

Burden of diarrhoea from WASH: process and lessons learned

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World Health
Organization

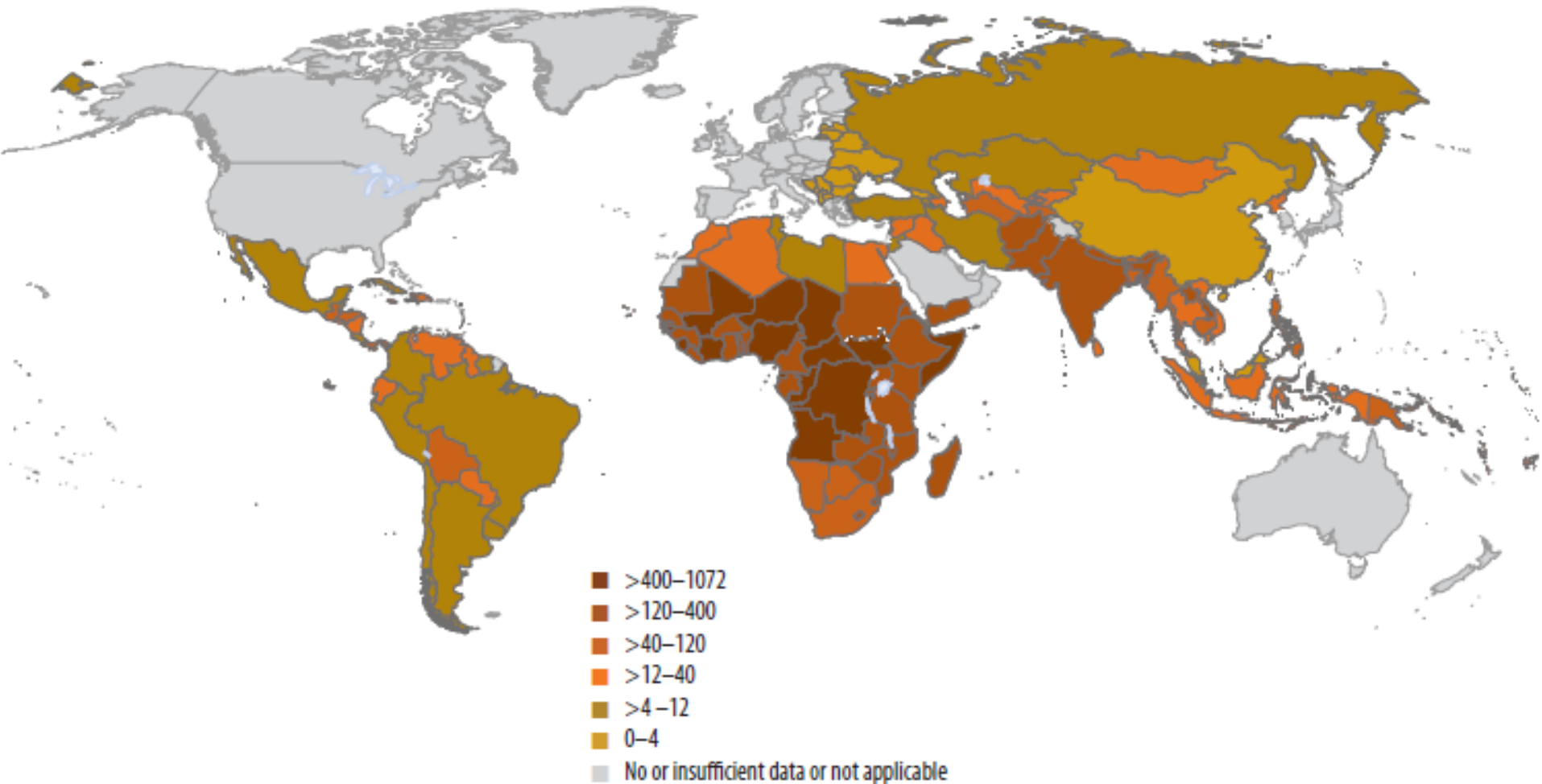
Why estimate EBD?

