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Investigation into an outbreak of Shiga toxin producing *Escherichia coli* (STEC) O157 PT 21/28 Stx2 in England, August 2017

October 2018

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Executive summary

In August 2017, a cluster of 4 cases infected with genetically related strains of STEC O157 was identified. The strains possessed the stx2a toxin subtype, a toxin type known to be associated with more severe disease and the development of Haemolytic Ureamic Syndrome (HUS), a serious complication of this infection, predominantly affecting the kidneys. One case had died following development of HUS.

A multi-agency investigation was undertaken which included re-interviewing cases and the sampling and testing of implicated products. Interviews indicated that 3 of the cases had been exposed to dogs fed on a raw meat based diet), specifically, tripe. In 2 cases, the tripe has been purchased from the same supplier.

While one case was not linked to raw pet food, as cattle and sheep are the main reservoir of STEC in the UK, exposure to the same strain of STEC may have occurred through a different route. This may be indirect or direct exposure to the infected animals which entered the pet feed supply chain for example. Alternatively, the case may have been exposed to an animal fed a raw meat based diet without being aware of, or being able to recall that exposure.

Sampling and microbiological screening of raw pet food was undertaken and indicated the presence of STEC in the products. STEC was isolated from one sample of raw tripe but was different to the strain causing illness in the humans. Nevertheless, isolation of STEC did provide evidence for microbiological contamination of tripe and its pathogenic risk to human health and that it was a plausible transmission route in this outbreak. This adds to the evidence of raw pet food as a risk factor for zoonotic transmission of GI pathogens, which is already relatively widely accepted for salmonella, listeria and campylobacter.

Feeding raw meat based diet to companion animals has recently increased in popularity due to both increasing availability and beliefs that they provide health benefits to animals. Although still rare, an increase in STEC cases reporting exposure to raw meat based diet ’s was detected in 2017. There has also been an increased frequency of raw pet food incidents in 2017, suggesting an increasing trend in potential risk to humans from raw pet food. IMT concluded that the best approach to reduce the risk of infection is to improve awareness of risk and promote good hygiene practices amongst the public when handling raw pet food.

Abbreviations

E. coli	*Escherichia coli*
EHPs	Environmental Health Practitioners
FS	Field Service
FSA	Food Standards Agency
FW&E	Food, Water and Environmental laboratories
GBRU	Gastrointestinal Bacteria Reference Unit
GI	Gastrointestinal
HPT	Health Protection Team
HUS	Haemolytic Uraemic Syndrome
IMT	Incident management team
NESSS	National Enhanced STEC Surveillance System
NIERP	National Incident and Emergency Response Plan
NIS	National Infection Service
PFMA	Pet Food Manufacturer's Association
PHE	Public Health England
PT	Phage type
RMBD	RAW Meat Based Diets
SNP	Single Nucleotide Polymorphisms
STEC	Shiga toxin-producing Escherichia coli
Stx	Shiga toxin
TARGET	Tuberculosis, Acute Respiratory, Gastrointestinal, Emerging /Zoonotic Infections, and Travel and Migrant Health Division
WGS	Whole genome sequencing

Background

Shiga toxin-producing *Escherichia coli* (STEC) are a group of bacteria associated with human disease and are defined by the presence of one or both phage-encoded Shiga toxin genes; *stx1* and *stx2.* In the UK, STEC serogroup O157 is the most common type and around 700 cases of STEC O157 are reported annually in England. While this compares to around 10,000 *Salmonella* and 60,000 *Campylobacter* cases, (https://www.gov.uk/government/publications/zoonoses-uk-annual-reports) STEC O157 are of significant public health concern due to the potential severity of disease. Symptoms can range from mild diarrhoea to include abdominal cramps, vomiting and severe bloody diarrhoea. In 5-15% of cases, infection can lead to the development of haemolytic uraemic syndrome (HUS), a severe multisystem syndrome (1).

The risk of developing HUS following STEC infection varies by age and gender; HUS is most commonly seen in children under 5 and is recognised as the most common cause of acute kidney failure in children in the UK. Although extremely rare, HUS can be fatal, particularly in infants, young children and the elderly. Certain STEC strains have been shown to be more often associated with developing HUS than others, with those possessing stx2, particularly the stx2a sub toxin type most associated with severe disease (1-3).

STEC are zoonotic and healthy ruminants, particularly cattle and sheep, are the main reservoir of infection. STEC has a very low infectious dose and transmission to humans occurs through consumption of contaminated food or water, direct or indirect contact with infected animals or their environment and through person to person spread. Each transmission route can cause sporadic infection as well as outbreaks.

Enhanced monitoring of STEC infections in England is undertaken by Public Health England (PHE). Since 1 January 2009, the National Enhanced STEC Surveillance System has collected detailed epidemiological data on every case of STEC O157 in England. (4). In addition, isolates of STEC identified at local diagnostic laboratories are referred to the Gastrointestinal Bacteria Reference Unit at PHE for confirmatory testing. Since July 2015, whole genome sequencing (WGS) has been employed on all STEC to provide highly discriminatory typing for public health surveillance and to facilitate outbreak detection and investigation (5-8).

In August 2017, a cluster of four cases infected with genetically related strains of STEC O157 was identified. The strains possessed the stx2a toxin subtype, known to be associated with more severe disease and HUS. Furthermore, one case died following development of HUS. Despite the small numbers of cases, due to the high disease severity, a multi-agency investigation was undertaken and the findings are reported here.

Incident coordination

Subsequent to the cluster detection on 14 August 2017, an Incident Management Team (IMT) was formed on 15 August 2017 with the aim of risk assessing the situation and developing an evidence base to formulate public health interventions.

The first IMT included representatives from PHE including the national Gastrointestinal Infections unit of the Tuberculosis, Acute Respiratory, Gastrointestinal, Emerging /Zoonotic Infections, and Travel and Migrant Health Division (TARGET), Field Services (FS), and local Health Protection Teams (HPT's). Representation at subsequent meetings was expanded to include members from the Animal and Plant Health Agency (APHA) and the Food Standards Agency (FSA).

The small scale of the incident meant that it was managed as part of normal PHE business and was declared as not requiring standard, national or enhanced response as per PHE's National Incident and Emergency Response Plan .

All incident related documents including meeting minutes and reports were stored in a dedicated folder on the PHE network.

Methods

Microbiological

Faecal specimens from GP and hospital patients were processed in local hospital microbiology laboratories for identification of *Salmonella*, *Campylobacter*, *Shigella* spp. and STEC O157. Presumptive STEC O157 isolates were sent to the PHE (GBRU) for confirmation and identification of the phage type (PT) and Shiga toxin (stx) testing. Further typing was undertaken using WGS, where the bacteria are compared genetically to each other and to STEC O157 isolates previously obtained from humans, animal and food samples across England.

For WGS, DNA was extracted from cultures of STEC O157:H7 for sequencing on the Illumina HiSeq 2500 instrument. Quality trimmed Illumina reads were mapped to the STEC O157:H7 reference genome Sakai (Genbank accession BA000007) using BWA-MEM (9, 10). Single Nucleotide Polymorphisms (SNPs) were identified using GATK2 (ref3) in unified genotyper mode (11). Core genome positions that had a high quality SNP (>90% consensus, minimum depth 10x, GQ >= 30) in at least one isolate were extracted for further analysis. Genomes were compared to the sequences held in the PHE STEC O157:H7 WGS database. STEC O157:H7 with less than 5 SNPs differences within their core genome are considered closely related and likely to have

an epidemiological link. (Dallman et al)Hierarchical single linkage clustering was performed on the pairwise SNP difference between all strains at various distance thresholds (250, 100, 50, 25, 10, 5, 0). The result of the clustering is a SNP profile, or SNP address, that can be used to describe the population structure based on clonal groups.(7) Although isolates greater than 5 SNPs apart are unlikely to be part of the same temporally linked outbreak, deeper phylogenetic relationships within the 10 or 25 SNP clusters may provide epidemiologically useful information or associations. For the purpose of investigations the wider phylogenetic context of the outbreak strain was explored through construction of an annotated phylogeny using metadata obtained from the NESSS (Appendix III).

Epidemiological

The objectives of the epidemiological investigation were to identify and describe cases associated with the outbreak, and to identify and confirm the likely source/vehicle of the outbreak. Key strands of the epidemiological investigation included agreeing the outbreak case definition, case ascertainment, collection and review of epidemiological data for hypothesis generation and confirmation.

Case definitions

Microbiological typing results reported from the PHE GBRU were used for case finding and classification using the following definitions:

Confirmed: A case of STEC O157 reported by GBRU as belonging to the SNP designation 4.4.4.590.1280.3966.% with an onset date on or after 23nd June 2017.

Possible: A case of STEC O157 PT 21/28 confirmed by GBRU and awaiting WGS and SNP typing with no known links to concurrent outbreak investigations of this PT.

Case interviews

Local laboratories report presumptive isolates of STEC directly to PHE HPT'S. Each HPT arranges for an enhanced surveillance questionnaire (ESQ) to be completed either directly or via their Local Authority, Environmental Health Officer to interview the patients in a timely manner as part of routine public health follow-up.(ESQ available at https://www.gov.uk/government/publications/vero-cytotoxin-producing-escherichia-coli-questionnaire). The ESQ collects data in the following categories: demographic details; risk status; clinical condition (including progression to HUS); household or other close contact details; exposures including travel, food and water consumption, contact with animals and environmental factors; case classification; outbreak status. Completed questionnaires are forwarded for inclusion in the National Enhanced STEC Surveillance System which is managed by the PHE GID.

Trawling exercise

Confirmed and probable cases or a family member were contacted by phone by PHE HPT's in order to complete trawling questionnaires (Appendix I). These questionnaires were completed online in SelectSurvey by the interviewers and a script provided (Appendix II).

Food and environmental sampling

Samples of potential food source/vehicles were obtained and tested at the PHE Food, Water and Environmental (FW&E) laboratories. Food, water and environmental samples were collected by Environmental Health Practitioners (EHPs) from the freezers of 2 cases , an implicated producer of raw pet feed and a pet food shop, and transported in accordance with the Food Standards Agency Food Law Code of Practice (https://www.food.gov.uk/enforcement/codes-of-practice/food-law-code-of-practice-2015) to PHE F W&E microbiology laboratories at Porton and York in cold boxes at a temperature of between 0 and 8 °C and tested within 24 hours of collection

Food and environmental testing

The York and Porton laboratories tested food and environmental samples using PHE Standard method M6 which is based on: 'EN ISO/TS 13136:2012 Microbiology of food and animal feed — Real-time polymerase chain reaction (PCR)-based method for the detection of food-borne pathogens – Horizontal method for the detection of Shiga toxin-producing *Escherichia coli* (STEC) and the determination of O157, O111, O26, O103 and O145 serogroups'. In addition one sample of tripe was also tested following PHE Standard Method F17 based on BS EN ISO 16654:2001 Detection of *Escherichia coli* O157 by Automated Immunomagnetic Separation (Table 1)

Method M6 involves enriching the sample in a non-select medium at 37^{o}C for 24h. The resulting culture is extracted and subjected to PCR using the Applied Biosystems 7500 Fast System to determine the presence of specific DNA sequences found in Shiga toxigenic *E.coli* including O157, *stx* and the *eae* genes. If these sequences are detected in the sample the culture is further examined and an attempt made to STEC. Attempts to isolate the bacteria can be unsuccessful particularly if there is a high background of other bacteria.

