

CA18105



RIBMINS

Risk-based meat inspection and
integrated meat safety assurance

Global risk categorisation of pig farms and pig abattoirs

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Introduction (from keynote on Wednesday)

- **Meat safety depends on:**

- **the initial pathogen load of the incoming animals**

But the relevant biological hazards – either by incidence or disease severity – causing the top-four most commonly reported meat borne human diseases in Europe are ‘invisible’ hazards present in the intestinal tract and/or on the hide/skin of healthy slaughter animals.

→ Limited ability of traditional meat safety system to control the currently most important meat-borne hazards.

- **the prevention and the reduction of cross-contamination incidences during slaughter and carcass dressing**

Multiple hazards threatening a single farm

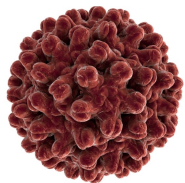
Salmonella spp.



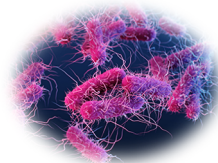
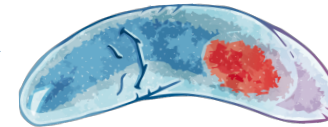
Yersinia enterocolitica



Hepatitis E virus



Toxoplasma gondii

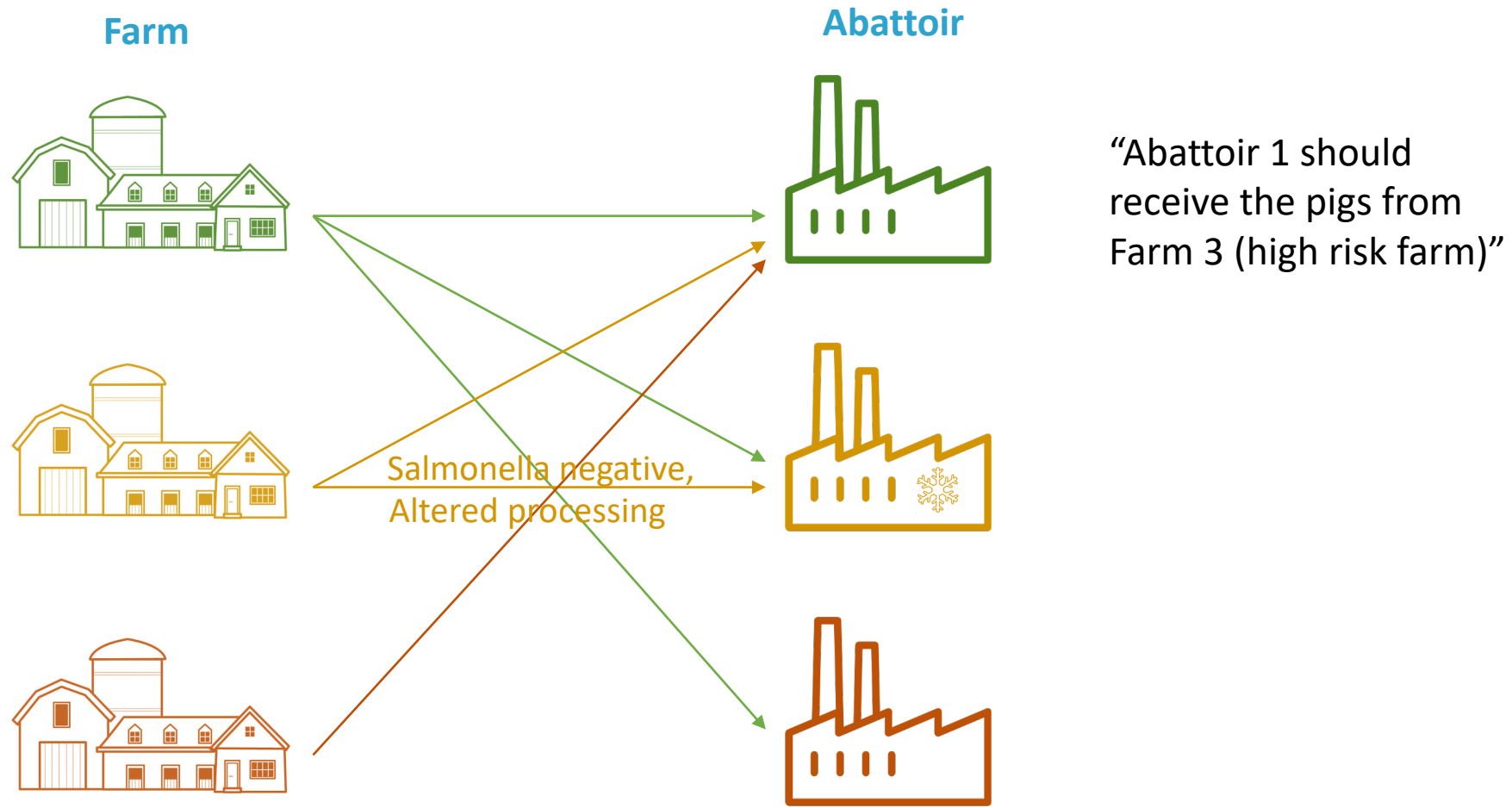


ESBL's

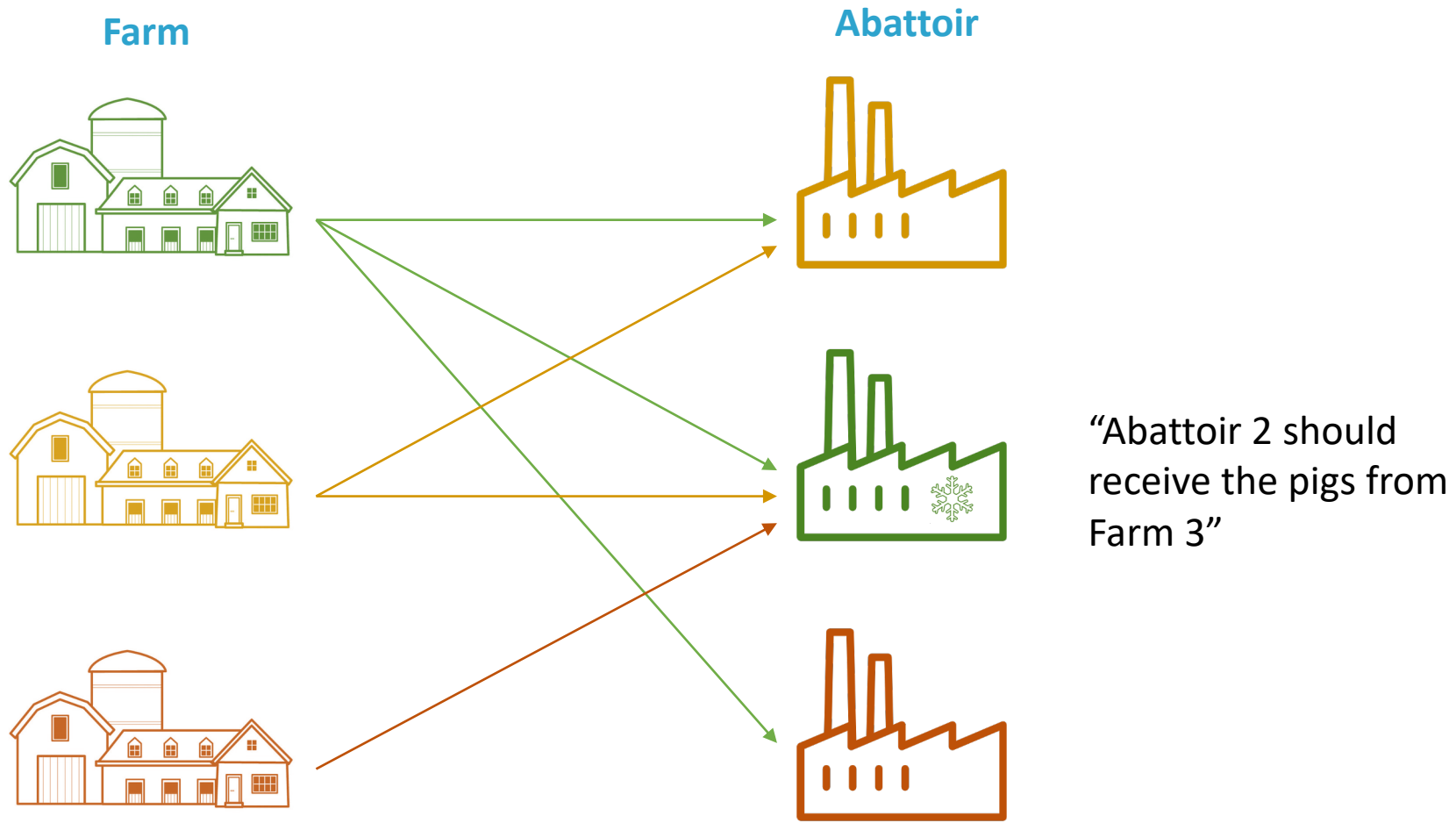
Challenges as a risk manager

- Risk manager is the FBO as well as CA: same goal
- One management option cannot fit all situations
 - Salmonella, ESBLs, yersinia: faecal contamination control affects multiple hazard risks
 - Toxoplasma: on-farm control most cost-effective, only freezing
 - Hepatitis E virus: almost all farms are at risk, not all products
- Risk manager's responsibility to:
 - Balance & prioritise
 - Decide