Useful for :

- Awareness raising
- Communicating
- Provide rational basis for prioritizing public health actions
- Basis for economic evaluation
- Engaging other sectors

Global map of diarrhoeal deaths due to inadequate WASH, 2012

(annual deaths per million population)

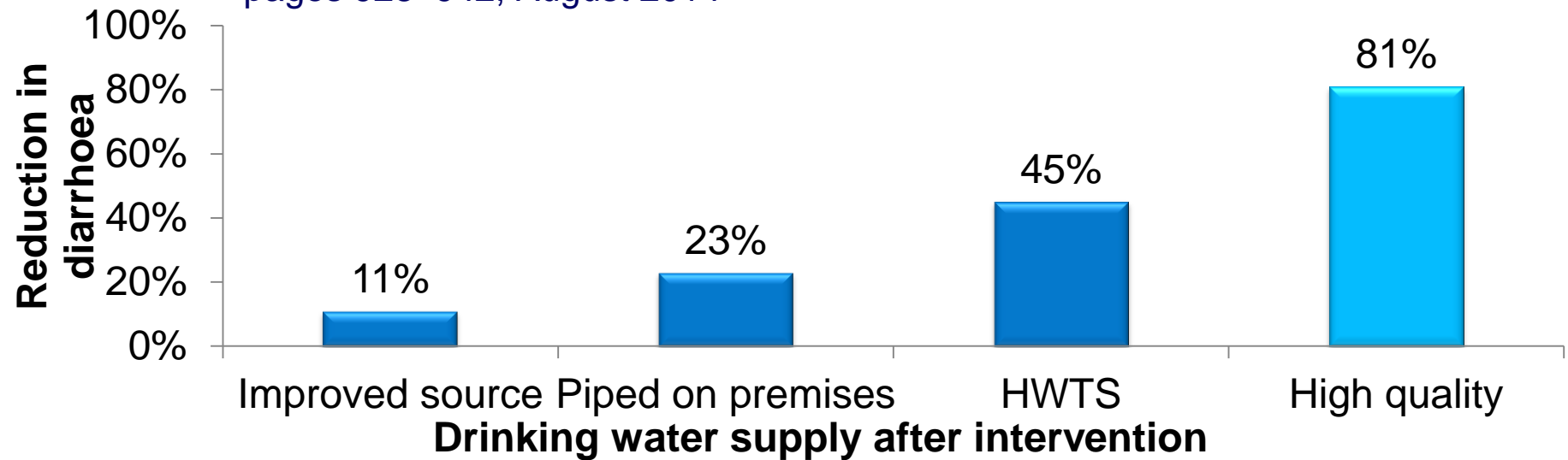


Process –

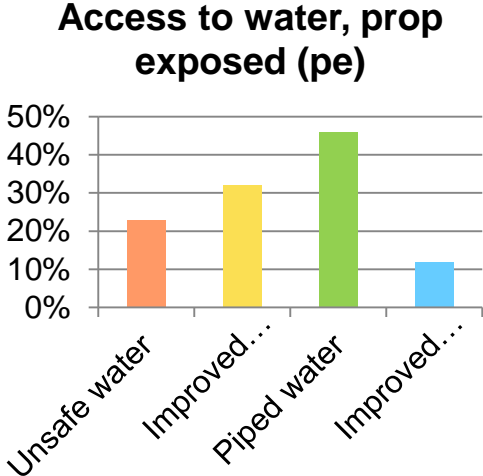
1. Exposure response for drinking water and diarrhoea

- Systematic review of the literature for exposure-response matching exposure information
 - Meta-regression on WSH and DD, input from expert group

