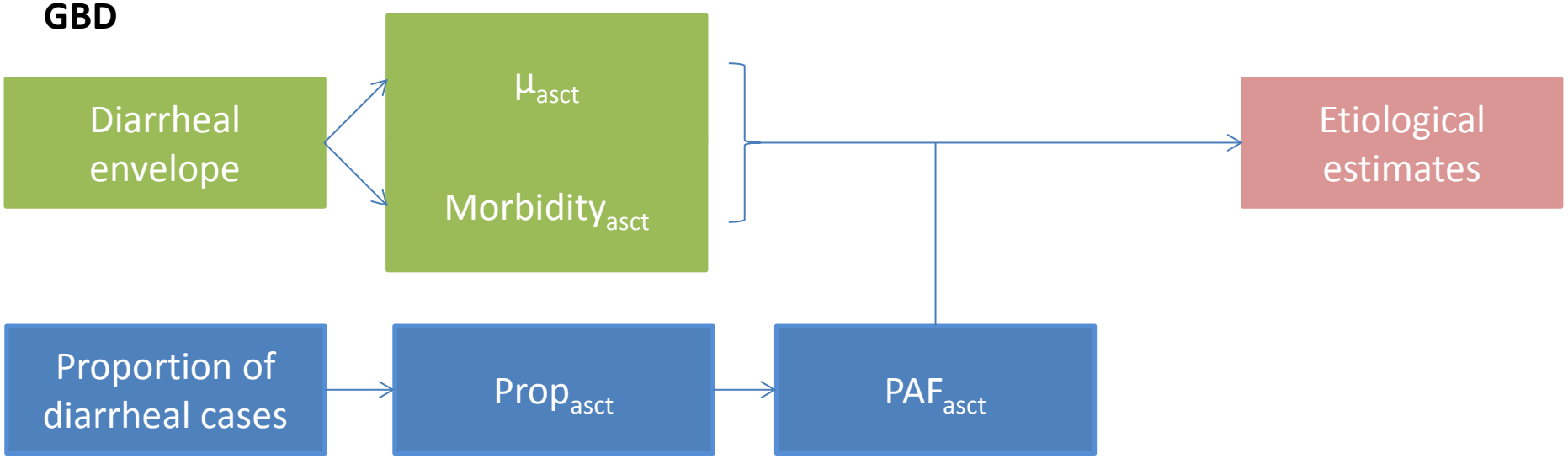
FERG

Shigella spp. Disease Model

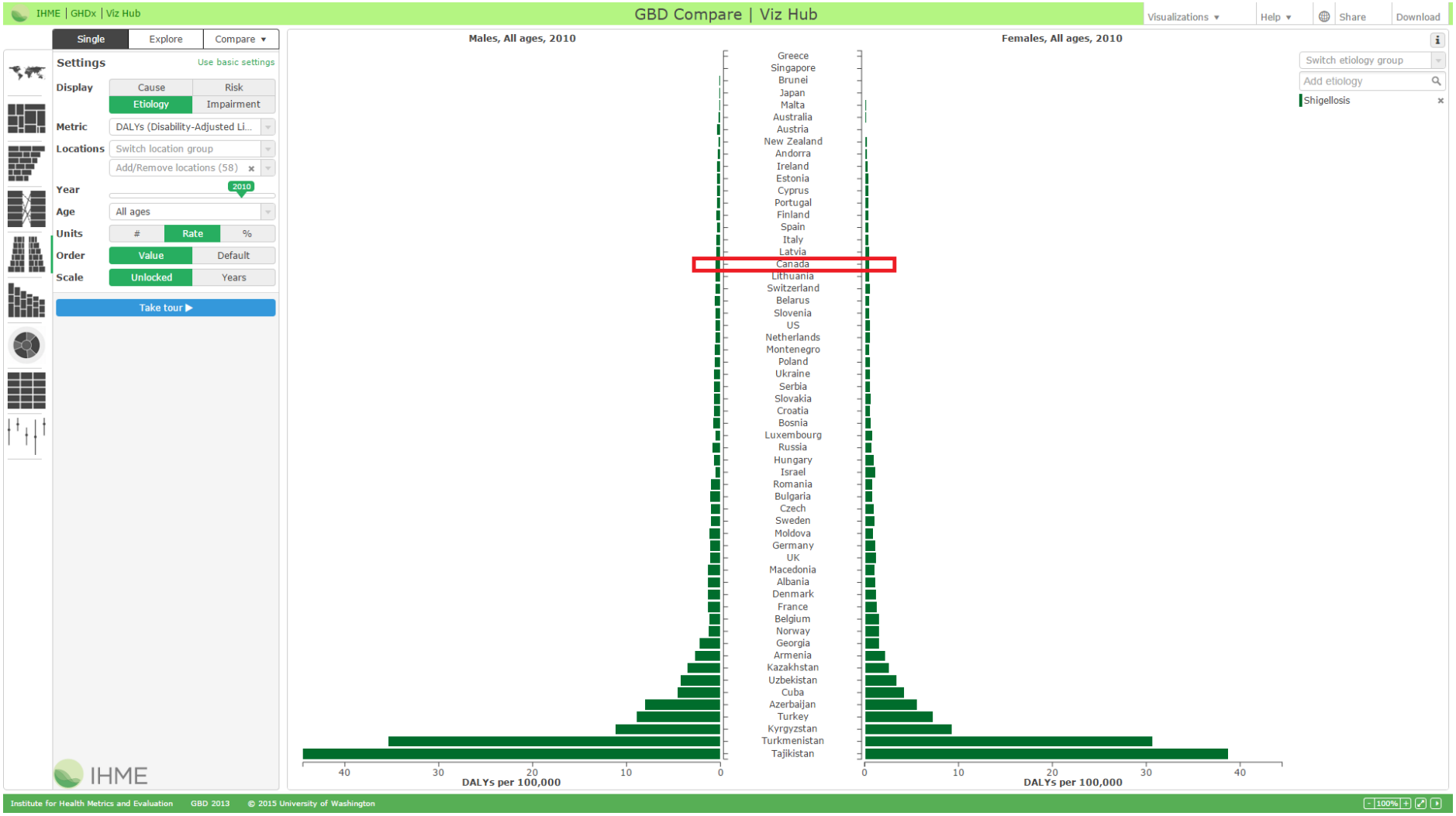


Vibrio cholerae Disease Model + STEC

GBD

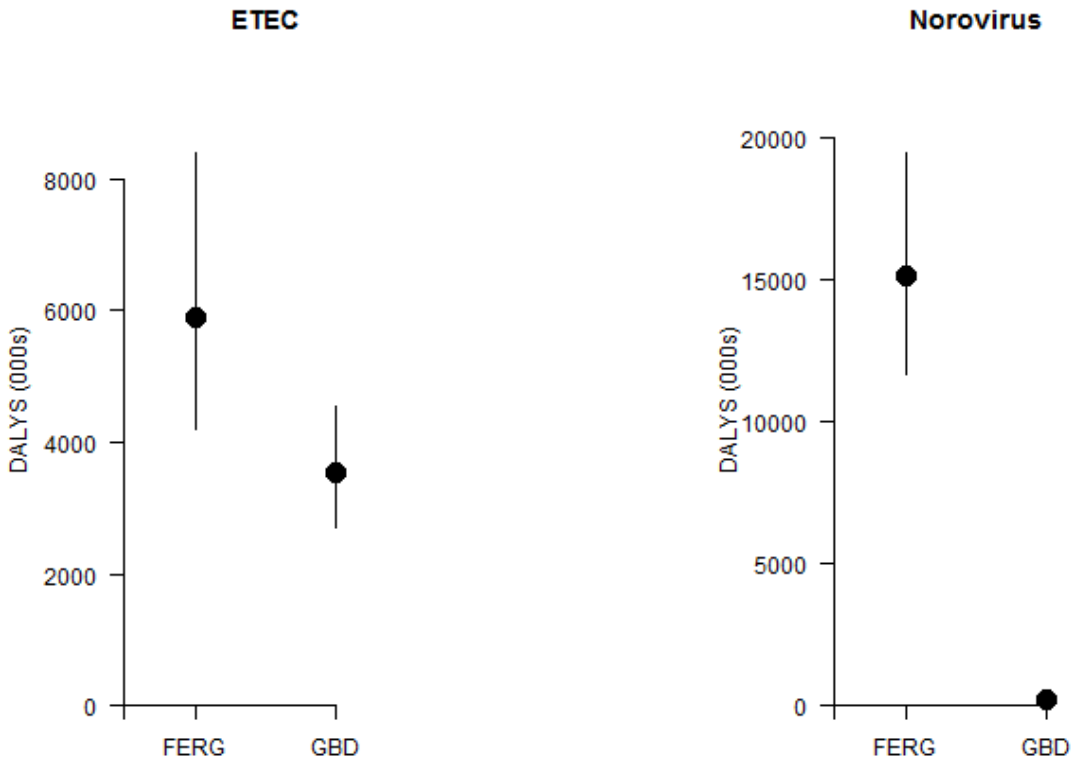


Assumptions of incidence



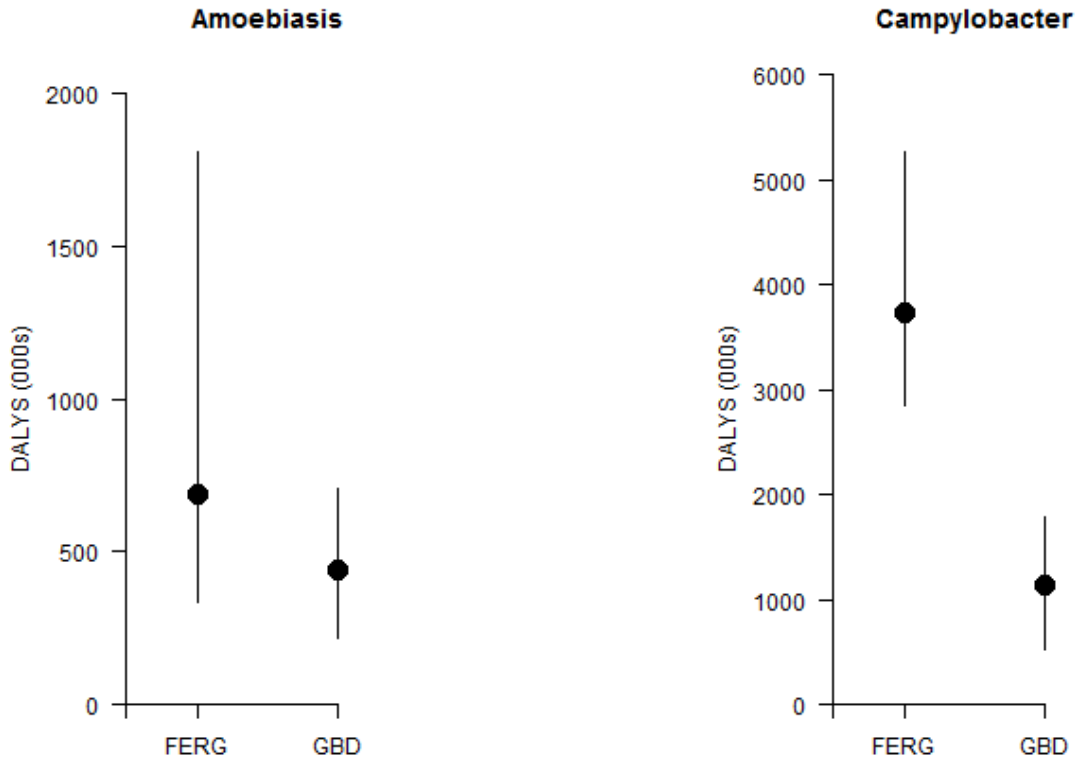
Assumptions of GEMS