Method F17 involves enriching the sample in a select medium at 41.5^{o}C for 24h. The resulting culture is subjected to Immunomagnetic separation (IMS) using magnetic beads coated with antibody specific to *E.coli* O157– the PCR described for M6 may be applied but is optional . Following IMS the beads are transferred to selective agar media and cultured at 37 ^{o}C for 24 h. Presumptive colonies are further confirmed.

Isolates of STEC from food and environmental samples were referred to GBRU for further characterisation and WGS, as per clinical isolates.

Table 1. Food and environmental sampling undertaken as part of investigations and testing methods used

Sample number	Date of submission	Place of sampling	Sample description	Methods used
YO1714436-01	24/08/2017	Home of case	Tripe	M6, F17
YO1714436-02	24/08/2017	Home of case	Minced Beef	M6
YO1715559-01	24/08/2017	Producer	Raw tripe	M6
YO1715559-02	24/08/2017	Producer	Raw tripe	M6
YO1715559-03	24/08/2017	Producer	Swab of prep bench	M6
YO1715559-04	24/08/2017	Producer	Swab of hook that tripe hangs on	M6
YO1715559-05	24/08/2017	Producer	Swab of freezer shelf	M6
YO1715559-06	24/08/2017	Producer	Swab of outside of blue box	M6
YO1715559-07	24/08/2017	Producer	Outside of water bath	M6
YO1715559-08	24/08/2017	Producer	Water from bath	M6
PO1714738-01	30/08/2017	Producer	Dog food (tripe and offal)	M6
PO1714738-02	30/08/2017	Producer	Dog food (tripe and offal)	M6
PO1714738-03	30/08/2017	Producer	Dog food (tripe and offal)	M6

Product trace-back

Local EHPs requested supply chain data on the implicated products from the pet food stores.

Results

Microbiological

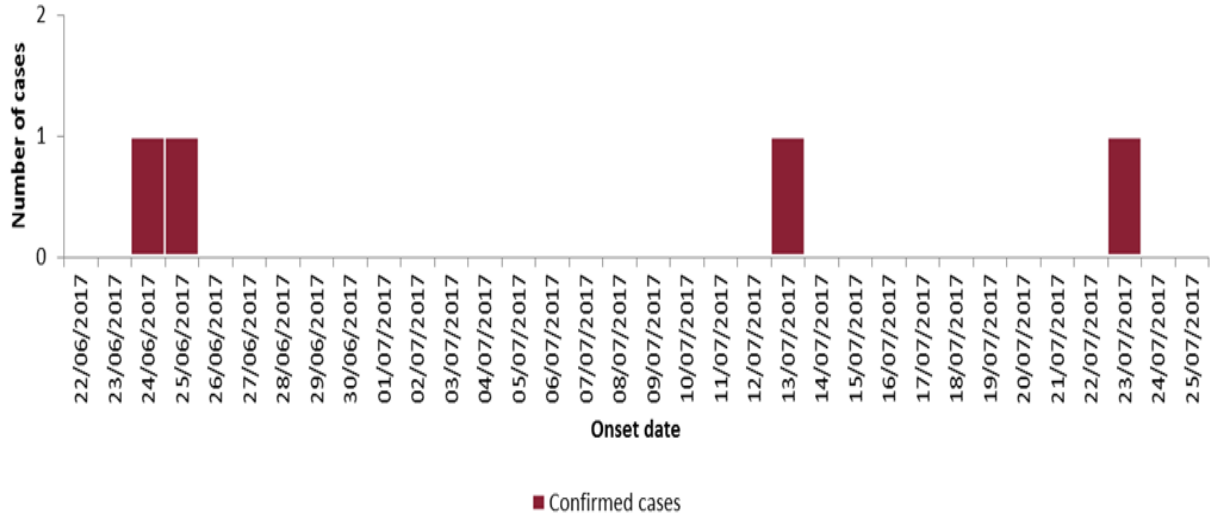
The isolates of STEC O157 from the four cases were all PT21/28 stx2a. WGS identified that the isolates from 3 human cases had an identical Single Nucleotide Polymorphism (SNP) profile (4.4.4.590.1280.3966.4548) and one case had a SNP profile that was one SNP different to the outbreak profile.

Phylogenetic analyses indicated the strain of STEC in this outbreak clustered most closely with other strains isolated from cases reporting that they had not recently travelled outside the UK or from UK animals, and
the source of infection was therefore likely to be of domestic (UK) origin (Appendix III). This indicates transmission to human cases was most likely due to (i) direct contact with UK cattle or their environment, (ii) contact with, or consumption of, contaminated meat or dairy products from UK cattle or sheep or (iii) consumption of produce cultivated in close proximity to a ruminant reservoir in the UK.

Epidemiological

Four confirmed cases were identified. Onset dates ranged from 23 June 2017 to 23 July 2017 (Figure 1).

Figure 1: Epidemic curve of cases by onset date (n=4)



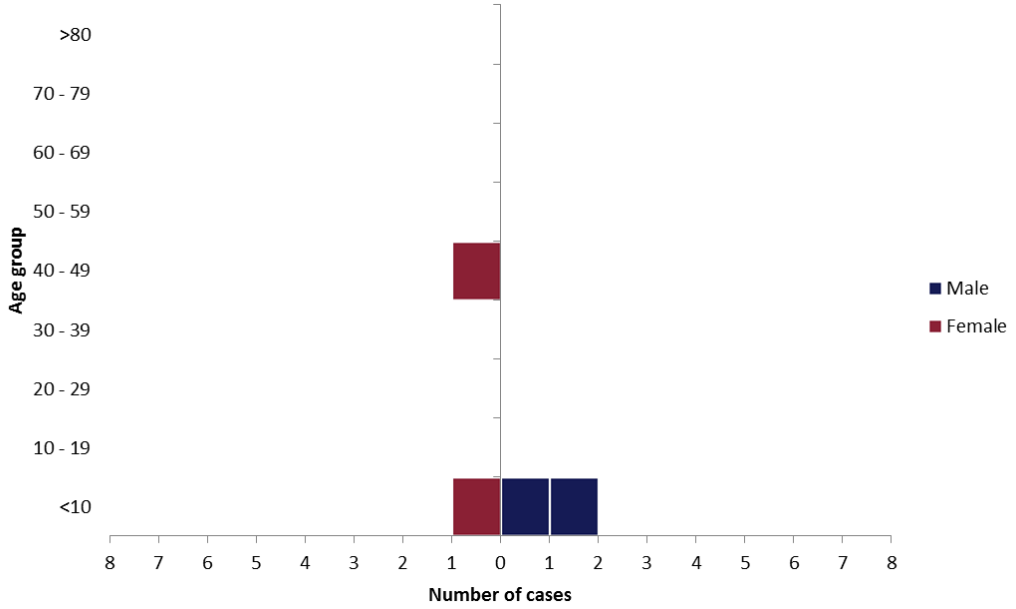
Tw
6 years (range 6 – 45 years) (Figure 2).

All 4 cases were resident in England cases and distributed amongst four PHE centres. No cases were detected in Scotland or Wales.

All 4 cases reported diarrhoea, 3 of which had bloody diarrhoea accompanied by vomiting.

One of the cases was still ill when the ESQ was administered and duration of illness ranged from four to 8 days at time of interview. Three cases were hospitalised and one case developed HUS and subsequently died. The cause of death was listed as HUS and sepsis.

Figure 2: Age and sex distribution of confirmed cases (n=4)



Exposure information

None of the cases had recent foreign travel. No cases reported private water supplies however 2 cases reported swimming and one case reported other water exposure (eg canoeing, fishing, sailing and surfing). Four cases reported contact with dogs, one also with chickens. One case specified feeding their dogs' raw tripe. A variety of food exposures were reported on the ESQ's (Appendix IV). Cases reported shopping at various different supermarket chains, the food histories were complex and no clear common exposures were apparent. Two cases reported consuming dairy free products such as soya yoghurt and goats milk and free from products such as gluten free bread.

At the first IMT on 15 August 2017, it was reported that a second case had contact with dog(s) also fed on raw tripe purchased from the same shop as that for the first case who reported handling raw tripe. Furthermore, another case had close contact with a dog,

including brushing its teeth with their own toothbrush, this dog was also fed a raw meat based diet .

At that time therefore, exclusion diets and cases' contact with animals and animal feed were of further interest to the IMT. A second trawling interview was undertaken with each case (or a family member) between the 21 and 24 August 2017 with the aim of refining a hypothesis for investigation.

The trawling questionnaires indicated that contact with dogs and consumption of raw carrots were the only exposures common to all 4 cases. Feeding of raw tripe (n=2) and a raw meat based diet (n=1) was reconfirmed in the interviews. The fourth case had contact with a family member's dog that was not reported as being fed tripe or raw pet food. The family were re-questioned specifically around the dog's diet and confirmed the dog was not fed a raw raw meat based diet . However, they reported contact with another dog fed on bulk frozen pet food sourced from an online company supplying raw pet food, but that contact was 4 weeks prior to onset.

The putative link to raw pet food in this incident led to a retrospective review of exposures to raw pet food amongst all STEC cases reported to the NESSS. Primary, symptomatic cases with no reporting of foreign travel were included from 1 January 2013 through to 31 December 2017. Of the 2082 cases included in the analysis, 1124 (54.0%) cases, reported exposure to dogs and/or cats. Less than a third of those (n=353, 31.0%) reported handling pet food, this is unsurprising given the predominance of child cases of STEC. Handling raw pet food was reported for just twelve cases (3.4%). However, 7 of those were reported in 2017, representing 9.1% of cases with exposure to dogs and/or cats in 2017. Of the twelve cases, 9 were infected with STEC O157 and 3 cases with non-O157 strains (O76, O113 and O146).

Food and environmental testing

All samples taken from the North East raw pet food producer and the case's freezer were PCR positive for STEC. STEC was subsequently isolated from one sample of raw tripe. The STEC isolated was STEC O100:H30 and was positive for the *stx2g* gene and was therefore not the same as the strain infecting the human cases. The South East samples from the case's freezer and pet food shop were all negative for STEC.

Product trace-back

Product trace-back was limited. For the pet shop in the South East, the raw pet food had been supplied by a raw pet food producer, distributor and retailer based in the North East (Durham Animal Feeds Ltd). The retailer in the North East, was supplied by a separate producer from which the sample from which STEC was recovered was taken. The company stated that they were sourcing tripe from 2 suppliers, one based in

North East England and another based in Northern Ireland. The nature of their processes meant it wasn't possible to determine which of the 2 sources an identified finished product came from. They also reported using a third source in the North East, which went into administration on 24 July 2017 primarily due to hygiene issues but were being used during the period prior to onset of cases.

Discussion

WGS enabled the detection and investigation of this small, nationally dispersed cluster which would have gone undetected prior to the introduction of WGS due the commonly reported PT (PT21/28), comprising approximately a third of STEC O157 cases in England (4). The benefits of WGS for national surveillance of STEC have been previously demonstrated (7), and in this case facilitated the identification of a novel vehicle for STEC transmission.

