**ADVISORY COMMITTEE ON THE MICROBIOLOGICAL SAFETY OF FOOD**

**EPIDEMIOLOGY OF FOODBORNE INFECTIONS GROUP (EFIG)**

1. The group met on 9 June 2021 and the following is a combined summary of the animal and human data and food surveillance activities that were discussed at this meeting.

## Summary

2. This paper reports on *Salmonella* in livestock in Great Britain in 2020 and the first quarter of 2021, *Salmonella* National Control Programme in Poultry in 2020 and January – June 2021 and human infection in the UK in relation to key pathogens in 2020. It provides an update on the Food Standards Agency/Public Health England's burger watch monitoring programme, discusses food surveillance in GB and highlights the FSA's Survey of infectious intestinal disease in the UK (wave 1, wave 2 and wave 3).

## Animal data

### Salmonella in Livestock Production (January – December 2020 and January – March 2021)

3. There are currently two separate data reporting requirements for *Salmonella* in livestock in Great Britain - data reported as having been collected under the National Control Programmes (NCPs) for *Salmonella* in flocks of laying hens, breeding chickens, broilers and turkeys and data from other livestock species not subject to a *Salmonella* NCP.

4. In livestock species not subject to a *Salmonella* NCP (i.e. there is no routine *Salmonella* monitoring) isolations of *Salmonella* are usually derived from clinical diagnostic material. Therefore, the number of reports is dependent on the total animal population and the number of diagnostic submissions to veterinary laboratories. It must be noted that trends in surveillance intensity within companies/organisations (including pet re-homing centres) and by farmers/private veterinarians have a significant influence on the number of reported incidents from livestock species not subject to a *Salmonella* NCP.

5. For species not subject to NCP, EFIG considered the provisional data for 2020 and first quarter data for 2021. Finalised data for January to December 2020 was subsequently published in *Salmonella* in Livestock production in Great Britain, 2020

6. Chapter 1 of the above-mentioned report provides an overview of *Salmonella* in Livestock and People. Isolations of the most common serovars in livestock and people in GB in 2020 can be seen in Figure 1.1 of the report. Table 1.1 shows the isolations in cattle, sheep, pigs and poultry (excluding chickens and turkeys) in all premises in GB including statutory and non-statutory results.

7. Incidents of *Salmonella* serovars in livestock in GB by year (Jan – Mar 2017 to 2021 incl.) – excluding chickens and turkeys (*S*. Enteritidis, *S* Typhimurium (incl. mST) and other serovars) showed little change in *S.* Typhimurium numbers (39 in 2021, 37 in 2020 and 42 in 2019). *S*. Enteritidis numbers were 5 incidents in 2019 and single incidents in 2020 and 2021.

8. Incidents of *S.* Typhimurium by species in GB (Jan – Mar 2017 to 2021 incl.). Highest number of incidents was in pigs with 4 (2017), 8 (2018), 5 (2019),18 (2020) and 21 (2021); 3 incidents were DT193 and 12 incidents U288. There were fewer incidents from cattle: 1 (2017), 2 (2018), 6 (2019), 3 (2020) and 2 (2021) or Sheep 2 (2017) and nil in 2018 to 2021. A single incident of *S*.Typhimurium DT104 was recorded for dogs.

9. From February 2021 dogs have been classified (under the Zoonoses (Amendment) Order 2021) as a statutory species having previously been categorised under non-statutory. It was noted that up to 1 June 2021 there were 167 incidents of *Salmonella* recorded in dogs including regulated serovars such as *S*.Infantis, which had also been associated with chickens. Members noted that there are ongoing discussions between Public Health England (PHE), Animal and Plant Health Agency (APHA) and the Food Standards Agency (FSA) on the increasing number of incidents relating to dogs some of which were associated with the use raw pet food. It was agreed that action was needed to address this issue.

