EFSA's risk assessment on biological hazards

56th Advisory Forum Meeting,
Jurmala, Latvia, 11-12 June 2015

MANDATE OF THE BIOHAZ PANEL

To deliver scientific opinions on biological hazards relating to Food Safety and Food-borne Diseases including:

- Food-borne Zoonoses
- Food Hygiene
- Microbiology
- Transmissible Spongiform Encephalopathies (TSE)
- Associated Waste Management

THE BIOHAZ PANEL: ACTIVITIES

- **Provision of Scientific Opinions**
  - General questions: providing guidance and advice in response to mandates
  - Investing in science: development, promotion and application of new and harmonized scientific approaches and methodologies for (quantitative) MRA

- **Evaluation of Products (or Processes):**
  - Decontamination treatments: assessing the efficacy to remove microbial contamination
  - Animal by-Products: assessing effectiveness of new disposal methods
  - TSE Tests: assessing if the performance of the tests meet requirements

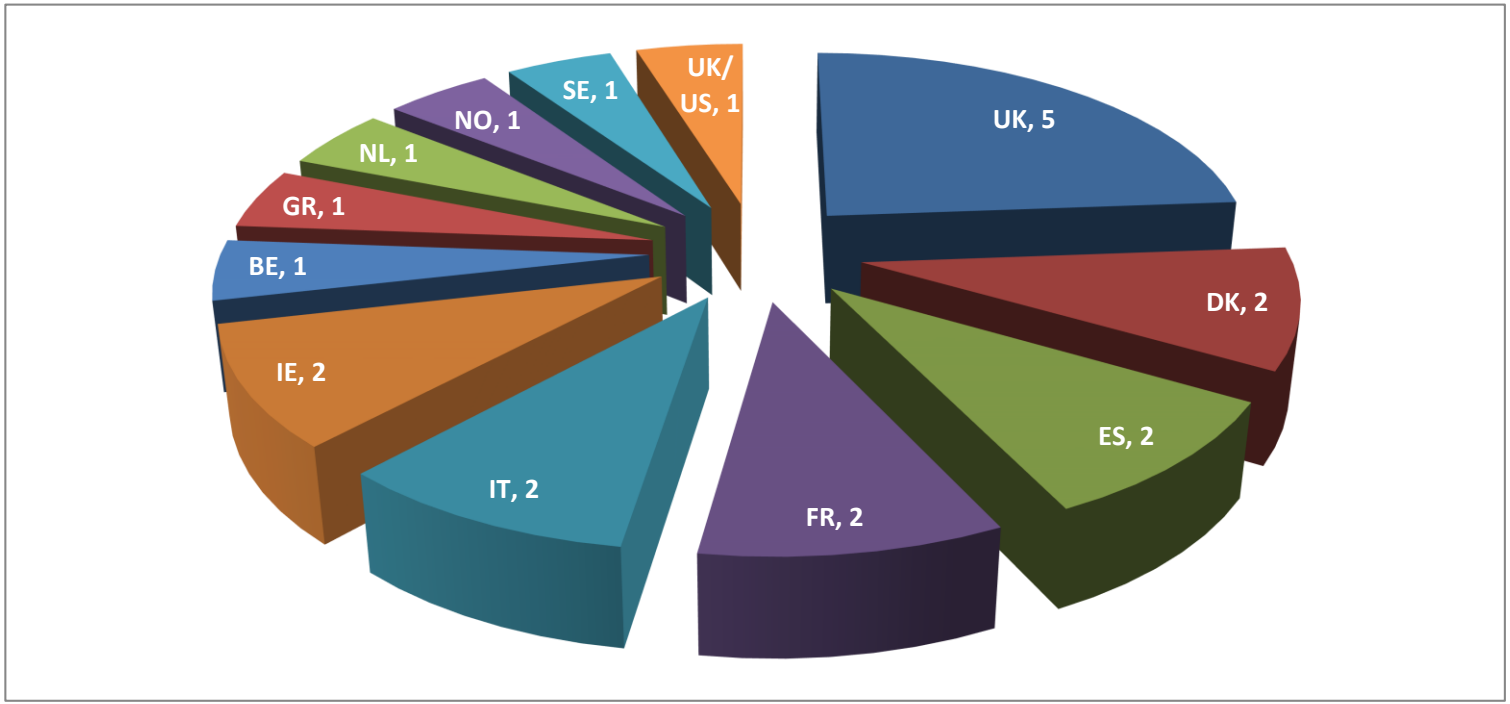
- **Data Collection**
  - Networking: collaboration with national authorities on MRA and TSEs
    - MRA Network
    - BSE-TSE Network
  - Grants and Procurements: literature reviews, data collection, model development.

