Monitoring of foodborne outbreaks caused by toxin-producing bacteria in the European Union

Giusi Amore
BIOCONTAM unit - European Food Safety Authority (EFSA)
OUTLINE

■ BACKGROUND

■ DATA COLLECTION ON FOOD-BORNE OUTBREAKS (FBOs) IN EU

■ MAIN FINDINGS FROM EU SUMMARY REPORT 2014

  ➢ FOODBORNE OUTBREAKS CAUSED BY
    ▪ BACTERIAL TOXINS
    ▪ STEC

■ RAPID OUTBREAK ASSESSMENT
EFSA IS...

- the EU reference body for risk assessment regarding food and feed safety
- independent European agency
- covers the entire food chain – from field to fork
- committed to ensuring food and feed safety
BIOCONTAM UNIT – BIOLOGICAL MONITORING

- Monitoring of zoonoses and zoonotic agents in food, animals and feed
- Monitoring of food-borne outbreaks
- Joint EFSA-ECDC Rapid Outbreak Assessments
EU-WIDE MONITORING OF FBOs

- Reporting of FBOs mandatory since 2003
- Based on Zoonoses Directive 2003/99/EC
- Member States investigate FBOs in their territory
- Report annual data on monitoring FBOs

EFSA’s tasks
- Data collection & analysis
- Publication of the EU annual Summary Reports
EU ZOONOSES DATA COLLECTION

EU Member States and other reporting countries

Animal, food and feed monitoring

Foodborne outbreaks

Communicable human diseases

Data Collection Framework (DCF)

The European Surveillance System (TESSy)

Scientific Network for Zoonoses Monitoring Data

European Food Safety Authority

ECDC

PMD and EVD Networks

Joint EFSA-ECDC annual EU Summary Report (EUSR) on zoonoses and food-borne outbreaks

[Available online: www.efsa.europa.eu/efsajournal]
EU-WIDE MONITORING OF FBOs

- **2007**: Harmonised specifications on the reporting of FBOs progressively applied in the EU

- **2010**: European Union Food-borne Outbreaks reporting System (EU-FORS)

- **2014**: Classification of the outbreaks
  - 'strong evidence'
  - 'weak evidence'

Based on the strength of evidence implicating a food vehicle.
EU-WIDE MONITORING OF FBOs

Information on FBOs to report

- N outbreaks per causative agent
- N human cases
- N hospitalisations
- N deaths
- Type of FBO (i.e. general/household)
- Type food vehicle
- Food vehicle info
- Type of evidence (strong or weak)
- Place of exposure
- Place of origin
- Origin of the food vehicle
- Contributory factor (e.g. cross-contamination, inadequate heat treatment, etc.)

EU-WIDE MONITORING OF FBOs

**EU-FORS**

Evaluation of the strength of evidence implicating a suspected food vehicle

- **Assessment of all available types of evidence**
  - Microbiological evidence
  - Epidemiological evidence
  - Environmental evidence
  - Tracing-back of the investigated foodstuffs

- The nature of evidence is not necessarily correlated with its strength

References & definitions: EU-FORS guidance and the published manual for reporting on food-borne outbreaks
Food-borne outbreak (FBO) investigation systems at national level non harmonised among MS

- Differences in the sensitivity of the surveillance systems for food-borne outbreaks in the different countries

- Some countries have implemented changes in the national systems over time

- These aspects and limitations are to be considered when interpreting the results on the monitoring of foodborne outbreaks in the EU
In 2014, overall **5,251 food-borne outbreaks** reported by 26 EU MS → 45,665 human cases, 6,438 hospitalisations and 27 deaths.
Most food-borne outbreaks caused by **viruses**, followed by **Salmonella**, **bacterial toxins** and **Campylobacter**

→ unknown causative agent in 29.1% of all outbreaks
FOOD-BORNE OUTBREAKS (EUSR 2014)

Food-borne outbreaks caused by bacterial* toxins (*Bacillus, clostridium, staphylococcus)

- 840 food-borne outbreaks reported by 18 MS (excluding three water-borne outbreaks) → slight increased from 2013
- 3 water-borne outbreaks (2 weak-evidence outbreaks by FR and 1 strong-evidence outbreak by ES)
- 10 outbreaks reported by the non-MS: Iceland and Switzerland (3 strong-evidence outbreaks each), Norway (4 weak-evidence outbreaks)

- Mosty general outbreaks (less household outbreaks)
FOOD-BORNE OUTBREAKS (EUSR 2014)

FBOs caused by *Bacillus* toxins

- In 2014, 12 Member States reported **287 food-borne outbreaks** caused by *Bacillus* toxins (5.5% of all outbreaks)
  - Small increase (3.2%) compared with 2013, when 9 MS reported 278 *Bacillus* toxin outbreaks.

