

# Nordic Workshop, case-control study for sporadic EHEC (VTEC) cases in the Nordic countries

Report from a workshop in Stockholm, Swedish Institute for Infectious Disease Control (SMI), 20 April 1999



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**The Nordic Food Policy Co-operation**

The Nordic Committee of Senior Officials for Food Issues is concerned with basic Food Policy issues relating to food and nutrition, food toxicology and food microbiology, risk evaluation, food control and food legislation. The co-operation aims at protection of the health of the consumer, common utilisation of professional and administrative resources and at Nordic and international developments in this field.

**The Nordic Council of Ministers**

was established in 1971. It submits proposals on co-operation between the governments of the five Nordic countries to the Nordic Council, implements the Council's recommendations and reports on results, while directing the work carried out in the targeted areas. The Prime Ministers of the five Nordic countries assume overall responsibility for the co-operation measures, which are co-ordinated by the ministers for co-operation and the Nordic Co-operation committee. The composition of the Council of Ministers varies, depending on the nature of the issue to be treated.

**The Nordic Council**

was formed in 1952 to promote co-operation between the parliaments and governments of Denmark, Iceland, Norway and Sweden. Finland joined in 1955. At the sessions held by the Council, representatives from the Faroe Islands and Greenland form part of the Danish delegation, while Åland is represented on the Finnish delegation. The Council consists of 87 elected members - all of whom are members of parliament. The Nordic Council takes initiatives, acts in a consultative capacity and monitors co-operation measures. The Council operates via its institutions: the Plenary Assembly, the Presidium and standing committees.

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# Preface

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This microorganism has different names in different parts of the world. In Sweden, normally the name Enterohaemorrhagic *E. coli* (EHEC) is used, verotoxin-producing *E. coli* (VTEC) is commonly used in the other Nordic countries and also by the veterinarians in Sweden. In the USA shiga-like toxin-producing *E. coli* (STEC) is used. These differing names may sound confusing as in practice they refer to the same pathogen. In the different presentations, the term is used as it was in the presentation.

EHEC-infection is a disease with symptoms ranging from mild diarrhoea and non-bloody diarrhoeas to haemolytic-uremic syndrome (HUS) and thrombocytopenic purpura. Children aged less than 5 years are especially susceptible to a severe attack of the disease and also more commonly develop HUS. EHEC is a relatively recently discovered disease; the first known outbreak was reported in 1982 in USA. Since then, outbreaks have been reported globally. Outbreaks of greater interest took place in the USA in 1993 with 700 cases and 4 deaths, in Scotland in 1996 with 500 cases and 19 deaths, and lastly the largest EHEC outbreak ever reported –in Japan in 1996, with more than 9,000 cases.

EHEC O157 first increased in Sweden and still has the highest incidence among the Nordic countries. The attention focused on the first Swedish EHEC O157 outbreaks, in the autumn of 1995, also increased the awareness in the other Nordic countries that they might soon face the same situation. Other Nordic countries closely followed the development of the Swedish EHEC situation. From having at least two food borne outbreaks during the autumn and winter of 1995-1996 the situation changed in Sweden to a high incidence of sporadic cases each year, particularly on the west coast. A small number of cases or smaller outbreaks were suspected to be food borne. In Sweden, animal or environmental contacts appear to have involved a greater risk of contracting EHEC than food. Also Finland reported an increase of EHEC cases during the same time period.

In June 1998, a Swedish workshop was held in on EHEC which was attended by representatives from the other Nordic countries. Two speakers from Scotland gave lectures concerning the situation in Scotland among humans and cattle and gave details of a recent, large, food borne outbreak. The following day, an informal meeting of representatives of the Nordic countries was held in Stockholm, to discuss the increased number of EHEC cases in some Nordic countries and how we could get the most out of our co-operation. We also discussed the topic of missing information and how this situation could be improved. It was decided to apply for grants from the Nordic Council of Ministers to organize a Nordic meeting to discuss the possibilities of a case-control study for sporadic EHEC cases in the Nordic countries. The aims of the intended meeting were to discuss the layout of the project, the objectives and the study protocol. A case-control study can identify the most important risk factors and is of great value when conducting an acute outbreak investigation. It may also be very useful in dealing with the investigation of sporadic cases of disease to establish the risk factors and their significance, which will create a basis for a specific control strategy.

Two VTEC workshops were held in Denmark in 1995 and 1999, both founded by grants from the Nordic Council of Ministers. These workshops focused on the source of infection and typing procedures. At the workshop in 1995, no Nordic country had experience of any EHEC outbreak or an increased number of EHEC-cases. To be able to start Nordic co-operation in case-control studies, a workshop was organised by Yvonne Andersson of the Swedish Institute for Infectious Disease Control, Sweden, Georg Kapperud of the National Institute of Public Health, Norway, Jakob Neiman of the Danish Zoonosis Centre, Denmark, Petri Ruutu of the National Public Health Institute, Finland, and Kåre Mølback of the National Serum Institute, Denmark.

The Nordic Council of Senior Officials for Food Issues, under the Nordic Council of Ministers, granted funds.

Listed below are the participants from the Nordic countries who presented papers and/or took part in the discussions. In addition Dr. Bob Adak of the Public Health Laboratory Service (PHLS), London, was invited to attend and present a lecture.

### **Denmark**

Kåre Mølbak, Statens Serum Institut

Jakob Neimann, Danish Zoonosis Centre

### **Finland**

Petri Ruutu, National Public Health Institute

Elina Tast Lathi, Forskningsanstalten för veterinärmedicin och livsmedel (EELA)

### **Iceland**

Asmundur Thorkelsson, Environmental and Food Agency

### **Norway**

Viggo Hasseltvedt, National Institute of Public Health

Georg Kapperud, National Institute of Public Health

### **Sweden**

Yvonne Andersson, Swedish Institute for Infectious Disease Control

Birgitta de Jong, Swedish Institute for Infectious Disease Control

Johan Giesecke, Swedish Institute for Infectious Disease Control

Hannelore Götz, Swedish Institute for Infectious Disease Control



# Summary

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The presentations and discussions at the meeting are summarised below as a number of conclusions and recommendations.

Consensus was reached that VTEC should be used instead of EHEC. Better descriptive epidemiology is needed in food borne and water borne outbreaks.

Further work should be done to discover whether a joint case-control study can be carried out in the Nordic countries.

A questionnaire should be developed on the basis of the English and Swedish questionnaires.

A study protocol common to all Nordic countries must also be prepared.

Several of the questions concerning the design of a questionnaire were discussed and also the need for further penetration to obtain consensus.

There was no consensus as to whether the case-control study should be conducted as a telephone interview or with a postal questionnaire.

The study should involve only VTEC O157.



# Sammanfattning

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Presentationer och diskussioner under mötet är sammanfattat som ett antal konklusioner och rekommendationer.

Gruppen var enig om att begreppet VTEC skulle användas i stället för EHEC.

Bättre deskriptivepidemiologi behövs vid vatten och livsmedelsburna utbrott.

Det behöver utredas ytterligare om det är möjligt att göra en gemensam fall-kontrollstudie i de nordiska länderna.

Ett frågeformulär baserat på de engelska och svenska formulären bör utformas. Även ett studieprotokoll som kan användas i alla de Nordiska länderna behöver utformas.

Många frågor om design av frågeformulär diskuterades och även ytterligare diskussioner för att hitta en gemensam ståndpunkt.

Det fanns ingen enighet om fall-kontroll studien skulle genomföras som telefonintervju eller med postal enkät.

Det beslöts att studien bara skulle omfatta VTEC O157.



# The objectives of the project

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The objectives of this project were as follows:

- To exchange experience about the EHEC situation in the Nordic countries.
- To learn from other countries about EHEC case-control studies, in order not to repeat any badly constructed questions.
- To discuss the methodology in case-control studies of sporadic cases.
- To establish a Nordic model of action in EHEC outbreaks or in increased numbers of cases.
- To encourage co-operation between the Nordic countries in conducting case-control studies.
- To discuss how to proceed with the co-operation between the Nordic countries concerning EHEC case-control studies and outbreaks.

