

THE ROLE OF FOOD STANDARDS SCOTLAND IN REDUCING THE PUBLIC HEALTH RISKS ASSOCIATED WITH CAMPYLOBACTER

PURPOSE

1. **For discussion** The Board is invited to note the public health significance of Campylobacter in Scotland, and comment on how Food Standards Scotland (FSS) should contribute to the work being led by the Food Standards Agency (FSA) to reduce the risks of this pathogen in the food chain.
2. Campylobacter reduction has been a key food safety priority for the Food Standards Agency (FSA) since 2000, and continues to be an important goal in its strategic plan. Historically, Scotland has had one of the highest rates of Campylobacter infection in the UK, and in recent years, the number of reported cases in Scotland has increased.
3. Since 2000, FSA has led the UK strategy, which aims to reduce the prevalence of Campylobacter in poultry; the most significant source of human infection. Its current objectives are to raise awareness of the risks to public health and to influence the major retailers and poultry producers into taking action to control the pathogen at all stages of the production chain. A UK wide approach is required to tackle Campylobacter due to the integrated nature of the poultry supply chain, which is dominated by a small number of major companies supplying to all of the major retailers UK wide.
4. FSA in Scotland (FSAS) has previously supported the FSA Campylobacter strategy; primarily through its communications and research activities. However, the recent increase in Campylobacter infection in Scotland has raised the profile of FSS's role across Scottish Government, and it will be necessary to consider our future contribution to the FSA's strategy. The FSA Board will be reviewing the Campylobacter strategy at its meeting on 15 July, and FSS will await the outcome of their discussions before agreeing with FSA officials how we can most usefully collaborate to achieve our shared objectives.
5. The Board is asked to:
 - **Note** the profile of Campylobacter infection in Scotland and the progress being made at a UK level to reduce the levels of contamination in the poultry production chain;
 - **Agree** that reducing the incidence of foodborne Campylobacteriosis in Scotland is a strategic priority for FSS and that it should take a lead role in co-ordinating activities in this area across Scottish Government;
 - **Agree** that FSS should work with FSA to agree how we can most effectively collaborate to optimise our impact on public health in Scotland.

BACKGROUND

Campylobacter Infection in Scotland

6. Campylobacter infection (sometimes referred to as Campylobacteriosis) results in an acute, self-limiting gastroenteritis characterised by diarrhoea, abdominal pain and fever, and, in some cases, nausea and vomiting. The illness usually develops a few days after ingesting the bacteria and lasts around one week. Post infection sequelae may occur, the most important of which is Guillain-Barré Syndrome (GBS), a demyelinating disorder resulting in acute neuromuscular paralysis.
7. Campylobacter is the most commonly reported cause of bacterial infectious intestinal disease (IID) in Scotland (Figure 1), a situation which is similar for the UK and much of the developed world. It should be noted that the number of reported cases only represents those which are detected through the testing of faecal samples submitted to NHS laboratories by General Practice following the presentation of a human case to a doctor's surgery. In the UK, reporting is believed to under-estimate the actual number of Campylobacter infections in the community by nine-fold¹.