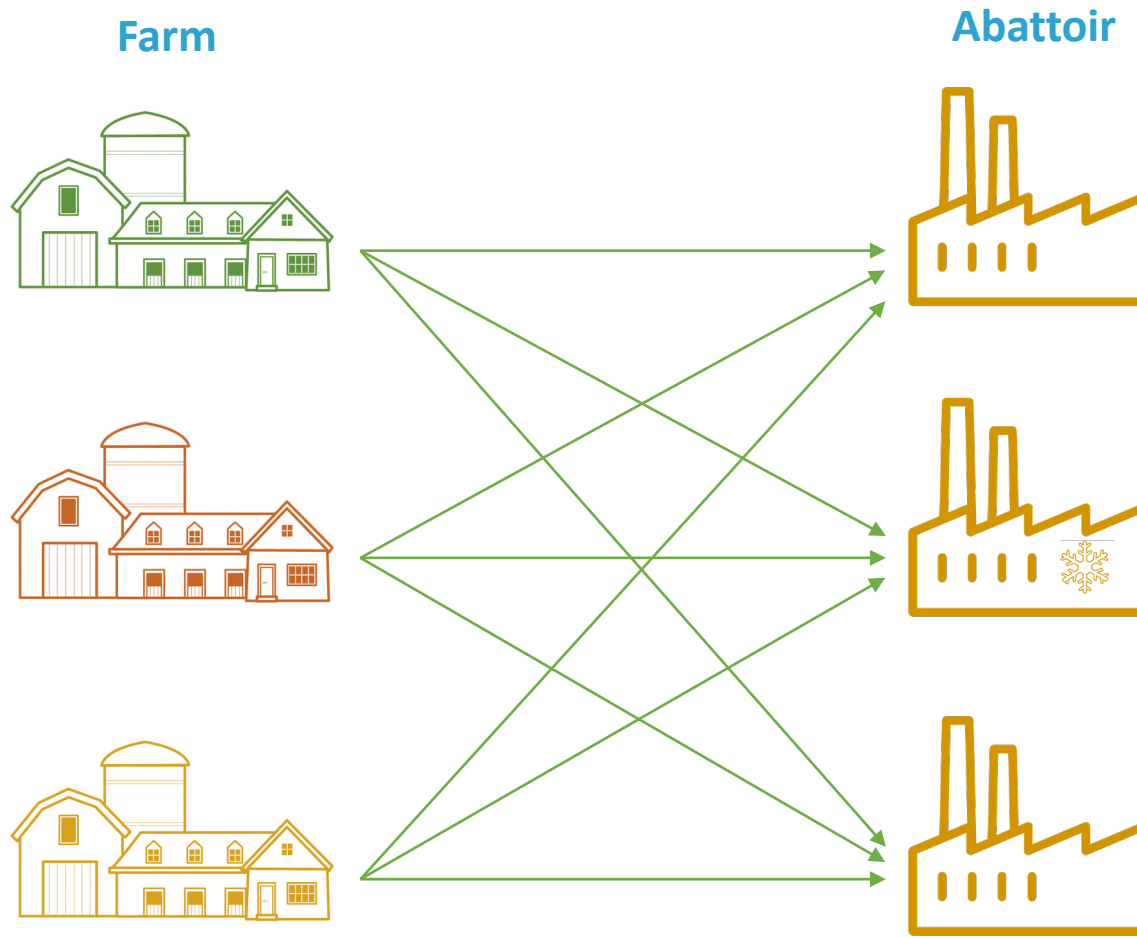
The case of Salmonella



The case of Toxoplasma



The case of HEV: some products at risk only



“All abattoirs essentially face the same risk. All abattoirs can purchase pigs from Farm 3”

Conclusion: In categorization, hazards ideally are integrated into a summary measure that supports a global (general) assessment

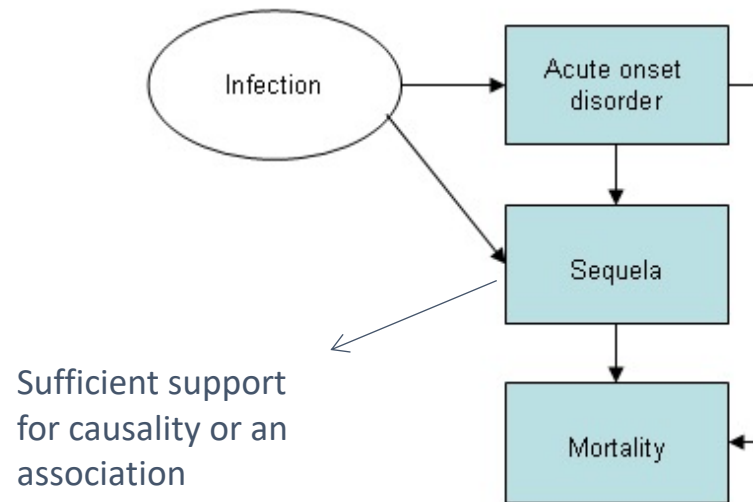
Summary measure for integration of hazards

- Aspects to consider
 1. What is the public health impact of each hazard?
