European Food Safety Authority

Biological Hazards and Contaminants Unit (BIOCONTAM UNIT)

Network on Microbiological Risk Assessment
Minutes of the 12th meeting
Held on 12/13 May 2015, Parma

(Agreed on 29 May 2015)

Participants

- **Network Representatives of Member States (including EFTA Countries):**

Country	Name
Austria	Monika Matt
Belgium	Isabel De Boosere
Bulgaria	Hristo Naydenski
Cyprus	Georgios Papageorgiou
Croatia	Brigita Hengl
Czech Republic	Barbora Macková
Denmark	Maarten Nauta
Finland	Pirkko Tuominen
France	Nicole Pavio
Germany	Anja Buschulte
Greece	Vassilis Xanthopoulos
Hungary	László Mészáros
Ireland	Wayne Anderson
Italy	Dario De Medici
Lithuania	Indre Stoskuviene
Netherlands	Benno ter Kuile
Poland	Elzbieta Mackiw
Portugal	Luisa Peixe
Romania	Ioana Neghirla
Slovakia	Lubomir Valík
Spain	Elena Carrasco Jimenez
Sweden	Karin Nyberg
United Kingdom	Joanne Edge
Norway	Danica Grahek-Ogden
Switzerland	Renata Boss

- **Hearing Experts**

Jonathan Suk (for item 4.1); Kostas Koutsoumanis (for item 4.2), Reimar Johne (for item 6.4)

- **EFSA:**

BIOCONTAM Unit: Frank Boelaert (participated in agenda item 6.7); Emmanouil Chantzis (trainee); Beatriz Guerra; Michaela Hempen (secretariat); Winy Messens (chair); Pablo Romero Barrios;

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1. Welcome and apologies for absence (12 May 2015)

The Chair welcomed the participants and invited them to introduce themselves.

Apologies were received from Ioana Neghirla (Romania) and Renata Boss (Switzerland).

2. Adoption of agenda

The agenda was adopted with changes (agenda points 7.2 and 7.3 added).

3. Agreement of the minutes of the 11th meeting of the Network on Microbiological Risk Assessment held on 25/26 November 2014, Parma

The minutes were agreed by written procedure on 16 December 2014 and published on the EFSA website 19 December 2014.

4. Topics for discussion

4.1 Best practices in ranking emerging infectious disease threats

Jonathan Suk (ECDC) presented the ECDC report on ranking emerging infectious diseases.[1] A literature review was conducted to identify the range of methods used to prioritise communicable disease threats for the purposes of emergency preparedness planning, and an evaluation undertaken to identify which are the most robust methodologies. Due to the diversity of ranking methods identified, a narrative synthesis was performed, with studies clustered by methodology. Seventeen studies were selected for inclusion in the review. The included studies used one of five methodologies to prioritise communicable disease risks: bibliometric index, the Delphi technique, multi-criteria decision analysis (MCDA), qualitative algorithms, and questionnaires. Instead of recommending a single definitive approach to risk ranking of communicable diseases for the purpose of preparedness planning, this review provides an evaluation of the strengths and limitations of the available methods, with a framework of best practice suggestions specific to individual methodologies and general points. This approach is intended to help inform decision-makers' choice of an appropriate risk-ranking method and ensure that these methods are carried out according to best practice. The speaker also made reference to ECDC's Climate change and food-borne disease quantitative microbial risk assessment tool (CC-QMRA).[2]

4.2 Development of a risk ranking toolbox for the EFSA BIOHAZ Panel

Kostas Koutsoumanis (EFSA BIOHAZ Panel member) presented the Scientific Opinions of the BIOHAZ Panel on Risk ranking framework[3] and toolbox.[4] The first opinion was published in June 2012. In that opinion, a conceptual risk ranking framework with nine separate stages is proposed to allow the adoption of the appropriate risk ranking methodology at each stage. The second opinion was published in January 2015. Eight tools relevant to risk ranking of biological hazards in food were identified and assessed using two case studies. Differences in their performance were observed, related to the risk metrics, data requirements, ranking approach, model type, model variables and data integration. Quantitative stochastic models are the most reliable for risk ranking. The use of deterministic models that ignore variability may result in risk ranking errors. The ordinal scoring approaches in semi-quantitative models provide ranking with more errors than the deterministic

[1] http://ecdc.europa.eu/en/publications/Publications/emerging-infectious-disease-threats-best-practices-ranking.pdf
[2] http://ec.europa.eu/environment/integration/research/newsalert/pdf/369na1_en.pdf
[3] http://www.efsa.europa.eu/en/efsajournal/pub/2724.htm
[4] http://www.efsa.europa.eu/en/efsajournal/pub/3939.htm

approaches. FDA (Food and Drug Administration)-iRISK was identified as the most appropriate tool for risk ranking of microbiological hazards.