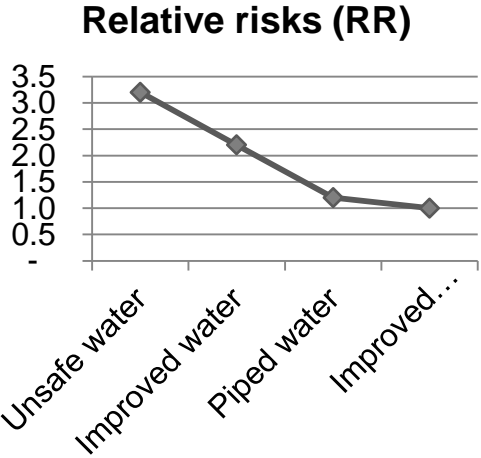
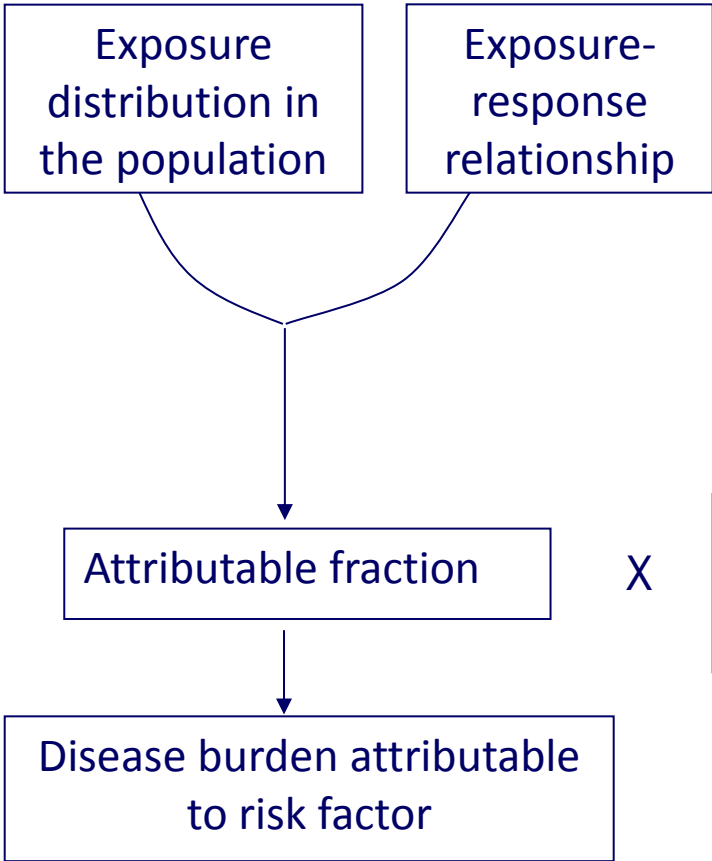
Systematic review: Assessing the impact of drinking water and sanitation on diarrhoeal disease in low- and middle-income settings: systematic review and meta-regression, *Tropical Medicine & International Health*, Volume 19, Issue 8, pages 928–942, August 2014



Comparative risk assessment for estimating disease attributable burden



$$AF = \frac{\sum (Pe_x \cdot RR_x) - 1}{\sum (Pe_x \cdot RR_x)}$$



Disease burden estimates per disease, or epidemiological data
Incidence, mortality, DALYs