MEMBERS OF THE BIOHAZ PANEL 2012-2015

- Chair:
  - Prof. John Sofos (GR/USA) from July 2012 to March 2014
  - Dr. John Griffin (IE) from March 2014
- Vice-chairs:
  - Dr. John Griffin (IE) from July 2012 to March 2014
  - Dr. Paul Cook (UK) from March 2014
  - Prof. Arie Havelaar (NL)
- 21 Panel members

More information about the BIOHAZ Panel experts
http://www.efsa.europa.eu/en/biohaz/biohazmembers.htm

NATIONALITIES REPRESENTED

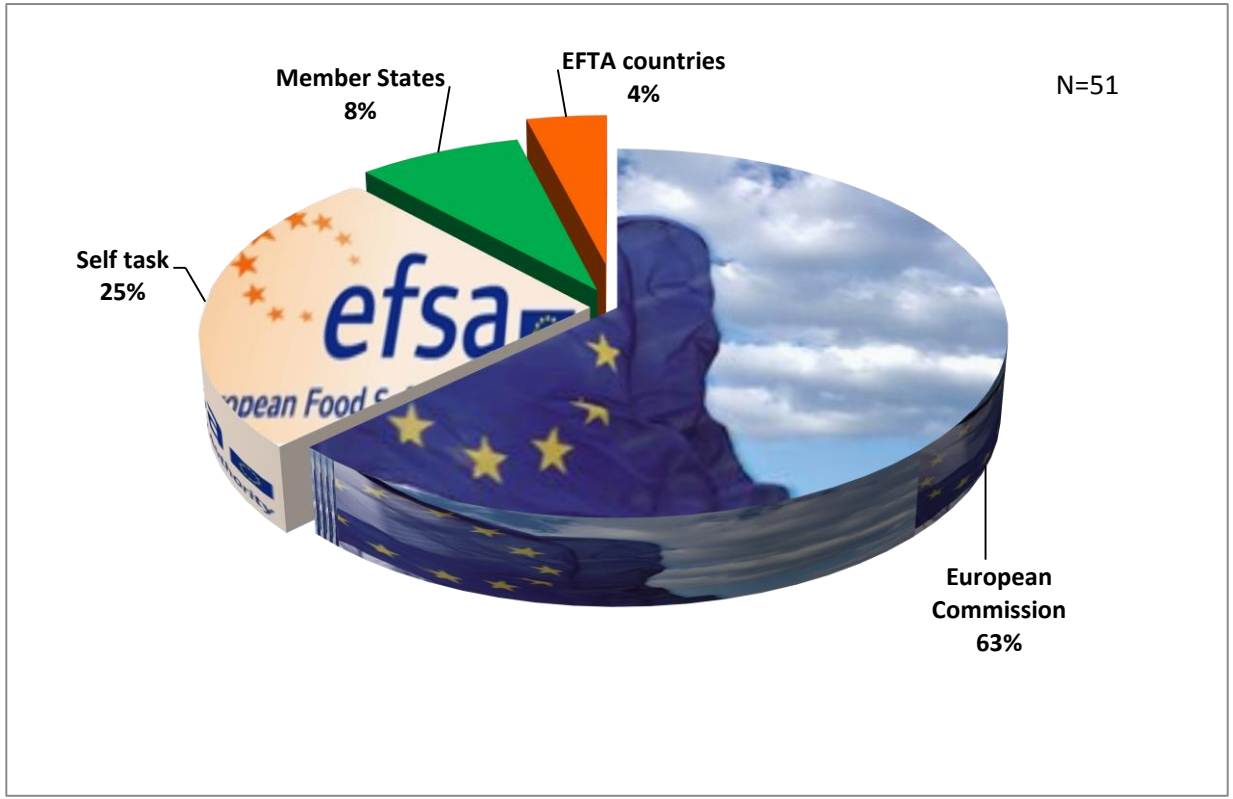


EXPERTISE OF THE PANEL MEMBERS

MAIN EXPERTISE OF THE BIOHAZ PANEL MEMBERS	Number of experts
Food pathogens	16