4.3 Break out session on risk ranking

The participants were introduced by Kostas Koutsoumanis to two tools: FDA iRisk[5] and Risk Ranger.[6]

4.4 CamCon, an EU FP7 project on Campylobacter control in primary poultry production

The representative from Denmark presented results from the European framework project CamCon.[7] The aim of the project, which started in May 2010 and ended in April 2015, was to provide European broiler producers and governments with tools to achieve a broiler population without or very low *Campylobacter* concentration levels. The work package on risk assessment and economics was presented, in particular the effects of on-farm interventions. The effects of interventions and their cost-effectiveness varied among MS. Interventions with low cost/disability-adjusted life years (DALY) are anteroom with hygiene barrier and dedicated tool. Interventions with high costs/DALY are discontinued thinning, new houses, slaughter at 35 days and drink nipples without cup. Project reports and scientific articles result from this project as well as an e-learning programm and other information material for farmers and risk managers.

4.5 A QMRA for the transmission of ESBL-producing E. coli and Campylobacter from poultry farms to the human population

The representative from the Netherlands presented a report on the transfer of pathogens and antibiotic resistant microorganisms from agriculture to the human population.

One of the studies in the report aims to discern the contribution of poultry farms to the environmental load of Extended-Spectrum Beta-Lactamase (ESBL)-producing *Escherichia coli* and therewith, potentially to their spread to humans and other animals. The introduction of ESBL-producing *E. coli* into the environment may pose a risk if these bacteria are transported to places where the general public may become exposed. The environmental compartments most likely acting as vehicles for dissemination are water, air, and, possibly, flies. Another study looks at the prevalence and characteristics of *Campylobacter* at poultry farms and their direct environment. Surface water was identified as an important vehicle of dissemination of *Campylobacter* from poultry farms to water to which the general human population may be exposed. The third component of the report is a QMRA for the transmission of ESBL-producing *E. coli* and *Campylobacter* from poultry to humans through flies using a worst case risk model. Human exposure was modelled by the fraction of contaminated flies, the number of specific bacteria per fly, the number of flies leaving the poultry farm, and the number of positive poultry houses in The Netherlands. Comparing estimates of the worst case risk of transmission through flies with estimates of the real risk of chicken fillet consumption, the number of human exposures to ESBL-producing *E. coli* was higher for chicken fillet as compared with flies, but the total level of exposure was higher for flies. For *Campylobacter*, risk values were nearly consistently higher for transmission through flies than for chicken fillet consumption. This indicates that the public health risk of transmission of both ESBL-producing *E. coli* and *Campylobacter* to humans through flies might be of importance.

[5] https://irisk.foodrisk.org/
[6] http://www.foodsafetycentre.com.au/riskranger.php
[7] http://www.camcon-eu.net/

4.6 Food safety aspects of insects intended for human consumption

The representative from Belgium presented a joint advice[8] on biological, chemical and physical hazards in insects intended for human consumption. The report describes the production and species of insects for human consumption and concludes that the microbial quality of raw products is not acceptable and that heat treatment is required to reduce risk. Spore-forming bacteria and pathogenic fungi are the most important biological hazards. Prions may be relevant if insects that are fed on specified risk material. Chemical hazards from the enviornment need to be assessed case by case but there is no indication of natural toxins. Legs and wings of larger insects may rupture the intestines and should be removed before consumption.

After the presentation, France shared results from an Anses opinion on risks from insect consumption.[9]

4.7 Current and recent activities of BIOHAZ Panel

Michaela Hempen gave an overview of the activities in the field of MRA finalised and ongoing since the last Network meeting.

Finalised MRA activities include:

- Scientific Opinion on the development of a risk ranking toolbox for the EFSA BIOHAZ Panel (see agenda item 4.2);
- Scientific Opinion on the public health risks related to the consumption of raw drinking milk (see agenda item 6.1);[10]
- Scientific Opinion on the risk posed by pathogens in food of non-animal origin. Part 2 (other): Salmonella, Yersinia, Shigella and Norovirus in bulb and stem vegetables, and carrots;[11]
- An update on the risk of transmission of Ebola virus (EBOV) via the food chain – Part 2.[12]

On-going MRA activities are :

- Scientific and technical assistance on the evaluation of the temperature to be applied to pre-packaged fishery products at retail level;[13] deadline June 2015;
- Scientific opinion on the public health risks associated with Enteroaggregative Escherichia coli;[14] deadline December 2015;
- Scientific Opinion on the evaluation of heat treatments, that could be applied to live bivalve molluscs in order to eliminate pathogenic micro-organisms;[15] deadline December 2015.

