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Foodborne zoonoses: an overview

Luca Busani
Istituto Superiore di Sanità





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





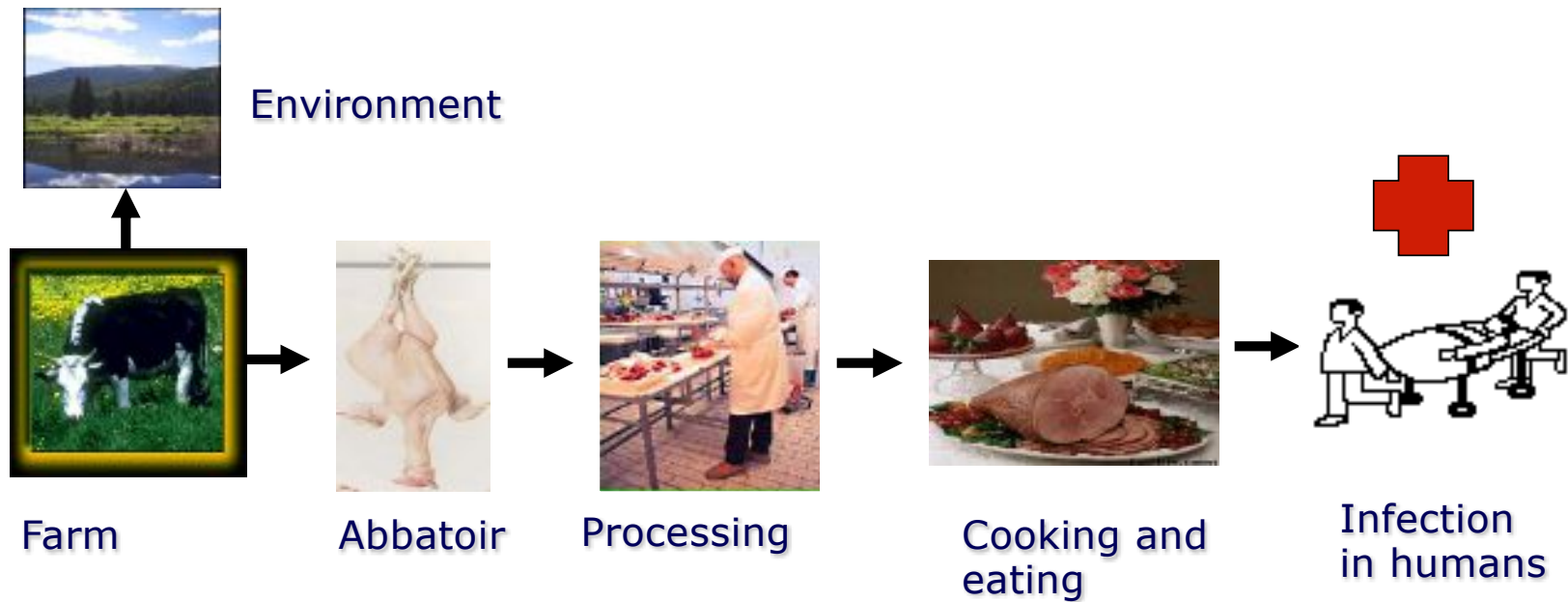