Due to the small number of cases, epidemiological investigations were limited but did point to exposure to raw pet food, specifically tripe, as a putative source in 3 of the 4 cases. While one case was not linked to raw pet food, as cattle and sheep are the main reservoir of STEC in the UK, exposure to the same strain of STEC may have occurred through a different route. This may be indirect or direct exposure to the infected animals which entered the pet feed supply chain for example. Alternatively, the case may have been exposed to an animal fed a raw meat based diet without being aware of, or being able to recall that exposure.

STEC O157 is detected in approximately 20% of farms housing cattle in the UK.(12) Tripe is the edible lining of cow's stomachs and as such raw tripe can plausibly contain pathogens including STEC if the animals are infected. While tripe is cleaned and treated for human consumption, many raw pet foods contain green tripe, a raw product which hasn't been cleaned and contains the untreated contents of the cow's stomach. Sampling and microbiological screening of raw pet food in this investigation indicated the presence of STEC in the products via PCR. Subsequently, STEC was isolated from one sample of raw tripe but was different to the strain causing illness in the humans. The same STEC was also detected in a swab of a preparation bench at the producers premises.

The outbreak strain was not recovered from samples of tripe, however there are a number of caveats to interpreting these results; the samples tested were not necessarily the batches fed to the case's pets which caused human illness; the infectious dose of STEC is very low and may be below the limits of the tests and there may be uneven distribution of bacteria in the products which meant sampling could miss an affected part of product. Nevertheless, isolation of STEC did provide evidence for microbiological

contamination of the tripe and its pathogenic risk to human health and that it was a plausible transmission route in this outbreak.

It is widely accepted that raw meat, including animal by-products used in pet feeds, can contain pathogens which are harmful to health. A recent microbiological study of commercial RMBD products found *Escherichia coli* serotype O157:H7 in 23% of tested product, as well as *Listeria monocytogenes* (54%) and *Salmonella* species (20 %).(13) Raw pet foods have the potential to cause human disease if contaminated products are consumed, handled or via secondary transfer from contact with contaminated surfaces eg kitchen surfaces or dog bowls.

There is evidence of salmonella, listeria and campylobacter being carried by clinically health companion animals. (14-19) Human campylobacteriosis has also been attributed to dogs.(20) For STEC, there is one study published from England where investigators identified a probable zoonotic transmission of STEC O157 between dogs and humans, while an outbreak investigation in England led to detection of STEC from cat faeces.(21, 22) raw meat based diets are a reported risk factor for faecal carriage of salmonella, (23, 24)and certain *E.coli* by companion animals.(24) These data suggest therefore that companion animals fed RMBD's may present a zoonotic risk for human infection.

Feeding raw meat to companion animals has recently increased in popularity due to both increasing availability and beliefs that they provide health benefits to animals. Although still rare, an increase in STEC cases reporting exposure to raw meat was detected in NESSS in 2017. The APHA, responsible for approval and monitoring of raw pet food producers, reported an increase in manufacturers from 5 in 2013, to 90 (with 23 awaiting approval) by February 2018.(25)The FSA reported data on the frequency of raw pet food Incidents in 2017 including data on imports into the UK and exports from UK producers: 10 incidents were reported, 8 were microbiological.(26) Together these data suggest an upward trend in potential risk to humans from raw pet food.

The PFMA Raw Pet Food Group developed, in conjunction with Defra, the APHA, Public Health England (PHE) and the Food Standards Agency (FSA) published the Guidelines for the Manufacture of Raw Pet Food on 20 September 2017. These guidelines are intended to improve safety, hygiene and nutrition of raw pet food made in the UK. Meanwhile, there are legislative requirements for regular microbiological testing for salmonella and enterobacteriaceae , where findings demonstrate microbial levels above those stipulated in the regulation, rapid action is taken to address this non-compliance including recall of product where appropriate.(ACAF paper). Testing, however, is not required for listeria, campylobacter or STEC.
The IMT concluded therefore, the best approach to reduce the risk of infection is to improve awareness of risk and promote good hygiene practices when handling raw pet food.

Conclusions

The investigation highlighted the necessity of a ‘One Health’ approach to control of STEC due to the complex interplay of pathogens between animals, the environment and humans. Raw pet feed as the putative cause of human STEC infections was a novel finding. As the popularity of raw pet feed diets is increasing, this could be an important emerging source of infection and further work is needed to assess the risk and to improve infection control amongst industry and the public.

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Appendices

Appendix I (Trawling questionnaire)

Ref No ☐ ***IN STRICT MEDICAL CONFIDENCE***

VTEC O157 PT 21/28
Trawling Questionnaire

Please tick boxes or write in the space(s) provided. **USE BLACK OR DARK BLUE BIRO/PEN.**

Interviewer's initials. . . . . **Date** . . . . . / . . . . . / . . . . . (dd/mm/yy)

PERSONAL DETAILS

Forename: ……. Surname: …….

Address: …….

……

Postcode: …….

Tel no (home/mobile): ……

Sex: Female ☐ Male ☐

Date of Birth: . . . . . / . . . . . / . . . . . (dd/mm/yyyy)

TREATMENT FOR OTHER CONDITIONS

Were you being treated at a clinic or by your GP for any other conditions in the **7 DAYS** before your symptoms first started?

Yes ☐ No ☐

If **YES,** what were you being treated for? …….

……

Where did you receive treatment? …….

Did you visit any clinics or specialists providing alternative therapies? Yes ☐ No ☐

If **YES**, please give details ? …….

Where did you receive treatment? …….

Were you taking any of the following in the **7 DAYS** before you became ill?

Medicines (oral preparations) Yes ☐ No ☐
*[**Prompt:** includes prescription, **over the counter** and homeopathic medicines]*

If **YES,** please specify type (s) …….

……

Dietary supplements Yes ☐ No ☐
*[**Prompt:** includes powdered drinks, shakes and tonics]*

If **YES,** please specify type and brand (s) …….

……

Place of purchase …….

Vitamins and minerals Yes ☐ No ☐
*[**Prompt:** includes multivitamins, calcium supplements etc and herbal remedies]*

If **YES,** please specify type and brand (s) …….

……

Place of purchase …….

HOUSEHOLD DETAILS

Is there anything about your house or the area in which you live that we might not appreciate from the walk to your front door? *[**Prompt:**eg the house has a pigeon loft, there are foxes in the neighbourhood, the area is prone to flooding]*

……
……
……
……
……
……
……

Is your home within a **5 minute walk** of any of the following?

	Yes	No	Where
Farmland, fields, grazing land etc.	☐	☐	……
Park	☐	☐	……
River/canal/stream	☐	☐	……
Livestock markets	☐	☐	……
Small holdings	☐	☐	……

Slaughter houses	☐	☐	……
Cemetery	☐	☐	……

WORK/SCHOOL DETAILS

Are you involved in any activites where you handle or come into contact with:

*[**Prompt:** includes voluntary work or helping out]*

	Yes	No	Details
Animals	☐	☐	……..
Infants (<6 yrs)	☐	☐	……..
Elderly people	☐	☐	……..
People who are ill	☐	☐	……..
Raw meat/carcases	☐	☐	……..

	Yes	No	Details
Food	☐	☐	……..
Soil	☐	☐	……..
Manure	☐	☐	……..
Compost	☐	☐	……..

Are you involved in any outside activities? Yes ☐ No ☐

*[**Prompt:** work, sport, other forms of recreation]*

If YES, please give details……..

……

SEVEN DAY HISTORY

Walk the case through the **7 DAYS** preceding their illness to collect:

- information on foods they ate or were likely to have eaten including snacks, sweets and drinks;
    - ♦ include information on places where food was eaten;
    - ♦ shops, stalls etc where food and groceries were bought;
- information on their involvement in food preparation at home or work;
- places visited including for work, social or recreational purposes;

- activities undertaken as part of their work or education;
- activities undertaken for social or recreational purposes;
- anything they did that was outside their normal routine.

Please note that on the next page, the first day before onset refers to the 24 hours starting from the time that people normally rise in the morning, eg: if the case's onset of symptoms was at **17.30 Saturday 5 February 2011**, then the first day before onset of symptoms would start at **07.00 on Friday 4 February 2011** if that is the time the case would normally rise in the morning.

You might find it useful to refer to a diary.

FIRST DAY BEFORE THE ONSET OF SYMPTOMS

SECOND DAY BEFORE THE ONSET OF SYMPTOMS

THIRD DAY BEFORE THE ONSET OF SYMPTOMS

FOURTH DAY BEFORE THE ONSET OF SYMPTOMS

FIFTH DAY BEFORE THE ONSET OF SYMPTOMS

SIXTH DAY BEFORE THE ONSET OF SYMPTOMS

SEVENTH DAY BEFORE THE ONSET OF SYMPTOMS

I will now ask you some more specific questions. These might overlap with information that you have alreay given us. If the case is a child please substitute "you" with "your child."

EVENTS/VISITS

Did you visit friends or family in the **7 DAYS** before you became ill?

*[**Prompt:** parties, visits, concerts, exhibitions, sporting events, purchases, meals, etc]*

Yes ☐ No ☐

If **YES**, please give details……

……

……

Did you visit any hospitals the **7 DAYS** before you became ill?

*[**Prompt:** including visits to A&E]*

Yes ☐ No ☐

If **YES**, please give details……

……

……

Did you do anything special or different in the **7 DAYS** before you became ill?

*[**Prompt:** parties, visits, concerts, exhibitions, sporting events, purchases, meals, etc]*

Yes ☐ No ☐

If **YES**, please give details……

TRAVEL HISTORY

In the **7 DAYS** before you became ill did you visit any of the following?

	Yes	**No**	If **YES** give details
Parks	☐	☐	……
Wild or rough ground	☐	☐	……
Woodlands	☐	☐	……
Farms	☐	☐	……
Fields	☐	☐	……
Grazing land	☐	☐	……
Beaches	☐	☐	……

Lakes, ponds etc	☐	☐	……
Canals, rivers etc	☐	☐	……
Swimming pools	☐	☐	……
Allotments	☐	☐	……
Garden centres	☐	☐	……
Stables	☐	☐	……
Campsites	☐	☐	……

	Yes	**No**	If **YES** give details
Zoos	☐	☐	……
Bird sanctuaries	☐	☐	……
Animal markets	☐	☐	……
Slaughter houses	☐	☐	……
Small holdings	☐	☐	……

CONTACT WITH ANIMALS

Do you or your family keep any of the following pet animals?

	Yes	**No**
Dog(s)	☐	☐
Cat(s)	☐	☐
Fish	☐	☐
Bird(s) *[**Prompt:** budgies, parrots, pigeons, chickens etc]*	☐	☐
Reptile(s) *[**Prompt:** snakes, lizards, tortoises etc]*	☐	☐
Other animals	☐	☐

Please specify ……
*[**Prompt**: hamsters, rabbits, frogs etc]*

Did you clean the pets, or their cages, tanks etc? Yes ☐ No ☐

Did you feed the pets? Yes ☐ No ☐

Are your pets fed in the kitchen? Yes ☐ No ☐

Did you come into contact with any animals outside your home?
*[**Prompt:** at a friends house, school etc]*

Yes ☐ No ☐

If **YES** please specify. *[**Prompt:** cats, dogs, hamsters, snakes, terrapins etc]*

……

Did you or any other member of your household buy any of the following products in the **7 DAYS** before you became ill?