## **Program at the workshop**

The Nordic Workshop concerned with case-control studies of sporadic EHEC cases in the Nordic countries was held on 20 April 1999 at **Smittskyddsinstitutet, Solna, Sweden.**

10.00-10.15	Introduction	Johan Giesecke, Swedish Institute for Infectious Disease Control, Sweden
10.15-11.15	Case-control study in England	Bob Adak, Communicable Disease Surveillance Centre (PHLS), United Kingdom
11.25-12.00	Discussion on the English EHEC study	Petri Ruutu, National Public Health Institute, Finland
12.00-13.00	LUNCH	
13.00-14.00	Study design	Georg Kapperud, National Institute of Public Health, Norway
14.15-16.15	Design of questionnaire	Kåre Mølbak, National Serum Institute, Denmark
16.15-17.00	Discussion	Yvonne Andersson, Swedish Institute for Infectious Disease Control, Sweden



# Introduction

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Most *E. coli* bacteria that are found in the human intestine are harmless to their hosts, but Enterohaemorrhagic *E. coli* (EHEC) produces toxins and can cause severe disease in man. EHEC is responsible for a range of illnesses, which may be severe, and in rare cases fatal, particularly in infants, young children and the elderly. The EHEC strains can be divided into several O serogroups; the most important one associated with human disease is serogroup O157.

EHEC O157 can cause a wide range of symptoms, from mild diarrhoea to bloody diarrhoea (haemorrhagic colitis) and haemolytic uraemic syndrome (HUS). Haemorrhagic colitis is characterised by bloody diarrhoea, often with severe abdominal cramps but normally without fever. HUS is characterised by acute renal failure, haemolytic anaemia and thrombocytopenia (lowered platelets). It usually occurs in young children and is the major cause of acute renal failure in children in some countries. HUS develops in up to 10% of patients infected with EHEC O157. Some patients, usually adults, with EHEC O157 infection develop thrombotic thrombocytopenic purpura (TTP) in which the clinical features of HUS are seen together with neurological complications.

The incubation period for EHEC O157 infections can be from 2 to 8 days with a median of 3 to 4 days. Symptoms usually resolve within two weeks, except in cases of HUS or TTP. The duration of excretion of the bacteria is usually up to a week but has been observed for much longer periods, particularly in children. Asymptomatic carriage of EHEC O157 VTEC has also been reported. The fatality rate of O157 VTEC infections is extremely variable and depends on the age-groups of those affected. Fatality rates ranging from 1 to 5% have been reported but may be much higher in some institutional outbreaks.

In the Nordic countries, the laboratory diagnosis of EHEC started in the 1980's and 1990's. Very few cases were reported during the first years. At that time, it was optional for laboratories to report human cases of EHEC. Since the 1st of January 1996, enterohaemorrhagic *E. coli* O157 has been a notifiable disease in Sweden under the Communicable Disease Act. The reports from the laboratories became compulsorily notifiable at the same time. Reporting of other serotypes than enterohaemorrhagic *E. coli* O157 is still optional from the laboratories in Sweden. In Sweden, findings of enterohaemorrhagic *E. coli* O157 in animals has been compulsorily notifiable since October 1996, defined as *E. coli* of serotype O157, VT+, eaeA+. Enterohaemorrhagic *E. coli* O157 in food is not compulsorily notifiable in Sweden. In Denmark, HUS is also a notifiable syndrome.

In 1995, Sweden was the first Nordic country to detect an increase of *E. coli* O157 cases. Sweden has also reported some outbreaks and a higher incidence of sporadic cases. The Swedish situation is consequently described further.

Between 1988 and the autumn of 1995, only a few human cases of EHEC were reported. From the first week of October 1995 onwards, several cases appeared each week, and it was stated that an EHEC outbreak had started, the first one in a Nordic country. During the autumn of 1995 and the first few weeks of 1996, 99 confirmed cases were

reported, of which 24 cases developed haemolytic uraemic syndrome (HUS). The epidemiological investigation and later also further typing showed that there were at least two different outbreaks and also some sporadic cases. No source of infection was incriminated in these outbreaks. After this epidemiological situation in 1995-1996, the way of investigating suspected cases changed. Most patients with bloody diarrhoea, and in addition, small children with bloodless diarrhoea were sampled for EHEC. These changes in the sampling of suspected cases probably contributed to the increase of reported cases from 1996 onwards. The cases are spread throughout the year, with an increase in the summer and autumn.

It appears that food-borne transmission is not always the cause either in sporadic cases or in outbreaks. Person-to-person spread is sometimes seen as the cause of an outbreak, but different types of spread from ruminants to humans seems to play a greater part in the transmission than was earlier expected. Environmental spread from bathing water and having picnics on grazing land has also been incriminated. That was quite different from what was reported, particularly from the USA, where most outbreaks during that time seem to have emanated from red meat.

In Sweden, the different prevalence studies have shown that nearly 1% of the cattle are carriers of VTEC *E. coli* O157. Among milk cattle, about 10% at herd level were found to be positive for VTEC in a prevalence survey.



# Summary of presentations

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## Case control study in England, VTEC O157

**Bob Adak, Communicable Disease Surveillance Centre, United Kingdom**

### Introduction

The Public Health Laboratory Service Concerted Programme for the Surveillance of *Escherichia coli* O157 infections consist of six different elements:

- Laboratory surveillance by local hospitals and laboratories
- Outbreak surveillance by local public health authorities and physicians
- Case-control studies
- Childhood HUS surveillance
- European surveillance (ENTER-NET)
- Cost and consequences studies

All the reports from these bodies are compiled by the Public Health Laboratory Service at the Communicable Disease Surveillance Centre in London. This Centre is also responsible for database management and reference microbiology.

VTEC has since the 1980's increased each year in the United Kingdom. The highest incidence is in the north (Scotland), but the number of VTEC cases is also increasing in the northern part of England. Not all outbreaks are food-borne, and that is a difference from the Salmonella outbreaks. More common sources in VTEC infection are person-to-person spread, animal or environmental contacts. A national case-control study of VTEC O157 was initiated in England. The aim of the study was to identify and estimate the relative importance of risk factors for the acquisition of infections with VTEC O157.

### Working hypothesis

Infections from meat and milk and even contamination at the farm, from pet dogs, animal contacts and manure can be a risk factor for VTEC infection. Transmission from person to person can also be a risk factor. .

### Aims and objectives

The aim of the study was to identify and estimate the relative importance of risk factors for the acquisition of infection with VTEC O157.

The objectives were as follows:

- To identify the risk factors associated with VTEC O157 infection.

- To identify the factors, which make implicated vehicles more likely to cause infection, e.g. the consumption of raw beef dishes or undercooked meat.
- To estimate the proportion of cases of diarrhoeal illness attributed to VTEC O157 infection.
- To estimate secondary attack rates in the households of laboratory-confirmed cases.

## Methods

A case-control study was conducted. The case definition was any case with abdominal pain or diarrhoea in which VTEC O157 had been isolated from stool culture. It was an unmatched, case-control study with three controls to each case, within the same age span, nominated by the GP in the case. Persons who had been abroad or were co-infected with other gastrointestinal pathogens were excluded. The questionnaire was designed with the following groups: personal details, symptoms, household details, recent travel history, occupational details, food history, water consumption and contact with animals. To save time, the questionnaire was sent out as soon as the case was reported without waiting for the serotype. Cases with non-O157 were later excluded from the study.

## Discussion and methodology in the English VTEC study

The questionnaire was discussed with the experience that Bob Adak had acquired during the study and also afterwards in analysing the study. Some comments from Bob Adak were as follows:

- **Postcode** of the case to be obtained in order to be able to use Geographical Information System (GIS-mapping) () to obtain information as to whether the case lived in an agricultural or an urban area and to see if there was any clustering of cases in a particular area.
- **Occupation** to be given to find out if any case was associated with risk in the occupation (farmer, butcher etc). In this study, all known cases connected with other cases were excluded so as not to compromise the validity of a future outbreak investigation.
- If there was a **double infection** with VTEC and some other pathogen, the case was excluded because it was then impossible to tell which disease was responsible for the symptoms and the day of onset.
- If not **working on a farm** it was crucial to ask if the patient had visited one.
- If any questions should be asked about **medication and antibiotics**, it must be made very clear that the antibiotic was used for treatment before VTEC infection.
- The question concerning **burger restaurants** can be difficult to understand. It must be clarified.
- **Blood in stools** may be a difficult question to answer correctly.
- For **ethical reasons**, do not interview the parents of a deceased child.

