

Overview of 2017 Zoonoses Data

Introduction

Zoonoses are diseases and infections naturally transmissible between animals and humans. Transmission may occur via direct contact with an animal or indirect contact with animal excreta (e.g. faeces) present in contaminated food, water or the environment. Foodborne zoonotic diseases are caused by consuming food or drinking water contaminated by zoonotic pathogenic (disease-causing) microorganisms such as bacteria and their toxins, viruses and parasites. They enter the body through the gastrointestinal tract where the first symptoms often occur. Many of these microorganisms are commonly found in the intestines of healthy food-producing animals. The risks of contamination are present from farm to fork and require prevention and control throughout the food chain. While it is possible for anybody to become infected with a zoonotic pathogen, certain population groups such as the very young, the elderly and immunocompromised are particularly vulnerable and at greater risk of more serious consequences.

The eradication of zoonoses in humans and animals is very challenging. The impact of zoonoses on the health of humans and animals can however be limited, by (i) monitoring the reservoirs of infectious zoonotic pathogens with a view to understanding and controlling their modes of transfer; (ii) by businesses controlling the hazard along the food chain and; (iii) by educating the public about how to avoid or limit the risk of infection.

The Irish zoonoses report is published annually by the FSAI, in collaboration with the Department of Agriculture, Food and the Marine (DAFM), the Health Service Executive (HSE), the Local Authority Veterinary Service (LAVS), the Sea-Fisheries Protection Authority (SFPA) and the Health Protection Surveillance Centre (HPSC). The report brings together the results of thousands of tests carried out on samples of food and feed, as well as tests on material of animal or human origin, in an effort to determine the pattern and extent of infection by zoonotic pathogens transmitted to humans from animals.

Zoonoses data collected by EU Member States serve as a basis for the EU to set targets for the reduction of these microorganisms in food-producing animals and foodstuffs. The impact of the reduction programmes on the actual prevalence of zoonoses in animals and foods and related human health cases are then monitored and analysed in the annual EU summary reports published by the European Food Safety Authority and the European Centre for Disease Control and Prevention (EFSA and ECDC, 2018).

The data in the 2017 tables for the results of Irish testing carried out in food, animal and animal feed samples are presented in four categories (routine, census, objective and suspect sampling) depending on the sampling context. Routine sampling is planned sampling but does not involve statistically random sampling. Census sampling is when the totality of a population, on which the data are reported, is controlled. Objective sampling is

the planned selection of a random sample, which is statistically representative of the population to be analysed (EFSA, 2018). Suspect sampling is the unplanned selection of a sample whereby the individual units are selected based on the recent judgement and experience regarding the population, lot or sampling frame, e.g. earlier positive samples (EFSA, 2018). The samples obtained from suspect sampling may have a higher likelihood of having pathogens present.

Overview of 2017 data

Campylobacteriosis

- *Campylobacter* remained the most common bacterial cause of gastroenteritis in Ireland and in the European Union in 2017 (EFSA and ECDC, 2018). There were 2,786 cases of human campylobacteriosis reported in Ireland in 2017 (HPSC, 2018a; b), corresponding to a crude incidence rate (CIR) of 58.1 cases per 100,000 population. This was an increase on the 2,513 cases (CIR 5.28 per 100,000 population) reported in Ireland in 2016. In Europe, there were 246,158 cases reported in 2017 with a corresponding CIR of 64.8 per 100,000 population.
- A total of 113 routine and 170 suspect food samples were tested for *Campylobacter* spp. in 2017. *Campylobacter* was not detected in any samples.
- Out of 2,319 suspect animal samples tested for *Campylobacter*, 165 (7.1%) were positive. *Campylobacter jejuni* was identified from 94.5% (n=156) of the 165 positive samples. *Campylobacter coli* (n=1), unspecified thermotolerant *Campylobacter* species (n=5) and unspecified *Campylobacter* species (n=3) were identified in the 9 remaining positive samples. The breakdown of *Campylobacter* in suspect animal samples was as follows:
 - 146 positives (9.8%) of 1,496 calves under 1 year (bovine) sampled
 - 1 positive (33.3%) of 3 broilers sampled
 - 17 positives (2.3%) of 741 sheep sampled
 - 1 positive (50%) of 2 zoo animals tested.

Salmonellosis

- In 2017, there were 414 reported cases of salmonellosis in Ireland (CIR 8.7 per 100,000 population) which is an increase on the previous year (309 reported cases, CIR 6.3 per 100,000 population; HPSC, 2018a; b). The Irish figures for 2017 were below the European average CIR of 19.7 per 100,000 population (EFSA and ECDC, 2018).
- Of 153 human *Salmonella* isolates referred to the National Salmonella Shigella and Listeria Reference Laboratory (NSSLRL) for typing in 2017, the most common serotypes were *Salmonella* Typhimurium (including monophasic *S. Typhimurium*; 53%) and *Salmonella* Brandenburg (32%).