	Yes	**No**	**Name**
Dog chews	☐	☐	……
Cat biscuits	☐	☐	……
Cat/dog food in pouches	☐	☐	……
Tinned cat/dog food	☐	☐	……
Fishfood	☐	☐	……
Birdfood/chicken feed	☐	☐	……
Fresh meat/offal (e.g tripe)	☐	☐	……
Other	☐	☐	……

If other, please specify type, name/brand. *[**Prompt**: dog biscuits, live mice/insects for reptiles etc]*

……

If **YES** to any, where were the products purchased? *[**Prompt**: name and location of shop, stall, internet]*

……

Did you ride, touch or care for any horses or ponies in the **7 DAYS** before you became ill?

Yes ☐ No ☐

If **YES** give details [eg xx stables near xx village in Kent etc]

……

……

Did you visit any places where farm animals or wildlife might be found in the **7 DAYS** before you became ill? [Prompt: parks, farms, woods, zoos etc] Yes ☐ No ☐

If **YES** give details [eg xx zoo or park, or woods near xx village in Kent etc]

……

……

Did you come into contact with any goats, kids, sheep or lambs in the **7 DAYS** before you became ill?

Yes ☐ No ☐

Did you come into contact with any cows or calves,in the **7 DAYS** before you became ill?

Yes ☐ No ☐

Did you come into contact with any other farm animals or wildlife in the **7 DAYS** before you became ill? *[**Prompt**: hens, rabbits, fish, birds etc]* Yes ☐ No ☐

If **YES**, what types of animal did you touch?

……

……

If you have a garden or access to a communal garden or allotment did you come into contact with any wildlife or their droppings in the **7 DAYS** before you became ill? *[**Prompt**: squirrels, foxes, hedgehogs, birds etc]*

Yes ☐ No ☐ If **YES**, what types of animal were they?

……

……

Did you handle or feed any garden birds,in the **7 DAYS** before you became ill?

Yes ☐ No ☐ If **YES**, what type of feed did you use?

Name of brand ……

Place of purchase ……..

FOOD HANDLING AT HOME

Now we are going to ask you about cooking and preparing food at home.

Did you handle any of the following raw foods in your kitchen in the **7 DAYS** before you became ill?

	Yes	**No**	**Where bought**
Eggs	☐	☐	……
Sausages	☐	☐	……
Beefburgers	☐	☐	……
Minced beef	☐	☐	……
Other beef *[**Prompt:** steak, joints etc]*	☐	☐	……
Lamb	☐	☐	……
Other pork *[**Prompt:** chops, joints etc]*	☐	☐	……
Chicken	☐	☐	……

Turkey	☐	☐	……
Other meat *[**Prompt:** duck, rabbit etc]*	☐	☐	……
Potatoes	☐	☐	……
Carrots	☐	☐	……
Onions	☐	☐	……
Leeks	☐	☐	……
Raw pet/animal food	☐	☐	……
Other vegetables *[**Prompt:** parsnips, cabbage etc]*	☐	☐	……

If you did handle any vegetables, was there any soil on them? Yes ☐ No ☐

Did any other members of your household handle any of the above raw foods in your kitchen in the **7 DAYS** before you became ill?

If **YES** give details *[**Prompt:** parents, brothers, sisters etc]*

……

……

Were you involved in any of the following activities the **7 DAYS** before you became ill?

	Yes	**No**
Washing/cutting vegetables	☐	☐
Making/mixing cakes	☐	☐

If you did make any cakes could you have eaten any of the mix before it was cooked?

Yes ☐ No ☐

In which part of your kitchen fridge is raw meat kept?

	Yes	**No**		**Yes**	**No**	
Top	☐	☐	Middle	☐	☐	Bottom
☐	☐		Other	☐	☐	

If other, please specify *[**Prompt**:in a designated drawer]*.

……

Is raw meat stored in a freezer? *[**Prompt**:includes that in a fridge freezer]*.

Yes ☐ No ☐

Do the cooks in your family or household use a separate chopping board for cutting raw meat?

Yes ☐ No ☐

Is it possible that the cooks in your family used any gelatin in making any dishes in the **7 DAYS** before you became ill?

Yes ☐ No ☐ If **YES,** what brand? ……

Is it possible that the cooks in your family used any milk powder in making any dishes in the **7 DAYS** before you became ill?

Yes ☐ No ☐ If **YES,** what brand? ……

Is it possible that the cooks in your family used any whey powder in making any dishes in the **7 DAYS** before you became ill?

Yes ☐ No ☐ If **YES,** what brand? ……

Is it possible that the cooks in your family used any flour to make any dishes in the **7 DAYS** before you became ill?

Yes ☐ No ☐ If **YES,** what brand? ……

Is it possible that the cooks in your family used any suet in making any dishes in the **7 DAYS** before you became ill?

Yes ☐ No ☐ If **YES,** what brand? ……

Is it possible that the cooks in your family used any beef dripping in making any dishes in the **7 DAYS** before you became ill?

Yes ☐ No ☐ If **YES,** what brand? ……

CLEANING

What products do you use to clean work surfaces in the kitchen?

……

What products do you use to clean the kitchen floor?

……

Do you remember if there was anything that you bought that might have had soil or dirt on it? *[**Prompt**: potatoes from the garden, dirty milk bottles, garden or building materials]*.

……

FOOD HISTORY

Now we are going to ask you about food eaten in the **7 DAYS** before you became ill.

VENUES

Did you have a packed lunch prepared at home? Yes ☐ No ☐

Have you eaten lunch at any of the following places in the **7 DAYS** before you became ill?

	Yes	**No**	**Name**
At home	☐	☐	

At Work/School	☐	☐	……
Restaurant	☐	☐	……
Take away	☐	☐	……
Pub	☐	☐	……
Other	☐	☐	……

Did you eat any food (including take-aways and delivered foods) from or in any of the following places in the **7 DAYS** before you became ill?

	Yes	**No**	**Name**
Coffee shop *[**Prompt:** eg Starbucks, Costas etc]*	☐	☐	……
Burger bar *[**Prompt:** eg McDonalds, Burger King etc]*	☐	☐	……
Pizza parlour *[**Prompt:** eg Dominos, Pizza Express etc]*	☐	☐	……
Kebab shop	☐	☐	……
Fish & chip shop	☐	☐	……
Fried chicken bar *[**Prompt:** eg KFC, Tennesee Fried Chicken etc]*	☐	☐	……
Bakers shop	☐	☐	……
Sandwich bar	☐	☐	……
Delicatessen *[not in a supermarket]*	☐	☐	……
British restaurant	☐	☐	……
Chinese restaurant	☐	☐	……
Greek restaurant	☐	☐	……
	Yes	**No**	**Name**
Indian restaurant	☐	☐	……
Italian restaurant	☐	☐	……
Other restaurant	☐	☐	……
Hotel	☐	☐	……
Café *[**Prompt:** greasy spoons, supermarkets, gyms etc.]*	☐	☐	……
Pub	☐	☐	……
Canteen *[**Prompt:** eg work, school etc]*	☐	☐	……

Food stalls ☐ ☐ .....
*[**Prompt:** eg lunch van, hot dog stand, market stands etc]*

Motorway service ☐ ☐ .....

Airport ☐ ☐ .....

Railway station/train ☐ ☐ .....

Petrol station ☐ ☐ .....

Other ☐ ☐ .....
*[**Prompt:** eg ferry, theme park etc]*

POULTRY

Did you eat any of the following foods in the **7 DAYS** before you became ill?

	Prepared at home	Away from home	No
Processed Chicken *[**Prompt:** eg pies, nuggets etc]*	☐	☐	☐
Hot/cold chicken *[**Prompt:** eg roasts, casseroles, curries, sandwiches/baguettes, salads etc]*	☐	☐	☐
Chicken liver pâté/parfait	☐	☐	☐
Hot/cold turkey	☐	☐	☐
Hot duck *[**Prompt:** eg roasts, crispy fried duck etc]*	☐	☐	☐
Other poultry *[**Prompt:** eg goose, guinea fowl, quail, partridge etc]*	☐	☐	☐

If YES to other please specify .....
[specify eg quail, partridge]

Did you eat any ready made meals with poultry which were cooked at home?

Yes ☐ No ☐

If **YES** please specify .....
*[**Prompt:** ask for brands place of purchase]*

Was the poultry bought from? [Can be more than one]

	Yes	No	Name/Branch/Location
Supermarket	☐	☐	.....
Butcher	☐	☐	.....
Corner shop/mini mkt	☐	☐	.....
Market	☐	☐	.....
Mobile shop	☐	☐	.....
Other *[**Prompt:** from a local farm, stall or smallholding]*	☐	☐	.....

BEEF

Did you eat any of the following foods containing beef in the **7 DAYS** before you became ill?

	Prepared at home	Away from home	No
Burgers	☐	☐	☐
Other minced beef dishes *[Prompt: lasagne/chilli/cottage pie etc]*	☐	☐	☐
Steak	☐	☐	☐
Roast beef (hot)	☐	☐	☐
Beef stew/casserole/curry	☐	☐	☐
Pies and pasties *[Prompt: steak & kidney pie, Cornish pasty etc]*	☐	☐	☐
Cold roast/corned beef etc	☐	☐	☐
Sausages [including hot dogs]	☐	☐	☐
Other beef	☐	☐	☐

If YES to other please specify ……

Did you eat any **cold cooked beef** in salads or sandwiches etc, which were made at home in the **7 DAYS** before you became ill? *[**Prompt:** sliced roast beef; corned beef, tongue, brawn etc]*

Yes ☐ No ☐

If **YES** please specify ……
*[**Prompt:** product type and brand eg corned beef from supermarket X]*

If **YES,** was the meat sliced at the counter? Yes ☐ No ☐
*[**Prompt:** at a butchers shop or delicatessen counter]*

Did you eat any processed beef products which were cooked at home?
*[**Prompt:** cooked chill or ready meals eg lasagne, steak and kidney pudding etc]*

Yes ☐ No ☐

If **YES** please specify ……
*[**Prompt:** ask for brands of pies etc]*

If any beef was eaten, was the beef bought from? [Can be more than one]

	Yes	No	Name/Branch/Location
Supermarket	☐	☐	……
Butcher	☐	☐	……
Corner shop/mini mkt	☐	☐	……
Market	☐	☐	……
Mobile shop	☐	☐	……
Other *[**Prompt:** from a local farm, stall or smallholding]*	☐	☐	……

PORK

Did you eat any of the following foods in the **7 DAYS** before you became ill?