Food hygiene	11
Food microbiology	14
Food virology	4
Epidemiology of foodborne zoonoses	12
Exposure assessment of food pathogens, foodborne zoonotic agents and TSE	9
Risk assessment of food pathogens, foodborne zoonotic agents and TSE	8
Quantitative microbiological risk assessment in food	5
Epidemiology, testing and risk assesment of TSE	5
Monitoring of foodborne zoonoses and TSE	9
Waste management: environmental microbiology	5
Waste management:processing technology	2
AMR	4

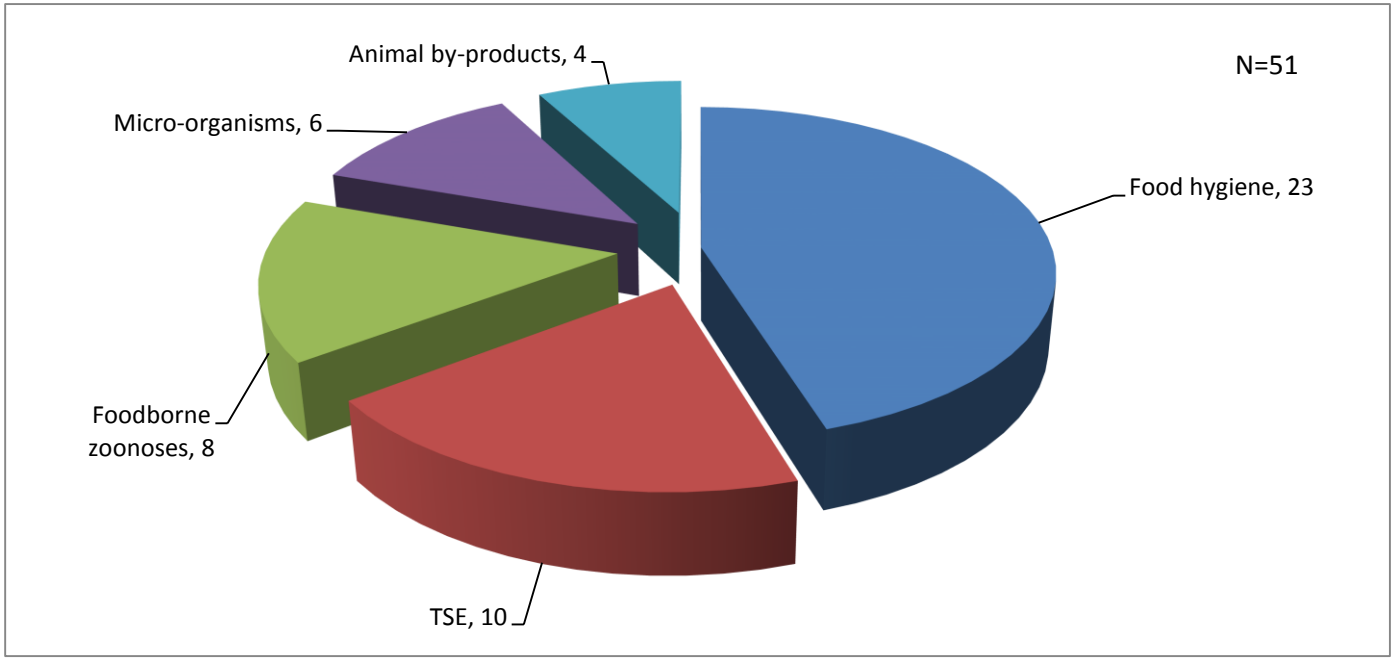
Development of the activities of the BIOHAZ Panel over the years

