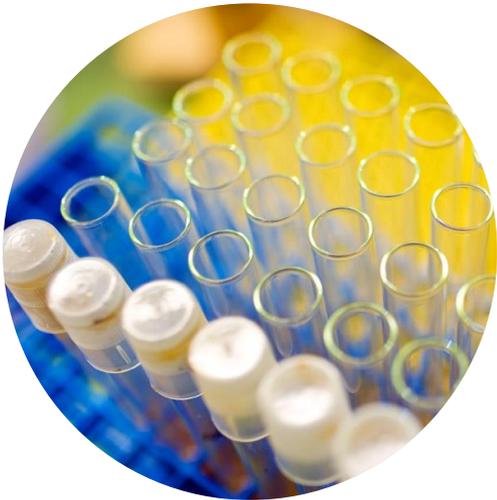


Burden of foodborne disease in Ethiopia

Estimates of Pull-Push project to inform national food safety management

12 December 2023, Dr. Coen van Wagenberg, Wageningen Economic Research

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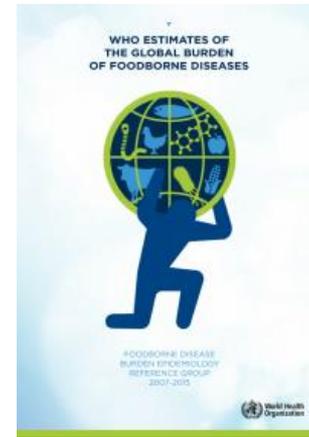


What is burden of foodborne disease?

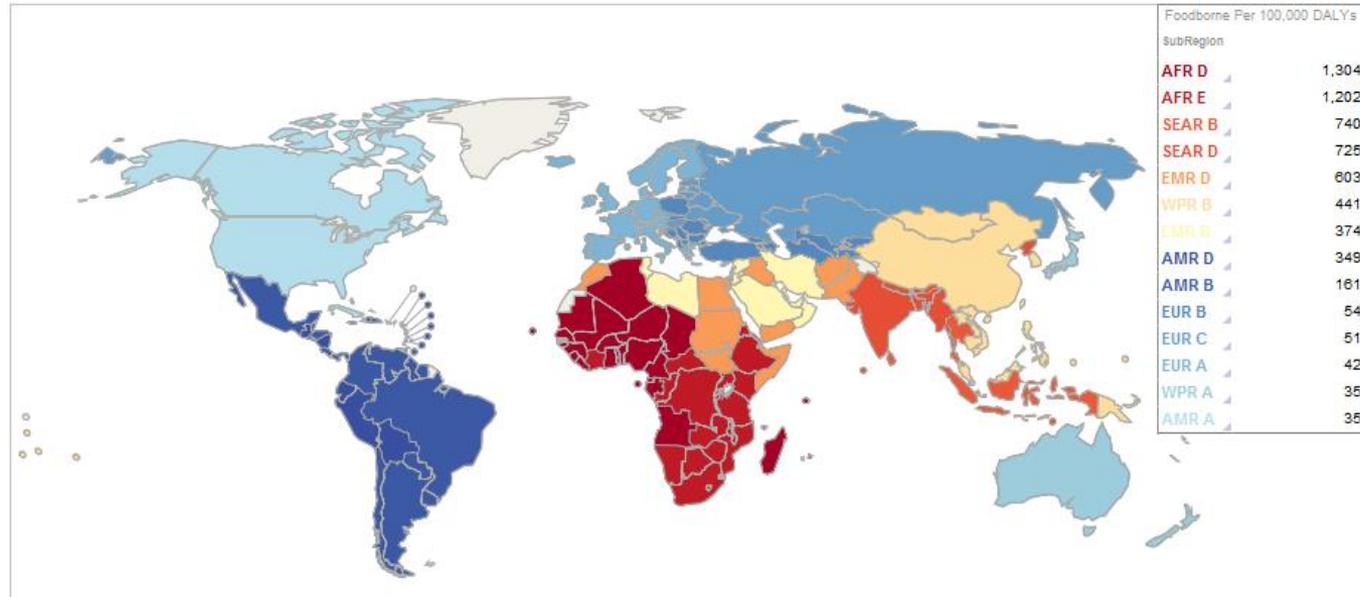
- Health burden of foodborne disease
 - Cases, deaths, Disability-Adjusted Life Years (1 DALY = 1 healthy life year lost, summary measure of population health)
- Economic costs of foodborne disease
 - Willingness to pay (WTP) to reduce risk of death
 - WTP to reduce risk of pain and suffering
 - Productivity losses
 - Medical treatment costs
 - (Individual expenditures on illness prevention)