	Prepared at home	Away from home	No
Pork sausages	☐	☐	☐
Bacon	☐	☐	☐
Gammon	☐	☐	☐
Hot pork dishes *[**Prompt:** roast, chops, casseroles etc]*	☐	☐	☐
Pork pies	☐	☐	☐
Pâté	☐	☐	☐
Salami	☐	☐	☐
Pepperoni	☐	☐	☐
Pork scratchings	☐	☐	☐
Ham *[Not including Parma, Serrano ham etc]*	☐	☐	☐
Dry cured ham *[Parma, Serrano, Bayonne ham etc]*	☐	☐	☐
Luncheon meat	☐	☐	☐
Other	☐	☐	☐

If Other please specify .....
[eg cold roast pork, mortadella etc]

If ham, salami or luncheon meat were eaten -

Were any of the products sliced at the shop counter? Yes ☐ No ☐
*[**Prompt:** at a butchers shop or delicatessen counter]*

Did you eat any processed pork products which was cooked at home?
*[**Prompt:** cooked chill or ready meals eg sweet and sour pork, slimmers meals etc]*

Yes ☐ No ☐

If **YES** please specify the brands .....

If any pork was consumed, was the pork bought from? [Can be more than one]

	Yes	No	Name/Branch/Location
Supermarket	☐	☐	.....
Butcher	☐	☐	.....
Corner shop/mini mkt	☐	☐	.....
Market	☐	☐	.....
Mobile shop	☐	☐	.....
Other	☐	☐	.....

*[**Prompt:** from a local farm,stall or smallholding]*

LAMB

Did you eat any hot dishes containing lamb/mutton in the **7 DAYS** before you became ill?
*[**Prompt:** Roast lamb, chops, kebabs, casseroles, curries or stews]*

Cooked at home from raw	☐	Ready meals cooked at home	☐
Away from home	☐	No	☐

Was the lamb bought from? [Can be more than one]

	Yes	No	Name/Branch/Location
Supermarket	☐	☐	……
Butcher	☐	☐	……
Corner shop/mini mkt	☐	☐	……
Market	☐	☐	……
Mobile shop	☐	☐	……
Other	☐	☐	……

*[**Prompt:** from a local farm, stall or smallholding]*

OTHER MEAT PRODUCTS

Did you eat any of the following foods in the **7 DAYS** before you became ill?

	Cooked/prepared at home	Away from home	No
Kebabs	☐	☐	☐
Sausages	☐	☐	☐
Sausage rolls	☐	☐	☐
Pasties/ meat pies	☐	☐	☐
Scotch eggs	☐	☐	☐
Haggis	☐	☐	☐
Haslet	☐	☐	☐
Brawn	☐	☐	☐
Tripe, liver etc	☐	☐	☐

If **YES** please specify ……

Pizza with meat *[Pepperoni etc]*	☐	☐	☐
Rabbit meat	☐	☐	☐
Goat meat	☐	☐	☐
Venison	☐	☐	☐

Gravy ☐ ☐ ☐
*[**Prompt:** ready made in cartons orplastic packs]*

Other ☐ ☐ ☐

If **YES** please specify ……
[eg ready meals, slimmers meals etc]

If eaten at home, were the other meat products bought from? [Can be more than one]

	Yes	No	Name/Branch/Location
Supermarket	☐	☐	……
Butcher	☐	☐	……
Corner shop/mini mkt	☐	☐	……
Market	☐	☐	……
Mobile shop	☐	☐	……
Other	☐	☐	……

*[**Prompt:** from a local farm, stall or smallholding]*

FISH & SEAFOOD

Did you eat any seafood in the **7 DAYS** before you became ill? *[**Prompt**: fish, crab, scampi, mussels]*

Yes ☐ No ☐

If **YES**, what type of seafood? ……

If eaten at home, were the seafood products bought from? [Can be more than one]

	Yes	No	Name/Branch/Location
Supermarket	☐	☐	……
Fishmonger	☐	☐	……
Delicatessen	☐	☐	……
Market	☐	☐	……
Mobile shop	☐	☐	……
Other	☐	☐	……

*[**Prompt:** from a local farm or smallholding]*

MILK

Did you drink (or have with cereal, tea/coffee etc) any milk in the **7 DAYS** before you became ill?

Yes ☐ No ☐

If **YES** was the milk?

Yes	No	Brand

Cows milk	☐	☐	……
Goats milk	☐	☐	……
Soya milk	☐	☐	……
Raw unpasteurised milk	☐	☐	……
Almond milk	☐	☐	……
Rice milk	☐	☐	……
Flax milk	☐	☐	……
Hazelnut milk	☐	☐	……
Oat milk	☐	☐	……
Cashew milk	☐	☐	……
Coconut milk	☐	☐	……
Other	☐	☐	……

If other please specify ……

Was the milk?

	Full fat	**Semi-skimmed**	**Skimmed**
Unpasteurised	☐	☐	☐
Pasteurised	☐	☐	☐
Filtered	☐	☐	☐
Sterilised/UHT	☐	☐	☐
Powdered	☐	☐	☐

Was the milk bottled? Yes ☐ No ☐

Was it bought from? [Can be more than one]

	Yes	**No**	**Name/Branch/Location**
Supermarket	☐	☐	……
Corner shop/mini mkt	☐	☐	……
Milk round	☐	☐	……
Other	☐	☐	……

*[**Prompt:** eg farm shop, market etc]*

CHEESE

Did you eat any of the following types of cheese in the **7 DAYS** before you became ill?

*[**Prompt:** includes cheese in salads, sandwiches, burgers etc]*

Eaten/ prepared at home	**Eaten away from home**	**No**	**Type(s)/brand of cheese**

Goats cheese	☐	☐	☐ ……
Blue cheese *[eg Stilton, Gorgonzola etc]*	☐	☐	☐ ……
Cheese spread *[eg Philadelphia, Dairylea, Roulé etc]*	☐	☐	☐ ……
Other soft cheese *[eg Brie, dolcelatte, cottage cheese etc]*	☐	☐	☐ ……
Hard white cheese *[eg Cheddar, Edam, Feta etc]*	☐	☐	☐ ……
Cooked cheese dishes *[eg pizza, macaroni cheese etc]*	☐	☐	☐ ……
Dairy free cheese *[eg almond cheese etc]*	☐	☐	☐ ……

If **eaten at home** was cheese bought from? [Can be more than one]

	Yes	**No**	**Name/Branch/Location**
Supermarket	☐	☐	……
Corner shop/mini mkt	☐	☐	……
Delicatessen *[not in a supermarket]*	☐	☐	……
Cheese shop	☐	☐	……
Butcher	☐	☐	……
Market	☐	☐	……
Mobile shop	☐	☐	……
Other	☐	☐	……

If other please specify ……
*[**Prompt:** department store, farm shop, abroad etc]*

Was the cheese prepacked? Yes ☐ No ☐

Was the cheese cut in the shop Yes ☐ [Can be both] No ☐

OTHER DAIRY PRODUCTS

Did you eat any of the following dairy products in the **7 DAYS** before you became ill?

	Yes	**No**	**Brand and flavour/type**
Cream	☐	☐	……
Yoghurt	☐	☐	……
Dairy free Yoghurt	☐	☐	……
Fromage frais	☐	☐	……

Butter	☐	☐	……
Dairy free butter	☐	☐	……
Probiotic drinks *[**Prompt**: eg Yakult, Activia etc]*	☐	☐	……
Yoghurt drinks *[**Prompt**: eg Yop]*	☐	☐	……
Milk drinks *[**Prompt**: eg cold chocolate milk]*	☐	☐	……
Other	☐	☐	……

If Other please specify ……
*[**Prompt**: buttermilk, smetena etc]*

If eaten at home were the dairy products bought from? [Can be more than one]

	Yes	**No**	**Name/Branch/Location**
Supermarket	☐	☐	……
Corner shop/mini mkt	☐	☐	……
Delicatessen *[not in a supermarket]*	☐	☐	……
Cheese shop	☐	☐	……
Market	☐	☐	……
Mobile shop	☐	☐	……
Other	☐	☐	……

If other please specify ……
*[**Prompt:** department store, farm shop, ethnic grocer etc]*

CAKES & BISCUITS

Did you eat any cakes with nuts in the **7 DAYS** before you became ill?

Yes ☐ No ☐

If **YES** please specify ……
*[**Prompt:** ask for type and brand]*

Did you eat any kind of biscuits in the **7 DAYS** before you became ill? *[**Prompt**: flapjacks, cookies, biscuits]*

Yes ☐ No ☐

If **YES** please specify ……
*[**Prompt:** ask for type and brand]*

Did the biscuits contain nuts? Yes ☐ No ☐

If eaten at home were the products bought from? [Can be more than one]

	Yes	**No**	**Name/Branch/Location**
Supermarket	☐	☐	……
Corner shop/mini mkt	☐	☐	……

Delicatessen *[not in a supermarket]*	☐	☐	……
Bakers shop	☐	☐	……
Market	☐	☐	……
Mobile shop	☐	☐	……
Other	☐	☐	……

If other please specify ……
*[**Prompt**: eg church fair, friend, abroad etc]*

DESSERTS & PUDDINGS

A) i) Did you eat any of the following types of desserts/puddings in the **7 DAYS** before you became ill?

	At home	Carton	Away from home	No
Mousse (eg chocolate, lemon, strawberry etc)	☐	☐	☐	☐
Meringue (including pavlova/baked alaska)	☐	☐	☐	☐
Pancakes and crépes *[not Scotch pancakes or waffles]*	☐	☐	☐	☐
Trifle (with custard)	☐	☐	☐	☐
Tiramisu	☐	☐	☐	☐
Home made ice cream	☐	☐	☐	☐
Other ice cream	☐	☐	☐	☐
Milk pudding *[eg rice pudding etc]*	☐	☐	☐	☐
Dairy free deserts	☐	☐	☐	☐
Other desserts/puddings	☐	☐	☐	☐

If other please specify ……
*[**Prompt**: sticky toffee pudding, banoffee pie, pannacotta etc but not fresh fruit or fruit cocktail]*

Did any of the puddings contain cream? Yes ☐ No ☐

Did any of the puddings contain nuts? Yes ☐ No ☐

If eaten at home were the products bought from? [Can be more than one]

	Yes	No	Name/Branch/Location
Supermarket	☐	☐	……
Corner shop/mini mkt	☐	☐	……
Delicatessen *[not in a supermarket]*	☐	☐	……
Bakers shop	☐	☐	……
Market	☐	☐	……

Mobile shop ☐ ☐ ……

Other ☐ ☐ ……

If other please specify ……
*[**Prompt**: specialist ethnic store etc]*

SANDWICHES, BURGERS & KEBABS

Did you eat any sandwiches, rolls, filled baguettes or wraps that were **bought or served** away from home in the **7 DAYS** before you became ill?
*[**Prompt:** includes prepacked sandwiches from shops/railway stations, works/school canteens, rolls at buffet lunches, custom made sandwiches from sandwich bars, pubs etc].*

Yes ☐ No ☐

If **YES** did you eat any of the following types of sandwich?
*[**Prompt:** Sandwich includes rolls, baguettes, wraps etc. Custom made is non-prepacked sandwiches **made to order** in sandwich bars, pubs etc.]*

	Prepacked	Custom made	Buffet	No
Ham	☐	☐	☐	☐
Beef *[roast beef, corned beef, salt beef, pastrami etc]*	☐	☐	☐	☐
Bacon/BLT	☐	☐	☐	☐
Chicken	☐	☐	☐	☐
Turkey	☐	☐	☐	☐
Other meat *[salami, sausage etc]*	☐	☐	☐	☐
Tuna sandwich	☐	☐	☐	☐
Salmon sandwich *[includes smoked salmon]*	☐	☐	☐	☐
Prawn/other seafood *[crab, crayfish etc]*	☐	☐	☐	☐
Egg mayonnaise	☐	☐	☐	☐
Other egg	☐	☐	☐	☐
Cheese	☐	☐	☐	☐
Other	☐	☐	☐	☐

If Other please specify ……..