- It may be good to adopt **another questionnaire** to send out later to get further information about the severity of the disease, how long the patient was ill, whether he or she was hospitalised, when they were discharged, costs of the disease, etc.
- **Travelling in the country** could be specified. There may be a higher risk in some part of the country, such as a rural area or farm visit on holiday.
- One problem in a case-control study like this may be that sometimes it is difficult to know if the sick child is the **primary case**. It may be a secondary case to a healthy parent or sibling.
- **Adults working on a farm** get VTEC more often than other adults, but do occasional workers at a farm have it?
- In this study, it was **protective** handling fruit.
- Ask about handling **raw meat** in the kitchen. That is a way to check possible cross-contamination.
- The questions about eating **seafood** yielded nothing. That part could be removed from the questionnaire.
- Eating **baby-milk formula**. Sometimes grown-ups had filled that in. It is important in some questions to check the age of the answerer.
- **Raw milk** or cheese made from raw milk. These questions must be made very clear.
- **Spring or well water treatment** must be specified, as it is easy to misinterpret.
- **Frozen red meat or poultry**. This question needs to be more specific.

## Comments

Try to make a shorter questionnaire; this one was a bit too long. Cases in the age-group 15-65 normally had a mild disease or were asymptomatic. The first case to appear is normally a child, but it is not always the index case. However, one important risk factor was actually contact with other persons. The study found a large number of family outbreaks, which was rather surprising compared with earlier experience. The child that got a severe disease was not always the youngest family member.

The incubation period is normally 3-4 days but may be 1-8 days. The number of days asked for is crucial; 5 days may be used as the incubation period, but then the source of infection will be missed, if the incubation period happened to be longer. On the other hand, if there is a long time span to cover, both cases and controls will have eaten most of the food items and also been exposed to more environmental items.

The response rate of cases in this VTEC study was 80% and 50% for controls. The questionnaires were well filled out, even for the controls. The GP should nominate and send out the questionnaires to the controls. However, they had some problems in getting the controls, losing them and taking too much time. To choose the GP as the person to recruit controls meant that the control persons knew the person who had selected them as controls. The GP did not send out the questionnaires promptly. Controls should have the same age + 5 years, but the GP took the next one so the common cold became protective. It is important to get the controls quickly and right. If this had been a

matched study, 60% of the questionnaires would have been lost. There was a discussion about matching and the statistician thought that they should not do it. An unmatched, case-control study could also increase the possibility of finding several sources of infection, which might be risk factors. Telephone interviews would have been better, but there was insufficient funding to allow for that method. Bob Adak had no good experience of using family contacts as controls, so he did not recommend that. Many cases reported travelling abroad and were thus excluded, but it might be interesting to look at foreign travel as a risk factor.

# Study design

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**Georg Kapperud,**  
**National Institute of Public Health, Norway**

Design, conduct and analysis

The following steps should be followed in a prospective case-control study:

- Design
  - Define research hypotheses
  - Develop study protocol
  - Create the questionnaire
- Conduct
  - Test feasibility in small-scale, pilot study
  - Collect data
  - Enter and validate data
- Analysis
  - Perform statistical analyses
  - Report the results

## Case definition

The case definition should include the following four components:

1. Disease (clinical or diagnostic information)
2. Time (study period)
3. Place (study area)
4. Person (study population)

A case should be culture-confirmed, identified by routine examination of clinical specimens, and diagnosed within the study period. It should be a sporadic case and not part of a recognized outbreak. The case should also inhabit the geographically defined, study area. The case should not have been travelling abroad prior to the onset of illness. Healthy carriers should not be included in the study.

## Selection of cases

All eligible cases should have an equal chance of being enrolled. Depending on the expected number of cases in the study area, all cases could be selected during the study period or a random sample of cases or a systematic sample e.g. every  $n^{\text{th}}$  patient with the

selected disease, could be taken. It is important to have a predetermined sampling scheme. Cases may be identified from any of the following sources:

- Medical microbiological laboratories performing examinations of stool specimens
- Reference laboratories receiving isolates for confirmation
- Surveillance or notification systems that record culture-confirmed cases
- Primary health service, hospitals or private practitioners
- The best source is screening of the population

### Selection of controls

Controls could be chosen from the general population, the population registry, the patient's physician or neighbours, friends, household members or random digit-dialling. All potential controls should have an equal chance of being enrolled.

Cases and controls should have an equal chance of being exposed to the disease or developing it, controls should be "at risk".

### Exclusion criteria, case-control study

Cases should be excluded if they are not residents of the study area, have been travelling abroad in the two weeks prior to the onset of illness or are unable to complete the questionnaire or interview.

Controls should be excluded if they have a present or past history of the study disease or other diarrhoeal disease in the past month. They should also be excluded as controls if they are unable to complete the questionnaire, are non-residents of the study area or have travelled abroad in the last two weeks. Also factors influencing the development of the studied disease, such as immunity and vaccination, may exclude them as controls.

### Matching or not matching

A common subject of discussion in case-control studies is whether the control should be matched or not. The purpose of matching is to control confounders, to elimination of biased comparisons and to control unpreventable risk factors (age, sex, and geography). Some problems with matching may be that the risk factor status of matching variables cannot be assessed and that factors closely associated with matching variables (overmatching) may be underestimated.

### Timelines

The cases are interviewed for the period before the illness. The length of this period is dependent on the incubation period of the infectious disease. Controls are interviewed for the time period before the interview. But recall bias can be a problem because cases have normally been thinking about how they contracted the infection and what could have been the reason for the disease. The controls will not remember for a very long time what they have been eating or doing. The problem with interviewing cases and controls for different time periods is that different exposures may have seasonal

variations, e.g. special food items at Christmas and Easter and barbecuing in the warm season.

### Collecting data

Face-to-face interview, telephone interview, self-administered questionnaire, mailed questionnaire followed by interview.

### Creating the questionnaire

A questionnaire for a case control study should include the following information:

- Personal and demographic data
- Clinical-impact data (cases)
- Economic-impact data (cases)
- Exposure to potential risk factors
  - Consumption of specific food items
  - Drinking untreated water
  - Animal contact
  - Foreign travel
  - Eating outside the home
  - Eating raw, rare or undercooked meat
  - Kitchen hygiene, food-handling practices, preferences

### Interview

Interviewing of cases and controls in a prospective case-control study of sporadic cases over a long time period needs approval by the ethical committee. That is a difference from the investigation of an outbreak of an acute infection. In some countries permission from the patient's health-care provider is needed. There is also a need for the informed consent of the enrolled person to participate. The enrolled person should also be informed about the confidentiality and safety of the information entrusted to the interviewer.

The interviewers should:

- Be motivated and trained for the study
- Be routinely monitored
- Not disclose the research hypotheses
- Not encourage positive responses from cases
- Not encourage negative responses from controls
- Same interviewer for each matched, case-control set

### Numbers of cases and controls (sample size)

The number of cases and controls in a retrospective case-control study of sporadic cases is determined by the following factors:

- Anticipated risk (OR)
- Anticipated statistical exposure frequency
- Desired statistical power
- Control-to-case ratio
- Resource limitations, practical considerations

### Data entry and validation

Enter the questionnaire data in a computer database and after that validate the consistency and quality of the material.

The essential variables are:

- The dependent variable (case-control status)
- The set identifier (case-control group)
- The unique identifier



# Design of questionnaire

---

**Kåre Mølbak**

**Statens Serum Institut, Denmark**

A case-control study should include the following paragraphs:

- Personal details
- Pre-illness morbidity and drug use
- Clinical history
- If child: details about care
- Travel history: inside Nordic countries - outside the Nordic countries
- Person-to-person transmission
- Food exposure (bought, handled, consumed), meat and meat products, seafood, fish and fish products, dairy products fresh vegetables and products from these, purchasing products from door-to-door salesman, picnic and barbecue,
- Drinking water (untreated or chlorinated),
- Recreational water (swimming etc),
- Contact with pets and live animals, farm visits
- Outdoor activity (gardening, festival soil, manure, sewage)
- Type of housing (urban, suburban, rural)
- How do you think you acquired the disease?

# Discussion and Co-operation between the Nordic countries

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**Yvonne Andersson**

**Swedish Institute for Infectious Disease Control, Sweden**

The following items were discussed after the presentations. There was a consensus that VTEC should be used instead of EHEC. Better descriptive epidemiology is also needed.