- Likely accounting for the large variation amongst etiological agents

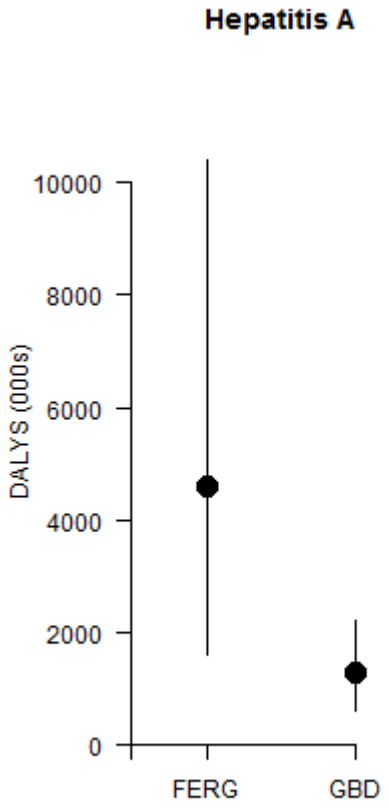


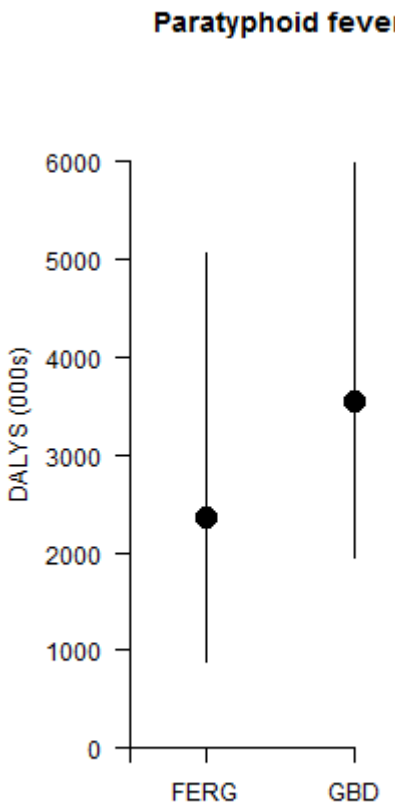
Assumptions of sequelae

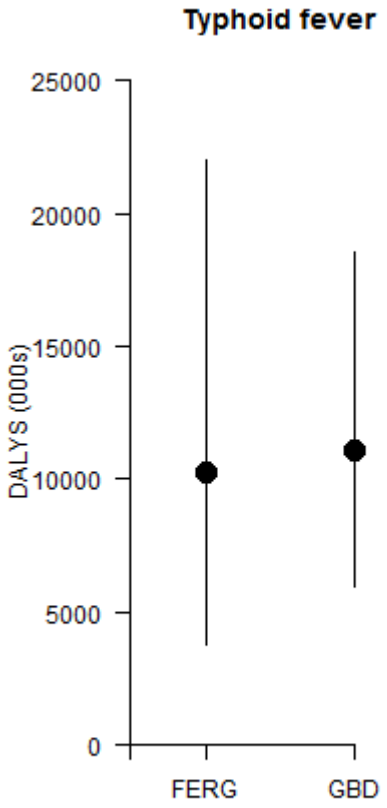
- Can have important consequences when comparing conditions



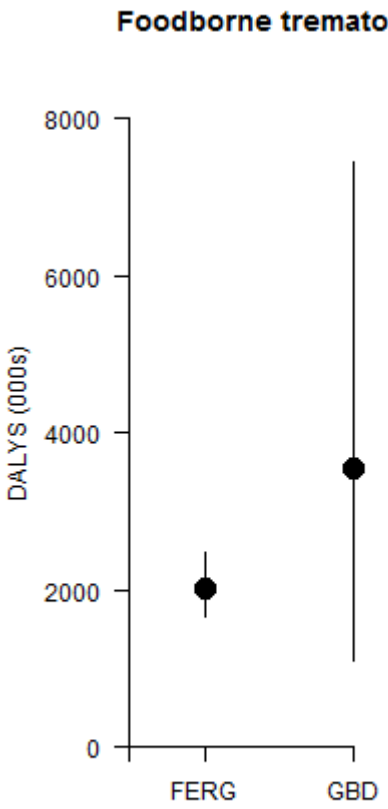
Shared invasive infectious diseases