Foodborne zoonoses

- 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



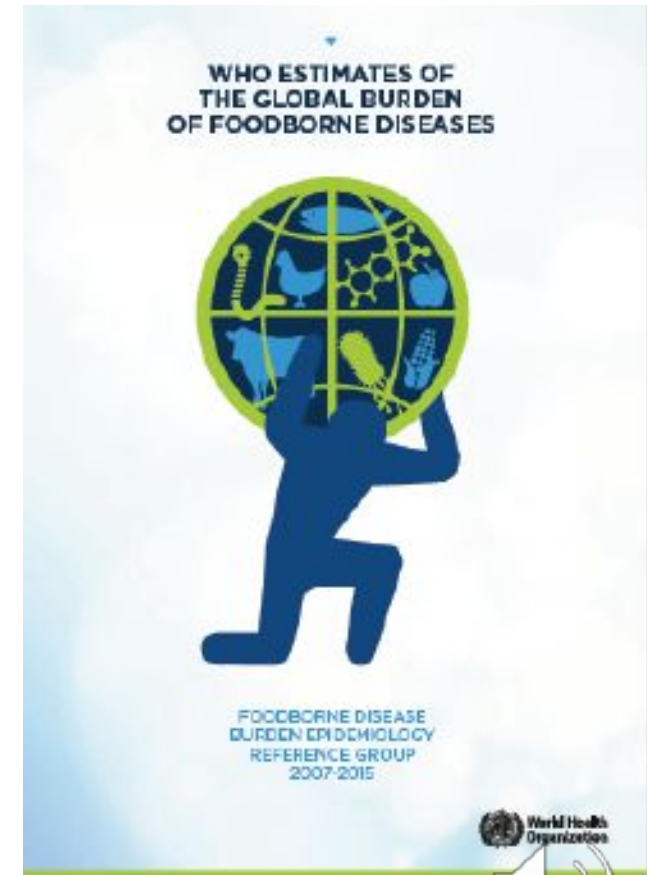
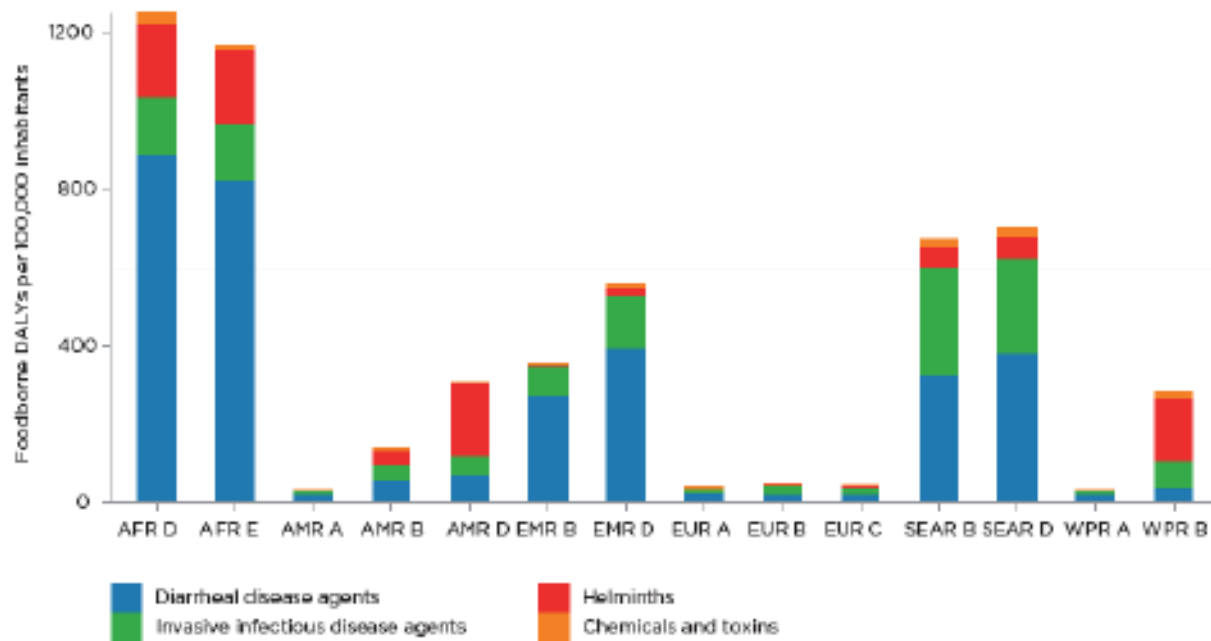
PNAS, 2004





Overall impact of foodborne hazards (WHO, 2012)