- A total of 5,082 food samples were tested for *Salmonella* in 2017.
- A total of 1,991 meat samples were tested. *Salmonella* was detected in 8 of 1811 routine meat samples tested. Of these, 3 were detected in raw meat and 5 in meat of unspecified RTE status. In total, 180 suspect meat samples were taken for *Salmonella* in 2017, of these 1 (0.6%) RTE meat sample was found to be positive for *Salmonella*.
- A total of 3,091 non-meat foods were tested. *Salmonella* was detected in 140 (4.5%) of 2,887 routine samples tested. One hundred and eighteen of the *Salmonella* positive routine samples were of unspecified RTE status while 17 were of raw and 5 were of RTE status. No *Salmonella* was detected in 204 non-meat suspect samples.
- *Salmonella* spp. unspecified (98%) was the predominant serotypes reported from 147 food isolates in 2017.
- In 2017, 39 of 4,763 (0.8%) breeding, laying hens and commercial poultry flocks were positive for *Salmonella*. The 39 isolates were detected in census sampled flocks. These included:
 - 19 positives (0.5%) of 3,701 broilers sampled before slaughter
 - 2 (2.1%) of 181 parents breeding flocks (*Gallus gallus*)
 - 6 (1.6%) of 372 laying hens (*Gallus gallus*)
 - 12 (3.6%) of 333 turkey fattening flocks.
- *Salmonella* Derby (13) and *Salmonella* Kentucky (11) were the most common serotypes detected in census flocks. Seven suspect sampled flocks were positive for *Salmonella* Enteritidis in 2017.

Of 8,599 suspect cattle samples tested for *Salmonella* spp. in 2017, 235 (2.7%) were positive. Two hundred and eighteen (92.7%) of the 235 isolates were *Salmonella* Dublin and 9 (3.8%) were *Salmonella* Typhimurium. Positive samples included:

- 35 positives (2.2%) of 1,582 sampled adult cattle (bovine > 2 years)
 - 79 positives (1.9%) of 4,239 sampled calves (bovine under 1 year)
 - 121 positives (4.4%) of 2,778 sampled cattle (foetus/stillbirth).
- *Salmonella* Kentucky (1) and *Salmonella* Senftenberg (1) were detected in 2 (1.1%) of 180 feed material samples analysed in 2017 (all objective sampling). The positive samples were in soya bean in the “oilseeds or fruits” category.

Cryptosporidiosis

- In 2017, 589 cases of cryptosporidiosis were notified in Ireland (CIR of 12.4 per 100,000 population) which is an increase on the 561 cases (CIR 11.8 per 100,000 population) reported in 2016 (HPSC, 2018a; b).

Shiga toxin-producing *Escherichia coli* (STEC) also known as Verocytotoxigenic *Escherichia coli* (VTEC)

- In 2017, there were 923 VTEC notifications (CIR 19.4 per 100,000 population) in Ireland, which is an increase from 2016 (832 cases, CIR of 17.6 per 100,000 population; HPSC, 2018a; b). In Europe 6,260 confirmed cases of VTEC were reported in 2017 with a CIR of 1.66 per 100,000 population (EFSA and ECDC, 2018). The reported VTEC incidence rate in Ireland is generally high relative to other European countries. For many years, Ireland has reported the highest VTEC incidence rate of any Member State in the EU, reporting over 11 times the EU average in 2017, except in 2011 when Germany reported the highest rate due to a large VTEC O104 outbreak linked to fenugreek seeds.
- In 2017, there were 146 VTEC outbreaks reported which involved 293 cases of illness. None of the 13 general outbreaks were suspected to be foodborne. A lower number of outbreaks (98) and cases of illness (250) were reported in 2016. The dominant known transmission routes reported for VTEC infection in Ireland have been person-to-person spread, especially in childcare facilities and among families with young children, and waterborne transmission associated with exposure to water from untreated or poorly maintained private water sources. Person-to-person was suspected to have played a role in 43 (29.45%) VTEC outbreaks whilst waterborne transmission was reported to have contributed to 10 outbreaks (4.06%). Animal or environmental contact was reported to have contributed to 13 (5.28%) outbreaks.
- Of 1,593 food samples tested for VTEC in 2017, none of the 1,446 routine or the 147 suspect samples were positive.

Listeriosis

- Fourteen cases of listeriosis were notified in Ireland in 2017 (CIR of 0.29 per 100,000 population; HPSC, 2018a; b). This is higher than reported in 2016 (13 cases, CIR of 0.27 per 100,000 population). Listeriosis in Ireland is below the 2017 European average CIR of 0.48 per 100,000 population (EFSA and ECDC, 2018).
- Of 3,035 detection tests (detected or not detected in 25 grams) carried out on food samples, 220 (7.2%) were positive for *Listeria monocytogenes*. Of these, 210 positives were detected in routine food samples (RTE (69), raw (26), and unspecified RTE status (115)). A further ten positives were detected in suspect samples, five in RTE food and five in food of unspecified RTE status.
- Of 6,334 enumeration tests (number of colony forming units per gram), *L. monocytogenes* was present in 85 (1.4%) of routine samples at >100 cfu/g. The microbiological criteria for *L. monocytogenes* in Commission Regulation (EC) 2073/2005, as amended, sets a legislative limit of 100 cfu/g for certain categories of RTE food

products during their shelf-life when they are placed on the market. Of the 85 routine samples with enumerated levels of *L. monocytogenes* >100 cfu/g, 35 were RTE and 50 were raw samples. In total, *Listeria monocytogenes* was present in nine suspect samples. Of these, five were RTE and four were of unspecified RTE status.