Global burden of foodborne disease in 2010

- WHO: Foodborne Disease Burden Epidemiology Reference Group (FERG)
- Global and regional cases, deaths and DALYs for 31 foodborne hazards in 2010



Global burden of foodborne disease in 2010



- All hazards: 600M illnesses; 420k deaths; 33M DALY
- Diarrheal hazards: 550M illnesses; 230k deaths; 18M DALY

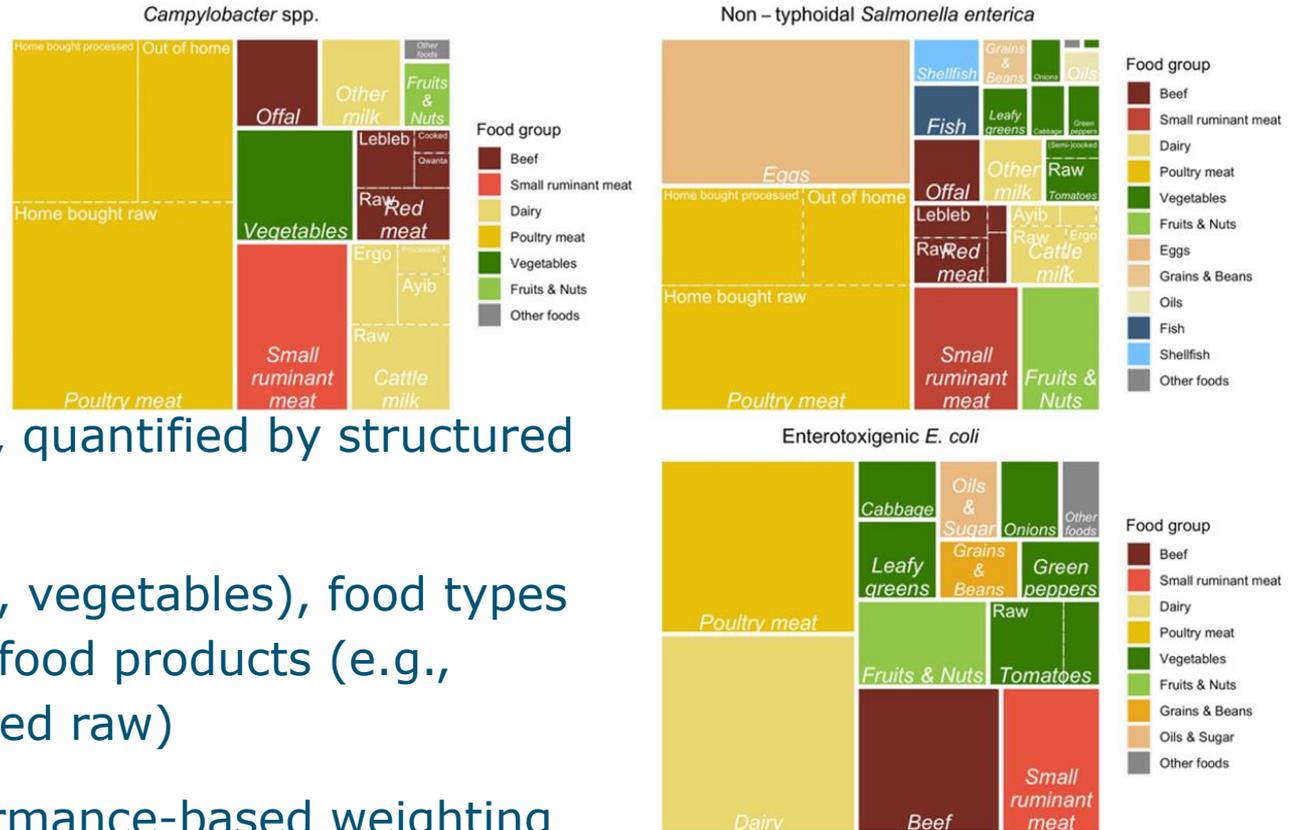
Health burden foodborne disease in Ethiopia 2017