 2. How often does it occur in the population?
 3. What part is attributed to meat?
- Ad **1**: Summary measure of public health
- Ad **2**: incidence per hazard in the population of interest
- Ad **3**: results from source attribution sources

What is the public health impact? Different options

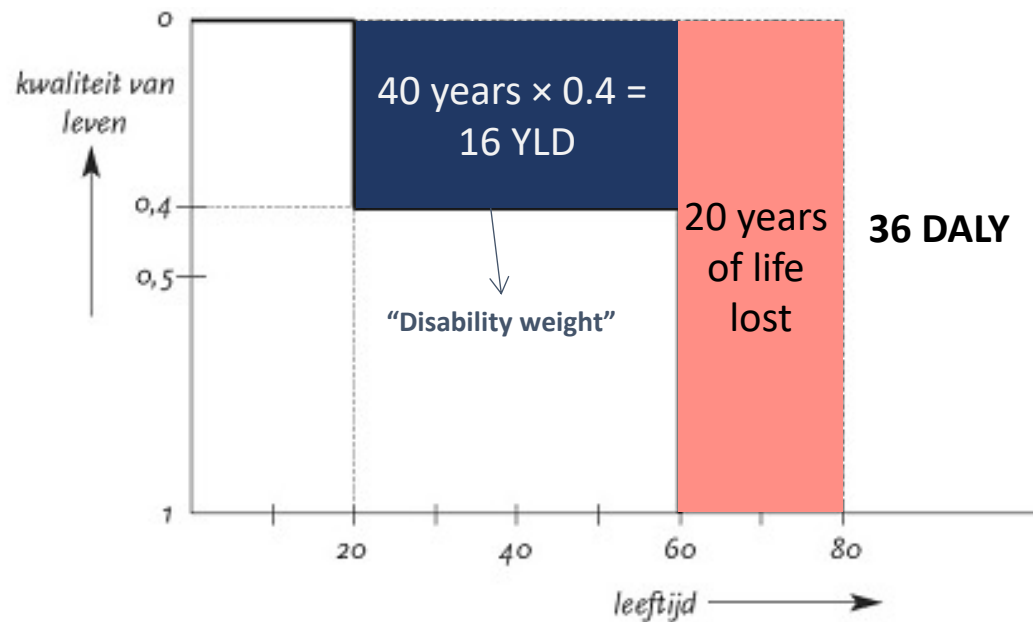
Outcome	Norovirus	Rotavirus	Campylobacter	Salmonella
Gastroenteritis	592,000	366,000	88,000	33,000
GE – visit to GP				
GE – hospital				
GE – death				
Reactive arthritis				
Guillain-Barré S.				
Irr. Bowel Syndrome				