51 OUTPUTS ADOPTED OR ONGOING SINCE JULY 2012*



*Outputs adopted since July 2012 and on-going

51 OUTPUTS ADOPTED OR ONGOING SINCE JULY 2012 PER TOPIC



ADOPTED SCIENTIFIC OPINIONS JULY-DEC 2012

2 ADOPTED OPINIONS (Adoption date)
EFSA-Q-2012-00218: Scientific opinion on the maintenance of the list of **QPS** recommended biological agents intentionally added to food or feed as notified to EFSA (2012 update) (6 Dec 2012) - Self task mandate
EFSA-Q-2012-00237. Risk posed by pathogens in Foods of non-animal origin (**FoNAO**). **Part 1**: outbreak data analysis and risk ranking of food/pathogen combinations (6 Dec 2012) - Request from the EC

ADOPTED SCIENTIFIC OPINIONS IN 2013 (I)

11 ADOPTED OPINIONS (Adoption date)

Public health hazards to be covered by **inspection of meat**:

- EFSA-Q-2011-00367: domestic solipeds (6 Jun 2013)
- EFSA-Q-2011-00366: farmed game (6 Jun 2013)
- EFSA-Q-2011-00365: domestic sheep and goats (6 Jun 2013)
- EFSA-Q-2011-00364: bovine (6 Jun 2013)

- Request from the EC

EFSA-Q-2012-00576: VTEC-seropathotype concept and scientific criteria regarding pathogenicity assessment (7 March 2013)
- Request from Austrian Federal Ministry of Health

EFSA-Q-2012-00752. Public health risks related to mechanically separated meat (**MSM**) derived **from poultry and swine** (27 March 2013)
- Request from the EC

EFSA-Q-2013-00019: Scientific opinion on the maintenance of the list of **QPS** recommended biological agents intentionally added to food or feed as notified to EFSA (2012 update) (24 Oct 2013)
- Self task mandate

ADOPTED SCIENTIFIC OPINIONS IN 2013 (II)

11 ADOPTED OPINIONS (Adoption date)
EFSA-Q-2013-00010: Carbapenem resistance in food animal ecosystems (5 Dec 2013) - Self task mandate
EFSA-Q-2013-00032. Evaluation of **molecular typing methods** for major food-borne microbiological hazards and their use for attribution modelling, outbreak investigation and scanning surveillance. **Part 1**: evaluation of methods and applications (5 Dec 2013) - Self task mandate
EFSA-Q-2012-00647: Risk of transmission of **scrapie** via in vivo derived embryo transfer in ovine animals (24 Jan 2013) - Request from the EC
EFSA-Q-2013-00609: Application for EFSA approval sought for on-farm containment using **Bioreduction** (4 Dec 2013) - ABP -Request from the Competent Authority of the United Kingdom

ADOPTED SCIENTIFIC OPINIONS IN 2014 (I)

15 ADOPTED OPINIONS (Adoption date)

EFSA-Q-2012-00238. Risk posed by pathogens in Foods of non-animal origin (**FoNAO**). **Part 2**: specific food/pathogen combinations: (Mar-Dec 2014)

- The risk from *Salmonella* and Norovirus in leafy greens eaten raw as salads.
- The risk from *Salmonella* and Norovirus in berries.
- The risk from *Salmonella* and Norovirus in tomatoes.
- The risk from *Salmonella* in melons.
- The risk from *Salmonella*, *Yersinia*, *Shigella* and Norovirus in bulb and stem vegetables, and carrots.