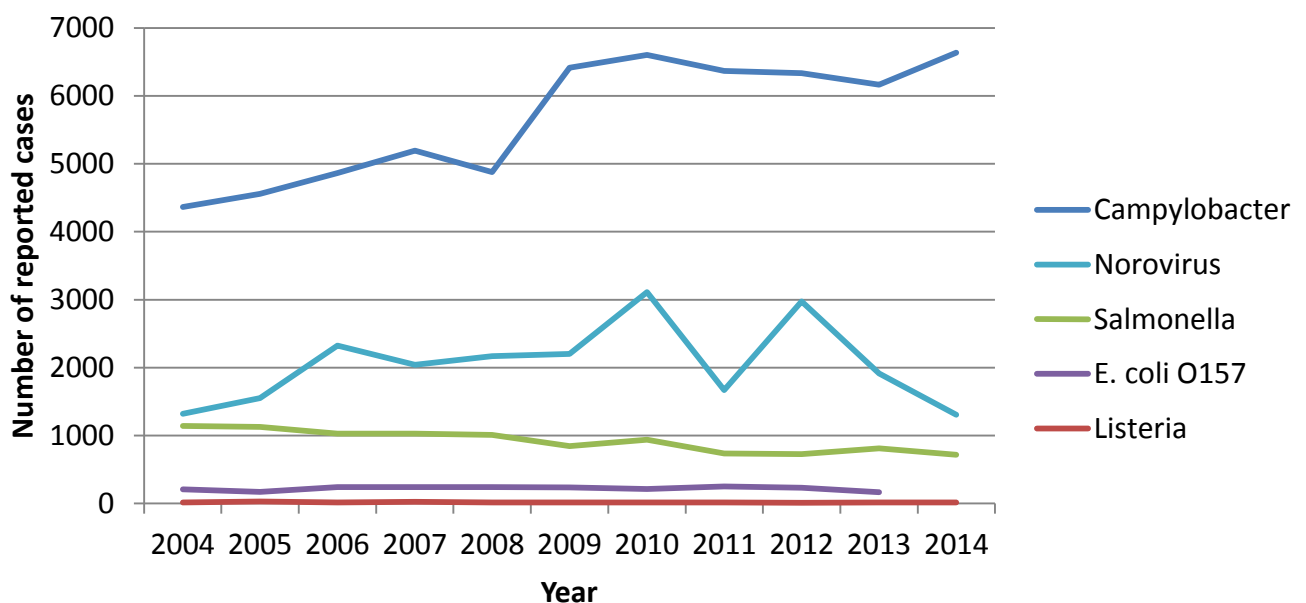


Figure 1. Number of reported cases for the top five foodborne pathogens in Scotland

8. The number of reported cases of Campylobacter infection in Scotland is currently higher than it has been in the past 10 years. During 2014, 6636 laboratory reports of Campylobacter were received by Health Protection Scotland (HPS); an increase

¹ The Second Study of Infectious Intestinal Disease in the Community (IID2 Study) FSA Project B18021
<http://www.foodstandards.gov.scot/second-study-infectious-intestinal-disease-community-iid2-study>

of 472 (7.7%) compared to 2013. This increase followed a declining trend over the previous three years, although the number of reports still exceeded 6000 during this period.

9. During the first 20 weeks of 2015, 2225 laboratory reports of *Campylobacter* were recorded by HPS, compared to an average of 1861 reports during the first 20 weeks of the previous three years; representing an increase of 364 reports or 19.5%. The increase was spread across all weeks and observed in the majority of NHS Health Boards and across all age groups. The reasons for this increase are not yet known, however initial evidence suggests that it is not attributable to changes in ascertainment and therefore represents a true rise in infection.

Evidence on the Key Causes of *Campylobacter* Infection in Scotland

10. *Campylobacter* rarely causes outbreaks, and the majority of reports represent sporadic, isolated cases distributed throughout Scotland. The sporadic nature of *Campylobacter* infection is due to the fact that the pathogen requires particular conditions for growth, and is usually not distributed evenly in environmental or food sources. There are exceptions however, and outbreaks can occur where groups of people come into contact with sources which are contaminated with high numbers of bacteria. This has led to outbreaks from raw milk, drinking water, and most notably, chicken liver pate; which has been implicated in the highest number of *Campylobacter* outbreaks in the UK.
11. There is unequivocal evidence that chicken is the most important source of *Campylobacter* infection. In the UK, surveillance undertaken by FSA has indicated that at approximately 73% of raw, chilled chicken on retail sale is contaminated with *Campylobacter*². This contrasts with red meat, where a very low prevalence of the pathogen has been identified³. Further to this, research funded by FSAS and FSS has demonstrated a clear link between the contamination of raw chicken and human illness⁴. This research employed whole genome sequencing to produce molecular fingerprints of *Campylobacter* strains isolated from Scottish clinical cases, and samples of food and the environment. The results (shown in Figure 2), indicate that the types of *Campylobacter* identified in human cases of infection are more similar to those found in raw chicken (represented by the orange area in the graph), than those identified in other known sources of the pathogen (the faeces of cattle, sheep, wild birds and pigs; shown in red, grey, blue and pink respectively). These findings provide clear evidence that 60-80% of human infection in Scotland can be attributed to a chicken source; a figure which is similar to that derived for the rest of Europe.

² <https://www.food.gov.uk/science/microbiology/campylobacterevidenceprogramme/retail-survey>

³ <http://tna.europarchive.org/20140306205048/http://www.food.gov.uk/science/research/surveillance/fsisbranch2010/fsis0210>

⁴ <http://www.foodstandards.gov.scot/molecular-epidemiology-scottish-campylobacter-isolates-human-cases-infection-using-multilocus>