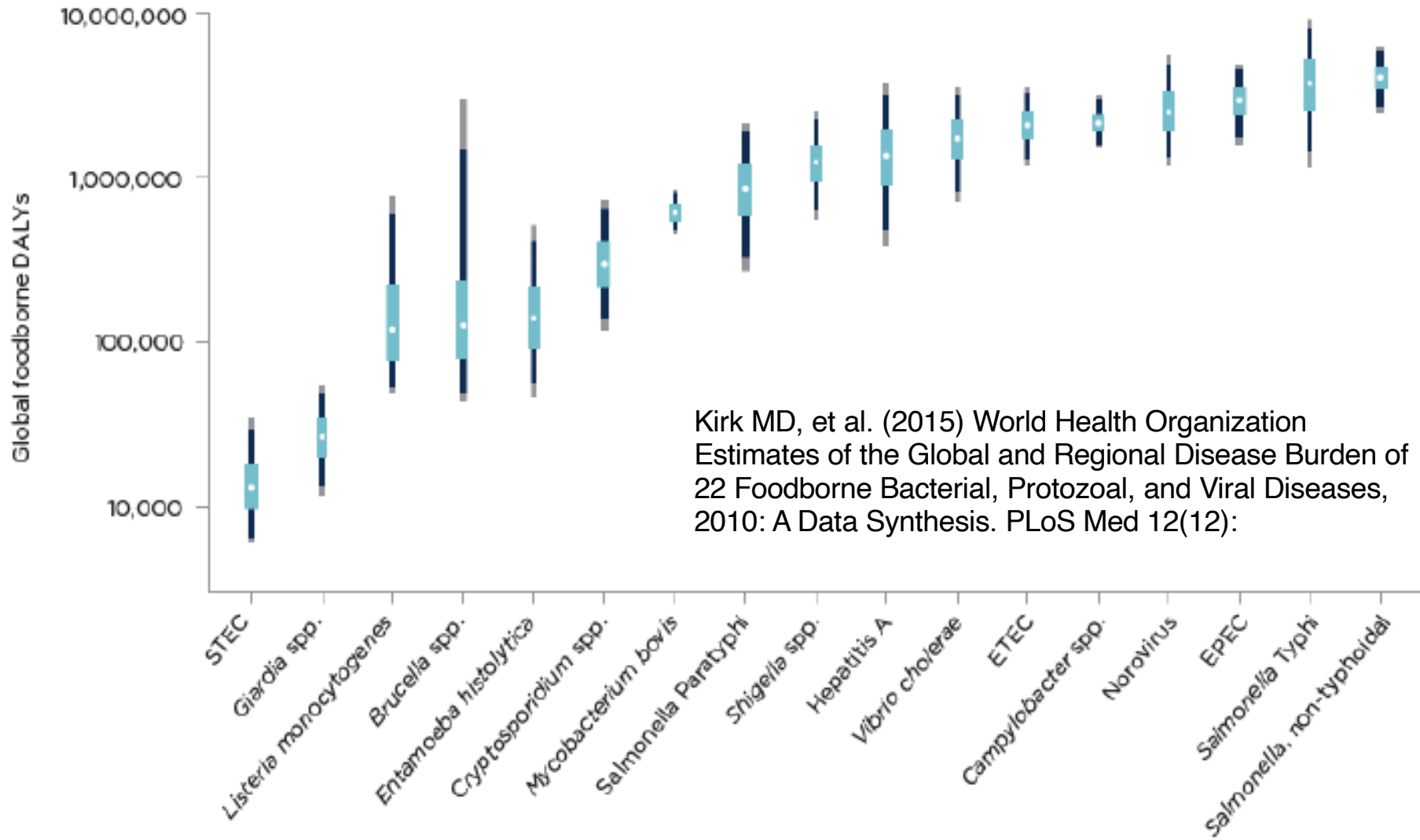
- 420–960 million foodborne illnesses and 310,000–600,000 deaths per year (WHO, 2010)
- The most frequent causes of foodborne illness were diarrhoeal disease agents
- Foodborne diarrhoeal disease agents cause 160,000–320,000 deaths per year (WHO, 2010)