## Objectives

What type of objectives should a future case control study have? It was agreed that the following objectives should be chosen.

- To identify the risk factors for clinical sporadic VTEC infections
- To describe the epidemiology of VTEC in the Nordic countries, using mutually agreed criteria.
- The first laboratory-confirmed case and the first case in an outbreak

## Case definition

there was a discussion as to whether only O157 or all EHEC-cases should be included (in Finland one-third is non-O157). From each Nordic country, a structured description of the typing system from the laboratory is needed. VTEC should be used to name the micro organism instead of EHEC, which is used only in Sweden. A discussion followed as to whether travellers abroad with a positive stool sample should be included in the study or not. An agreement followed that for cases with a travel-associated VTEC, descriptive epidemiology of the cases should follow, but no controls in these cases.

## Selection of cases

If several persons became sick in the same household, take the first person in the family with symptoms who is sampled. Use only acute cases of gastroenteritis; exclude chronic carriers and asymptomatic persons.

## Selection of controls

No decision was made as to how controls should be selected.

## Exclusion criteria, case-control study

Cases belonging to obvious outbreaks should be excluded. Also carriers with symptoms for the previous month or longer should be excluded. Persons unable to answer

questions because of language problems should also be excluded. Exclude persons with chronic diseases. Take only the first case in an outbreak. In an English study all cases from outbreaks were excluded so as not to disturb the outbreak investigation. Controls to be excluded if they had had diarrhoea during the last month.

### Matching or not matching

There was a long discussion about matching, whether it is necessary or not, a lot of cases and controls might be lost by matching and also the power of the study might be reduced because of this. On the other hand, there will be a problem if small children have controls who are adults, because they have different habits and sometimes eat different types of food. Matching may produce some problems, but on the other hand, one probably needs to match for age and geographical area.

### Timelines

The time from the onset of illness to the interview should be chosen as a maximum of 30 days. If longer, the case should be excluded from the case-control study.

### Design of the study

A study protocol should be prepared and further discussed.

### Creating the questionnaire

The follow-up of the economic impact may be measured by the days of absence from work. Hygienic behaviour and practice should also be measured. Seafood should be removed from the questionnaire. Elaborate door sales. Dairy products; unpasteurised, strict from farm. Barbecue, type of meat? Who grilled it, was it well cooked? Source of drinking water during week and also at weekend accommodation. We could design a draft questionnaire. Personal details; social factors, income. A person infected abroad was concluded to be a person who had been outside the Nordic countries in the two weeks prior to onset of disease. Behavioural factors (time spent in kitchen), how many meals eaten at restaurants. Pre-illness morbidity and drug use, clinical history, short time or long time

### Interview

It was discussed whether questionnaires should be by telephone interview or a mailed, self-administered questionnaire. One suggestion was that the best way would be to first send out the questionnaire and then perform a telephone interview. This would give the person some time to read the questionnaire before the interview. No consensus was reached on this subject.

### Number of cases and controls

One problem could be obtaining enough replies to get a valid sample. A one- or two-year study was discussed. At the workshop the number of VTEC O157 cases in the Nordic countries was estimated at 100 cases a year.

## Other general points discussed

Perform a pilot study first, in order to obtain greater validity. Could we get consensus on a standard p-value that could be used as a cut-off value for variables that are significant in the analysis and will be used in the multivariate analysis? Demand for surveillance, what type (quality) of surveillance do we need for case-control studies? Publishing the studies; when and how? What criteria should be used for being infected abroad? Could two weeks outside the Nordic countries be a reasonable criterion?

# Appendix

---

## Svenskt frågeformulär EHEC

Gäller det ett barn ber vi målsman besvara frågorna

fall

kontroll

Namn: ..... Personnr: .....

Adress: ..... Telnr: .....

Postadress: .....

Yrke: ..... Arbetsplats/skola/daghem: .....

**Har Du haft några mag- tarmbesvär eller andra sjukdomssymtom?**

Ja  Nej  Minns ej

Om ja, vilket datum insjuknade Du? (första symtom) .....

Symtom? (blodiga diarréer, HUS) .....

**Har Du rest utomlands inklusive de nordiska länderna (de närmaste 14 dagarna före insjuknandet)?**

Ja  Nej  Minns ej

I så fall var och när? .....

Hur reste Du? .....

**Har du rest inom landet (de närmaste 14 dagarna före insjuknandet)?**

Ja  Nej  Minns ej

I så fall var och när? .....

Hur reste Du? .....

Vad åt Du? .....

**Har Du före insjuknandet haft kontakt med någon person med diarrésjukdom (inklusive familjemedlemmar)?**

Ja  Nej  Minns ej

Om ja, vem och när insjuknade den/dessa? .....

**Förtärde Du under den närmaste veckan före insjuknandet något av följande födoämnen?**

	Ja	Nej	Minns ej	Sort/fabrikat
Mjök	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Grädde	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Filmjök	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Yoghurt	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Opastöriserad mjök	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Välling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Andra typer av mjökprodukter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Om ja, vilken sort och fabrikat?				.....

**Glass (även mjökglass)?**

Om ja, vilken sort och fabrikat? .....

**Pulvermat** t.ex. såspulver, chokladpulver, mjökpulver och dylikt?

Ja  Nej  Minns ej

Om ja, vilken sort och fabrikat? .....

**Förtärde Du under den närmaste veckan före insjuknandet något av följande födoämnen?**

**Majonnäs eller någon produkt där majonnäs ingår?**  Ja  Nej  Minns ej

Om ja, vilken sort och fabrikat? .....

.....

Sort/fabri

kat

**Höns eller kyckling?**

Ja  Nej  Minns ej .....

**Annan fågel?**

Ja  Nej  Minns ej .....

Om ja, vilken sort och fabrikat och inköpsställe? .....

.....

**Kött?**

Ja Nej Minns ej Sort/fabrikat

Får/lamm

.....

Gris

.....

Nöt/oxkött

.....

Köttfärs:

.....

Nöt  Färsk  Fryst  Fläsk  Färsk  Fryst  Blandfärs  Färsk  Fryst

Hamburgare

.....

Köttbullar

.....

Pannbiff

.....

Annat köttfärsrätt (t.ex. lasagne, tacos)

.....

Råbiff

.....

Kebab

.....

Rostbiff

.....

Inälvsmat (lever etc)

.....

Gravat kött

.....

Rökt kött

.....

Annat kött

.....

Om Du gör maträtt med köttfärs

.....

brukar Du smaka på råa smeten?

.....

**Saltat, kokt eller rökt köttpålägg?**

Skinka

.....

Medwurst, kokt

.....

Medwurst, rökt

.....

Salami

.....

Sylta

.....

Hamburgerkött

.....

Saltrulle, tunga

.....

Spickleskinka/parmaskinka eller dylikt

.....

Leverpastej

.....

Annat köttpålägg

.....

Om ja, vilket pålägg? .....

**Korv?** Ja  Nej  Minns ej

Om ja, vilken sort och fabrikat? .....

**Pizza?** Ja  Nej  Minns ej

Om ja, vilken sort och fabrikat? .....

**Rökt, gravad eller annan fisk?**

	Ja	Nej	Minns ej	Sort/fabrikat
Rökt fisk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Rå fisk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Färsk fiskkrom (t.ex. löjrom)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Gravad fisk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Annan fisk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....

Om annan fisk, vad? .....

**Skaldjur (ej konserv)?**

	Ja	Nej	Minns ej	Sort/fabrikat
Färska eller frysta räkor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Skaldjurssallad	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Krabba/hummer/kräftor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Andra skaldjur	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....

Om andra skaldjur, vilka? .....

**Sallad , paté eller dylikt?**

	Ja	Nej	Minns ej	Sort/fabrikat
Potatissallad	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Annan majonnässallad	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Sallader med kött/fisk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Aladåb	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Pateér	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....

**Hårdostar?**

	Ja	Nej	Minns ej	Sort/fabrikat
Hushållsost	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Grevé/Herrgård, typ	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Gräddost	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Får/getost	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Keso, cottage cheese, färskost	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Andra ostar (även hemgjorda)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....

Om andra ostar, vilka? .....

**Dessertostar?** Ja  Nej  Minns ej

Om ja, vilka ostar? .....