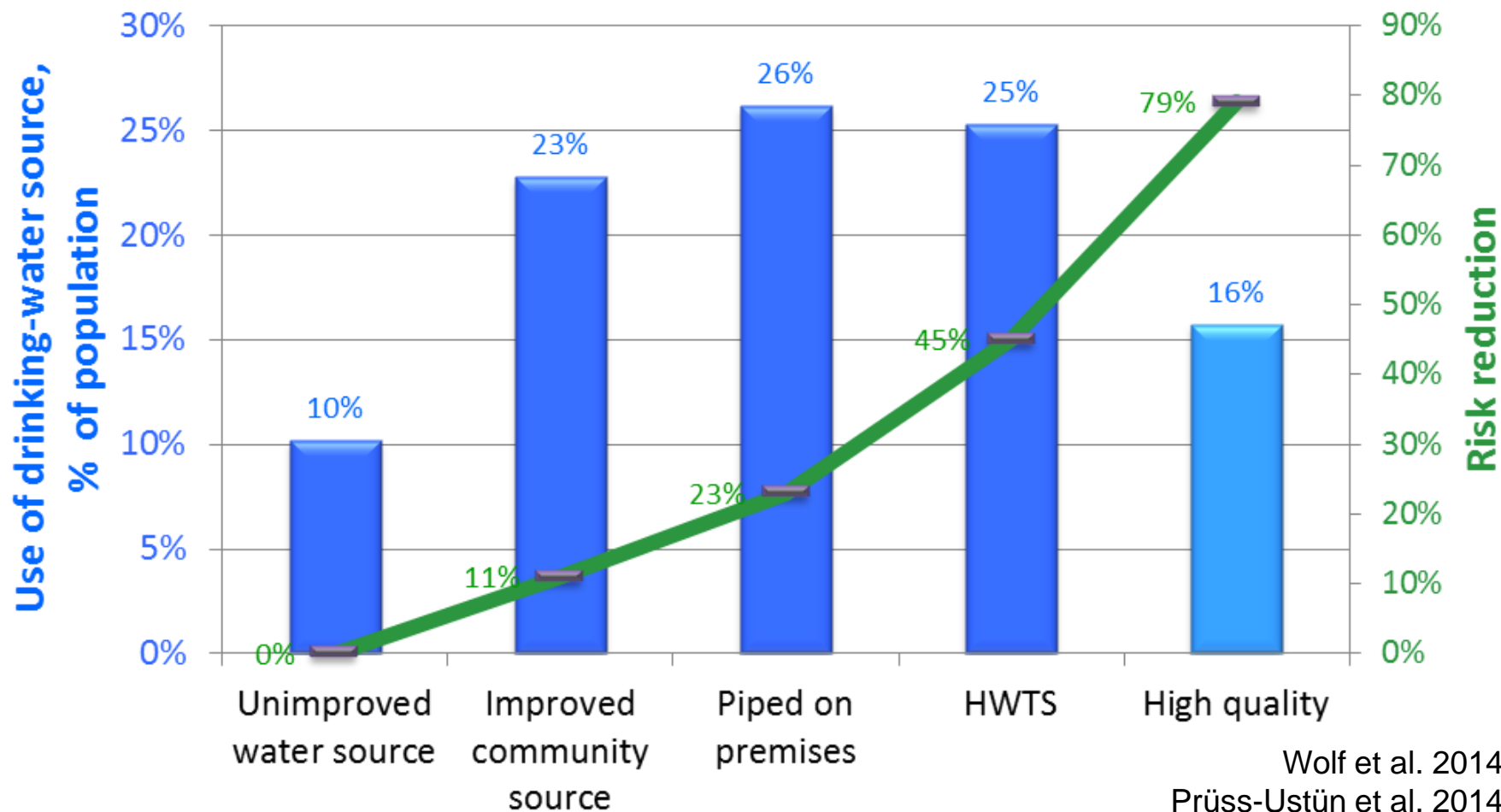
Attributable incidence, mortality, DALYs

Process –

2. Exposure synthesis matching the exposure response curve

- Retrieve data from the WHO/UNICEF Joint Monitoring Programme
- Complete with data from DHS on household water treatment practices
- Model exposure for current year