The mandates of the new activities that have started since the last MRA Network meeting were presented:

- Scientific opinion on risks for public health related to the presence of the *Bacillus cereus* and other *Bacillus* spp., including *Bacillus thuringiensis* in foodstuffs;[16] deadline December 2015;

[8] http://www.favv.be/comitescientifique/avis/_documents/AVIS14-2014_FR_DOSSIER2014-04_000.pdf
[9] https://www.anses.fr/en/documents/BIORISK2014sa0153EN.pdf
[10] http://www.efsa.europa.eu/en/efsajournal/pub/3940.htm
[11] http://www.efsa.europa.eu/en/efsajournal/pub/3937.htm
[12] http://www.efsa.europa.eu/en/efsajournal/pub/4042.htm
[13] http://registerofquestions.efsa.europa.eu/roqFrontend/questionLoader?question=EFSA-Q-2014-00528
[14] http://registerofquestions.efsa.europa.eu/roqFrontend/questionLoader?question=EFSA-Q-2014-00538
[15] http://registerofquestions.efsa.europa.eu/roqFrontend/questionLoader?question=EFSA-Q-2015-00161

- Scientific Opinion on the growth of spoilage bacteria during storage and transport of meat;[17] deadline October 2015;
- Scientific Report on a clarification on the Scientific Opinion on the public health risks related to the maintenance of the cold chain during storage and transport of meat (Part I and Part II);[18] deadline October 2015;
- 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;[19] deadline December 2016.

5. Welcome and apologies for absence (13 May 2015)

6. Topics for discussion

6.1 BIOHAZ opinion on public health risks related to the consumption of raw drinking milk

This self-task opinion of the BIOHAZ Panel was initiated by the MRA Network. The network members contributed to the opinion by replying to a detailed questionnaire.

The main microbiological hazards associated with raw drinking milk (RDM) from cows, sheep and goats, horses and donkeys and camels were identified using a decision tree approach. This considered evidence of milk-borne infection and the hazard being present in the EU, the impact of the hazard on human health and whether there was evidence for RDM as an important risk factor in the EU. The main hazards were *Campylobacter* spp., *Salmonella* spp., shigatoxin-producing *Escherichia coli* (STEC), *Brucella melitensis*, *Mycobacterium bovis* and tick-borne encephalitis virus, and there are clear links between drinking raw milk and human illness associated with these hazards. Antimicrobial resistance has been reported in several EU countries in some of the main bacterial hazards isolated from raw milk or associated equipment and may be significant for public health. Sale of RDM through vending machines is permitted in some EU countries, although consumers purchasing such milk are usually instructed to boil the milk before consumption, which would eliminate microbiological risks. With respect to internet sales of RDM, there is a need for microbiological, temperature and storage time data to assess the impact of this distribution route. Intrinsic contamination of RDM with pathogens can arise from animals with systemic infection as well as from localised infections such as mastitis. Extrinsic contamination can arise from faecal contamination and from the wider farm environment. It was not possible to rank control options as no single step could be identified which would significantly reduce risk relative to a baseline of expected good practice, although potential for an increase in risk was also noted. Improved risk communication to consumers is recommended.

6.2 Evaluation of the microbiological risks of the consumption of dairy products based on raw milk

The Belgian representative presented an advice on risks through raw milk products,[20] in particular cheese, butter, cream and butter milk from cow, sheep and goat and buffalo (mozzarella). Relevant hazards in raw milk cheeses are *L. monocytogenes*, VTEC, *Salmonella*, *S. aureus* and *Campylobacter*, in raw milk butter and cream are *L. monocytogenes*, VTEC and *S. aureus*. There is very limited information on raw

[16] http://registerofquestions.efsa.europa.eu/roqFrontend/questionLoader?question=EFSA-Q-2015-00254
[17] http://registerofquestions.efsa.europa.eu/roqFrontend/questionLoader?question=EFSA-Q-2015-00163
[18] http://registerofquestions.efsa.europa.eu/roqFrontend/questionLoader?question=EFSA-Q-2015-00162
[19] http://registerofquestions.efsa.europa.eu/roqFrontend/questionLoader?question=EFSA-Q-2015-00216
[20] http://www.favv.be/comitescientifique/avis/default.asp

butter milk. Identified hazards for raw milk produced outside of Belgium were *Brucella*, *M. bovis* and tick-borne encephalitis virus.