Hazard	Incidence (×1,000)	Incidence per 100,000	Mortality	Mortality per 100,000	DALY (×1,000)	DALY per 100,000
<i>Campylobacter</i> spp.	2,800 (310–8,600) [^]	2,640 (300–8,100)	704 (320–1,160)	0.66 (0.30–1.09)	62.6 (28.6–102)	58.8 (26.9–95.9)
Enterotoxigenic <i>E. coli</i>	1,070 (140–2,680)	1,000 (130–2,510)	1,170 (180–2,440)	1.09 (0.16–2.30)	91.3 (13.8–193)	85.8 (13.0–181)
Non-typhoidal <i>S. enterica</i>	1,110 (100–3,290)	1,050 (100–3,090)	1,420 (320–2,450)	1.33 (0.30–2.30)	101 (22–175)	95.1 (20.8–165)

[^]Mean (95% uncertainty interval).

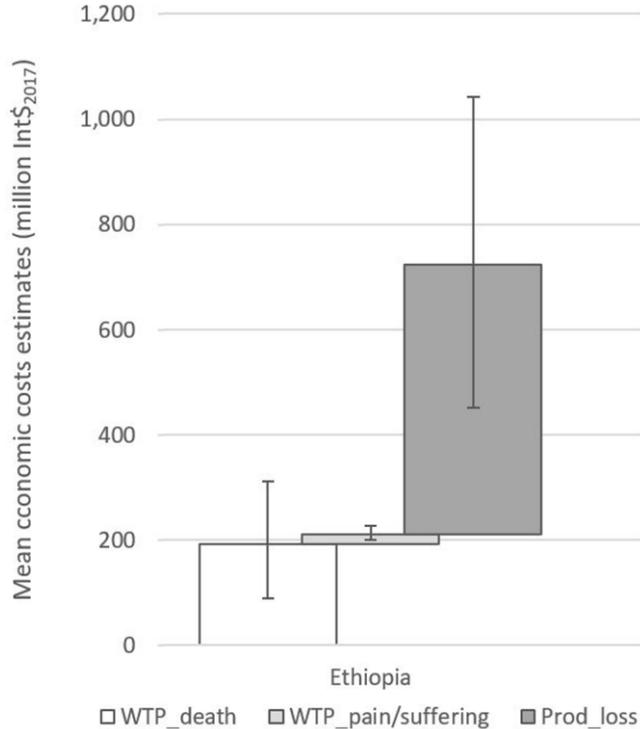
- ~5 million cases (1 of 20 people got sick), ~3.3k deaths, ~255k healthy life years lost (0.2% total healthy life expectancy)
- Total health burden of foodborne disease at least twice as high
- Children under 5 (15% of population) bear 49% of health burden of *Salmonella* and 63% of health burden of *Campylobacter* and ETEC

Attribution to food products



- Large uncertainty, quantified by structured expert elicitation
- Food groups (e.g., vegetables), food types (e.g., tomatoes), food products (e.g., tomatoes consumed raw)
- 12 experts, performance-based weighting

Cost of foodborne disease in Ethiopia in 2017

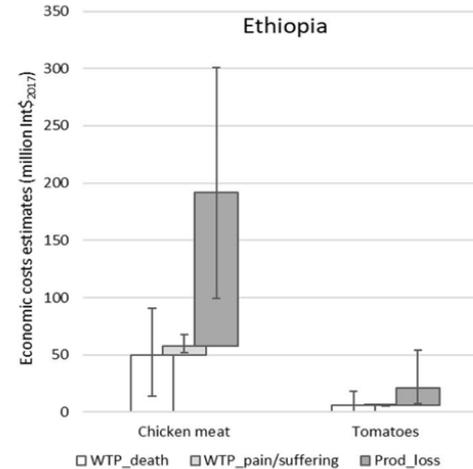
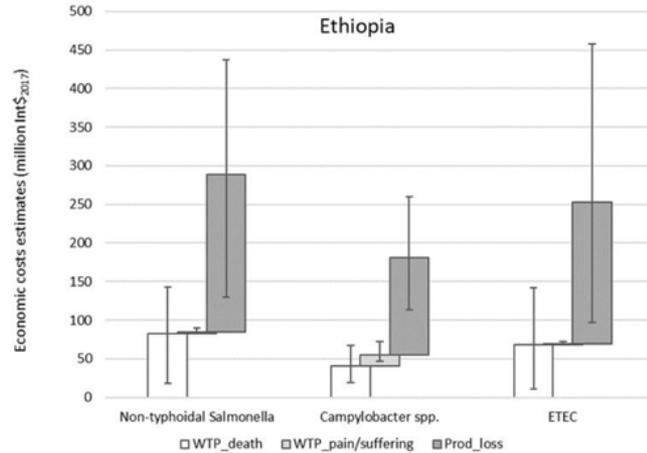