World's use of drinking-water sources, and associated risk reductions



Process –

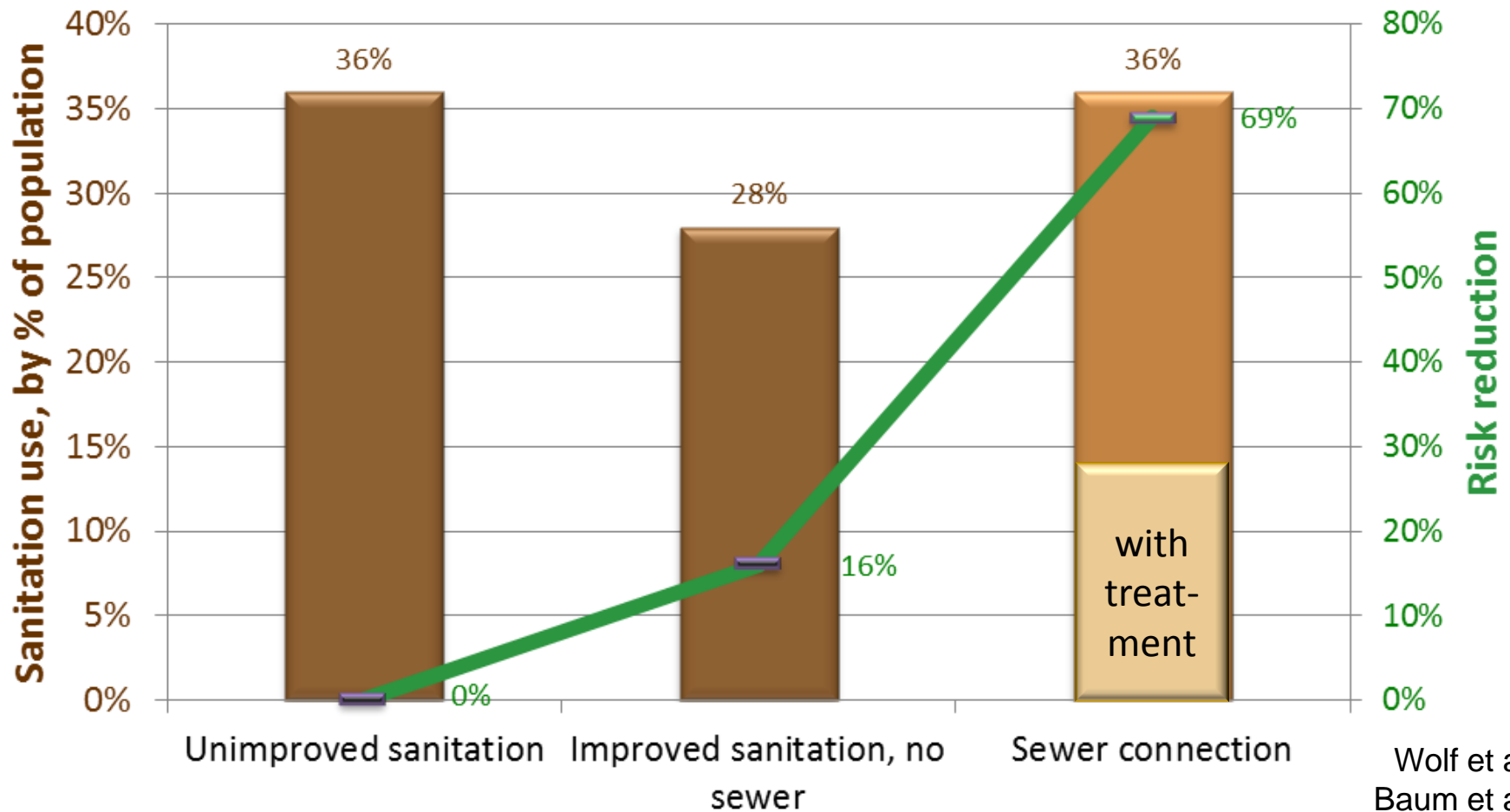
3. Estimate PAF and multiply with disease statistics

