



# Parma Summer School 2020 "One Health"

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## Foodborne zoonoses: an overview

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## Definitions

- ZONNOSES: infectious diseases transmitted between humans and other vertebrates (WHO)
- Emerging zoonoses: zoonoses newly recognised or newly evolved, or that have occurred previously but show an increase in incidence or expansion in geographic, host, or vector range (OIE)
- Foodborne zoonoses: infections and diseases that are transmissible between animals and humans via foodstuffs





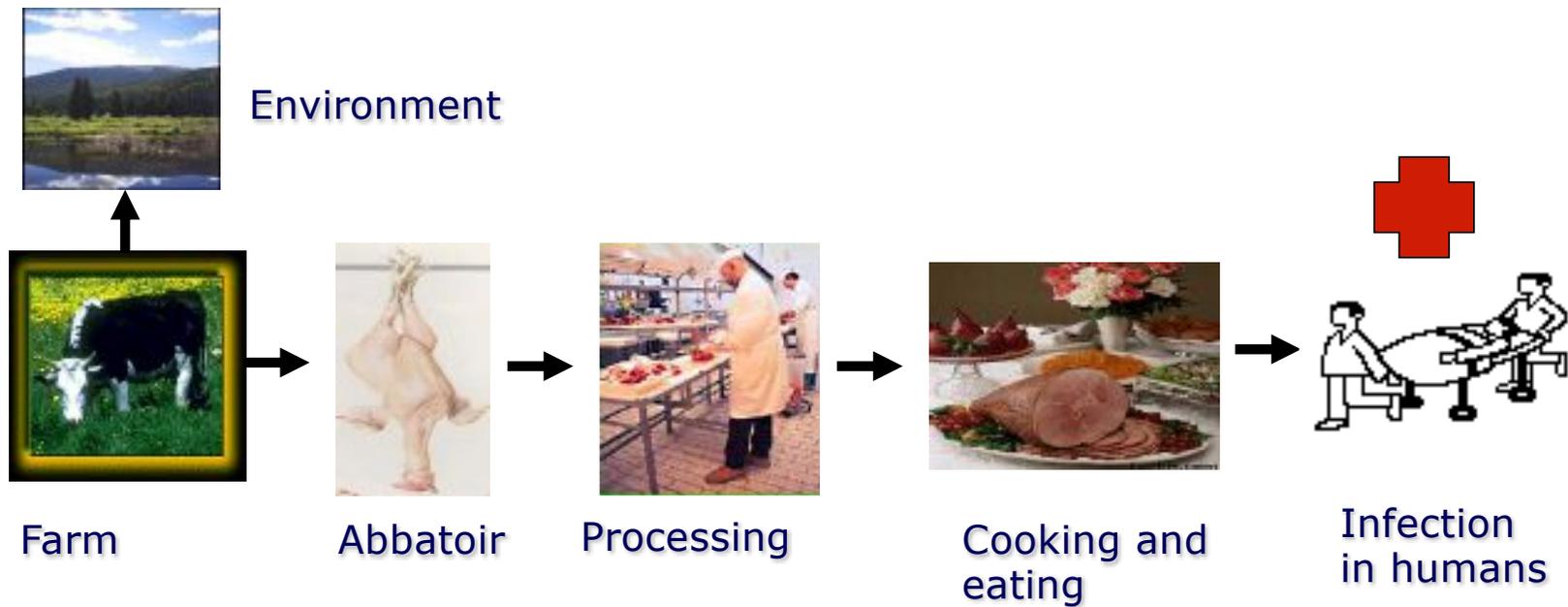
## Foodborne zoonoses

- More than 250 different human infectious pathogens (viruses, bacteria, parasites...)
- Many different animal reservoirs and foods involved in transmission (increasing relevance of water and environment)
- Different clinical pictures (mild/severe, enteric/systemic)
- Different control strategies (what works for one pathogen is not granted that will work for others)