Did any of these sandwiches include any of the following extras?

	Yes	No		Yes	No
Mayonnaise	☐	☐	Cucumber	☐	☐
Lettuce	☐	☐	Onions	☐	☐
Tomato	☐	☐	Water cress	☐	☐
Spinach	☐	☐	Mustard cress	☐	☐

Bean sprouts	☐	☐	Other leaves	☐	☐
Herbs	☐	☐	If **YES**, please specify ……		

*[**Prompt**: coriander, basil,dill etc]*

Were the sandwiches bought/served from?

	Yes	No	Name/Brand/Branch/Location
Bakers shop	☐	☐	……
Sandwich bar	☐	☐	……
Supermarket	☐	☐	……
Mini market	☐	☐	……
Restaurant/hotel/pub	☐	☐	……
School/work canteen	☐	☐	……
Delivery service *[at work or hospital]*	☐	☐	……
Petrol/service station	☐	☐	……
Railway station	☐	☐	……
Airport/plane	☐	☐	……
Buffet *[cricket club, wedding reception]*	☐	☐	……
Other	☐	☐	……

If Other please specify ……

Did you eat any of the following foods away from home in the **7 DAYS** before you became ill?

	Yes	No	Where purchased/served
Hamburgers (beef)	☐	☐	……
Chicken burgers	☐	☐	……
Chicken nuggets etc	☐	☐	……
Veggie burgers	☐	☐	……
Fish burgers *[filet of fish etc.]*	☐	☐	……
Hot dogs	☐	☐	……
Meat kebabs	☐	☐	……
Chicken kebabs	☐	☐	……

Did any of these include any of the following extras?

	Yes	No		Yes	No
Mayonnaise	☐	☐	Lettuce	☐	☐

Ketchup	☐	☐	Tomato	☐	☐
Chilli sauce	☐	☐	Cucumber	☐	☐
Gherkins	☐	☐	Onions	☐	☐
Spinach	☐	☐	Other leaves	☐	☐

SAUCES, PICKLES & DIPS

Did you eat any sauces or dips containing yoghurt in the **7 DAYS** before you became ill?
*[**Prompt:** tzatziki, raita, salad dressing etc]*

Yes ☐ No ☐

If **YES,** please specify type (s) ……

Was it from a restaurant/hotel/take away Yes ☐ No ☐

If **YES** please specify [can be more than one]:……
*[**Prompt:** name and location of restaurant/take away]*

……

Did you eat any sauces or dips containing cream in the **7 DAYS** before you became ill?
*[**Prompt:** pasta sauces, cheese dips etc]*

Yes ☐ No ☐

If **YES,** please specify type (s) ……

Was it from a restaurant/hotel/take away Yes ☐ No ☐

If **YES** please specify [can be more than one]:……
*[**Prompt:** name and location of restaurant/take away]*

……

Did you eat any other sauces, pickles or dips in the **7 DAYS** before you became ill?
*[**Prompt:** including those in sandwiches, burgers and kebabs, eg salad dressings, pesto, tomato sauce, soy sauce, Thai fish sauce, piccalilly, Indian pickles, hummus, salsas etc]*

Yes ☐ No ☐

If **YES,** please specify type (s) ……
*[**Prompt:** salad dressing, guacamole, hummus, salsa etc and brand]*

……

Was it from a restaurant/hotel/take away Yes ☐ No ☐

If **YES** please specify [can be more than one]:……
*[**Prompt:** name and location of restaurant/take away]*

……

Was it a commercial brand Yes ☐ No ☐

If **YES,** please specify type and brand (s) [Can be more than one]:……
*[**Prompt:** eg Heinz tomato ketchup, HP sauce, Pataks mango pickle, Tescos hummus etc]*

……

Was it home made Yes ☐ No ☐

If **YES** please specify ……
*[**Prompt:** type of sauce or pickle eg barbecue sauce, lime pickle etc]*

Other Yes ☐ No ☐
*[**Prompt:** eg from a local market stall, church sale or friend]*

If **YES,** please specify type ……
*[**Prompt:** eg tomato chutney, piccalilly etc]*

SALAD VEGETABLES & HERBS

Did you eat any of the following raw vegetables in the **7 DAYS** before you became ill?

*[**Prompt:** don't forget salads that you've pureed or those in sandwiches, burgers, kebabs and as garnishes with Indian or Chinese meals etc includes lettuce, tomatoes, cucumbers, cress, bean shoots, beetroot, gerkins etc]*

	Eaten/prepared at home	Away from home	No	In bag	Loose
Mixed salad leaves	☐	☐	☐	☐	☐
Water cress	☐	☐	☐	☐	☐
Lettuce *[includes rocket, radiccio etc]*	☐	☐	☐	☐	☐
Tomatoes	☐	☐	☐	☐	☐
Spinach	☐	☐	☐	☐	☐
Baby Spinach	☐	☐	☐	☐	☐
Bean sprouts	☐	☐	☐	☐	☐
Other sprouted seeds *[Including alfalfa,pea shoots etc.]*	☐	☐	☐	☐	☐
Cabbage *[eg cole slaw]*	☐	☐	☐	☐	☐
Cucumber	☐	☐	☐	☐	☐
Peppers	☐	☐	☐	☐	☐
Onions (any)	☐	☐	☐	☐	☐
Mushrooms	☐	☐	☐	☐	☐
Cauliflower	☐	☐	☐	☐	☐
Basil	☐	☐	☐	☐	☐
Parsley	☐	☐	☐	☐	☐
Coriander leaves	☐	☐	☐	☐	☐
Dill	☐	☐	☐	☐	☐
Other *[**Prompt:** beetroot, mustard cress, chives etc]*	☐	☐	☐	☐	☐

If other please specify .....

Did you eat any of the following ready-made productss in the **7 DAYS** before you became ill?

	At home	Away from home	No	In bag	Loose
Pasta Salad	☐	☐	☐	☐	☐
Green Salad	☐	☐	☐	☐	☐
Chicken salad	☐	☐	☐	☐	☐
Potato salad	☐	☐	☐	☐	☐
Couscous	☐	☐	☐	☐	☐
Peppers	☐	☐	☐	☐	☐
Coleslaw	☐	☐	☐	☐	☐
Tzatziki	☐	☐	☐	☐	☐
Olives	☐	☐	☐	☐	☐
Sun dried tomatoes	☐	☐	☐	☐	☐
Sauerkraut	☐	☐	☐	☐	☐
Other	☐	☐	☐	☐	☐

If other please specify ……

If eaten at home were the products bought from? [Can be more than one]

	Yes	No	Name/Branch/Location
Supermarket	☐	☐	……
Corner shop/mini mkt	☐	☐	……
Delicatessen *[not in a supermarket]*	☐	☐	……
Green grocers	☐	☐	……
Chinese grocers	☐	☐	……
Indian grocers	☐	☐	……
Greek grocers	☐	☐	……
Other ethnic grocers *[eg African, Arabic etc]*	☐	☐	……
Market	☐	☐	……
Mobile shop	☐	☐	……
Home delivered boxes	☐	☐	……
Other	☐	☐	……

If other please specify ……

FRUIT

Did you eat any of the following fresh fruit in the **7 DAYS** before you became ill?

	At home	Away from home	No
Apples	☐	☐	☐
Bananas	☐	☐	☐
Grapes	☐	☐	☐
Oranges *[includes satsumas, tangerines etc]*	☐	☐	☐
Cranberries	☐	☐	☐
Blueberries	☐	☐	☐
Bilberries	☐	☐	☐
Strawberries	☐	☐	☐
Raspberrries	☐	☐	☐
Kiwi fruit	☐	☐	☐
Pomegranate	☐	☐	☐
Other	☐	☐	☐

If other please specify ……
*[**Prompt:** eg pineapples, pears, guava etc]*

Did you eat any of the following types of preserved fruit in the **7 DAYS** before you became ill?

	At home	Away from home	No
Raisins/sultanas	☐	☐	☐
Dates	☐	☐	☐
Figs	☐	☐	☐
Desiccated coconut	☐	☐	☐
Candied peel	☐	☐	☐
Glacé cherries	☐	☐	☐
Tinned fruit	☐	☐	☐

Specify ……
[brand and type eg peaches, pears etc]

Dried fruit	☐	☐	☐

Specify ……
[brand and type eg apricots, apples, fruit bars etc]

Jam and other preserves	☐	☐	☐

Specify ……
[brand and type eg raspberry jam, lime marmalade, cranberry jelly etc]

If eaten at home were the products bought from? [Can be more than one]

	Yes	No	Name/Branch/Location
Supermarket	☐	☐	……
Corner shop/mini mkt	☐	☐	……
Delicatessen *[not in a supermarket]*	☐	☐	……
Green grocers	☐	☐	……
Chinese grocers	☐	☐	……
Indian grocers	☐	☐	……
Greek grocers	☐	☐	……
Other ethnic grocers *[eg African, Arabic etc]*	☐	☐	……
Market	☐	☐	……
Mobile shop	☐	☐	……
Home delivered boxes	☐	☐	……
Other	☐	☐	……

If other please specify ……

SPICES AND SEEDS

Did you eat any foods prepared at home which contained any of the following spices in the **7 DAYS** before you became ill?

	Yes	No
Chilli powder	☐	☐
Cinnamon bark/powder	☐	☐
Coriander seeds/powder	☐	☐
Cumin seeds/powder	☐	☐
Curry powder	☐	☐
Chinese five spice	☐	☐
Ginger root/powder	☐	☐
Nutmeg	☐	☐
Paprika	☐	☐
Pepper	☐	☐
Saffron	☐	☐
Turmeric	☐	☐
Other	☐	☐

Please specify ……
*[**Prompt:** cardamom, star anise, poppy seeds, nigella etc]*

If **YES** to any of the above were the products bought from? [Can be more than one]

	Yes	No	Name/Branch/Location
Supermarket	☐	☐	……
Corner shop/mini mkt	☐	☐	……
Delicatessen *[not in a supermarket]*	☐	☐	……
Green grocers	☐	☐	……
Ethnic grocers	☐	☐	……
Market	☐	☐	……
Mobile shop	☐	☐	……
Other	☐	☐	……

If other please specify ……

Did you eat any foods which contained sesame seeds in the **7 DAYS** before you became ill?

*[**Prompt:** bread, halva, tahini, houmous]*
Yes ☐ No ☐

If yes, please specify ……

Did you eat any foods which contained any other seeds in the **7 DAYS** before you became ill?