- Calculate the PAF

$$AF = \frac{\sum (Pe_x \cdot RR_x) - 1}{\sum (Pe_x \cdot RR_x)}$$

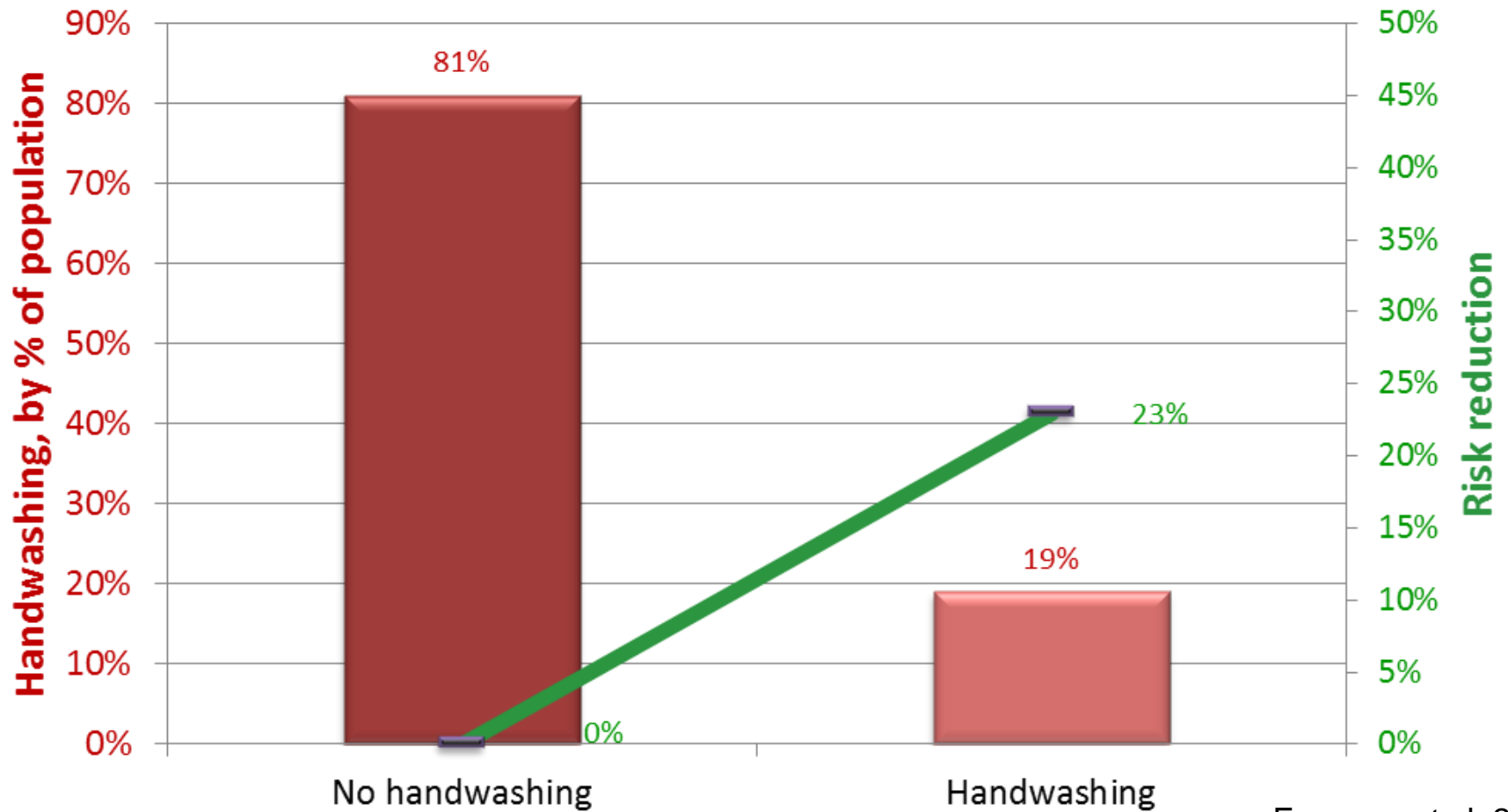
- Multiply with the number of deaths / disease burden for the specific disease
 - Diarrhoea is available
 - 133 diseases and injuries available from WHO
 - A few more from IHME