# Foodborne zoonoses from Farm to Fork





## Adding to the food safety challenges:

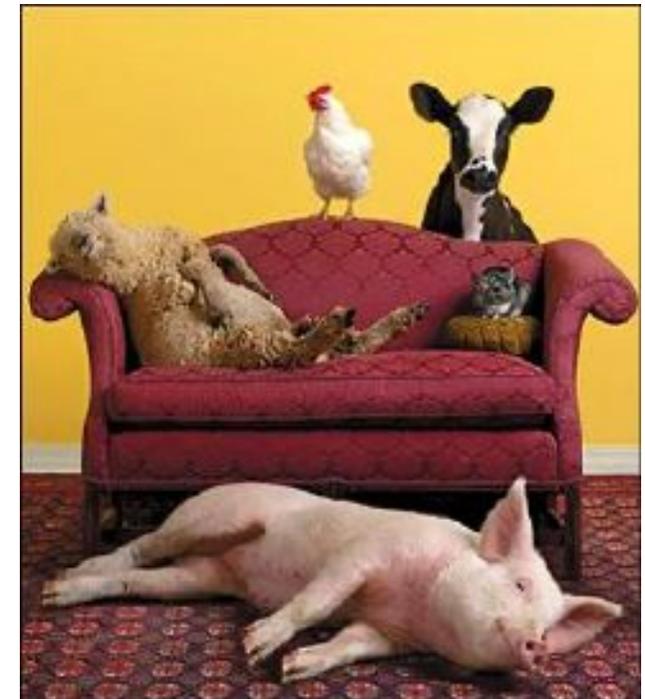
- Infected animals often show no illness
  - Public health initiatives must include apparently healthy animals
  - Public health initiatives must include feed safety
- Contaminated food usually looks, smells and tastes normal
  - Traditional (visual) food inspection is not sufficient
  - Public health initiatives must consider Laboratory testing capacity





## Pathogens strategies for persistence in the food chain

- 80% of animal pathogens are multihost
- Many foodborne pathogens can infect more than one animal species
- Ecological generalists
- Efficient food “contaminants” (viruses and parasites)





*There is no where in the world from which we are remote and no one from whom we are disconnected*