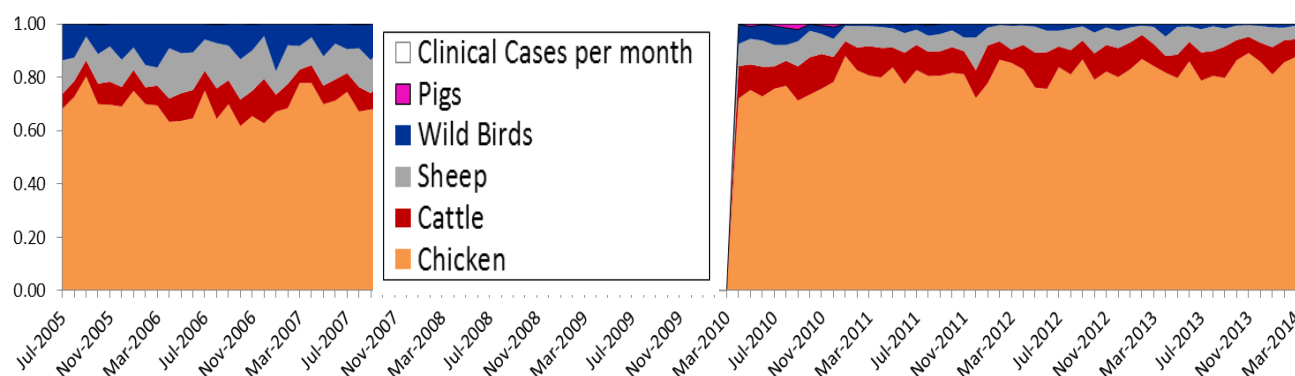


Figure 2. Molecular attribution of Campylobacter infection in Scotland.

12. Previous research undertaken by FSAS has shown that there are differences in the profile of Campylobacter infection in different population groups in Scotland⁵. An association has been identified between human Campylobacteriosis and households which have a private drinking water supply⁶, suggesting that environmental sources play a role in infection for individuals living in the countryside. Furthermore, infection in young children living in rural areas has been found to be more commonly attributed to cattle and sheep faeces than chicken sources. In urban areas of Scotland, where infection is most commonly associated with chicken, a link has been identified between socioeconomic status and Campylobacteriosis with individuals living in more deprived areas reporting fewer cases of infection compared with those in affluent post code sectors.

FSA Strategy for Reducing Campylobacter in UK Produced Chicken

13. Reducing Campylobacteriosis in the UK population has been the FSA's food safety priority since its inception in 2000. However, it has proven to be the Agency's most challenging goal, and despite significant research investment, a definitive solution has not yet been identified. Campylobacter is prevalent in the environment and once established, it can spread very rapidly through intensively reared chicken flocks, meaning that a large number of birds will be colonised by the time they are presented for slaughter. Furthermore, in contrast with Salmonella, against which there is vaccine for egg laying and broiler stock, no single intervention has been shown to be effective for the reduction of Campylobacter in chicken. Until which time an effective vaccine or processing treatment is developed, the control of Campylobacter in poultry production will be

⁵ <http://www.foodstandards.gov.scot/factors-associated-geographic-and-temporal-variation-campylobacteriosis-humans>

⁶ <http://www.foodstandards.gov.scot/private-water-supplies-risk-factor-campylobacter-infection-aberdeen-city-and-aberdeenshire>

reliant on a number of different intervention approaches being applied throughout the food chain.

14. Since 2009 FSA has been working with industry to tackle *Campylobacter* in poultry through a Joint Working Group (JWG). The JWG agreed a target to reduce the levels of *Campylobacter* in UK-produced fresh chicken (sampled at the end of processing) and developed an Action Plan to deliver the target. The target was considered achievable for the reduction of *Campylobacter* contamination of UK-produced chickens. This target aimed to reduce the percentage of the most heavily contaminated chickens (with more than 1000 colony forming units per gram of chicken (cfu/g)) at the end of the slaughter process, from 27% in 2008 to 19% by 2013, and to 10% by 2015. It was estimated that achievement of this target could lead to a reduction in *Campylobacter* food poisoning in the UK by up to 30%; approximately 111,000 cases per year.
15. In 2013, FSA reviewed progress and it was clear that, by the mid-way point of the action plan, there had been no measurable reduction in the levels of *Campylobacter* on chicken at the end of processing. Despite investment by the industry to trial a range of on-farm and processing interventions, and positive action including the development of new Red Tractor Assurance standards for improved biosecurity at farm level, and the introduction, by retailers of non-leak packaging and clearer food hygiene messaging on labels, the target was not being achieved. The FSA Board therefore agreed to a refreshed strategy, which more clearly defined the industry's accountability, and provided a new focus for FSA to incentivise action by raising consumer awareness and clearing regulatory barriers to interventions which could be effective in reducing *Campylobacter* on fresh chicken⁷.
16. One of the key outputs of the FSA's refreshed *Campylobacter* strategy was its 'Acting on *Campylobacter* Together' (ACT) campaign⁸, which brought together representatives from government, retailers, caterers, poultry producers and processors, and consumer organisations, to agree actions that could be taken to reduce *Campylobacter*. As part of ACT, the major poultry producers and retailers in the UK signed up to a commitment to invest in *Campylobacter* reduction as a core business priority, and share information to support the development of effective interventions. ACT replaces the JWG approach and has provided a more accountable and publically visible means of monitoring industry action.