Summary measure for public health (1)



Summary measure for public health (2)

- DALYs: Disability adjusted live years
 - Assumes perfect health until end of life
 - Estimates what is lost due to illness and premature death
 - Years of live lost (YLL) + years lived with disability (YLD)



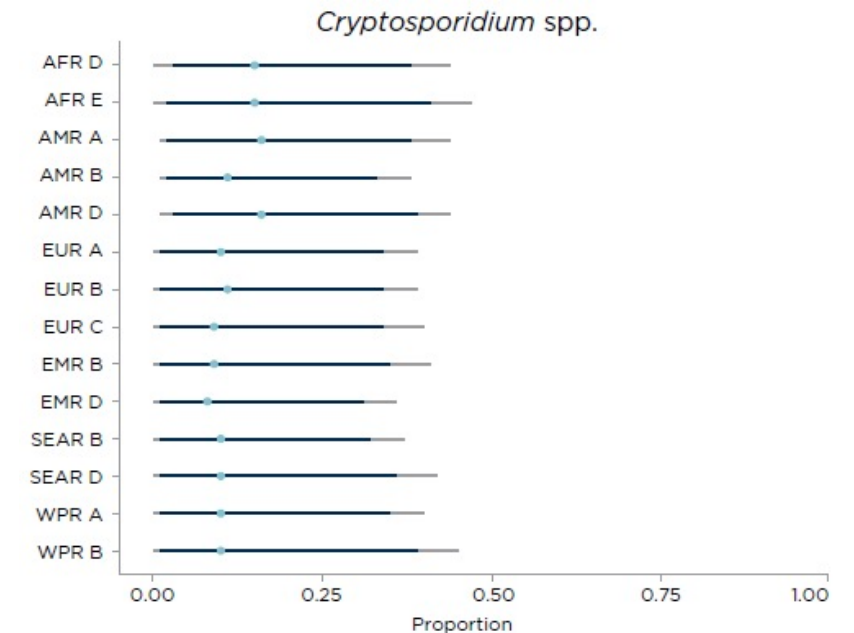
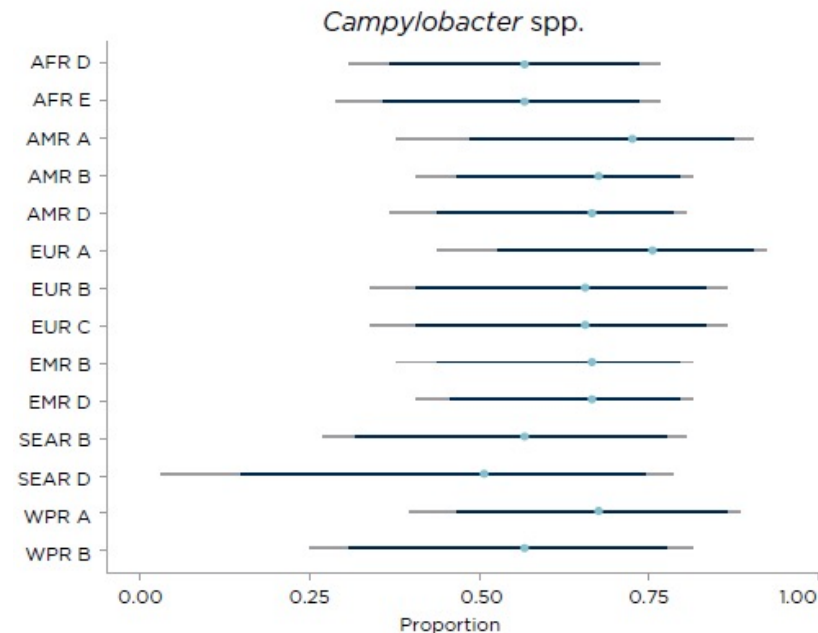
In RIBMINS:
DALY per case, integrating
disease outcomes and
severity