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



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





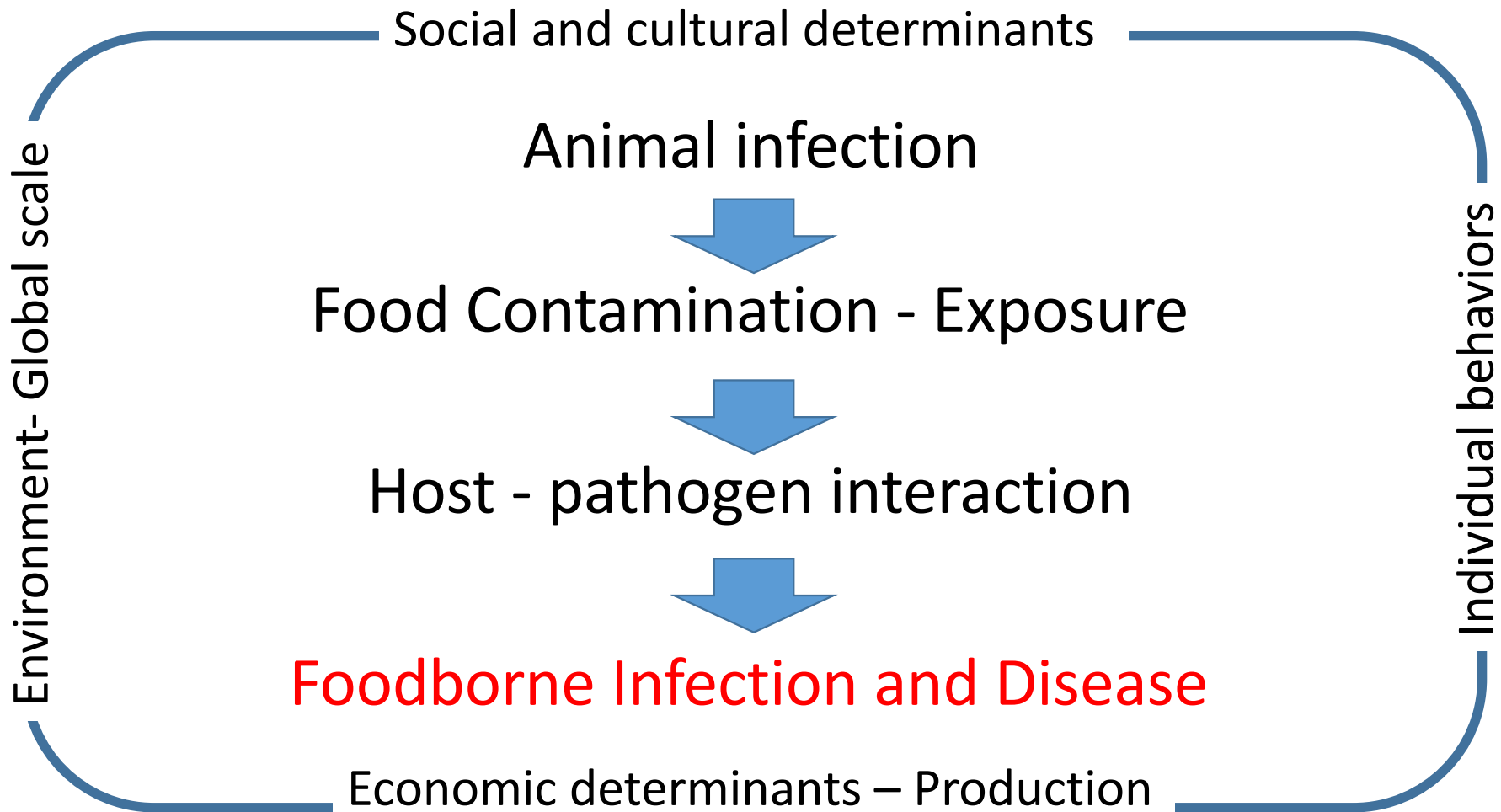
Pathogenesis of foodborne infections

- 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?

At any rate, you can email me at: luca.busani@iss.it