<b>Rå svamp, grönsaker eller frukt, bär?</b>	Ja	Nej	Minns ej	Sköjs? Sort/fabrikat
Rå svamp	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Bladsallad	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Salladskål	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Isbergssallad	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Annan sallad	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Råa morötter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Rå blomkål	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Rå vitkål, kålrot	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Tomat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Gurka	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Paprika	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Groddar, typ .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Purjolök	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Rädisor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
.....				
Vindruvor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
.....				
Äpplen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
.....				
Päron	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
.....				
Jordgubbar, hallon	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
.....				
Andra bär	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
.....				
Andra grönsaker, svamp, frukt? .....				

**Brakar Du skölja grönsaker innan de används?**  Ja  Nej  Minns ej

**Brakar Du krydda direkt på maten eller i salladen?**  Ja  Nej  Minns ej  
 Vilka kryddor har Du köpt och använt senast 14 dgr innan insjuknandet? .....

**Efterrätt (t.ex. parfait, chokladmoussé)**  Ja  Nej  Minns ej  
 Om ja, vilken sort och ev. fabrikat? .....

**Färdig nyponsoppa, kräm m.m.**  Ja  Nej  Minns ej  
 Om ja, vilken sort och ev. fabrikat? .....

**Chips, ostbågar eller annat tilltugg?**  Ja  Nej  Minns ej  
 Om ja, vilken sort och fabrikat? .....

**Lösgodis, choklad, annat godis?**  Ja  Nej  Minns ej  
 Om ja, vilken sort och fabrikat? .....

**Konditorivaror?**  Ja  Nej  Minns ej  
 Om ja, vad? .....

<b>Har Du druckit något av följande?</b> .....	<b>Ja</b>	<b>Nej</b>	<b>Minns ej</b>	<b>Sort/fabrikat</b>
Juice?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Dryck från dryckesautomat?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Annan dryck (gäller ej läskedrycker)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Kommunalt vatten	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Brunnsvatten	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Källvatten	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
Sjö/bäckvatten	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....

**Vilken/vilka butikskedja/or har Du handlat i de senaste veckorna före insjuknandet?**

.....

**Har Du under veckan före insjuknandet handlat från gårdsbutik eller annan lokal försäljning?**

Ja  Nej  Minns ej

Om ja, var, vad?? .....

**Har Du under veckan före insjuknandet ätit på någon personalrestaurang/skolmatsal/daghem?**

Ja  Nej  Minns ej

Om ja, hur många gånger? .....

Vad åt Du? .....

**Har Du under veckan före insjuknandet ätit mat från något matställe?**

	<b>Ja</b>	<b>Nej</b>	<b>Minns ej</b>
Restaurang	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Café eller konditori	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pizzeria	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Kebab bar	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Gatukök	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Andra matställen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Om ja, vilket vilka? .....

Vad åt Du? .....

**Har Du under veckan före insjuknandet besökt någon marknad/festival**

Ja  Nej  Minns ej

Om ja, var, vad åt Du? .....

**Finns husdjur i familjen?**

Ja  Nej  Minns ej

Om ja, vilka djur? .....

**Bor Du på lantgård med djur ?**

Ja  Nej  Minns ej

Om ja, vilken typ av djur? .....

**Har Du under veckan före insjuknandet gjort något av följande eller haft kontakt med:**

**Har Du haft kontakt med lantdjur (t.ex. kor, hästar, höns)?**

Ja  Nej  Minns ej

Om ja, vilken typ av djur? .....

**Har Du på annat sätt före insjuknandet haft kontakt med djur av något slag?**

Ja  Nej  Minns ej

Om ja, vilka djur? .....

**Har Du besökt någon djurpark/4H gård/lantgård med djur?**

Ja  Nej  Minns ej

Om ja, var och när? .....

**Har Du haft kontakt med *vilda* småfåglar?**

Ja  Nej  Minns ej

Om ja, på vilket sätt (t.ex. fågelbord, matat fåglar m.m.) .....

**Har Du sysslat med trädgårdsarbete eller på annat sätt kommit i kontakt med jord eller gödsel?**

Ja  Nej  Minns ej

Om ja, på vilket sätt? .....

**Har Du under veckan före insjuknandet badat utomhus?**

Ja  Nej  Minns ej

Om ja, var och när? .....

**Om detta gäller ett barn, har barnet vistats i sandlåda?**

Ja  Nej  Minns ej

Om ja, var och när? .....

**Vad misstänker Du själv att Du blev smittad av?**

.....  
.....

**Tack för Din medverkan!**

**STRICTLY CONFIDENTIAL**

The Public Health Laboratory Service  
National Case Control Study of  
*Escherichia coli* O157 Infection in England

Questionnaire

The information returned in this questionnaire will be treated as strictly confidential and will be used for medical research only.

This questionnaire should be answered by, or for the person named in the accompanying letter. If the "named person" is your child, and is under 14 years of age, we would be grateful if you, the parent or guardian, would complete the questionnaire on behalf of your child. If the "named person" is a child and is not yet old enough to eat solid foods, or any of the foods mentioned in the questionnaire please complete the form as best you can. Please note that some of the questions refer to the "named person", and some to the entire household.

In some of the questions on this questionnaire we ask about things you may have done before the "SPECIFIED DATE." If you were ill with *Escherichia coli* O157 infection please use the date on which you started to feel ill as the specified date. If you are a control please use today's date as the specified date.

Please tick boxes , or write in the spaces provided.

Please answer Yes or No where indicated. If you leave a blank space we cannot interpret your intended answer.

For Office Use Only

Laboratory  Serial Number  State  PT

**SECTION 1 PERSONAL DETAILS**

If you are answering on behalf of your child, please remember that these questions refer to your child and not yourself.

PLEASE FILL IN TODAY'S DATE \_\_\_\_/\_\_\_\_/\_\_\_\_

1.1 Forename (s) \_\_\_\_\_ Surname \_\_\_\_\_

1.2 Post code \_\_\_\_\_

1.3 Daytime telephone number \_\_\_\_\_

1.4 Sex: Male  Female  1.5 Date of Birth \_\_\_\_/\_\_\_\_/\_\_\_\_

1.6 Occupation (includes: retired; unemployed; housewife; student; school pupil; preschool child)

---

## SECTION 2 HEALTH DETAILS

If you are answering on behalf of your child, please remember that these questions refer to the health of your child and not yourself.

2.1 Did you regularly take any of the following medicines in the last month?  
Please tick YES or NO for each type of medicine listed.

	Yes	No		Yes	No
Antacids (eg Rennies, Milk of Magnesia)	<input type="checkbox"/>	<input type="checkbox"/>	Antidiarrhoeal medicines (eg Immodium)	<input type="checkbox"/>	<input type="checkbox"/>
Laxatives	<input type="checkbox"/>	<input type="checkbox"/>	Oral steroids	<input type="checkbox"/>	<input type="checkbox"/>
Antibiotics	<input type="checkbox"/>	<input type="checkbox"/>	Pain killers (eg aspirin, paracetamol, codeine etc)	<input type="checkbox"/>	<input type="checkbox"/>

2.2 Do you suffer from any of the following conditions?  
Please tick YES or NO for each condition listed.

	Yes	No		Yes	No
Colitis	<input type="checkbox"/>	<input type="checkbox"/>	A food allergy	<input type="checkbox"/>	<input type="checkbox"/>
Irritable bowel syndrome	<input type="checkbox"/>	<input type="checkbox"/>	Any serious chronic illness	<input type="checkbox"/>	<input type="checkbox"/>

2.3 Have you had a cold or flu in the last month? Yes  No

2.4 Have you had a stomach upset in the past month?

Yes

No

**IF NO, PLEASE REFER TO TODAY'S DATE AS THE "SPECIFIED DATE"  
IN FUTURE QUESTIONS, AND GO DIRECTLY TO SECTION 3 PAGE 3.**

2.5 While your stomach was upset did you suffer any of the following symptoms?  
Please tick YES or NO for each symptom listed.