<table>
<thead>
<tr>
<th>Country</th>
<th>Strong-evidence outbreaks</th>
<th>Weak-evidence outbreaks</th>
<th>Total outbreaks</th>
<th>Reporting rate per 100,000</th>
</tr>
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<tbody>
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<td>Total (MS)</td>
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FBOs caused by *Bacillus* toxins

- **35 strong-evidence outbreaks reported**
  
  - **Place of exposure**: mostly reported ‘restaurant, café, pub, bar, hotel’ and ‘canteen or workplace catering’ (six outbreaks each), followed by ‘school and kindergarten’ (four outbreaks). In 9 outbreaks reported as ‘others’
Distribution of FBOs caused by *Bacillus* toxins by food vehicle, 2014

- Mixed food: 34.3% (N=35)
- Cereal products including rice and seeds/pulses (nuts, almonds): 28.6%
- Broiler meat (*Gallus gallus*) and products thereof: 11.4%
- Crustaceans, shellfish, molluscs and products thereof: 11.4%
- Vegetables and juices and other products thereof: 5.7%
- Buffet meals: 5.7%
- Sweets and chocolate: 5.7%
- Sheep meat and products thereof: 2
- Other foods: 10
- Mixed foods: 12
FOOD-BORNE OUTBREAKS (EUSR 2014)

FBOs caused by *Clostridium* toxins

- In 2014, 13 Member States reported **160 food-borne outbreaks** caused by *Clostridium* toxins (3.1% of all outbreaks)

  - *C. perfringens* (124 outbreaks), *C. botulinum* (9 outbreaks) or unspecified *Clostridia* (27 outbreaks)

<table>
<thead>
<tr>
<th>Country</th>
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<th>Weak-evidence outbreaks</th>
<th>Total outbreaks</th>
<th>Reporting rate per 100,000</th>
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<tbody>
<tr>
<td></td>
<td>Number</td>
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FBOs caused by *Clostridium* toxins

- 42 strong-evidence outbreaks reported
- **Place of exposure**: mostly ‘restaurant, café, pub, bar, hotel’ (13), followed by ‘residential institutions’ (9) and ‘household’ (8)

**5 strong-evidence outbreaks caused by *C. botulinum* toxins** (by 4 MS)

→ 17 cases and 12 hospitalisations
→ All household outbreaks, except for one general outbreak
→ **Food vehicle**: ‘canned food products’ (2 outbreaks) and ‘vegetables and juices and other products thereof’ (2 outbreaks), ‘other foods (1 outbreak)
FOOD-BORNE OUTBREAKS (EUSR 2014)

FBOs caused by *Clostridium* toxins

37 strong-evidence outbreaks caused by *C. perfringens* toxins

→ 1710 cases, 24 hospitalisations, 3 deaths

**Food vehicle:** mostly ‘bovine meat and products thereof’ (6 outbreaks), ‘other or mixed red meat and products thereof’ (5 outbreaks) and ‘mixed foods’ (4 outbreaks).

In addition, **1 strong-evidence water-borne outbreak** reported by Spain, which involved 22 cases
FOOD-BORNE OUTBREAKS (EUSR 2014)

FBOs caused by staphylococcal toxins

- In 2014, 12 Member States reported 393 food-borne outbreaks caused by staphylococcal toxins (7.5% of all outbreaks)

- In addition, Switzerland reported 2 strong-evidence outbreaks caused by staphylococcal enterotoxins

<table>
<thead>
<tr>
<th>Country</th>
<th>Strong-evidence outbreaks</th>
<th>Weak-evidence outbreaks</th>
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<td>Total (MS)</td>
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</table>
FOOD-BORNE OUTBREAKS (EUSR 2014)

FBOs caused by staphylococcal toxins

- Only 31 strong-evidence outbreaks reported, less than 2013 (94 strong-evidence outbreaks)

- Type of outbreaks:
  - 18 general outbreaks,
  - 12 household outbreaks

- Place of exposure: ‘household’ (10), ‘restaurant, café, pub, bar, hotel’ (7), ‘school or kindergarten’ (3), ‘camp or pic nic’ (3), residential institutions (2), others (3)
Distribution of FBOs caused by staphylococcal toxins by food vehicle, 2014

- Mixed food: 9
- Broiler meat (Gallus gallus) and products thereof: 3
- Pig meat and products thereof: 3
- Cheese: 2
- Dairy products (other than cheeses): 2
- Fish and fish products: 2
- Vegetables and juices and other products thereof: 2
- Cereal products including rice and seeds/pulses (nuts, almonds): 1
- Eggs and egg products: 1
- Buffet meals: 1
- Crustaceans, shellfish, molluscs and products thereof: 1
- Drinks, including bottled water: 1

Total: 31
FOOD-BORNE OUTBREAKS (EUSR 2014)

FBOs caused by Shiga-toxin producing *E. coli*, STEC

- In 2014, 13 Member States reported **38 STEC outbreaks** involving 270 human cases, of which 34 hospitalised.

- Only **5 strong-evidence outbreaks** reported by 3 MSs (DE, ES, UK):
  - 3 outbreaks associated with consumption of milk (mainly raw milk).
  - 2 outbreaks associated with **vegetables** (bagged ready to eat salad and bagged rocket leaves).

In addition, **3 STEC waterborne outbreaks** involving 15 human cases were reported by 3 Member States (ES, Finland, Ireland).
Joint EFSA-ECDC Rapid Outbreak Assessments

An example of collaboration between EFSA and the European Centre for Disease Prevention and Control (ECDC) and EU Member States

Integrated approach to protect consumers
MAIN CONCLUSIONS

- Importance of adopting an integrated approach to food safety, engaging all the actors in the food chain, and making optimal use of scientific expertise.

- Prevention / risk reduction of food-borne diseases

  ✓ Safe handling of raw meat and other raw food ingredients, thorough cooking and good kitchen hygiene can prevent or reduce the risk posed by micro-organisms causing food-borne diseases.
Thank you for your attention!

Giusi Amore
Unit of Biological Hazards and Contaminants (BIOCONTAM)
Risk Assessment and Scientific Assistance Department
European Food Safety Authority (EFSA)
Parma, Italy
Email: giusi.amore@efsa.europa.eu