- In 2017, *Listeria* was detected in 4 of 4,217 (0.1%) animal suspect samples from sheep (4 of 1,169; 0.3%) and all were serotyped as *L. monocytogenes*.

Tuberculosis (TB)

- In 2017, 321 cases of TB were notified in Ireland (CIR of 6.7 per 100,000 population), which is an increase in the number of cases on the previous year (318 cases, CIR of 6.9 per 100,000 population). Whilst the number of cases increased in 2017, the crude incidence rate dropped due to an increase in the population. *Mycobacterium tuberculosis* was identified in 204 (97.14%) of the 210 culture confirmed cases for 2017. Two cases of *Mycobacterium bovis*-associated TB were reported in 2017, which is a decrease on the three cases reported in Ireland in 2016. Globally, most cases of zoonotic TB are caused by *M. bovis*, and cattle are the major reservoir. Zoonotic transmission of *M. bovis* occurs primarily through close contact with infected cattle or consumption of contaminated animal products such as unpasteurized milk. Bovine TB is a notifiable disease in Ireland and an ongoing national eradication program means that all herds are subject to test and control measures. Currently, in high-income countries, bovine TB is well controlled or eliminated in most areas, and cases of zoonotic TB are rarely seen. However, reservoirs of TB in wildlife populations have been linked to the persistence or increase of the incidence of bovine TB in some countries (Müller et al, 2013).
- In 2017, 3.5% of bovine herds were positive for TB compared with 3.2% in 2016.
- Of 323 suspect samples from animals other than bovine tested for *Mycobacterium* in 2017, 33.4% tested positive. Positive suspect samples were detected in badgers (61 of 152), alpacas (1 of 3), cats (1 of 4), farmed deer 1 of 2), wild deer (23 of 101), Dogs (1 of 3), Ducks (1 of 2), elephants (2 of 2), fowl – *Gallus gallus* (1 of 2), goats (1 of 20), pigs (14 of 23) and sheep (1 of 2).

Brucellosis

- No cases of brucellosis reported in humans in 2017, compared to two reported cases in 2016.
- Of the 2,743 suspect (cattle (bovine), monkeys, sheep, solipeds) samples tested in 2017, none were positive for *Brucella*.

Variant Creutzfeldt-Jakob disease (vCJD), Bovine Spongiform Encephalopathy (BSE) and Transmissible Spongiform Encephalopathy (TSE)

- No new vCJD cases were notified in 2017. The last case of vCJD was notified in 2006.
- Nine cases of CJD were notified in 2017. All notifications were for sporadic CJD cases.
- There was 1 new case of BSE reported in cattle in 2017.
- In 2017, one case of atypical scrapie and 11 cases of classic scrapie were reported.

Toxoplasmosis

- There were 20 toxoplasmosis notifications in humans in 2017 (CIR of 0.4 per 100,000 population), compared with 24 notifications reported in 2016 (CIR of 0.5 per 100,000 population).
- *Toxoplasma gondii* was detected in 13% (140 of 1,077) of sheep and 1.59% (1 of 63) of cattle (bovine) tested in 2017 (suspect samples).

Leptospirosis

- There were 20 cases of leptospirosis notified in humans in 2017, (CIR of 0.4 per 100,000 population) which is lower than 2016 in which 26 cases were notified (CIR of 0.54 per 100,000 population).

Other Zoonoses

- There were six reported cases of yersinosis (CIR of 0.1 per 100,000 population). This was an increase on the previous year (3 cases; CIR=0.06). Of 4,355 suspect animal samples tested for *Yersinia*, 2 (0.05%) were positive for *Yersinia pseudotuberculosis*.
- No human cases of trichinellosis were notified in Ireland in 2017. There were 3,636 tests carried out for *Trichinella* in pigs with no positive samples detected (objective samples). Of 3,362,663 census samples taken in pigs in 2017, none were positive for *Trichinella*.
- Two cases of Q fever were reported in Ireland in 2017. *Coxiella* was detected in 3.1% (5 of 159) of suspect animal samples tested in 2017. Four positives (5.19%) were from cattle (n=77) and one positive (1.2%) was from sheep (n=81). All positives (3.1%) were identified as *Coxiella burnetii* (n=5).
- No cases of echinococcosis were notified in 2017.

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