	Yes	No		Yes	No
Diarrhoea (3 or more loose stools in a 24 hour period)	<input type="checkbox"/>	<input type="checkbox"/>	Nausea (feeling sick)	<input type="checkbox"/>	<input type="checkbox"/>
Abdominal pain/cramps	<input type="checkbox"/>	<input type="checkbox"/>	Vomiting	<input type="checkbox"/>	<input type="checkbox"/>
Blood in stools	<input type="checkbox"/>	<input type="checkbox"/>	Headache	<input type="checkbox"/>	<input type="checkbox"/>
Fever	<input type="checkbox"/>	<input type="checkbox"/>			

2.6 When did you start feeling unwell?

Date \_\_\_\_/\_\_\_\_/\_\_\_\_

**PLEASE REFER TO THIS DATE AS THE  
"SPECIFIED DATE" IN FUTURE QUESTIONS.**

2.7 Are you still ill? Yes  No

2.8 If you are no longer ill, how many days were you ill? \_\_\_\_\_ days

2.9 How many days were you off work, school or normal activity as a result of this illness?  
(If none, write 0) \_\_\_\_\_ days

2.10 Did you consult your family doctor as a result of this illness?

Yes  No

2.11 Did you attend a hospital outpatient or casualty department as a result of this illness?

Yes  No

2.12 Did you stay overnight in hospital as a result of this illness?

Yes  No

If Yes when were you admitted? Date \_\_\_\_/\_\_\_\_/\_\_\_\_

When were you discharged? Date \_\_\_\_/\_\_\_\_/\_\_\_\_

### **SECTION 3 TRAVEL DETAILS**

**If you are answering on behalf of your child, please remember that these questions refer to your child and not yourself.**

3.1 Did you spend any nights away from home in the 5 days before the specified date?

Yes  No

If Yes, where did you stay? In the UK  Abroad

Please give details below.

Place(s) visited \_\_\_\_\_

Number of days away \_\_\_\_\_

Date returned \_\_\_\_/\_\_\_\_/\_\_\_\_

## SECTION 4 CONTACT DETAILS

If you are answering on behalf of your child, please remember that these questions refer to your child and not yourself.

4.1 Did anyone else in your household suffer from diarrhoea in the 10 days before the specified date?

Yes  No

If Yes, how many days before the specified date were they suffering from diarrhoea?  
please tick one box only

Less than 1 day  1-5 days  4-6 days   
7-10 days  More than 10 days

4.2 How many children below the age of two years live, or stayed overnight in your household in the 5 days before the specified date? \_\_\_\_\_

4.3 Did any children below the age of two years visit your household in the 5 days before the specified date? Yes  No

4.4 Did you visit any household with any children below the age of two years in the 5 days before the specified date? Yes  No

4.5 As far as you know, were you in contact with anyone outside your household who was suffering from diarrhoea (eg colleague, friend, children etc.) in the 5 days before the specified date?  
Yes  No

4.6 Did you change any nappies in the 5 days before the specified date? Yes  No

## SECTION 5 OCCUPATIONAL DETAILS

These questions are designed to find out if diarrhoea is more common among people working in particular jobs or attending particular types of school.

5.1 Do you work in, or regularly attend, any of the following types of school or child care facility? Please tick YES or NO for each of the places listed.

	Yes	No		Yes	No
Child minders	<input type="checkbox"/>	<input type="checkbox"/>	Play group/nursery	<input type="checkbox"/>	<input type="checkbox"/>
Infant school	<input type="checkbox"/>	<input type="checkbox"/>	Junior/middle school	<input type="checkbox"/>	<input type="checkbox"/>
Secondary school	<input type="checkbox"/>	<input type="checkbox"/>	School for special needs	<input type="checkbox"/>	<input type="checkbox"/>

If you are answering on behalf of your child, please remember that these questions refer to your child and not yourself.

5.1a Does anyone else in your household work in, or regularly attend, any of the following types of school or child care facility? Please tick YES or NO for each of the places listed.

	Yes	No		Yes	No
Child minders	<input type="checkbox"/>	<input type="checkbox"/>	Play group/nursery	<input type="checkbox"/>	<input type="checkbox"/>
Infant school	<input type="checkbox"/>	<input type="checkbox"/>	Junior/middle school	<input type="checkbox"/>	<input type="checkbox"/>
Secondary school	<input type="checkbox"/>	<input type="checkbox"/>	School for special needs	<input type="checkbox"/>	<input type="checkbox"/>

5.2 Do you work in any of the following health care settings? Please tick YES or NO for each of the places listed.

	Yes	No		Yes	No
Hospital	<input type="checkbox"/>	<input type="checkbox"/>	Dental surgery	<input type="checkbox"/>	<input type="checkbox"/>
GP surgery	<input type="checkbox"/>	<input type="checkbox"/>			

5.3 Do you work in a centre caring for any of the following groups of people? Please tick YES or NO for each type of centre listed.

	Yes	No		Yes	No
The elderly	<input type="checkbox"/>	<input type="checkbox"/>	The homeless	<input type="checkbox"/>	<input type="checkbox"/>
The handicapped	<input type="checkbox"/>	<input type="checkbox"/>			

5.4 Do you regularly come into contact with animals as part of your work (eg farmers, vets etc)? Please do not include recreational visits to farms or contact with your own household pets.

Yes  No  If Yes, which animals do you have contact with?  
Please tick YES or NO for each type of animal listed.

	Yes	No		Yes	No
Cattle	<input type="checkbox"/>	<input type="checkbox"/>	Sheep	<input type="checkbox"/>	<input type="checkbox"/>
Pigs	<input type="checkbox"/>	<input type="checkbox"/>	Poultry	<input type="checkbox"/>	<input type="checkbox"/>
Horses/ponies	<input type="checkbox"/>	<input type="checkbox"/>	Goats	<input type="checkbox"/>	<input type="checkbox"/>
Dogs	<input type="checkbox"/>	<input type="checkbox"/>	Cats	<input type="checkbox"/>	<input type="checkbox"/>
Birds	<input type="checkbox"/>	<input type="checkbox"/>	Fish	<input type="checkbox"/>	<input type="checkbox"/>
Reptiles	<input type="checkbox"/>	<input type="checkbox"/>	Zoo animals	<input type="checkbox"/>	<input type="checkbox"/>



If you are answering on behalf of your child, please remember that these questions refer to your child and not yourself.

5.4a Does anyone else in your household do work that involves contact with animals?

Yes  No

If Yes, which animals do they have contact with?  
Please tick YES or NO for each type of animal listed.

	Yes	No		Yes	No
Cattle	<input type="checkbox"/>	<input type="checkbox"/>	Sheep	<input type="checkbox"/>	<input type="checkbox"/>
Pigs	<input type="checkbox"/>	<input type="checkbox"/>	Poultry	<input type="checkbox"/>	<input type="checkbox"/>
Horses/ponies	<input type="checkbox"/>	<input type="checkbox"/>	Goats	<input type="checkbox"/>	<input type="checkbox"/>
Dogs	<input type="checkbox"/>	<input type="checkbox"/>	Cats	<input type="checkbox"/>	<input type="checkbox"/>
Birds	<input type="checkbox"/>	<input type="checkbox"/>	Fish	<input type="checkbox"/>	<input type="checkbox"/>
Reptiles	<input type="checkbox"/>	<input type="checkbox"/>	Zoo animals	<input type="checkbox"/>	<input type="checkbox"/>

5.5 If you do not normally work on a farm, did you visit one in the 5 days before the specified date to carry out any work (eg electricians, GPs, contractors). Yes  No

5.6 Does your work involve the handling of raw meat outside the home (eg as a chef, butcher, abattoir worker etc)? Yes  No

If Yes, please state your occupation \_\_\_\_\_

5.6a Does anyone else in your household do work that involves the handling of raw meat outside the home? Yes  No

If Yes, please specify their occupation \_\_\_\_\_

5.7 Does your work involve you coming into contact with any of the following things? Please do not include contact with soil or manure through gardening or playing in the garden at home. Please tick YES or NO for each tasks listed.

	Yes	No		Yes	No
Soil	<input type="checkbox"/>	<input type="checkbox"/>	Manure	<input type="checkbox"/>	<input type="checkbox"/>
Sewage	<input type="checkbox"/>	<input type="checkbox"/>	Household waste	<input type="checkbox"/>	<input type="checkbox"/>

5.7a Does anyone else in your household work in a job that involves coming into contact with any of the following things? Please tick YES or NO for each tasks listed.