⁷ FSA Board Paper FSA 13/09/04; A Refreshed Strategy to Reduce *Campylobacteriosis* from Poultry
<http://www.food.gov.uk/sites/default/files/multimedia/pdfs/board/board-papers-2013/fsa-130904.pdf>

⁸ <http://www.food.gov.uk/news-updates/campaigns/campylobacter/actnow>

17. Since the launch of ACT, there have been a number of positive developments which have the potential to make a significant impact on Campylobacter levels on UK produced chicken, including:

At the farm level industry trials to investigate the possibility of removing the thinning stage (when a portion of the flock is removed prior to depopulation to satisfy market demand for smaller chickens) from the growing process to reduce the risks of contamination. Research is also underway to determine the Campylobacter status of poultry sheds using a novel testing method and investigate which on-farm growing practices have an impact on bird colonisation at slaughter.

At processing end of line treatments have been developed by the industry which have shown considerable promise in reducing Campylobacter levels on whole chickens. Secondary scalding in which birds are immersed in a second scald tank after the defeathering stage has proven to be an effective heat treatment for reducing contamination. Sonosteam technology (involving the simultaneous application of both steam and ultrasound) has been demonstrated to offer a reduction in Campylobacter levels on chicken skin of over 80%. Rapid and Blast Surface Chilling (which involve chilling the surface of birds with extremely cold gases to kill off the Campylobacter cells) have been shown to reduce skin contamination by up to 95%.

At retail the major supermarkets have introduced improved packaging to reduce the risks of leakage, clearer labelling to improve consumer awareness of the risks, and 'Roast in the Bag' chickens to minimise contact with raw meat.

18. FSA and FSS Operations staff are rolling out a field based initiative which seeks to support the managers of poultry plants across the UK in identifying where improvements are required to reduce contamination at areas of processing which are considered to be key control points for minimising Campylobacter contamination (lairage hygiene, evisceration, scalding, defeathering, carcass washing, and chilling).
19. A number of retailers have publicised their commitment to implementing interventions which have been shown to be effective in controlling Campylobacter throughout the production chain. For example, in February 2015, Marks and Spencer published their 'Five Point Plan'⁹ in conjunction with 2 Sisters Food Group (their biggest poultry supplier) involving bonuses for farmers which employ

⁹ <http://corporate.marksandspencer.com/media/9c87915b6b664bb88dab76c7a506e0cb>

effective biosecurity; investment in end of treatment methods such as Blast Surface Chilling, and clearer labelling and double bagging of their whole fresh chickens. The company also conducted its own surveillance to demonstrate that the plan has resulted in a reduction in the numbers of the most highly contaminated birds to below the 10% target. Asda has also recently committed to employing Sonosteam for the processing of 30% of its whole bird production¹⁰.

20. In addition to raising public awareness of Campylobacter through ACT and consumer campaigns, FSA initiated, in February 2014, a survey to determine the prevalence and levels of campylobacter contamination on fresh whole chilled chickens and their packaging. The survey involved the testing of over 4000 samples of whole chickens bought from UK retail outlets and smaller independent stores and butchers. The results of this survey have been published on a quarterly basis, including a breakdown of results relating to each of the major UK retailers. The results for the fourth quarter of sampling, and cumulative results for the year were published on 28 May 2015.¹¹ The results have shown that overall 73% of chickens tested positive for Campylobacter, with 19% showing contamination at the highest banding level (>1000 cfu/g). The final report detailing all of the survey results is due to be published in July.
21. The FSA Board is scheduled to review the outcome of the retail survey, and progress with the Campylobacter strategy at its meeting on 15 July 2015.