**_Salmonella_ National Control Programme (NCP) results 2020 and 2021 (January – June 2021)**

10. An overview of the *Salmonella* NCP results for the above period was provided to the group.

11. EFIG noted that NCP testing continues to provide a good indication of the *Salmonella* status of chicken and turkey flocks in the NCP although there continue to be official concerns about the sensitivity of operator sampling with testing in private laboratories. Members noted that APHA has scheduled meetings with stakeholders to address this. Members noted that Official sampling targets were not fully met in 2020 due to COVID and AI restrictions. Official sampling for 2021 was on target.

12. APHA reported that although two human cases of the *Salmonella* Enteritidis t5:180 cluster strain were identified in the spring of 2021, no associated infected flocks have been identified as of 7 June 2021. Further meetings with FSA and PHE will be held to discuss the involvement of packing centres in the spread of infection.

13. One broiler flock with *Salmonella* Enteritidis was identified so far in 2021. This was considered to be due to persisting infection on the farm from a previously infected flock.

14. *Salmonella* Infantis was isolated from a broiler breeder flock. The source of infection was suspected to be a dog which had been fed raw pet food. Monophasic

*Salmonella* Typhimurium was identified in one fattening turkey flock in April 2021 with infection suspected to originate from a nearby outdoor pig unit.

15. As at 7June 2021 in all sectors, the prevalence of infection with non-regulated serovars continues at a similar rate to that identified in 2020. These are mostly feed-related serovars.

16. The group noted that PHE and APHA have setup a process for routine sharing of information on target serovars detected in poultry. This routine sharing of sequences from poultry enables comparisons with data on PHE's database of whole genome sequences. This was how a link with *Salmonella* Enteritidis t5:180 cluster strain was identified in the spring of 2021.

**Human Infection Data – Summary of key pathogens for 2020**

## Trend in laboratory reports

**Report of human infection data quarters 1-4, 2020**

17. PHE underlined the caveats attached to the report. **It was explained that 2020's data cannot be compared to previous years' data as a substantial and sustained reduction has been observed in reporting of the major GI pathogens to national surveillance coinciding with the Covid-19 pandemic. This is due to the introduction of non-pharmaceutical interventions (NPIs) to control the pandemic, as well as multifactorial influences on surveillance systems for the detection and reporting of GI pathogens. Due to this, trend data is not reported for 2020 in this report.**

18. Members noted that the effect of Covid-19 has been variable in data collected in 2020. PHE explained that this was noticed in the data relating to norovirus where there have been a notable reduction in outbreaks reported at local level and hospitals in 2020 compared to previous years, likely at least partly due to enhanced IPC measures in place to control COVID. Members also noted the impact of Covid-19 on travel associated *Salmonella* reports with reduction in travel to countries that PHE usually observe to be associated with a notable travel associated disease burden, particularly in relation to *S*.Enteritidis.

19. Overall, the group was asked to observe caution when interpreting the human data for 2020.

**All non-typhoidal *Salmonella* infections**

20. There were 5353 reports of non-typhoidal *Salmonella* in the UK in 2020, a decrease from 9723 reported in 2019. This decreased the overall UK reporting rate from 14.6 in 2019 to 8.0 in 2020.

### *Salmonella* serovars

21. Reports of *S.* Enteritidis in the UK decreased from 2968 in 2019 to 465 in 2020. The UK reporting rate decreased from 4.4 to 2.2 cases per 100,000 population.

22. A decrease in the UK reports of *S.* Typhimurium was seen in 2020 compared to 2019, with a decrease of 485 cases.

23. *S.* Enteritidis was the most commonly reported serovar across all constituent countries, comprising 27% of all reported *Salmonella* cases in the UK. *S.* Typhimurium comprised 24% of all reported *Salmonella* cases in the UK, Together *S.* Enteritidis and *S.* Typhimurium constitute 52% of all non-typhoidal Salmonellae reported ıthe United Kingdom.

24. In addition to *S.* Enteritidis and *S.* Typhimurium, *S.* Infantis, was within the top 10 most commonly identified serovars in all four countries in 2020. The top serovars comprise 64% of all reported *Salmonella* infections in the UK.