- Request from the EC

The public health risks related to the maintenance of the **cold chain during storage and transport of meat**

- EFSA-Q-2013-00646: Part 1 (meat of domestic ungulates) (6 Mar 2014)
- EFSA-Q-2013-00648: Part 2 (minced meat from all species) (10 Jul 2014)

- Request from the EC

EFSA-Q-2013-00400: The public health risks of **eggs due to deterioration** and development of pathogens (10 Jul 2014)

- Request from the EC

ADOPTED SCIENTIFIC OPINIONS IN 2014 (II)

15 ADOPTED OPINIONS (Adoption date)

EFSA-Q-2013-00906. Evaluation of **molecular typing methods** for major food-borne microbiological hazards and their use for attribution modelling, outbreak investigation and scanning surveillance. **Part 2**: surveillance and data management activities (10 Jul 2014)
- Self-task mandate

EFSA-Q-2013-00014: Development of a **risk ranking toolbox** for the BIOHAZ Panel (4 Dec 2014)
- Self-task mandate

EFSA-Q-2013-01026: The public health risks related to the consumption of **raw drinking milk** (4 Dec 2014)
- Self-task mandate

EFSA-Q-2014-00611: statement on the update of the list of **QPS**-recommended biological agents intentionally added to food or feed as notified to EFSA. 1: Suitability of taxonomic units notified to EFSA until July 2014 (4 Dec 2014)
- Self-task mandate

ADOPTED SCIENTIFIC OPINIONS IN 2014 (III)

15 ADOPTED OPINIONS (Adoption date)
EFSA-Q-2012-00247: **BSE risk** in bovine intestines and mesentery (23 Jan 2014) - Request from the EC
EFSA-Q-2012-00646: **Scrapie situation** in the EU after 10 years of monitoring and control in sheep and goats (10 Jul 2014) - Request from the EC
EFSA-Q-2013-00601: Evaluation of the safety and efficacy of **peroxyacetic acid** solution for reduction of pathogens on poultry carcasses and meat (6 Mar 2014) - Decontamination treatments - Request from the EC

SCIENTIFIC OPINIONS TO BE ADOPTED IN 2015 (I)

- EFSA-Q-2014-00695: Statement on the update of the list of **QPS**-recommended biological agents intentionally added to food or feed as notified to EFSA. 2: Suitability of taxonomic units notified to EFSA until March 2015 (deadline 30 Jun 2015)
- EFSA-Q-2014-00703: Application for evaluation of an alternative method for hygienic treatment of **colostrum** (deadline 5 Jul 2015)
- EFSA-Q-2015-00048: Request for a review of a scientific publication concerning the **zoonotic potential of ovine scrapie prions** (deadline 30 Jul 2015)
- EFSA-Q-2014-00902: Request for an update of the 2011 scientific opinion on **hatchery waste** as animal by-products (deadline 30 Oct 2015)
- EFSA-Q-2015-00163: Scientific Opinion on the **growth of spoilage bacteria during storage and transport of meat** (deadline 31 Oct 2015)

SCIENTIFIC OPINIONS TO BE ADOPTED IN 2015 (II)

- EFSA-Q-2015-00118: Application for the evaluation of **NExBTL process** as an alternative method for treatment of rendered animal fat (deadline 8 Nov 2015)
- EFSA-Q-2015-00161: Scientific Opinion on **heat treatment of bivalve molluscs** (deadline 31 Dec 2015)
- EFSA-Q-2014-00536: Public health risks associated with Enteroaggregative *Escherichia coli* (**EAggEC**) (self-task mandate) (deadline 31 Dec 2015)
- EFSA-Q-2014-00696: Statement on the update of the list of **QPS** biological agents intentionally added to food and feed. 3. Suitability of taxonomic units notified to EFSA until July 2015 (deadline 31 Dec 2015)