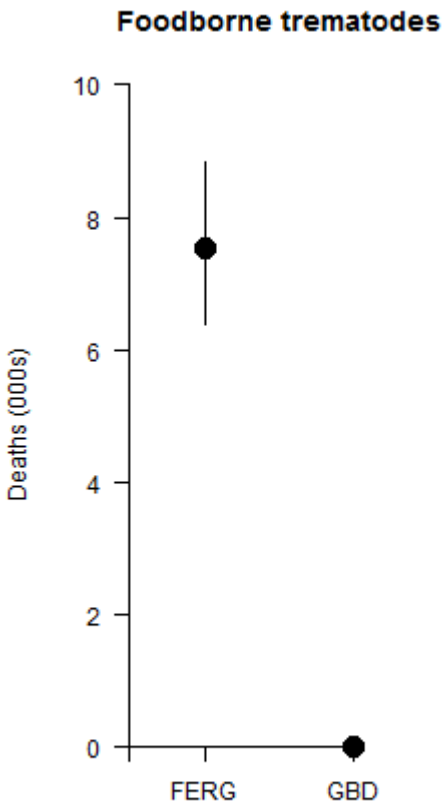






Foodborne trematodes





Cestodes within GBD

FERG Cestodes	GBD 2013 Cause
Echinococcus granulosus	Cystic echinococcosis
Echinococcus multilocularis	Other neglected tropical diseases (component)
Taenia solium	Cysticercosis

Missing specific categories from GBD

- Brucellosis
- Listeriosis
- Toxoplasmosis
- Trichinellosis
- FERG-priority chemicals and toxins

Attributing food-borne risk

- Attributing total Deaths and DALYs to food-borne pathways is unique to FERG approach
- Expert consultation – pros and cons
- What kinds of data are required? How can data be integrated with expert opinion?