World's use of sanitation facilities, and associated risk reductions



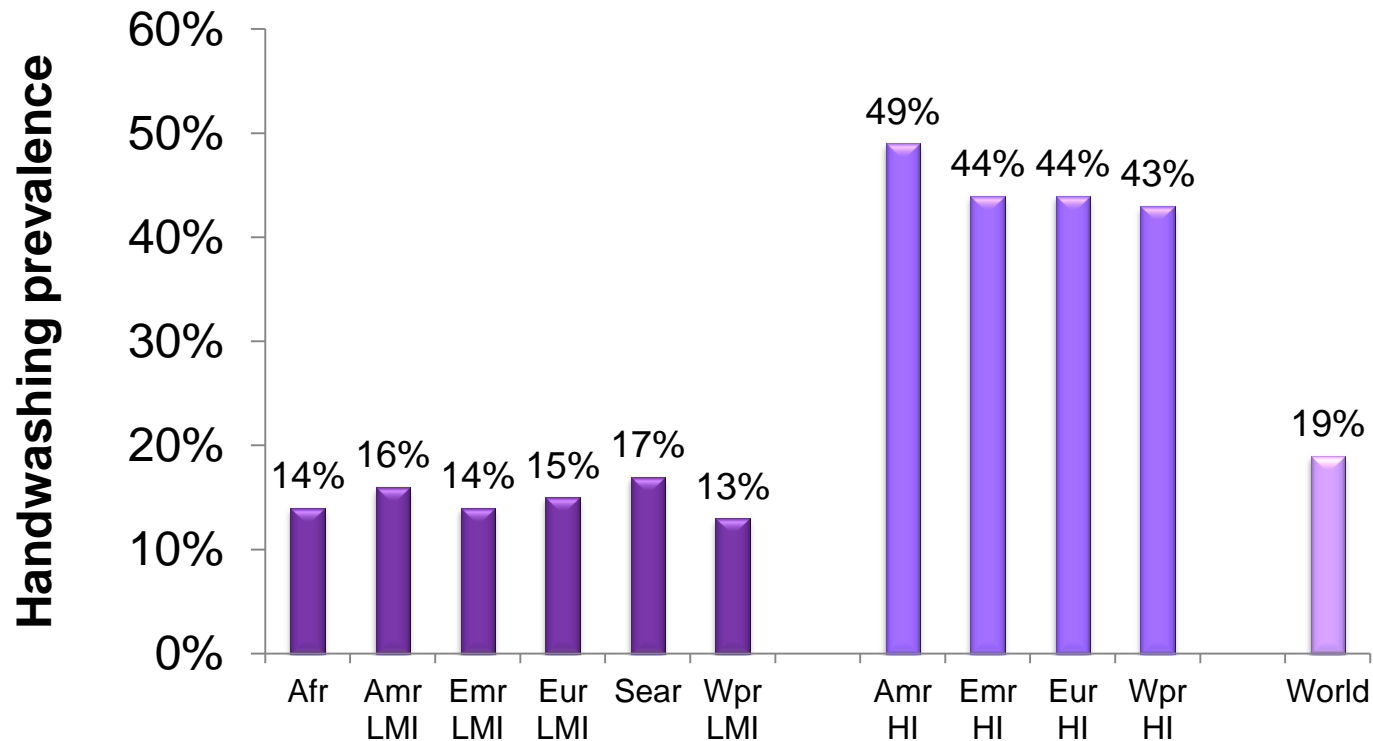
Wolf et al. 2014
 Baum et al. 2013
 Prüss-Ustün et al. 2014

World's handwashing after potential contact with excreta, and associated risk reductions