### *Campylobacter* infections

25. Reports of *Campylobacter* decreased in the UK from 67,872 in 2019 to 53,538 in 2020.The reporting rate for *Campylobacter* decreased in the UK from 101.6 per 100,000 population in 2019 to 80.2 per 100,000 in 2020. There was discussion on the Welsh *Campylobacter* data that showed a marked drop before lockdown in March 2020. It was confirmed that numbers have now returned to normal levels.

### *Listeria* infections

26. There was a decrease in the number of reported *Listeria monocytogenes* infections in England in 2020 by 26 cases compared to 2019. Increases in infections were reportedin Scotland (+7), Wales (+4) and Northern Ireland (+1).

### STEC infections

27. There was a decrease in reporting rate of STEC O157 in the UK from a rate of 1.1 cases per 100,000 population in 2019 to 0.9 cases per 100,000 population in 2020. Increases were reported by Wales and Northern Ireland, while decreases were reported for England and Scotland.

### *Cryptosporidium* infections

28. The reporting rate of *Cryptosporidium* infections decreased in the UK from 8.3 in 2019 to 4.3 in 2020. In 2020, the highest rates were seen in Northern Ireland and Wales.

### Foodborne outbreaks

29. In 2020, 30 foodborne outbreaks were reported to national surveillance systems in England, Wales, Scotland and Northern Ireland compared to 57 reported in 2019. There were 1148 affected individuals, 869 of which were laboratory confirmed, and

94 reported hospitalisations. *Salmonella* and STEC were the most commonly implicated pathogens (7/30 (23%) reports for each pathogen). Notable outbreaks involved *Salmonella* in imported chicken meat products and *S*. Typhimurium/*S*. Anatum associated with imported brazil nuts.

30. With the Covid restrictions on attending events and catering premises, a real reduction due to the impact of Covid control measures together with ascertainment issues including reduced resource available to investigate outbreaks was considered to have impacted on the surveillance data for 2020. It was mentioned that PHE is in the process of clarifying its definitions in relation to evidence descriptions (e.g., descriptive, analytical, microbiological, food chain).

**Burger Watch: Report on excess burger consumption amongst STEC cases in England**

31. Following the change in FSA policy on the serving of less than thoroughly cooked beef burgers in 2016, there was agreement between the FSA and PHE to develop and test the utility of an exceedance tool to detect potential increased reports of consumption of raw/under-cooked burgers derived from the STEC enhanced surveillance system ('Burger watch'). The exceedance algorithm that has been developed has been reviewed by PHE who concluded that it was not a robust way of monitoring STEC cases in relation to consumption of less than thoroughly cooked burgers. EFIG agreed to convene a small group to further consider this issue and come up with a methodology that will address the FSA's objective.