GBD Risk Factor Analyses

- How much of disease burden in a given year can be attributable to past exposure to a risk

$$AB_{jasct} = \sum_{o=1}^{w} DALY_{oasct}\, PAF_{joasct}$$

$$PAF_{joasct} = \frac{\int_{x=l}^{u} RR_{joas}(x) P_{jasct}(x) dx - RR_{joas}(TMREL_{jas})}{\int_{x=l}^{u} RR_{joas}(x) P_{jasct}(x) dx}$$

- FERG Aflatoxin estimates already generated in similar way
- Critically, requires different type of data

Looking to the future?

- Improving the iterative feedback loop between different projects
- Maximising information currently available – across both spatial and temporal scales
- Looking to new sources of data – CHAMPS and Bloomberg Data for Health Intiative
- Working with those generating data to improve how is recorded
- Answering the right questions?

IHME / **CODEm-2010**

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Code Issues 0 Pull requests 0 Pulse Graphs

Cause of Death Ensemble Model

4 commits 1 branch 0 releases 1 contributor

Branch: master New pull request New file Find file HTTPS https://github.com/IHME/COD Download ZIP

kforeman update publication year Latest commit 8dacd5f on 14 May

covariate_selection	Initial commit	7 months ago
model	Initial commit	7 months ago
.gitignore	Initial commit	7 months ago
LICENSE	Initial commit	7 months ago
README.md	update publication year	7 months ago

README.md

This is the CODEm model for estimating cause-specific mortality as described in Foreman et al 2012. It was used in GBD 2010, GBD 2013, and several other cause-specific mortality papers. This version of CODEm is no longer under active development.

GHDx

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Control of Foodborne Trematode Infections 1995

WHO Technical Report Series 849. Control of Foodborne Trematode Infections. Report of a WHO Study Group

01/1991 - 12/1993

Report

GHDx Entry last modified on: Jun 17, 2015

Joint WHO/FAO Workshop on Foodborne Trematode Infections in Asia

01/2002 - 12/2004

Report

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Epidemiological studies of digenetic trematodes in Yongyang County, Kyungpook Province

01/1989 - 12/1990

Scientific literature

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Korea, South - Collected Papers on Parasite Control in Korea

01/1981 - 12/1992

Report

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Opisthorchiasis control in Thailand

01/2001 - 12/2001

Scientific literature

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Geographical distribution of clonorchiasis in Anhui province

