



The VTEC operational manual

Operational guidance for HPA staff dealing with cases and incidents of VTEC infection

Part A. Operational guidance for HPUs

Part B. Responsibilities within the HPA for the identification and alerting of individual cases and clusters of VTEC

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Related documents

The companion document to this operational manual is **The VTEC Support Document** – background evidence for the public health management of infection with Vero Cytotoxin-producing *E. coli* (VTEC).

HPA Incident and Emergency Response Plan

Laboratory National Standard Methods

Superseded documents

Together, this VTEC Operational Manual and the VTEC Support Document supersede and replace previous operational guidance, including:

Guidelines for the control of infection with Vero cytotoxin Producing *Escherichia coli* (VTEC) – published in 2000 by the PHLS Advory Committee – GI Infections.

HPA criteria for reopening farms affected by *E. coli* O157, September 2009

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Abbreviations

CPHM	Consultant in Public Health Medicine
CHP	Consultant in Health Protection
CCDC	Consultant in Communicable Disease Control
Cfi	Centre for Infections
DEFRA	Department for Environment, Food and Rural Affairs
EH	Environmental Health
<i>E.coli</i>	<i>Escherichia Coli</i>
EHO	Environmental Health Officer
ELISA	Enzyme-linked immuno-sorbent assay
ESQ	Enhanced Surveillance Questionnaire
FSA	Food Standards Agency
FWEL	Food, Water and Environment Laboratory
GEZI	Gastrointestinal, Emerging and Zoonotic Infections
GI	Gastrointestinal
GP	General Practitioner
HPA	Health Protection Agency
HPP	Health Protection Practitioner
HPU	Health Protection Unit
HQSD	High Quality Service Development
HSE	Health and Safety Executive
HUS	Haemolytic uraemic syndrome
ICT	Incident Control Team
IgM	Immunoglobulin M
IMS	Immuno-magnetic separation
ICN	Infection Control Nurse
IERP	HPA Incident and Emergency Response Plan
IRIS	HPA Incident Reporting & Information System
LARS	Local and Regional Services
LA	Local Authority
LGP	Laboratory of Gastrointestinal Pathogens, Colindale
NSAID	Non-steroidal anti-inflammatory drug
NSF	Non-sorbitol fermenting
OCT	Outbreak Control Team
PCR	Polymerase Chain Reaction
PCT	Primary Care Trust
REU	Regional Epidemiology Unit
RMN	Regional Microbiology Network
RMP	Registered Medical Practitioner
SF	Sorbitol-fermenting
TMA	Thrombotic microangiopathy
TTP	thrombotic thrombocytopenic purpura
VLA	Veterinary Laboratories Agency
VTEC¹	Verotoxigenic <i>Escherichia coli</i>

¹ The term VTEC refers to all strain of *E. coli* that produce Verocytotoxin (VT) or possess VT genes. VTEC of serogroup O157 are the most common type in the UK and are the only VTEC for which routine standard tests are performed in diagnostic laboratories. A small number of other VTEC are isolated from infections in England and Wales, generally in the Reference Laboratory (LGP) and they should not be ignored. However 'VTEC' as referred to in this document will in practice refer almost exclusively to VTEC O157.

Part A.

Operational guidance for HPUs

1. BACKGROUND AND INTRODUCTION

The purpose of this document is to support appropriate action by staff of the HPU to protect the public health from the consequences of infection with VTEC O157 or other VTEC strains. It is intended as a supplement to, rather than a replacement for, professional judgement.

All cases of VTEC must be dealt with as a matter of urgency; prompt action can prevent further cases associated with a primary source and interrupt secondary transmission. HPU out-of-hours arrangements must have the capacity to manage the initial public health reporting and response to VTEC infections and to respond appropriately to developments that occur outside working hours.

There may be significant local differences in relation to sharing of responsibilities with Environmental Health and other partner agencies, and in availability of Environmental Health Officers outside of working hours. There should be written local agreements on responsibilities in place, which can be added to HPZone by HPUs in 'Local Support Materials'.

VTEC outbreaks will be managed within the general procedures of the HPA's Incident and Emergency Response Plan (IERP) and HPU outbreak plans. The HPU should have robust handover arrangements in place, during and out of working hours.

VTEC reporting and notification:

HPUs should liaise with NHS laboratories and other partners to ensure that arrangements are in place for the prompt clinical and laboratory notification of VTEC during and outside working hours, and that all relevant organisations are informed of their responsibilities. Notifications of VTEC O157 or other suspect VTEC should be treated as urgent, and reported within 24 hours of clinical suspicion or laboratory isolation.

The initial notification to the HPU will usually come from a GP, hospital clinician, or microbiology laboratory. Haemolytic Uraemic Syndrome and infectious bloody diarrhoea are notifiable by Registered Medical Practitioners (RMP) under the Health Protection (Notification) Regulations 2010².