- Three pathogens, all foods: 723 million Int\$2017
- 0.9% of Gross National Income in 2017
- Productivity losses 513 million Int\$2017 (71%)
- WTP death 192 million Int\$2017 (27%)
- WTP pain/suffering 18 million Int\$2017 (2%)

Hospital study medical costs
144 million Int\$2020

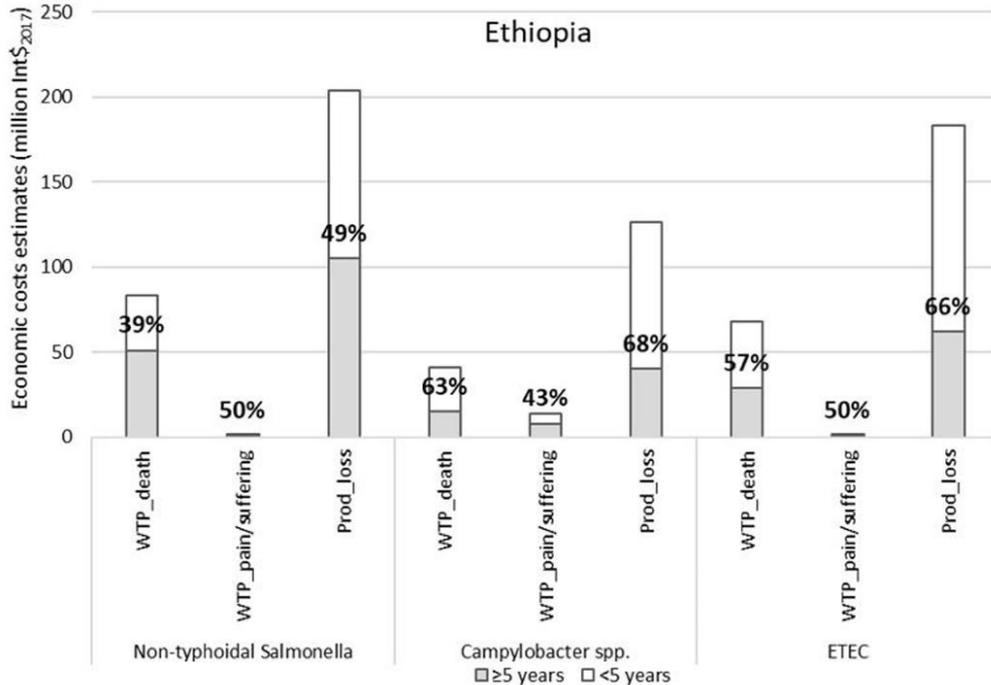
- Burkina Faso: ~835k cases, ~1.9k deaths, ~132k DALY, 391 million Int\$2017, 3.0% of GNI

Cost of foodborne disease in 2017 by pathogen and product



- Salmonella 288 million Int\$₂₀₁₇ (40%), ETEC 253 million (35%), Campylobacter 181 million (25%)
- Costs of chicken meat 8 times costs of tomatoes

Cost of foodborne disease in 2017 by age group



Children under 5 years are

- 15% of population

but bear

- 40-50% of Salmonella costs

- 40-70% of Campylobacter costs

- 50-70% of ETEC costs

Conclusions

- The disease burden and economic costs of foodborne disease are substantial in Ethiopia and Burkina Faso
- Children under 5 years of age bear disproportionately large part of the disease burden and economic costs
- Increased efforts to reduce foodborne illness will improve public health and the economy
- Attribution to pathogen and food group can aid in designing targeted effective and efficient policies and policy interventions

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- Economic costs: Tadesse Guadu Delele, Arie Havelaar
- Attribution: Arie Havelaar, Amanda Sapp, Mirna Amaya, Tina Nane, 12 experts from or working in Ethiopia



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