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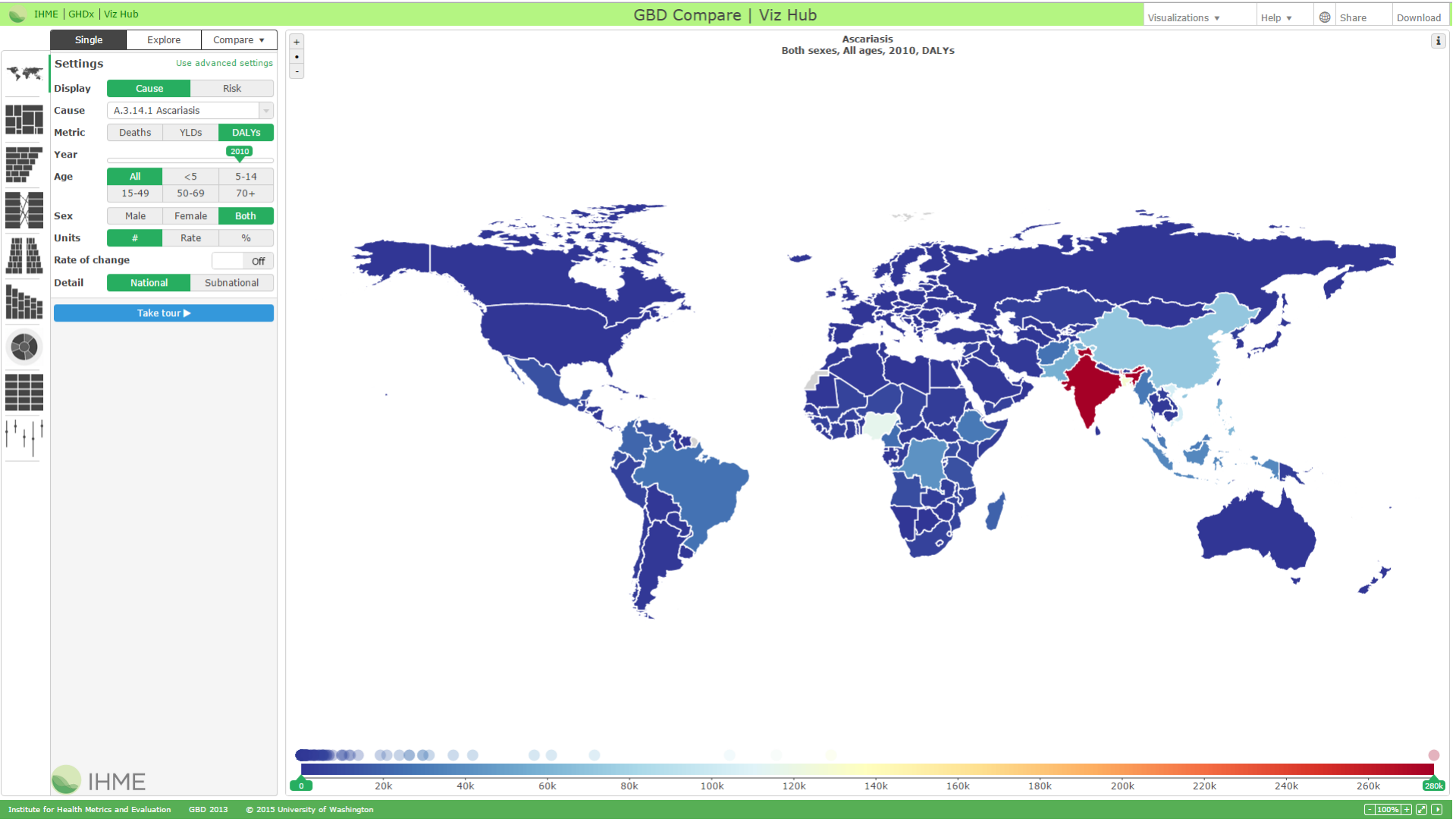
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Deaths
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Take tour
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Both sexes, All ages, 2010, DALYs