SCIENTIFIC OPINIONS TO BE ADOPTED IN 2016

- EFSA-Q-2014-00697: Statement on the update of the list of **QPS**-recommended biological agents intentionally added to food or feed as notified to EFSA. 4: Suitability of taxonomic units notified to EFSA until January 2016 (deadline 30 Jun 2016)
- EFSA-Q-2015-00254: Scientific opinion concerning the risks for public health related to the presence of ***Bacillus*** *cereus* and other *Bacillus* spp., including *Bacillus thuringiensis* in foodstuffs (deadline 30 Jun 2016 – under negotiation)
- EFSA-Q-2015-00216: Joint EFSA and EMA scientific opinion on measures to reduce the need to **use antimicrobial agents** in animal husbandry in the European Union and the resulting impacts on food safety (deadline 20 Dec 2016)
- EFSA-Q-2014-00189: Scientific Opinion on the update of the list of **QPS** recommended biological agents intentionally added to food or feed as notified to EFSA (deadline 31 Dec 2016)

ADOPTED SCIENTIFIC REPORTS 2012-2015

5 ENDORSED REPORTS

EFSA-Q-2012-00577: Revision of the **Norwegian annual monitoring programme for BSE** (20 Feb 2013)
- Request from European Free Trade Association (EFTA) Surveillance Authority

EFSA-Q-2013-00336: Updated revision of the **Norwegian annual monitoring programme for BSE** (20 Sep 2013)
- Request from European Free Trade Association (EFTA) Surveillance Authority

EFSA-Q-2013-01015: Protocol for further laboratory investigations into the distribution of infectivity of **Atypical BSE** (11 Jul 2014)
- Request from the EC

EFSA-Q-2014-00705: An update on the risk of transmission of **Ebola virus** (EBOV) via the food chain (24 Oct 2014)
- Request from the EC

EFSA-Q-2014-00901: An update on the risk of transmission of **Ebola virus** via the food chain – **Part 2** (9 Mar 2015)
- Request from the EC

SCIENTIFIC REPORTS TO BE ADOPTED IN 2015

- EFSA-Q-2014-00528: The evaluation of the temperature to be applied to **pre-packaged fishery products** at retail level (deadline 30 Jun 2015)
- EFSA-Q-2015-00240: Request for scientific and technical assistance to evaluate applications of Member States (DK, FI, SE) to be recognised as having a **negligible risk of classical scrapie** (deadline 30 Oct 2015 3 reports)
- EFSA-Q-2015-00162: Request for clarification on the Scientific Opinions on the **public health risks during storage and transport of meat** (deadline 31 Oct 2015)

UPCOMING REQUESTS

- Request for scientific and technical assistance concerning the revision of the **BSE monitoring regime in Croatia**
- Request for a scientific opinion on the safety of a **method for processing animal fats** intended for technical purposes with the aim to establish the end point in the manufacturing chain.

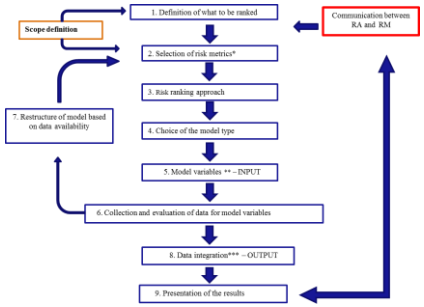
COOPERATION WITH MEMBERS STATES - ARTICLE 36 GRANTS

- Article 36 Grants are used by the BIOHAZ Team:
  - to generate data for the refinement of the BIOHAZ opinions (considering the recommendations present in the output),
  - for the preparation of new opinions, if data gaps are identified in advance
- Currently
  - EFSA-Q-2013-00207: Relationship between seroprevalence in the main livestock species and presence of ***Toxoplasma gondii*** in meat
  - Thematic grant: Molecular approaches for identifying and characterising microbial foodborne pathogens, specifically using **whole genome sequence** (WGS) analysis