Yes ☐ No ☐

If yes, please specify ……
*[**Prompt:** pumpkin, sunflower, poppy seed]*

SNACKFOODS

Did you eat any **snackfoods** in the **7 DAYS** before you became ill?
*[**Prompt:** cereal bars, crisps, tortilla chips, bombay mix, etc]*

Yes ☐ No ☐

If **YES,** please specify type and brand. [**Prompt:** crisps including flavour, tortilla chips, bombay mix, seedmixes, etc]

……

Were they bought from?

	Yes	No	Name/Branch/Location
Supermarket	☐	☐	……
Delicatessen	☐	☐	……
Corner shop/mini mkt	☐	☐	……
Market	☐	☐	……
Mobile shop	☐	☐	……

Restaurant/take away	☐	☐	……
Other	☐	☐	……

VEGETARIAN FOODS

Did you eat any of the following vegetarian foods in the **7 DAYS** before you became ill?

	At home	Away from home	No
Tofu/tofu products	☐	☐	☐
Bean curd/bean curd products	☐	☐	☐
Quorn/quorn product	☐	☐	☐
Veggie burgers/sausages	☐	☐	☐
Paneer	☐	☐	☐
Soya based products	☐	☐	☐
Other bean based products	☐	☐	☐
Other	☐	☐	☐

If other please specify ……

If **YES** to having any of the above at home were the products bought from? [Can be more than one]

	Yes	No	Name/Branch/Location
Supermarket	☐	☐	……
Corner shop/mini mkt	☐	☐	……
Health food shops	☐	☐	……
Delicatessen *[not in a supermarket]*	☐	☐	……
Green grocers	☐	☐	……
Chinese grocers	☐	☐	……
Indian grocers	☐	☐	……
Greek grocers	☐	☐	……
Other ethnic grocers *[eg Polish, African, etc]*	☐	☐	……
Market	☐	☐	……
Mobile shop	☐	☐	……
Other	☐	☐	……

If other please specify ……
*[**Prompt:** eg brought back from holiday, mail order etc]*

DRINKS

Did you have any of the following drinks in the **7 DAYS** before you became ill?

	At home	Carton/Bottle	Away from home	No
Orange juice	☐	☐	☐	☐
Apple juice	☐	☐	☐	☐
Pineapple juice	☐	☐	☐	☐
Grapefruit juice	☐	☐	☐	☐
Fruit smoothie	☐	☐	☐	☐
Yoghurt based (inc. lassi)	☐	☐	☐	☐
High protein milk shakes	☐	☐	☐	☐
Slimmers milk shakes	☐	☐	☐	☐
Other milk shakes	☐	☐	☐	☐
Other high protein drinks	☐	☐	☐	☐
Herbal infusions	☐	☐	☐	☐

If **YES** please specify
……
*[**Prompt:** camomile; mint etc]*

Iced tea	☐	☐	☐	☐
Chilled coffee	☐	☐	☐	☐
Coffee (inc. cappuccino, latte etc)	☐	☐	☐	☐
Still mineral water	☐	☐	☐	☐
Sparkling mineral water	☐	☐	☐	☐

If **YES** to having any of the above at home were the products bought from?
[Can be more than one]

	Yes	No	Name/Brand/Branch/Location
Supermarket	☐	☐	……
Corner shop/mini mkt	☐	☐	……
Health food shops	☐	☐	……
Delicatessen *[not in a supermarket]*	☐	☐	……
Green grocers	☐	☐	……
Ethnic grocers *[eg Indian, Chinese, Polish, African, etc]*	☐	☐	……
Market	☐	☐	……
Mobile shop	☐	☐	……

Other ☐ ☐ ……

If other please specify ……

CHOCOLATE

Did you eat any bagged chocolate in the **7 DAYS** before you became ill (eg Smarties, Maltesers, Mini Eggs, poppets)?

Yes ☐ No ☐

If yes, please specify type, brand and place of purchase:…….

Did you eat any wrapped chocolate or chocolate bars in the **7 DAYS** before you became ill (Kit Kat, Milky way, Bounty, Twix, Snickers)?

Yes ☐ No ☐

If yes, please specify type, brand and place of purchase:…….

Did you eat any boxed/ tinned chocolate in the **7 DAYS** before you became ill (gift box type e.g Milky Tray, Black Magic, Roses, Quality Street, Celebrations)?

Yes ☐ No ☐

If yes, please specify type, brand and place of purchase:…….

Did you eat any chocolate coated nuts products in the **7 DAYS** before you became ill?

Yes ☐ No ☐

If yes, please specify type, brand and place of purchase:…….

How was the product packed?

In a box (eg gift box) Yes ☐ No ☐

In a bag Yes ☐ No ☐

What type of chocolate were the nuts covered with?

Dark chocolate Yes ☐ No ☐

Milk chocolate Yes ☐ No ☐

White chocolate Yes ☐ No ☐

Did you eat **any other kind of chocolate** in the **7 DAYS** before you became ill?

Yes ☐ No ☐

If yes, please specify type, brand and place of purchase:…….

NUTS AND SEEDS

Did you eat any products with the following **nuts** in the **7 DAYS** before you became ill?

		Yes	No	Product/ purchased from
Peanut		☐	☐	……
Cashew	☐	☐	……	
Brazil	☐	☐	……	
Walnuts		☐	☐	……
Pine nuts		☐	☐	……
Sesame		☐	☐	……
Pistachios		☐	☐	……
Hazel nuts		☐	☐	……
Other nuts		☐	☐	……
Mixed nuts		☐	☐	……
Other seeds		☐	☐	……

Did you eat any boiled sweets in the **7 DAYS** before you became ill (ie sweets that you can suck on e.g mint humbug, Polo mints , pear drops)?

Yes ☐ No ☐

If **YES**, please specify type, brand and place of purchase:……

ICE CREAM ETC

Did you eat any ice cream, ice lollies or slushies away from home in the **7 DAYS** before you became ill?

Yes ☐ No ☐ If **YES**, please specify type, brand and place of purchase:

……

Did you eat any of the following at home in the **7 DAYS** before you became ill?

		Yes	No	Brand/flavour/purchased from
Ice cream	☐	☐	……	
Ice lollies	☐	☐	……	
Sorbets		☐	☐	……
Frozen yoghurt		☐	☐	……
Frozen desserts		☐	☐	……
Ice cream mixes		☐	☐	……

MISCELLANEOUS

Did you eat any of the following in the **7 DAYS** before you became ill?

Breakfast cereal Yes ☐ No ☐

If **YES,** please specify type and brand (s) ……

Margarines and spreads Yes ☐ No ☐

If **YES,** please specify type and brand (s) ……

Bread/rolls etc Yes ☐ No ☐

If **YES,** please specify type and brand (s) ……

Crispbreads and crackers Yes ☐ No ☐

If **YES,** please specify type and brand (s) ……

Peanut butter Yes ☐ No ☐

If **YES,** please specify type and brand (s) ……

Chocolate spreads [eg Nutella] Yes ☐ No ☐

If **YES,** please specify type and brand (s) ……

Uncooked cookie dough Yes ☐ No ☐

If **YES,** please specify type and brand (s) ……

SKINCARE ETC

Did you use any lip balm in the **7 DAYS** before you became ill?

Yes ☐ No ☐

If yes, please specify type, brand and place of purchase:……

Did you use any lipstick in the **7 DAYS** before you became ill?

Yes ☐ No ☐

If yes, please specify type, brand and place of purchase:……

Did you use any moisturising creme in the **7 DAYS** before you became ill?

Yes ☐ No ☐

If yes, please specify type, brand and place of purchase:……

Did you use any other skincare products in the **7 DAYS** before you became ill?

Yes ☐ No ☐

If yes, please specify type, brand and place of purchase:……

SHOPS

Have you bought any food from the following **shops** in the **2 WEEKS** before you became ill?

*[**Prompt:** bread, chicken; meat; milk; vegetables, processed foods etc]*

	Yes	No	Name/Branch/location
Aldi	☐	☐	……
Asda	☐	☐	……
Budgens	☐	☐	……
Co-op	☐	☐	……
Iceland	☐	☐	……
Lidl	☐	☐	……
Marks & Spencer	☐	☐	……
Morrisons	☐	☐	……
Netto	☐	☐	……
Sainsbury	☐	☐	……
Somerfield	☐	☐	……
Spar	☐	☐	……
Tesco	☐	☐	……
Waitrose	☐	☐	……
Local butchers	☐	☐	……
Local bakers	☐	☐	……
Local green grocers	☐	☐	……
Local fish monger	☐	☐	……
Corner shop/mini mkt	☐	☐	……
Chinese grocers	☐	☐	……
Indian grocers	☐	☐	……
Greek grocers	☐	☐	……
Other ethnic grocers *[eg African, etc]*	☐	☐	……
Markets	☐	☐	……
Farmers markets	☐	☐	……
Internet suppliers	☐	☐	……
Other(s)	☐	☐	……

*[**Prompt:** stalls at fairs, by the roadside etc]*

In the **7 DAYS** before you became ill did you eat any food that was **bought abroad?**

*[**Prompt:** bought by yourself or given to you as a gift]*

Yes ☐ No ☐

If **YES,** please specify type of food and country of purchase *[Prompt: eg camembert cheese from France etc]*

……

……

HOBBIES/PASTIMES

Do you have any hobbies or pastimes?

*[**Prompt:** gardening, swimming, hiking, football, stamp collecting etc]*

Yes ☐ No ☐

If **YES,** please specify

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……

Did you handle any potted plants in the **7 DAYS** before you became ill?

Yes ☐ No ☐

If yes give details [type of plant and where bought if known]

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……

Did you handle any cut flowers in the **7 DAYS** before you became ill?

Yes ☐ No ☐

If yes give details [type of flowers and where bought if known]

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……

In the **7 DAYS** before you became ill did you carry or handle any manure or compost?

Yes ☐ No ☐

If **YES,** please specify

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……

Is there anything else that you think it is important for us to know?

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THANK YOU FOR YOUR CO-OPERATION

Would it be all right for us to contact you again for additional information? Yes ☐ No ☐
If you have any specific questions about this investigation either now or in the future please call or write to:

Dr G K Adak
Health Protection Agency
61 Colindale Avenue
London NW9 5EQ
Tel: 0208 327 7551

GENERAL NOTES – INTERVIEWER'S OBSERVATIONS ON THE HOUSEHOLD AND LOCATION

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Appendix II (Interviewer script)

Instructions for interviewers

Background

This trawling exercise is part of a national outbreak investigation into microbiologically linked cases of *E. coli* O157 infection that might be associated with foods or items distributed across wide areas of the country. In order to guarantee that the data collected are of consistently high quality it is essential that all of the interviewers recruited to the study work to a uniform standard.

Case identification

Cases will have been identified for you.

Do not attempt an interview if any of the following occur:

- The telephone number provided is for a workplace or fax
- There are no adults (18 years or older) available to speak to
- There is no English speaking adult available to speak to
- A connection is made to an answer phone (please do not leave a message)

If a child answers, ask if an adult is available to speak to you.

Completing Questionnaires

Make sure that you have read the questionnaire carefully before you start interviewing subjects.