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220k
240k
260k
280k
IHME
Institute for Health Metrics and Evaluation
GBD 2013
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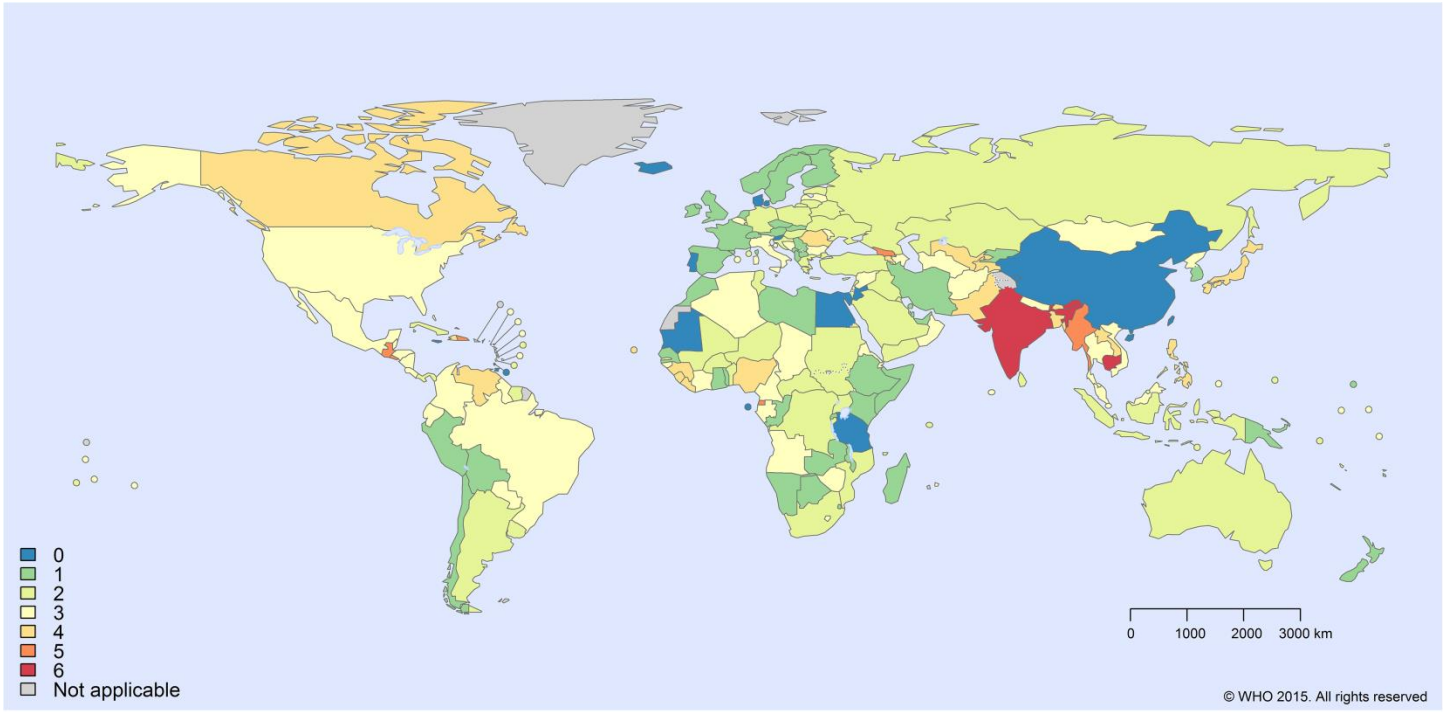
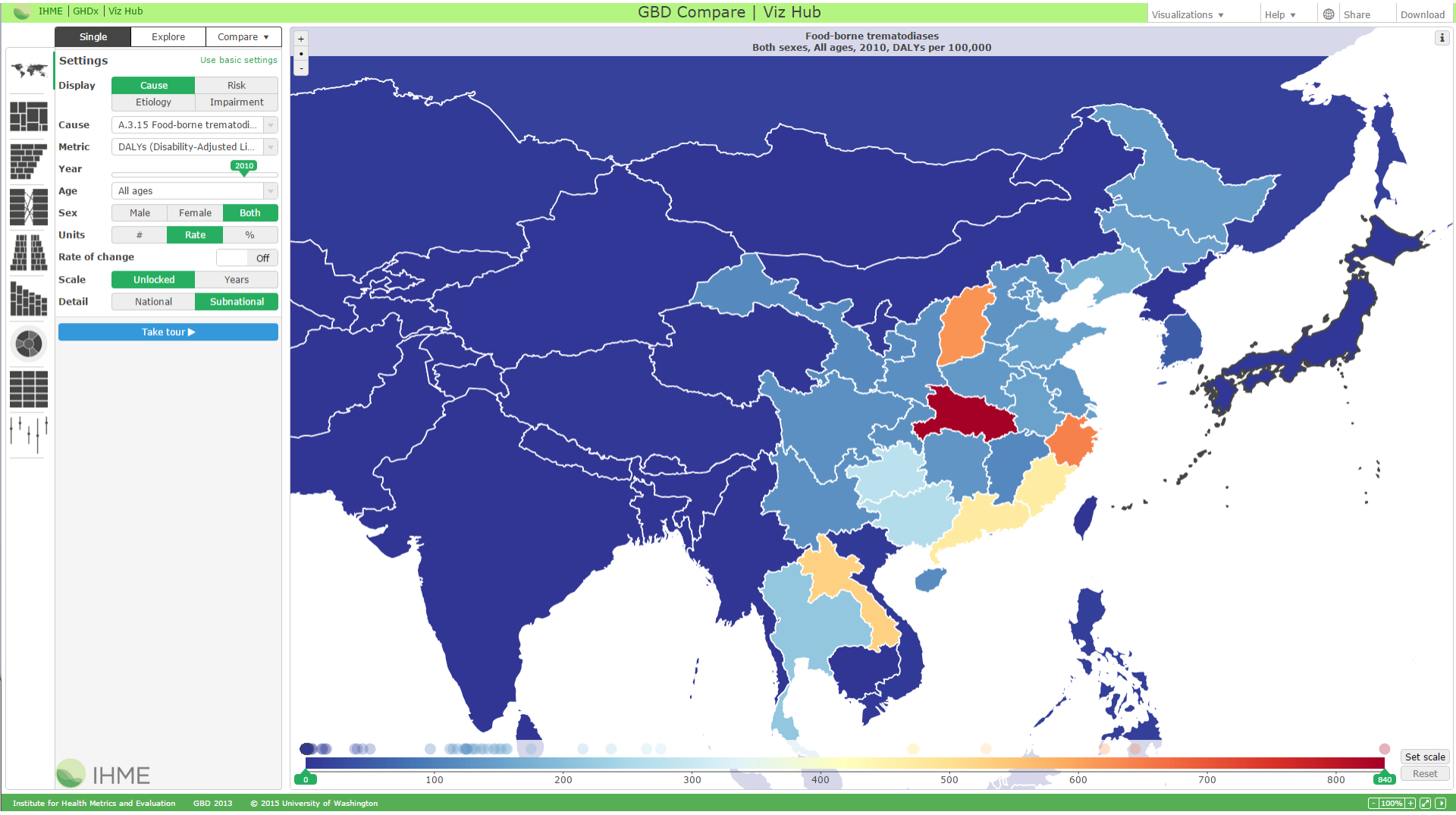
Leveraging existing data