	Yes	No		Yes	No
Soil	<input type="checkbox"/>	<input type="checkbox"/>	Manure	<input type="checkbox"/>	<input type="checkbox"/>
Sewage	<input type="checkbox"/>	<input type="checkbox"/>	Household waste	<input type="checkbox"/>	<input type="checkbox"/>

## SECTION 6 FOOD HISTORY

If you are answering on behalf of your child, please remember that these questions refer to your child and not yourself.

6.1 Did you handle any of the following raw foods while preparing a meal or snack in the 5 days before the specified date? Please tick YES or NO for each of the foods listed.

	Yes	No		Yes	No
Raw meat	<input type="checkbox"/>	<input type="checkbox"/>	Raw poultry	<input type="checkbox"/>	<input type="checkbox"/>
Raw fish	<input type="checkbox"/>	<input type="checkbox"/>	Raw vegetables	<input type="checkbox"/>	<input type="checkbox"/>
Raw fruit	<input type="checkbox"/>	<input type="checkbox"/>			

6.2 Did you eat food from any of the following places in the 5 days before the specified date? Please tick YES or NO for each of the places listed.

	Yes	No		Yes	No
Your home	<input type="checkbox"/>	<input type="checkbox"/>	Someone else's home	<input type="checkbox"/>	<input type="checkbox"/>
A barbecue	<input type="checkbox"/>	<input type="checkbox"/>	A picnic	<input type="checkbox"/>	<input type="checkbox"/>
A restaurant/hotel	<input type="checkbox"/>	<input type="checkbox"/>	A public house	<input type="checkbox"/>	<input type="checkbox"/>
A works/school canteen	<input type="checkbox"/>	<input type="checkbox"/>	A burger restaurant	<input type="checkbox"/>	<input type="checkbox"/>
A street/market stall	<input type="checkbox"/>	<input type="checkbox"/>	Other fast food outlets (eg kebab shops, fish & chip shops)	<input type="checkbox"/>	<input type="checkbox"/>

### BEEF

6.3 Did you eat any beef or any food containing beef in the 5 days before the specified date?

Yes  No

**IF YOU DID NOT EAT BEEF IN THE 5 DAYS BEFORE THE SPECIFIED DATE PLEASE GO DIRECTLY TO QUESTION 6.12 ON P9.**

If you are answering on behalf of your child, please remember that these questions refer to your child and not yourself.

6.4 Did you eat any ready bought baby food containing beef in the 5 days before the specified date? Yes  No

6.5 Did you eat any beefburgers or hamburgers in the 5 days before the specified date? Yes  No

If Yes, were any of the burgers that you ate rare, ie pink or red in the centre?

Yes  No

6.6 Did you eat any dishes made of minced beef (eg meat loaf, meat balls cottage pie, lasagne) in the 5 days before the specified date? Yes  No

If Yes, was any of the meat that you ate rare, ie pink or red in the centre?

Yes  No

6.7 Did you eat any cold roast beef, eg in sandwiches or salads in the 5 days before the specified date?

Yes  No

If Yes, was any of the cold roast beef that you ate rare, ie pink or red in the centre?

Yes  No

6.8 Did you eat any hot roast beef in the 5 days before the specified date?

Yes  No

If Yes, was any of the hot roast beef that you ate rare, ie pink or red in the centre?

Yes  No

6.9 Did you eat any beef steak in the 5 days before the specified date?

Yes  No

If Yes, was any of the beef steak that you ate rare, ie pink or red in the centre?

Yes  No

6.10 Did you eat any dishes containing calf or ox liver in the 5 days before the specified date?

Yes  No

PTO

If you are answering on behalf of your child, please remember that these questions refer to your child and not yourself.

6.10 If Yes, was any of the liver that you ate rare, ie pink or red in the centre?

cont. Yes  No

6.11 Did you eat any other dishes containing beef in the 5 days before the specified date?

Yes  No

If Yes, were any of the dishes rare ie pink or red in the centre?

If Yes, please specify the dish(es) \_\_\_\_\_

**OTHER MEAT**

6.12 Did you eat any sausages in the 5 days before the specified date?

Yes  No

If Yes, were any of the sausages that you ate undercooked?

Yes  No

6.13 Did you eat any lamb (eg lamb chops, roast lamb) in the 5 days before the specified date?

Yes  No

If Yes, was any of the lamb that you ate rare, ie pink or red in the centre?

Yes  No

6.14 Did you eat any pork (eg pork chops, roast pork) in the 5 days before the specified date?

Yes  No

If Yes, was any of the pork that you ate rare, ie pink or red in the centre?

Yes  No

6.15 Did you eat any chicken in the 5 days before the specified date?

Yes  No

If Yes, was any of the chicken that you ate rare, ie pink or red in the centre?

Yes  No

6.16 Did you eat any turkey meat in the 5 days before the specified date?

Yes  No

PTO

If you are answering on behalf of your child, please remember that these questions refer to your child and not yourself.

6.16 If Yes, was any of the turkey meat that you ate rare, ie pink or red in the centre?

cont. Yes  No

6.17 Did you eat any kebabs in the 5 days before the specified date?

Yes  No

If Yes, were any of the kebabs that you ate rare, ie pink or red in the centre?

Yes  No

6.18 Did you eat any other foods containing meat in the 5 days before the specified date?

Yes  No

If Yes, were any of the dishes that you ate rare, ie pink or red in the centre?

Yes  No  If Yes, please specify the foods \_\_\_\_\_

### SEAFOOD

6.19 Did you eat any of the following types of seafood in the 5 days before the specified date? Please tick YES or NO for each question listed.

	Yes	No		Yes	No
Oysters	<input type="checkbox"/>	<input type="checkbox"/>	Mussels	<input type="checkbox"/>	<input type="checkbox"/>
Crab	<input type="checkbox"/>	<input type="checkbox"/>	Prawns	<input type="checkbox"/>	<input type="checkbox"/>

### FRUIT AND VEGETABLES

6.20 Did you eat any of the following fruits raw (not including canned fruit) in the 5 days before the specified date? Please tick YES or NO for each fruit listed.

	Yes	No		Yes	No
Apples	<input type="checkbox"/>	<input type="checkbox"/>	Pears	<input type="checkbox"/>	<input type="checkbox"/>
Cherries	<input type="checkbox"/>	<input type="checkbox"/>	Grapes	<input type="checkbox"/>	<input type="checkbox"/>
Raspberries	<input type="checkbox"/>	<input type="checkbox"/>	Strawberries	<input type="checkbox"/>	<input type="checkbox"/>
Blackberries	<input type="checkbox"/>	<input type="checkbox"/>	Plums	<input type="checkbox"/>	<input type="checkbox"/>
Melons (including watermelon)	<input type="checkbox"/>	<input type="checkbox"/>	Peaches (including nectarines)	<input type="checkbox"/>	<input type="checkbox"/>

If you are answering on behalf of your child, please remember that these questions refer to your child and not yourself.

6.21 Did you eat any of the following vegetables **raw** (eg in salads or garnishes) in the **5 days** before the specified date? Please tick YES or NO for each of the vegetables listed.

	Yes	No		Yes	No
Lettuce	<input type="checkbox"/>	<input type="checkbox"/>	Celery	<input type="checkbox"/>	<input type="checkbox"/>
Tomatoes	<input type="checkbox"/>	<input type="checkbox"/>	Cucumber	<input type="checkbox"/>	<input type="checkbox"/>
Spring onions	<input type="checkbox"/>	<input type="checkbox"/>	Onions	<input type="checkbox"/>	<input type="checkbox"/>
Radishes	<input type="checkbox"/>	<input type="checkbox"/>	Peppers	<input type="checkbox"/>	<input type="checkbox"/>
Spinach	<input type="checkbox"/>	<input type="checkbox"/>	Mushrooms	<input type="checkbox"/>	<input type="checkbox"/>
Watercress	<input type="checkbox"/>	<input type="checkbox"/>	Mustard cress	<input type="checkbox"/>	<input type="checkbox"/>
Beansprouts	<input type="checkbox"/>	<input type="checkbox"/>	Cauliflower	<input type="checkbox"/>	<input type="checkbox"/>
Carrots	<input type="checkbox"/>	<input type="checkbox"/>	Broccoli	<input type="checkbox"/>	<input type="checkbox"/>
Courgettes	<input type="checkbox"/>	<input type="checkbox"/>	Cabbage	<input type="checkbox"/>	<input type="checkbox"/>
Preprepared mixed salad	<input type="checkbox"/>	<input type="checkbox"/>	Fresh Horseradish	<input type="checkbox"/>	<input type="checkbox"/>
Fresh herbs	<input type="checkbox"/>	<input type="checkbox"/>	Other _____		

**DAIRY PRODUCTS**

6.22 Is it likely that that you had any milk (not including milk in tea or coffee) in the **5 days** before the specified date?