Withhold your telephone number when making calls from either home or from the office. To hide your phone number when calling someone, put the numbers **141** before the phone number. To hide a mobile number, as above, although note that if your phone is set to hide the number anyway, this will actually reverse the procedure (show your number). To change this, go into your phone's 'call settings' and find an option labelled 'show' or 'hide' number or similar. Questionnaires take about one hour to administer. They should be filled in online using the link: https://surveys.phe.org.uk/TakeSurvey.aspx?SurveyID=985I6p41 or by printing it out if you

prefer to complete by hand and then enter the data onto the online survey after the interview is complete.
It is useful to have a diary or calendar in front of you so that you can keep the dates straight in your own mind and to remind the interviewee at intervals through the interview.

Introducing yourself to subjects

A script has been provided in the Appendix. It is not necessary to read out these scripts word for word, however you should familiarise yourselves with the basic themes and try to put them into your own words in a way that feels comfortable to you. The points that you must explain are as follows:

- who you are
- that you represent Public Health England
- how and why the agency has access to their medical details
- all information will be kept in **STRICT MEDICAL CONFIDENCE** and will not be passed on to anybody outside the investigation team
- how long the interview will take and if necessary that you will phone back at a time that is more convenient for them

Exposures

For interviews most of the questions relate, on the whole, to exposures in the **7 WHOLE DAYS** before the onset of their symptoms, not including the day of onset.

It is **essential** that all questions are asked (except for those that are supposed to be skipped) and that all responses are recorded. The answer **NO** is as important as the answer **YES** and should always be recorded. If a subject is not certain of the answer to the question then **NO** box should be ticked.

Ending the interview

At the end of the interview thank the interviewee. After the interview carefully check that you have filled in all the appropriate boxes. If an interviewee has remembered something at the end of the interview that requires responses to be amended make the necessary changes immediately after the interview has been completed.

Specific questions

When did you start to feel unwell?

Abdominal pain or nausea might precede diarrhoea, therefore the date you record should be when the patient first noticed any signs of gastrointestinal illness.

Food eaten in the home

For the questions which ask about food exposures, “At home” should be ticked if food was prepared at home but eaten away from the home.

Did you handle any of the following raw foods in your kitchen in the **7 DAYS** before you became ill?

This question should be asked even if the interviewee has not consumed the named foods in the reference period as cross-contamination may have occurred.

Would you mind if we called you back at some point in the near future for a little additional information should the need arise?

It is important to record a response to this question. New information from microbiological investigations, trace back enquiries or from other sources might reveal additional leads that might need to be pursued. While it is unusual for this to happen the possibility remains. If we do need to get back to people it will be with short focussed questions that should take only a few minutes to go through.

Appendix

E.coli O157 - Outbreak Investigation

Interviewer Script – **Cases**

Good morning/afternoon/evening.

- My name is _____ I work for Public Health England. We are the part of the National Health Service (NHS) that investigates outbreaks.

- I'm phoning about your recent infection with *E.coli*. Our laboratories have done additional tests on the *E.coli* and we believe that you/your child are part of an outbreak of this type of *E.coli* that we are seeing across England

- We are currently investigating this to find out what is causing it so that measures can be taken to prevent more people from becoming ill.

- We are in the process of interviewing everyone that has recently had this type of *E.coli* infection, and hoped that you would be able to spare fifteen minutes or so to answer some questions.

- We would like to ask you some questions about your illness and what you did in the week before you became ill.

- Is that okay? **or** Would you agree to help us in this investigation?

- Already interviewed?
  - I am aware that you have already been interviewed, however as your disease was caused by an unusual strain of *E.coli* we will need to get some additional information in order to work out how the infection is spread.

  Confidentiality
  - All the information that you would give us, should you agree to do so, will be kept in strict medical confidence and will only seen by our investigation team.

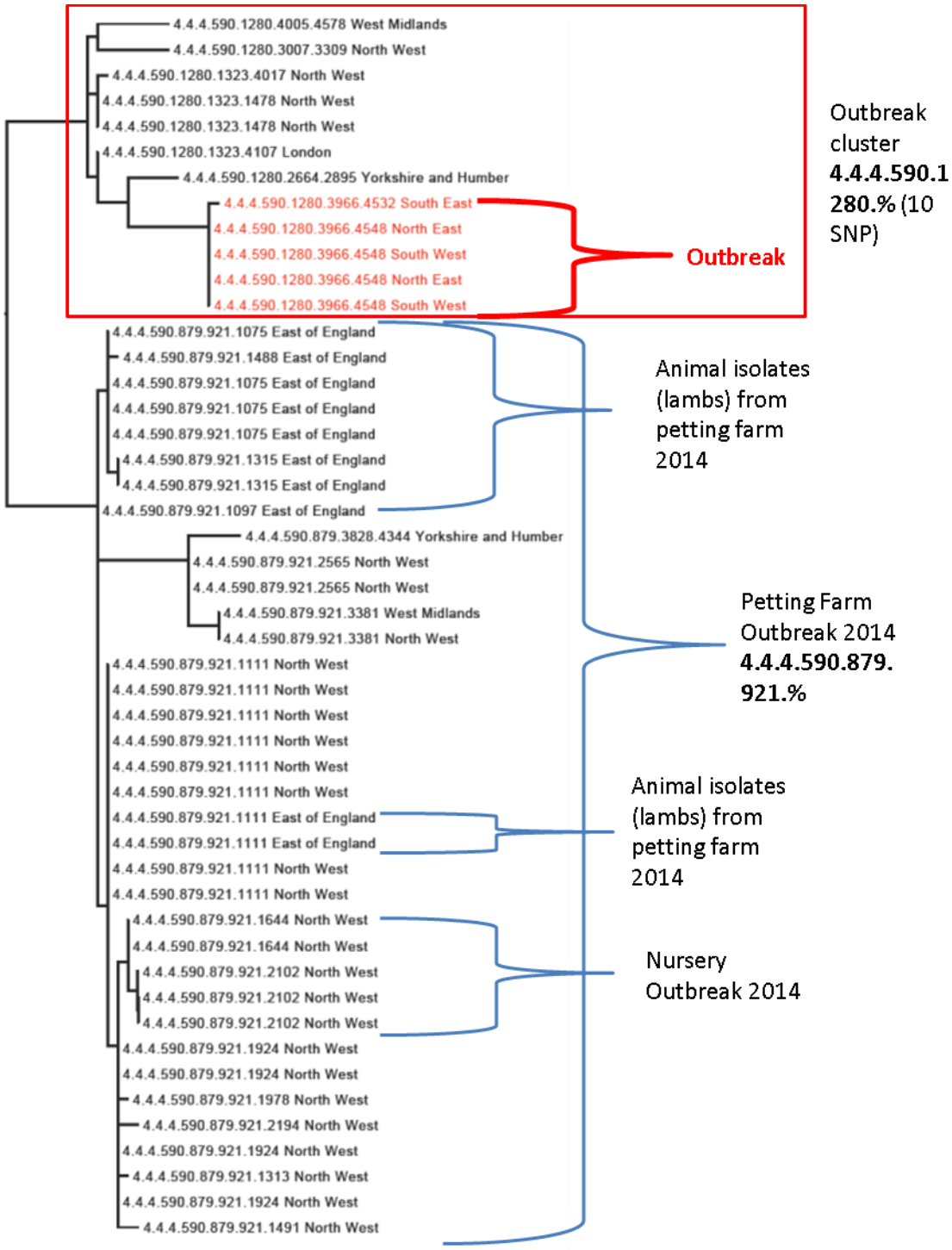
  Interview length
  - Each interview takes about one hour so if you haven't got the time to spare at the moment I can call you back at a time which is more convenient for you.

Appendix III. Phylogenetic analysis of the STEC outbreak strain

All the sequences of the isolates in the PHE archive within a 25 SNP linkage cluster of the outbreak strain were included in the analysis (57 isolates). Looking at the topology of the tree, it is possible to zoom in on the part of the tree where the outbreak strain is located (Figure 3). The SNP distances between the confirmed outbreak isolates (in red) are <2 SNPs. This presents strong genetic evidence that the cases have been exposed to contaminated food or animals (or their environment) from the same source.

Zooming out it can be seen that the tree in the figure splits into 2 sub-clusters. All of the isolates in the sub-cluster at the top (including the outbreak cluster), fall within a 10 SNP single linkage cluster of each other. Isolates within a 10-SNP cluster may not be directly linked; however clusters at this level may be characterised by persistent environmental contamination, or distribution of a food contaminated by the same original source, over an extended period of time (slow burn outbreak). The sub-cluster at the bottom comprises 2 outbreaks and 4 sporadic cases - all phylogenetically closely related with a 5 SNP single linkage cluster of each other. The first was a petting farm outbreak in 2014 in the NW associated with contact with lambs.(27) The second outbreak was an outbreak in a nursery school in the NW in 2014. The bottom sub-cluster is >30 SNPS away from the current outbreak.

Figure 3: Phylogenetic tree showing the STEC O157 PT21/28 cluster at the 25 SNP level



Appendix IV. Exposures to handling and/or consuming food reported by 2 or more confirmed cases as recorded on the standardised enhanced surveillance questionnaire

Exposure	No. cases	Notes
Cooked poultry	4	Chicken breasts (n=2), general chicken (n=1) and chicken nuggets ate home. Purchased from Retailer A (n=2); Retailer B (n=1); Retailer C (n=1) and Retailer D (n=2)
Raw vegetables	4	Carrots (n=4); Potatoes (n=2); Peas (n=3); Cabbage (n=1); Cauliflower(n=1); Stri-fry veg (n=1). Purchased from Retailer A (n=2); Retailer B (n=1); Retailer E (n=1); Retailer D (n=3)
Fish	3	Unspecified (n=1); Fish fingers (n=1) ; tinned tuna (n=1)
Salad items	3	Tomatoes (n=3); Cucumber (n=2); Lettuce (n=1). Purchased from Retailer A (n=2) and Retailer D (n=2)
Sandwiches	3	Ham & cheEse from Bakery A (n=2); Cheese sandwiches at school (n=1)
Ate Out	2	School meals (n=1); Pizza, Kebab shop & Bakery A (n=1)
Raw beef	2	Steak and a beef joint; Mince
Raw poultry	2	Chicken breast (n=2); Chicken whole (n=1)- Purchased from Retailer D and Retailer A.
Raw pork	2	Pork chops (n=2); Retailer A and Retailer D
Cooked beef	2	Steak at home from Retailer A (N=1); Mince in home-cooked lasagne.
Cooked pork	2	Pork chops (n=2); Retailer A and Retailer D
Processed meats	2	Ham (n=1); Mince pies at school (n=1)
Pasteurised milk	2	Low-fat milk (n=1); Goats milk(n=1)
Hard cheese	2	Cheddar (n=2), one from Retailer D,, one unspecified.
Ice Cream	2	Ice lollies (n=1); Dairy free ice cream (n=1)
PrePacked Salad	2	Possible (n=2)
Pet & animal feed*	2	Raw tripe (n=1); Chicken grain (n=1)
Soft Fruit/Berries	2	Strawberries (n=2), Retailer D (n=2) and Retailer A (n=1)
Raw Fruit	2	Bananas; Retailer D (n=2) and Retailer A (n=1)
Shops at Retailer D	2	