Incidence of pathogens

- Incidence: number of new infections occurring in a certain time period
- (Prevalence: the percentage of current and past cases in a population)
- Hazards in food safety are generally quite well monitored and proper data available from ECDC, EFSA and national public health institutes
- In RIBMINS: how often does a hazard cause illness in humans of a specific country in a year?

What proportion is related to food?

- Approaches to source attribution:
 - Data driven (e.g., based on MLST, sequencing -> see lecture on Friday)
 - Expert judgement
- In RIBMINS: results from the Foodborne Epidemiology Reference group from WHO



Approach in RIBMINS's FMSM-PA tool

- Implementation in the Food Safety Management System Performance Assessment tool
- Based on WHO/FAO's FERG work on the Global Burden of Foodborne Diseases
- Three European regions considered by FERG

Species	
Please select the species you are interested in:	Pigs
Country	France

Hazard ranking		
	Hazard	Incidence
For the identified hazards, please indicate the incidence in your country as number of cases per 100,000 population	Salmonella	29
	Yersinia	4
	Toxoplasma	15.5

	% related to food			DALY per case			Source
	Attribution to food			DALY per case			
	EUR A	EUR B	EUR C	EUR A	EUR B	EUR C	
Salmonella	0.76	0.62	0.62	0.066	0.065	0.058	FERG, 2015
VTEC	0.60	0.49	0.49	0.018	0.024	0.024	FERG, 2015
Dioxins	0.61	0.45	0.53	1.398	1.250	1.208	FERG, 2015
DLPBs	0.61	0.45	0.53	1.398	1.250	1.208	Copied from Dioxins
Yersinia	0.76	0.66	0.66	0.0195	0.0162	0.0151	Copied from Campylobacter
Toxoplasma	0.61	0.45	0.53	0.061	0.077	0.068	FERG, 2015
Campylobacter	0.76	0.66	0.66	0.020	0.016	0.015	FERG, 2015

Example of hazard importance

Always approach the data positively critically: how much can underestimation (i.e., under-ascertainment and underreporting) play a role?

Species	
Please select the species you are interested in:	Pigs
Country	France

Relevant biological hazards to be covered by meat inspection	
For the species you have selected, the most relevant biological hazards identified by EFSA are:	Salmonella, Yersinia, Toxoplasma

Hazard ranking			
	Hazard	Incidence	Hazard weights
For the identified hazards, please indicate the incidence in your country as number of cases per 100,000 population	Salmonella	29	0.69
	Yersinia	4	0.03
	Toxoplasma	15.5	0.28
		0	

Species	
Please select the species you are interested in:	Pigs
Country	Bulgaria

Relevant biological hazards to be covered by meat inspection	
For the species you have selected, the most relevant biological hazards identified by EFSA are:	Salmonella, Yersinia, Toxoplasma

Hazard ranking			
	Hazard	Incidence	Hazard weights
For the identified hazards, please indicate the incidence in your country as number of cases per 100,000 population	Salmonella	4	0.99
	Yersinia	0.07	0.01
	Toxoplasma	-	0.00
		0	

Take home messages

- Examine the need for a one-hazard vs. generic/global approach
- Generic can be obtained by an integrated assessment using weights
- Approach to weighting in RIBMINS
 1. What is the public health impact of each hazard?
 2. How often does it occur in the population?
 3. What part is attributed to meat?
- The integrated performance of a FSMS subsequently considered in the risk based categorisation, together with other non-hazard specific criteria