6.3 Hepatitis E transmission and the role of food

The representative from Ireland gave an introduction on hepatitis E virus (HEV) and reported routes of transmission. A research study is under development to look at :

- Quantification of seroconversion in pigs and epidemiological study;
- Quantification of HEV ribonucleic acid in meat and offal at slaughter;
- Heat inactivation studies in food and development of infectivity assays;
- Seroprevalence/molecular epidemiology in humans using whole gene sequencing.

6.4 Hepatitis E Virus in the food chain in Germany

Reimar Johne gave an overview on the research on HEV in Germany. In 2014, there was a marked increase of human hepatitis E cases in Germany. Wild boar liver samples were tested using RT-PCR in three regions. In Brandenburg 14 of 54 and in Thüringen 5 of 25 samples were positive (Berlin 3/73). One of the isolates had a very close relationship (97.9 % nucleotide sequence identity) with an isolate from a human case in the same region. Domestic pigs in Germany show a high seroprevalence (49.8 %), 8/200 pig livers at retail were PCR-positive. BfR is working on developing a detection method for HEV in meat products. HEV-DNA can be detected but infectivity testing is difficult and requires further optimization.

6.5 Hazard characterisation of Hepatitis E Virus in Belgium with regards to the zoonotic risk and food safety

The Belgian representative presented a project report that looked at both zoonotic risks of HEV and food safety. The objectives were to investigate whether HEV is present in the Belgian animal and human population, if a wild boar strain could infect domestic pigs and what could be the transmission route to humans. The herd prevalence in swine was 93%, apparent individual seroprevalence 73%. HEV is endemic in wild boar population in Belgium (34%), a low prevalence in cervids (1-3%). Swine were inoculated with wild boar HEV and became infected but this is no proof for natural transmission between wild boar and pigs. Wild boar and pigs are probably a reservoir for human infections.

6.6 Discussion on Hepatitis E

The MRA network, in general, agreed that foodborne transmission of HEV needs further attention and recommends a self-task opinion of the BIOHAZ Panel.

6.7 EU Summary Report on zoonoses, zoonotic agents and food-borne outbreaks[21]

Frank Boelaert presented the results of the EU zoonoses monitoring activities carried out in 2013. Campylobacteriosis was the most commonly reported zoonosis. After several years of an increasing EU trend, the human campylobacteriosis notification rate has stabilised. In food and animals no EU trends were observed and the occurrence of *Campylobacter* continued to be high in broiler meat at EU level. The decreasing EU trend in confirmed human salmonellosis cases observed in recent years continued. Most Member States met their *Salmonella* reduction targets for poultry. In foodstuffs, the reported EU-level *Salmonella* non-compliance in fresh poultry meat decreased. Human listeriosis increased further, showing an increasing EU trend in 2009-2013. In ready-to-eat foods *Listeria* was seldom detected above the

[21] http://www.efsa.europa.eu/en/efsajournal/pub/3991.htm

legal safety limit. Also during 2009-2013, a decreasing EU trend was observed in confirmed yersiniosis cases. Positive findings for *Yersinia* were mainly reported in pig meat and products thereof. The number of confirmed *verocytotoxigenic Escherichia coli* (VTEC) infections in humans increased. VTEC was reported from food and animals. A total of 5,196 food-borne outbreaks, including water-borne outbreaks, were reported in the EU. Most food-borne outbreaks were caused by *Salmonella*, followed by viruses, bacterial toxins and *Campylobacter*, whereas in 28.9 % of all outbreaks the causative agent was unknown. Important food vehicles in strong-evidence food-borne outbreaks were eggs and egg products, followed by mixed food, and fish and fish products.

7. Any Other Business

7.1 Date for next meeting

The next meeting of the MRA Network will be held on 27/28 October 2015 in Parma.

7.1 EFSA's Scientific Colloquium N°20 "Whole Genome Sequencing of food-borne pathogens for public health protection"

The Colloquium Report of EFSA's Scientific Colloquium N°20 "Whole Genome Sequencing of food-borne pathogens for public health protection" has been published.[22] It contains abstracts of the opening speeches, summaries of the group discussions and conclusions from the final plenary session.

7.2 EFSA's 2nd Scientific Conference in the context of EXPO 2015

EFSA has announced the detailed programme of the individual sessions of its second major Scientific Conference "Shaping the Future of Food Safety, Together"[23] to be held in Milan, Italy, on the occasion of EXPO 2015. The registration deadline is 15 May 2015.

8. Closure of the meeting

The chair thanked the participants and closed the meeting.

[22] http://www.efsa.europa.eu/en/supporting/pub/743e.htm
[23] http://www.efsaexpo2015.eu/