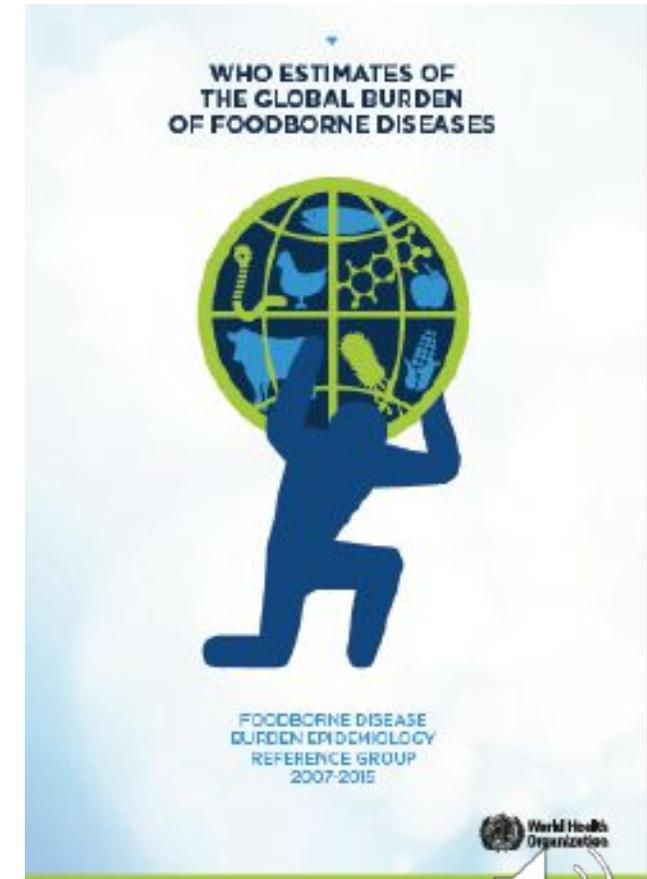
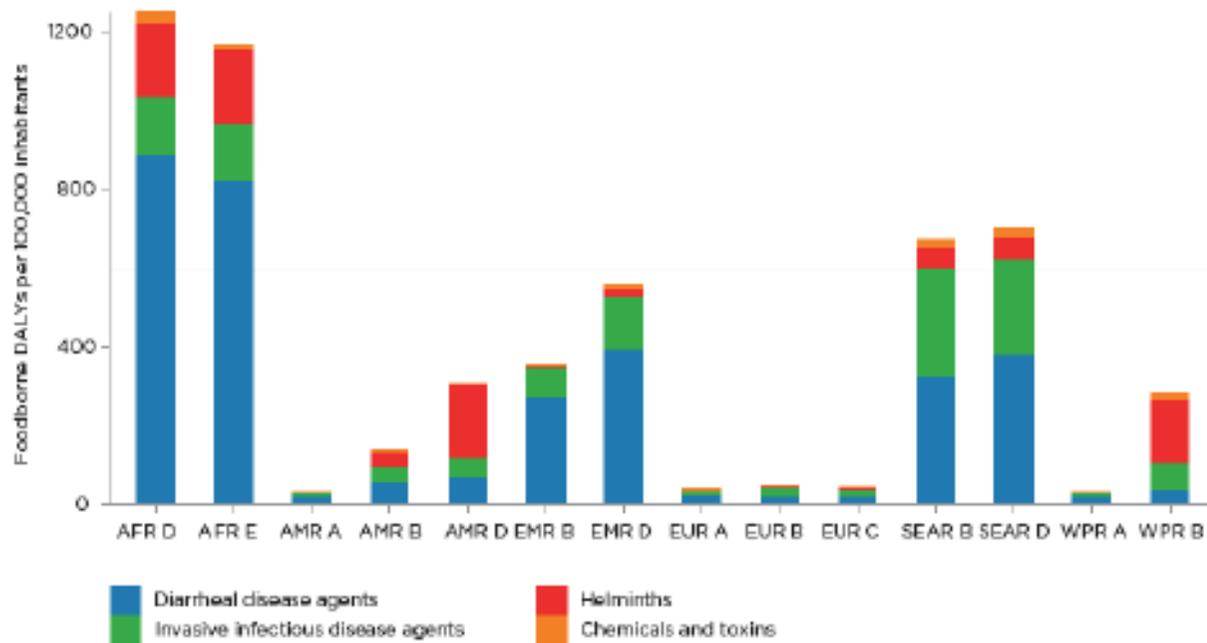
PNAS, 2004