Freeman et al. 2014

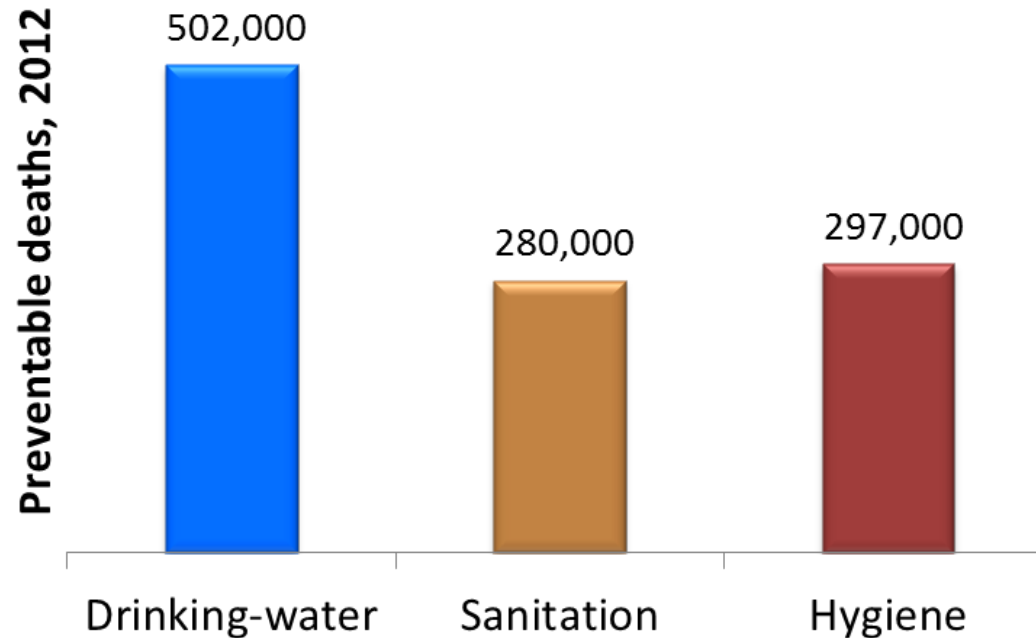
Handwashing after toilet use



Freeman et al. 2014

Diarrhoea burden from WASH

- 842 000 diarrhoea deaths
- 362 000 child deaths
- 58% of diarrhoeal disease
- 1.5% of all deaths



Prüss-Ustün et al. 2014

Limitations

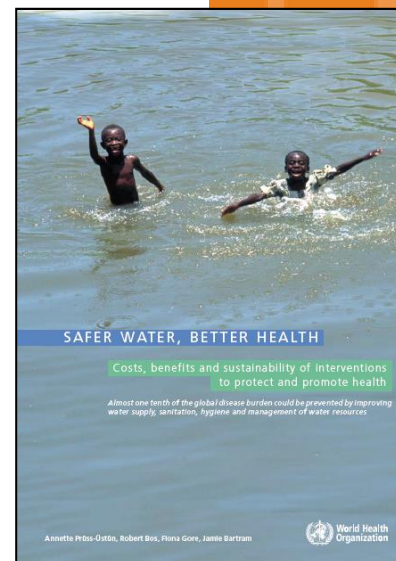
- Drinking-water assessments are based on the use of facilities, rather than the actual water quality.
- Exposure-response relationships are limited for certain scenarios, such as drinking water of safe quality/ continuous supply, community sanitation or handwashing.

Conclusions

- BoD estimation requires:
 - Established causality
 - Exposure-response relationship
 - Systematically compiled / accepted by the scientific community
 - Matching exposure data, representative for the world, or region of interest (or extrapolation possible)
- Limited information is acceptable to a certain point as long as hypotheses are clear and estimates are transparent, and the underpinning evidence "sufficient".

Further reading and upcoming results

- Full information on diarrhoea burden from WASH in 5-paper series in August 2014 issue TMIH
- Updates on other WASH-related diseases in preparation



A team effort



World Health Organization

WATER, SANITATION AND HYGIENE
WASH FOR HEALTH

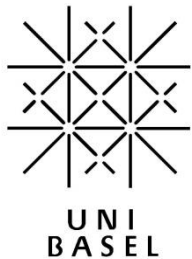


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