Yes  No

If Yes, how many glasses do you think you had each day (this includes cold milk on cereal)?  
In this context a glass is about one third of a pint.

Pasteurised milk \_\_\_\_\_glasses, none   
(full fat, semi skimmed or skimmed)

Sterilised/UHT milk \_\_\_\_\_glasses, none   
(full fat, semi skimmed or skimmed)

Unpasteurised milk \_\_\_\_\_glasses, none   
(direct from a dairy farm)

**PTO**

If you are answering on behalf of your child, please remember that these questions refer to your child and not yourself.

- 6.22 Baby formula milk \_\_\_\_\_ glasses, none   
 cont. (eg SMA, Cow & Gate)
- Other powdered milk \_\_\_\_\_ glasses, none   
 (eg Marvel)
- Goats milk \_\_\_\_\_ glasses, none

- 6.23 Did you consume milk from bottles or cartons that had been pecked by birds in the 5 days before the specified date?
- Yes  No

- 6.23 Is it likely that you ate or drank any of the following dairy products in the 5 days before the specified date? Please tick YES or NO for each products listed.

	Yes	No		Yes	No
Yogurt	<input type="checkbox"/>	<input type="checkbox"/>	Fromage frais	<input type="checkbox"/>	<input type="checkbox"/>
Cheese spread (eg Dairylea, Philadelphia)	<input type="checkbox"/>	<input type="checkbox"/>	Cottage cheese	<input type="checkbox"/>	<input type="checkbox"/>
Hard cheese (eg cheddar, stilton, edam)	<input type="checkbox"/>	<input type="checkbox"/>	Soft cheese (eg, camembert, brie)	<input type="checkbox"/>	<input type="checkbox"/>
Butter	<input type="checkbox"/>	<input type="checkbox"/>	Cream	<input type="checkbox"/>	<input type="checkbox"/>
Milk shake	<input type="checkbox"/>	<input type="checkbox"/>	Ice cream	<input type="checkbox"/>	<input type="checkbox"/>

## SECTION 7 WATER

- 7.1 Is it likely that you drank any of the following in the 5 days before the specified date? If Yes, how many glasses do you think you drank each day? In this context a glass is about one third of a pint.

	Yes	Number of glasses	No
Cold tap water (also when used in cold drinks eg orange squash or Ribena)	<input type="checkbox"/>	_____	<input type="checkbox"/>
Drinks containing ice	<input type="checkbox"/>	_____	<input type="checkbox"/>
Fizzy Bottled water	<input type="checkbox"/>	_____	<input type="checkbox"/>
Still Bottled water	<input type="checkbox"/>	_____	<input type="checkbox"/>
Spring or well water	<input type="checkbox"/>	_____	<input type="checkbox"/>

If you are answering on behalf of your child, please remember that these questions refer to your child and not yourself.

7.2 Do you filter your tap water? Yes  No

### SECTION 8 PETS

8.1 Do you have any pets at home? Yes  No

If you answered Yes, please specify (eg kittens, cats, puppies, dogs, budgies, terrapins etc).

---

8.2 Were any of your pets ill with diarrhoea or vomiting in the 5 days before the specified date?

Yes  No

If Yes, please specify (eg kittens, cats, puppies, dogs, terrapins etc).

---

### SECTION 9 RECREATIONAL ACTIVITIES

9.1 Did you take part in any of the following watersports or related activities in the 5 days before the specified date? Please tick YES or NO for each of the activities listed.

	Yes	No		Yes	No
Swimming	<input type="checkbox"/>	<input type="checkbox"/>	Paddling	<input type="checkbox"/>	<input type="checkbox"/>
Canoeing	<input type="checkbox"/>	<input type="checkbox"/>	Sailing	<input type="checkbox"/>	<input type="checkbox"/>
Rowing	<input type="checkbox"/>	<input type="checkbox"/>	Fishing	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	Please specify	<hr/>	

If Yes, did you swallow any water from any of the following places?

	Yes	No		Yes	No
A swimming pool	<input type="checkbox"/>	<input type="checkbox"/>	A paddling pool	<input type="checkbox"/>	<input type="checkbox"/>
Rivers/lakes or streams	<input type="checkbox"/>	<input type="checkbox"/>	The sea	<input type="checkbox"/>	<input type="checkbox"/>

9.2 Did you do any digging in a garden or allotment in the 5 days before the specified date, please include children planting seeds or playing with soil? Yes  No



9.3 Did you visit any farms in the 5 days before the specified date?

Yes  No

If Yes, is it likely that you touched any farm animals?

Yes  No

If Yes, please specify (eg calves, sheep, chickens etc).

---

9.4 Did you visit any zoos or wildlife parks in the 5 days before the specified date?

Yes  No

If Yes, is it likely that you touched any animals?

Yes  No

If Yes, please specify (eg horses, rabbits, deer, pigeons, turtles etc).

---

9.5 If you are answering on behalf of a child, did he/she play in any of the following places in the 5 days before the specified date? Please tick YES or NO for each places listed.

	Yes	No		Yes	No
A public playground	<input type="checkbox"/>	<input type="checkbox"/>	A sandpit	<input type="checkbox"/>	<input type="checkbox"/>
A park or common	<input type="checkbox"/>	<input type="checkbox"/>			

## SECTION 10 GENERAL HOUSEHOLD DETAILS

The following questions refer to your household as a whole.

10.1 Occupations of other household members. Please include part time or voluntary jobs.

1) \_\_\_\_\_ 2) \_\_\_\_\_  
3) \_\_\_\_\_ 4) \_\_\_\_\_  
5) \_\_\_\_\_ 6) \_\_\_\_\_

10.2 How would you describe the area in which you live?

Rural  Suburban  Urban

10.3 Do you share kitchen facilities with other people, apart from members of your own family

(eg shared accommodation, hostels, halls of residence etc)? Yes  No

10.3 If Yes, how many people, including members of your family, share your kitchen facilities?  
cont. Please tick YES or NO for each group of numbers listed.

	Yes	No		Yes	No
1-5	<input type="checkbox"/>	<input type="checkbox"/>	5-10	<input type="checkbox"/>	<input type="checkbox"/>
More than 10	<input type="checkbox"/>	<input type="checkbox"/>			

10.4 Do you buy frozen meat or poultry? Yes  No

If Yes, where do you usually defrost (thaw) it? Please tick YES or NO for each of the options listed.

	Yes	No		Yes	No
In the fridge	<input type="checkbox"/>	<input type="checkbox"/>	In a microwave oven	<input type="checkbox"/>	<input type="checkbox"/>
On a work surface (covered)	<input type="checkbox"/>	<input type="checkbox"/>	On a work surface (uncovered)	<input type="checkbox"/>	<input type="checkbox"/>

Are there any frozen meat or poultry products that you do not defrost before cooking?

Yes  No  Please specify \_\_\_\_\_

10.5 Do you share toilet facilities with other people, apart from members of your own family  
(eg shared accommodation, hostels, halls of residence etc)? Yes  No

If Yes, how many people, including your family, share your toilet facilities?  
Please tick YES or NO for each group of numbers listed.

	Yes	No		Yes	No
1-5	<input type="checkbox"/>	<input type="checkbox"/>	5-10	<input type="checkbox"/>	<input type="checkbox"/>
More than 10	<input type="checkbox"/>	<input type="checkbox"/>			

**THANK YOU FOR YOUR TIME AND COOPERATION IN COMPLETING THIS QUESTIONNAIRE. YOUR ANSWERS WILL HELP US GREATLY IN OUR EFFORTS TO PREVENT THE SPREAD OF INFECTIOUS DISEASE IN THE COMMUNITY.**

**PLEASE RETURN THE QUESTIONNAIRE IN THE STAMPED ADDRESSED ENVELOPE PROVIDED TO:-**

**Dr G K Adak  
PHLS CDSC  
61 Colindale Avenue  
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**If you have any enquiries about the study please telephone Dr Adak on 0181 200 6868 ext 4551.**

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