## Overall impact of foodborne hazards (WHO, 2012)

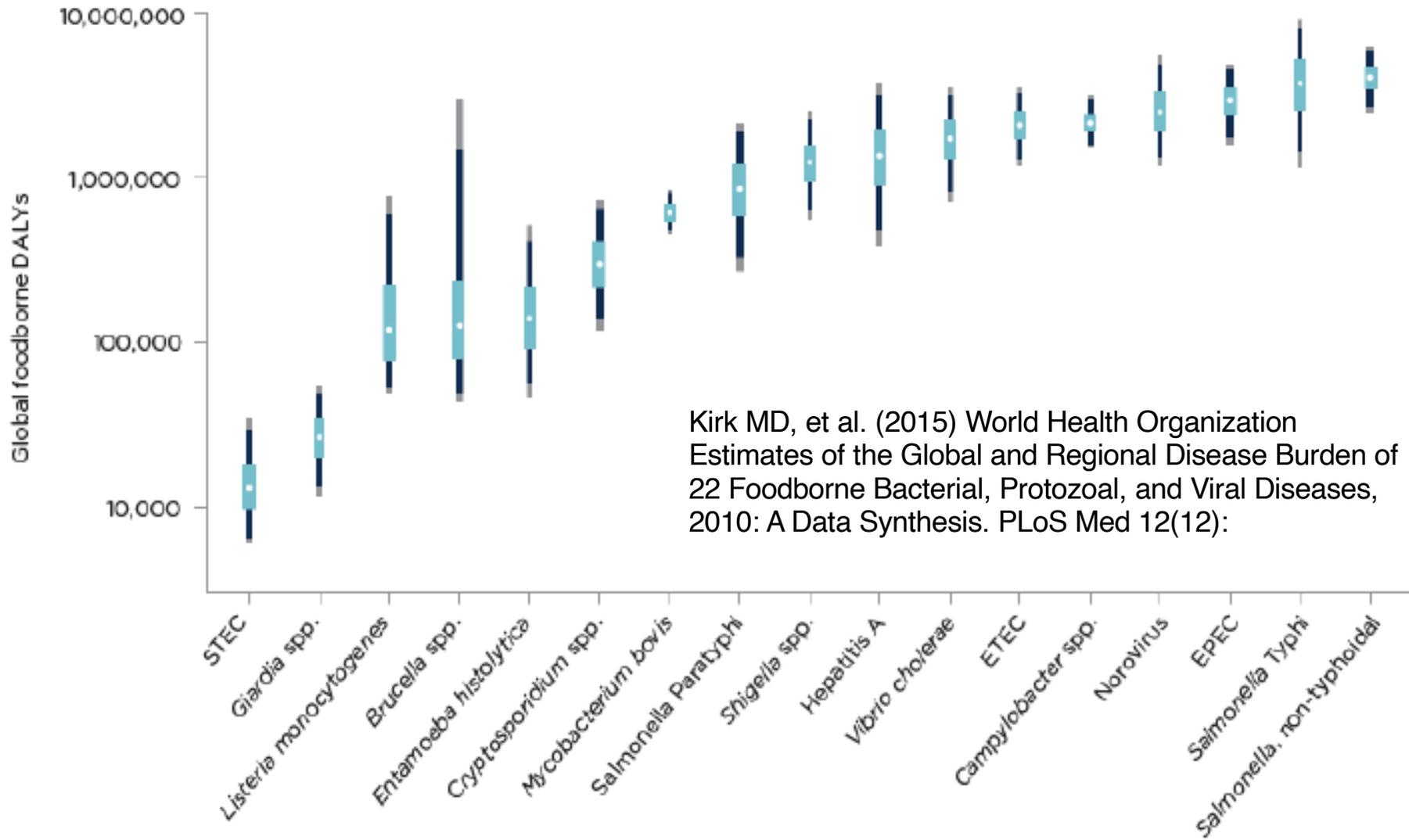
- 420–960 million foodborne illnesses and 310,000–600,000 deaths per year (WHO, 2010)
- The most frequent causes of foodborne illness were diarrhoeal disease agents
- Foodborne diarrhoeal disease agents cause 160,000–320,000 deaths per year (WHO, 2010)