**Food Surveillance**

**Public Health England Food, Water and Environment (FWE) Microbiology Services**

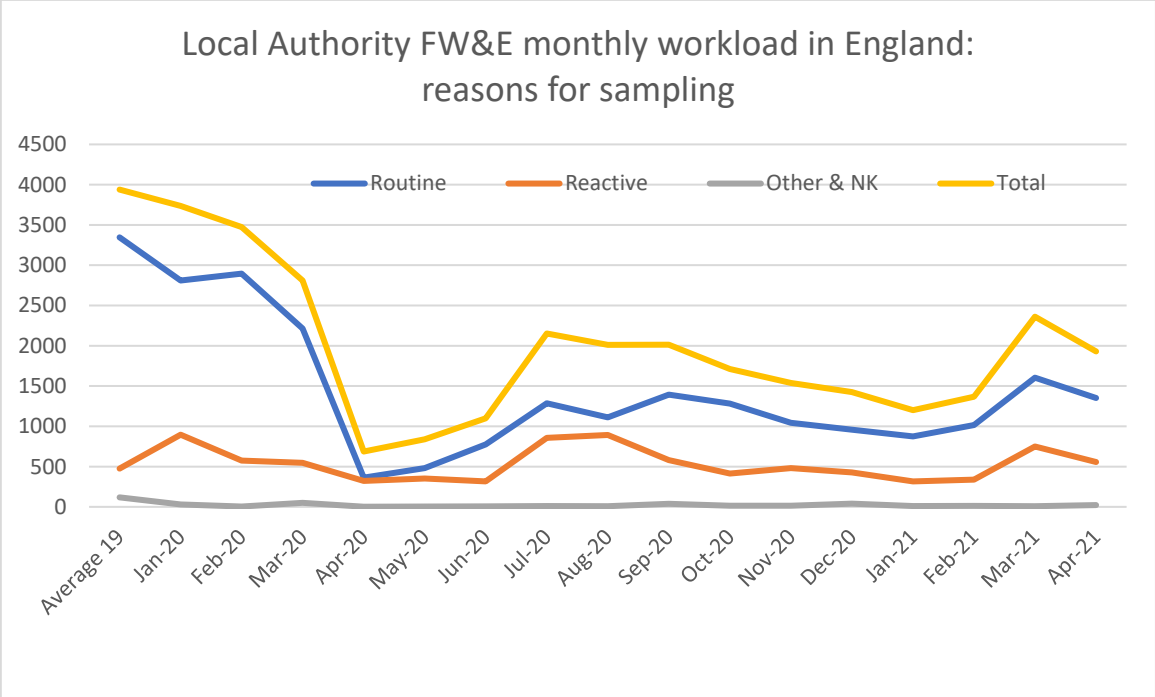
32. PHE FWE provided an update on its activities. This covered the following areas:

**Effects of Covid 19**

33. Members were presented with the following graph to illustrated PHE FWE microbiology services monthly monitoring of the workload (samples) they were receiving from Local Authorities (LA). The data is separated into routine, reactive and other surveillance and excludes imported food testing carried out by Port Health Authorities.

34. Members noted that LA routine sample submissions (food and environmental samples) in England had increased but remained less than half the monthly totals prior to February 2020. The number of reactive samples has remained at around 500 samples per month with increases as part of known outbreaks and other responses.

35. The graph revealed that from April 2020 the number of samples collected for routine purposes went down from over 3000 per month to about 1500. This was about 1000 per month early in 2021. Environmental sampling was for tests carried out on water systems in relation to *Legionella* surveillance.




36. Members noted the following papers published by PHE FWE since the last EFIG meeting held in January 2021 meeting and two ongoing studies.

37. Published papers:

- Measuring transfer of human norovirus during sandwich production: simulating the role of food, food handlers and the environment
- Increased incidence of listeriosis among pregnant women belonging to ethnic minorities in England
- A cluster of Shiga Toxin producing *Escherichia coli* O157:H7 highlights raw pet food as an emerging potential source of infection in humans.
- Response to the Specialist Cheesemakers Association on Microbiological quality of raw drinking milk and unpasteurised dairy products: results from England 2013-2019.
- Utility of whole genome sequencing during an investigation of multiple foodborne outbreaks of *Shigella sonnei*
- Outbreak of Shiga toxin-producing *Escherichia coli* O157 linked with consumption of a fast-food product containing imported cucumbers, United Kingdom, August 2020
- Epidemiological investigation of recurrent outbreaks of haemolytic uraemic syndrome caused by Shiga toxin-producing *Escherichia coli* serotype O55:H7 in England, 2014-2018

38. National Co-ordinated Monitoring Studies
    - Study 71: Ready-to-eat (RTE) Salads from retail and catering premises. Study is ongoing until September 2021.

    - FS430677: Survey of *Salmonella, E. coli* and Antimicrobial Resistance (AMR) in frozen, part-cooked breaded or battered poultry products at retail sale in the UK is ongoing until December 2021.