- Data varies in quality and coverage
- How best impute to maximise data we do have

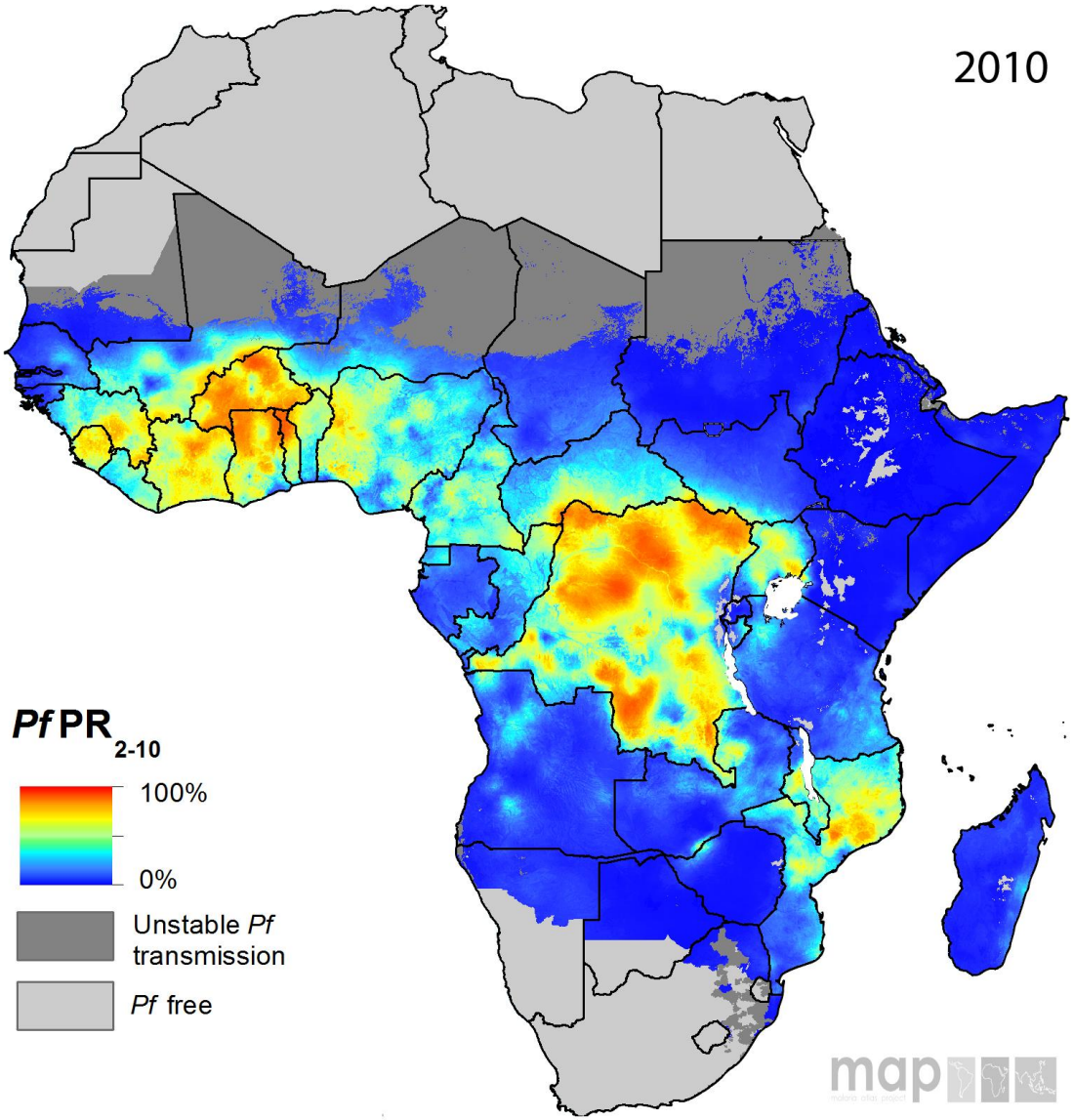


Torgerson *et al.* (2015) PLoS Med – Missing data for parasitic disease hazards

Subnational estimation – by administrative level



Subnational estimation – what sufficient data can allow for



Bhatt *et al.* (2015) Nature

Acknowledgements

- Global Burden of Disease team
  - Theo Vos, Juanita Haagsma and Chris Troeger for providing help on details

Thank you for listening!