PROCUREMENTS

- EFSA-Q-2013-00235: Assessment of classical **scrapie infectivity in sheep embryos**
- EFSA-Q-2014-00024: **Systematic review on *L. monocytogenes*** in RTE foods.
- EFSA-Q-2014-00025: **Quantitative risk characterization on *L. monocytogenes*** in RTE foods, starting from retail stage
- EFSA-Q-2014-00026: Comparison of ***L. monocytogenes*** isolates from different compartments along the food chain, and in humans using **whole genome sequencing** (WGS) analysis

SOME HIGHLIGHTS



FONAO: OUTBREAK DATA ANALYSIS / RISK RANKING

Conclusions ToR 1: to assess the PH risk posed by pathogens that may contaminate FoNAO and to compare the incidence of foodborne human cases linked to FoNAO and FoAO

Outbreaks due to:	Total number of foodborne outbreaks (%)	Human cases (%)	Hospitalisations (%)	Deaths (%)
FoNAO	219 (**10**)	10,543 (**26**)	2,798 (**35**)	57 (**46**)
FoAO	2,065 (90)	30,230 (74)	5,090 (65)	68 (54)
Total	2,284	40,773	7,888	125

- Excluding the VTEC O104 outbreak data, FoNAO still caused 10% of the outbreaks, 18% of cases, but only 8% of the hospitalisations and 5% of the deaths.
- General tendency for the outbreaks associated with FoNAO to involve more cases and to be less severe than those associated with FoAO.

FONAO: OUTBREAK DATA ANALYSIS / RISK RANKING

ToR 2:
to identify and rank specific food/pathogen combinations most often linked to foodborne human cases from FoNAO in the EU

Model output (reference scenario): Top 5 food/pathogen combinations

Reference scenario 1 including all criteria		
Ranking position	**Pathogen**	**FoNAO category**
First	*Salmonella* spp.	Leafy greens eaten raw as salads
Second	*Salmonella* spp.	Bulb and stem vegetables
	Salmonella spp.	Tomatoes
	Salmonella spp.	Melons
	Pathogenic *E. coli*	Fresh pods, legumes and grain
Third	Norovirus	Leafy greens eaten raw as salads
	Salmonella spp.	Sprouted seeds
	Shigella spp.	Fresh pods, legumes or grain
Fourth	*Bacillus* spp.	Spices and dry powdered herbs
	Norovirus	Bulb and stem vegetables
	Norovirus	Raspberries
	Salmonella spp.	Raspberries
	Salmonella spp.	Spices and dry powdered herbs
	Salmonella spp.	Leafy greens mixed with other fresh FoNAO
	Shigella spp.	Fresh herbs
	Pathogenic *E. coli*	Sprouted seeds
	Yersinia spp.	Carrots
Fifth	Norovirus	Tomatoes
	Norovirus	Carrots
	Salmonella spp.	Nuts and nut products
	Shigella spp.	Carrots

Public health hazards to be covered by inspection of meat

- ToR 1: to identify and rank the main risks for PH that should be addressed by meat inspection at EU level.
- ToR 2: to assess the strengths and weaknesses of the current meat inspection and to recommend alternative methods
- ToR 3: to recommend inspection methods fit for new hazards currently not covered by the meat inspection system
- ToR 4: to recommend adaptations of inspection methods and/or frequencies of inspections that provide an equivalent level of protection

Key Strengths and Weaknesses of current meat inspection

- Food chain information (FCI) provides information on disease occurrence and veterinary treatments, enabling a **focused inspection** of animals with problems;
- *Ante-mortem* inspection allows the detection of observable **abnormalities** and of animals **heavily contaminated with faeces**;
- *Post-mortem* inspection enables the detection of **carcass faecal contamination**, which is an indicator of slaughter hygiene.