DISCUSSION

Food Standards Scotland Input into the UK Campylobacter Programme

22. To date, the Campylobacter strategy has been led on a UK wide basis by FSA in London; an approach which is still considered to be appropriate due to the integrated nature of the poultry supply chain which comprises five major processing companies supplying the majority of fresh chicken sold by all of the major retailers. FSAS, and now FSS has worked closely with FSA to support the strategy in Scotland, primarily through its research programmes, communications and marketing activities.
23. Most recently FSS has been more actively involved through the participation of its Meat Hygiene Inspectors and Official Vets in promoting a field initiative in the four poultry processing establishments in Scotland. However, only two of these plants are high throughput, and their production only makes a partial contribution to retail sales in Scotland, which are supplemented by poultry produced elsewhere in the UK.

¹⁰ <http://your.asda.com/press-centre/asda-pledges-commitment-to-combat-campylobacter>

¹¹ <http://www.food.gov.uk/science/microbiology/campylobacterevidenceprogramme/retail-survey>

24. The integrated nature of the UK poultry industry and distribution of the major retailers means that there may be limited scope for FSS to have an impact on its own in reducing *Campylobacter* in the food chain through a Scotland specific programme of work. However, given its on-going public health importance as the most common cause of foodborne disease in the Scottish population, there will be a need for FSS to play a more prominent role in supporting UK wide strategies which will impact on the control of *Campylobacter* in foods produced and sold in Scotland.
25. Leading up to the development of a strategy for reducing foodborne illness in the Scottish population, it will be necessary for FSS to consider its future role in the *Campylobacter* programme to ensure its work complements and supports UK objectives, whilst taking account of specific activities in Scotland. The control of gastrointestinal zoonoses (GIZ) has been recognised as a public health priority by Scottish Government. Furthermore, a number of multi-agency initiatives have recently been developed under the auspices of the Scottish Health Protection Network (SHPN)¹², which are aimed at controlling the transmission routes and public health impact associated with the pathogens responsible for the highest burden of GIZ infection. This currently includes, the Action Group for Verotoxigenic *E.coli* (VTEC), various cross-cutting groups on communications and research, a working group to investigate the increase in Hepatitis E infection in Scotland, and a *Campylobacter* Group. FSS is involved in all of these initiatives, and has been asked to lead on the *Campylobacter* group, in recognition of the importance of the food chain in human incidence in Scotland.
26. There are a number of ways in which FSS could support and augment the UK *Campylobacter* strategy. Outcomes which would complement the activities being led by FSA include:

Promoting action by the poultry industry operating in Scotland

- Working with FSA to ensure Scottish interests in *Campylobacter* are fully represented when engaging with the major retailers and poultry producers through the ACT campaign ;
- Supporting Operational Field staff in implementing hygiene improvements in Scottish poultry plants;
- Working with Scottish Government and stakeholders such as the National Farmers Union Scotland (NFUS) and Quality Meat Scotland (QMS) to ensure that any strategies taken forward to support or promote the poultry

¹² An obligate network led by National Services Scotland . SHPN was developed following the publication of the Scottish Health Protection Stocktake exercise in 2010 to provide strategic direction for the co-ordination of health protection initiatives in Scotland.

industry in Scotland take account of the need for Campylobacter control throughout the production chain.

Raising awareness of Campylobacter risks at catering and in the home

- Supporting FSA either by contributing to UK wide campaigns aimed at raising awareness of the risks of Campylobacter and how to avoid them or having complementary campaigns in Scotland;
- Supporting these campaigns with Communications and marketing activities within Scotland which are targeted to the different segments of the population which have been found to be most at risk from Campylobacter infection;
- Through the SHPN Campylobacter and GIZ communications groups, improve the co-ordination of communications strategies aimed at increasing awareness of the Scottish population of the key transmission routes for Campylobacter and how to control the risks of infection.

Research and surveillance

- Funding enhanced surveillance of Campylobacter in the Scottish food chain, by supporting existing FSA funded surveys at abattoir and retail;
- Developing a defined research strategy to improve understanding of the epidemiology of Campylobacter infection in the Scottish population to underpin FSS strategy in this area.

CONCLUSIONS AND RECOMMENDATIONS

27. The Board is asked to:

- **Note** the profile of Campylobacter infection in Scotland and the progress being made at a UK level to reduce the levels of contamination in the poultry production chain;
- **Agree** that reducing the incidence of foodborne Campylobacteriosis in Scotland is a strategic priority for FSS and that it should take a lead role in co-ordinating activities in this area across Scottish Government;
- **Agree** that FSS should work with FSA to agree how we can most effectively collaborate to optimise our impact on public health in Scotland.

28. It is proposed that a further update on FSS's programme of work to reduce Campylobacteriosis in the Scottish population will be provided to the Board at its September meeting.

Dr Jacqui McElhiney
Food Protection Science and Surveillance