<https://www.who.int/activities/estimating-the-burden-of-foodborne-diseases>



## Disease Burden of 22 Foodborne Bacterial, Protozoal, and Viral Diseases, 2010





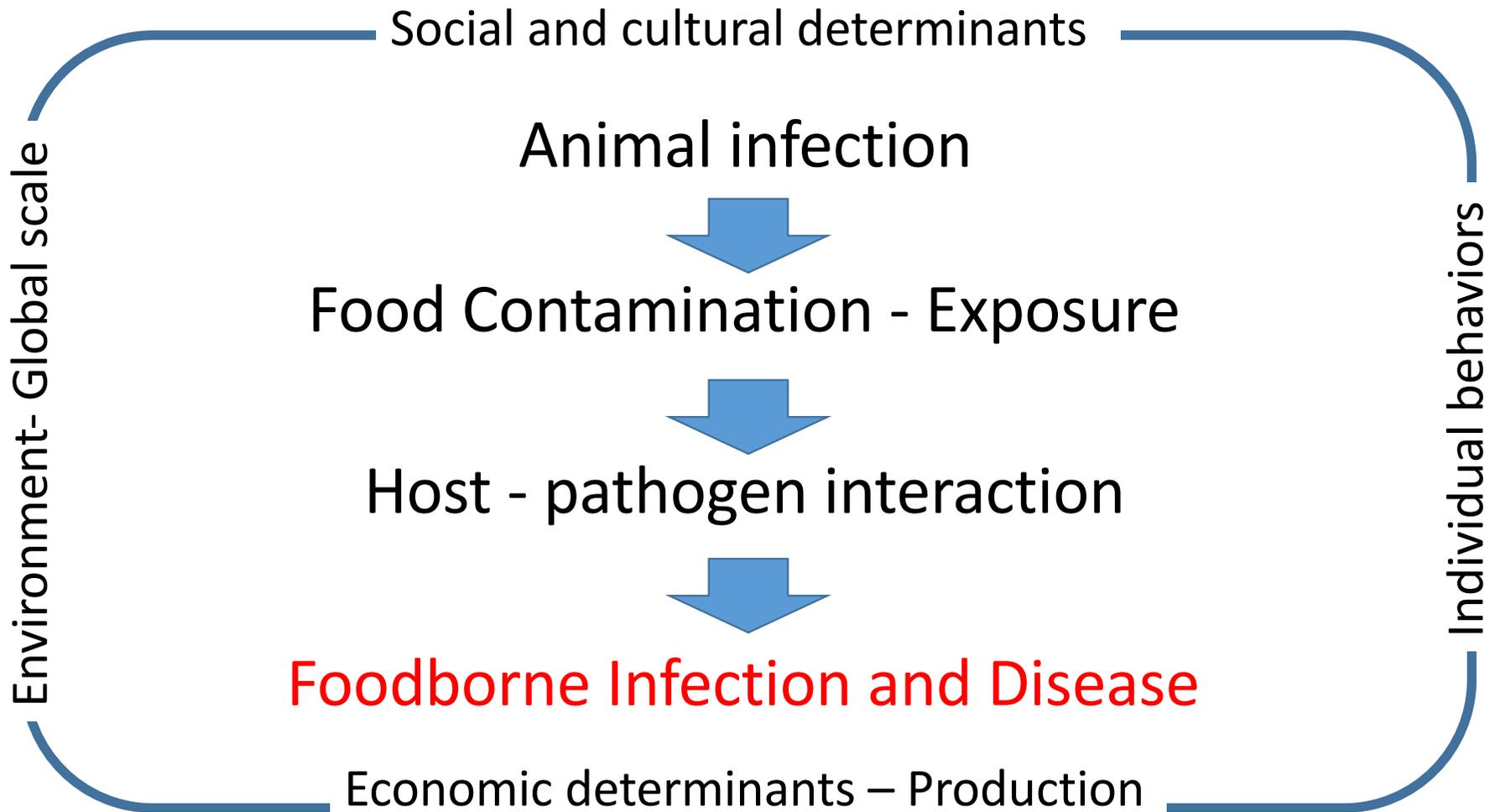
## Pathogenesis of foodborne infections

- Host susceptibility: Individuals are not equally susceptible to infection by different microbes; if infected, possible outcomes range from asymptomatic colonization to death
- Genetic factors: infectious diseases have a strong genetic contribution to susceptibility as do vascular disease and cancer
- Gut immunity: the human intestine is the largest immunologic organ of the body
- Microbiota: plays a central role in protection of the host from enteric bacterial infection





# The foodborne zoonoses in a nutshell: One Health





## COVID-19 pandemic and food safety

- **Covid-19 is not a foodborne disease**
- Millions in lockdown globally
- Reduction of 58% to 78% in international tourist arrivals
- Border closures, quarantines, and market, supply chain and trade disruptions
- Closure of restaurants and street food outlets
- Impacts on the food chain, the food safety and the food security are expected
- Medium and long term social and economic changes could occur
- What implications for foodborne zoonoses?





**THANK YOU FOR YOUR  
ATTENTION**

**ANY QUESTION?**

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