- **The use FCI for food safety purposes is limited** because the data that it contains is very general and does not address specific hazards of public health importance;
- Current *ante-* or *post-mortem* visual inspection are **not able to detect any of the public health hazards identified as the main concerns** for food safety;
- Palpation and incision techniques used during *post-mortem* inspection can cause **bacterial cross-contamination.**

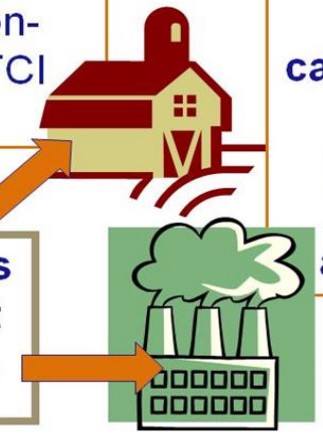
Conclusions on hazards currently not covered by meat inspection

To ensure effective control of the hazards of relevance, a comprehensive meat safety assurance, combining measures applied on-farm and at-abattoir, is necessary. A prerequisite for this system is setting targets.

1. Risk-Categorisation of batches/herds/flocks /farms for the main hazards: based on on-farm indicators and FCI

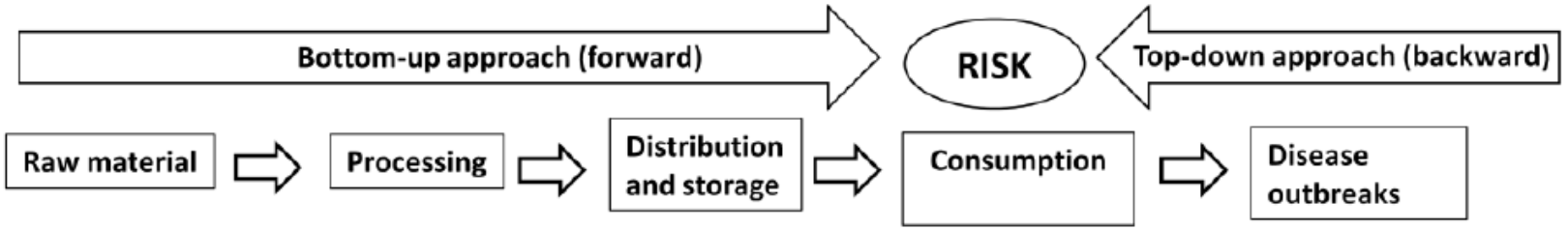
2. Risk-Categorisation of slaughterhouses according to their capacity to control the hazard: based on on trends of data derived from process hygiene assessments, HACCP

3. Control measures both on farm and at the slaughterhouse



RISK RANKING

- EFSA-Q-2011-1178: Development of a risk ranking framework on biological hazards
- EFSA-Q-2013-00014: Development of a risk ranking toolbox for the BIOHAZ Panel



Carbapenemases in food animal ecosystems

- Emerging and **highly sensitive** public health issue (last resort antimicrobials)
- Only a **few studies** have reported carbapenem-R bacteria in FP-animals, and **none** in food.
- Transmission through the food chain has **not yet been reported**, but is considered likely if these emerge.
- Specific **targeted surveys** needed at EU level.
- **Measures** to prevent emergence and minimising further spread need to be taken now.

BSE RISK BOVINE INTESTINES AND MESENTERY

European Food Safety Authority

EFSA Journal 2014;12(2):3554

SCIENTIFIC OPINION

Scientific Opinion on BSE risk in bovine intestines and mesentery[1]

EFSA Panel on Biological Hazards (BIOHAZ)[2, 3]

European Food Safety Authority (EFSA), Parma, Italy

- Available at EFSA website:

  http://www.efsa.europa.eu/en/efsajournal/pub/3554.htm

The Opinion

- Bovine intestines and mesentery (all ages): Specified risk material → to be destroyed
- Opinion estimates the level of infectivity that would enter the food chain if intestines and mesentery from cattle born and raised in the EU would be re-allowed for

- Whatever the scenario, the removal of the last 4 metres of the small intestine and of the caecum from the food and feed chain would result on average in a reduction exceeding 90% of the total infectivity associated with intestine and mesentery in BSE infected cattle up to 36 months of age.

ACKNOWLEDGEMENTS

- The experts of the BIOHAZ Working Groups
- The BIOHAZ Panel members
- The BIOCONTAM staff

...thank you for your attention!