**Co-ordinated Food Sampling Programme in Scotland 2020/21**

39. The group noted that the 2020/21 food surveillance sampling programme funded by Food Standards Scotland (FSS) has now concluded and final data will be collected and analysed in due course. FSS will again be providing funding this financial year to public analysts and local authorities in Scotland to undertake sampling and surveillance of food under 14 key recommendations. The sampling programme will run from July 2021 until March 2022 and results will be uploaded to the Scottish Food Sampling Database. This year's microbiological sampling priorities include:

    - Reconstituted frozen raw coated chicken products. Analysing for: *Salmonella*, *Listeria monocytogenes* (detection)
    - Reconstituted frozen raw poultry products other than chicken (turkey and duck): analysing for: *Salmonella, Listeria monocytogenes* (detection)
    - Frozen vegetables and fruit (imported). Analysing for: *Salmonella, Listeria monocytogenes* detection and enumeration, STEC, ACC
    - Sandwich fillings. Analysing for: *Salmonella, Listeria monocytogenes* (detection), STEC, *Campylobacter*, ACC.

40. Members noted the publication of the Survey of minced meat at retail. It was highlighted that in 2019 FSS undertook the survey to evaluate the microbiological quality of beef mince on retail in Scotland. Study findings showed levels of microbiological quality were encouraging, and in line with similar studies in the past. The survey found very low levels of *Campylobacter* (0.1%) and *Salmonella* (0.3%), but a higher level of Shigatoxigenic *Escherichia coli* (STEC, 4%) contamination. The levels of AMR were low, and any resistance found was to commonly used first line human relevant antibiotics. There was a small amount of detected non-susceptibility to single, commonly used antimicrobials with a long history of use in ruminant populations (e.g. tetracycline, ampicillin) but none to critically important antimicrobials.

41. Members noted that the study identified no significant differences between confirmed STEC and all tested factors, such as season, geographical location, or retailer type.

**Food Surveillance Wales**

42. EFIG noted that food surveillance activities in Wales have been severely impacted by Public Health Wales response to Covid-19. It was noted that very little reactive work has been done in Wales in the past 12 months.

**Survey of infectious intestinal disease in the UK (wave 1, wave 2 and wave 3)**

43. Members received a presentation on the above survey funded by the FSA carried out by Ipsos Mori. The study was commissioned to collect data to estimate the impact of the pandemic on IID and foodborne disease. The research aims were to address the following questions:

    - What is the self-reported level of IID in the community during the COVID-19 pandemic compared to a non-pandemic year?
    - How many people reporting IID consulted a doctor and/or medical practitioner, and if so, were lab tests taken to look for the causative agent of the IID?
    - What do people think caused their IID, and how does this compare to a non-pandemic year?
    - What are the self-reported differences in major IID risk factors (e.g. eating, lifestyle, travel) between those with and without symptoms, and between a pandemic and non-pandemic year?

44. It was reported that the findings of the study will also enable the FSA to test the effectiveness of an online IID survey as a possible temperature checker between larger IID cohort studies.

## Action

52. ACMSF Members are invited to comment on the recent trends in animal and human data and other subjects discussed by EFIG at their June 2021 meeting.

**Secretariat**
**October 2021**

## Annex 1

Data sources (human infection data)

Data are provisional and provided from numerous sources; caution is required in interpreting trends over time and differences between countries.

Data from 2011-2019 for England, Wales and Scotland were extracted from the previous annual EFIG report. Data from 2011-2019 for Northern Ireland were extracted from the previous annual EFIG report.

England and Wales data for Salmonella, Campylobacter and Cryptosporidium spp were extracted from the laboratory surveillance system SGSS, the laboratory reporting system implemented in 2015. Listeria data are from the enhanced Listeria surveillance database, STEC data are from the enhanced STEC surveillance database (England and Wales only), and foodborne outbreak data are from the enhanced foodborne outbreaks surveillance system (electronic Foodborne and non-foodborne gastrointestinal Outbreak Surveillance System, or eFOSS), all of which are Public Health England databases.

Data for Scotland for 2020 were provided by Public Health Scotland.

Data for Northern Ireland for 2020 were provided by Public Health Agency Northern Ireland.

Data are all provisional and subject to change.

Population data

Population data are ONS mid-year estimates, the latest available of which is 2019.