Laboratories are required to report presumptive isolates of VTEC O157 and any other suspect VTEC to HPUs, with effect from 1st October 2010. The definition of a "presumptive isolate" of VTEC O157 is stated in Section 4.3 of the **VTEC Support Document**.

² Department of Health. Health Protection Legislation (England) Guidance 2010. Available at: www.dh.gov.uk/publications

2. CASE DEFINITIONS FOR PUBLIC HEALTH ACTION

VTEC case definitions for public health management are based on a combination of clinical, epidemiological and laboratory findings.

Table 1: VTEC case definitions

	Clinical features	Epidemiological link to CONFIRMED VTEC case or source	Laboratory findings (see Sections 4.3 and 4.4 of the VTEC Support Document)	Action required
Possible	Acute non-bloody diarrhoea	Present	Awaiting lab testing	Initiate or complete testing at local lab
	Acute non-bloody diarrhoea	Absent	Local lab testing incomplete. Isolate has the following characteristics: <ul style="list-style-type: none"> - POSITIVE typical colony morphology on appropriate selective medium - POSITIVE O157 (by slide agglutination OR latex kit) - AWAITING biochemical identification of <i>E. coli</i> 	Complete assessment for epidemiological links³
Probable	Acute non-bloody diarrhoea	Present	Local lab testing incomplete. Isolate has the following characteristics: <ul style="list-style-type: none"> - POSITIVE typical colony morphology on appropriate selective medium - POSITIVE O157 (by slide agglutination OR latex kit) - AWAITING biochemical identification of <i>E. coli</i> 	Initiate public health actions (A-C in Box 1) Initiate or complete confirmatory testing
	Acute bloody diarrhoea	Present	Awaiting lab testing	
	Acute bloody diarrhoea	Present or absent	Local lab testing incomplete. Isolate has the following characteristics: <ul style="list-style-type: none"> - POSITIVE typical colony morphology on appropriate selective medium - POSITIVE O157 (by slide agglutination OR latex kit) - AWAITING biochemical identification of <i>E. coli</i> 	
	Symptomatic or asymptomatic	Present or absent	Local lab isolate identified as "presumptive (locally confirmed) <i>E. coli</i> O157" <ul style="list-style-type: none"> - POSITIVE typical colony morphology on appropriate selective medium - POSITIVE O157 (by slide agglutination OR latex kit) - POSITIVE biochemical identification of <i>E. coli</i> 	
	HUS without known alternative aetiology	Present or absent	Awaiting lab testing	
Confirmed	Symptomatic or asymptomatic	Present or absent	Reference lab (Laboratory of Gastrointestinal Pathogens, Colindale) confirmed isolate <ul style="list-style-type: none"> - POSITIVE confirmation of <i>E.coli</i> - POSITIVE O157 or other O-serogroup - POSITIVE genes for Vero cytotoxin 	Initiate or continue public health action
	HUS	Present or absent	Reference lab (Laboratory of Gastrointestinal Pathogens, Colindale) POSITIVE serological evidence of infection with <i>E. coli</i> O157 or other VTEC (presence of antibodies to O-antigen)	

³ Some public health action may be initiated at this stage if considered appropriate by local teams.

3. IMMEDIATE ACTION - to be taken on the day of notification of a single case

The aim of public health management of single cases of VTEC is to undertake prompt action to prevent further cases associated with a primary source and interrupt secondary transmission. Full public health action is required for probable or confirmed cases of VTEC. Possible cases require further laboratory testing, or epidemiological assessment.

These actions should be started on the day of notification or as immediately as possible. Every effort should be made to complete these actions on the same day, although actual time scales may vary depending on the specific circumstances.

Actions should be reviewed daily.

Box 1: The immediate priorities for action on the day of notification are to:

- A. Obtain information and conduct a risk assessment:
 - Identify any linked cases resulting from common exposure or secondary spread. Define the case(s) as possible, probable or confirmed (see Table 1).
 - Identify associated contacts. Determine whether there are any contacts in vulnerable groups, or whether any are in risk groups A-D (Box 2). Assess the risk of secondary transmission;
 - Identify possible source or vehicle of infection. Assess the risk of continued exposure;
 - Check for links to known or suspected outbreaks.
 - Ensure laboratory investigations arranged
 - Initiate or complete laboratory microbiology investigations in cases or other symptomatic persons with shared exposures, symptomatic contacts, and contacts in risk groups A-D (Box 2)
 - Consider additional microbiological sampling, for example food, water, animal
- B. Implement control measures to prevent further primary cases and secondary transmission
 - Hygiene and infection control
 - Source or vehicle
 - Exclusions and clearance
- C. Communicate with relevant organisations and persons:
 - Affected persons and the public
 - Health, environmental health and other professionals
 - Media
- D. Review risk assessment and actions on an ongoing basis, initially at least daily

Box 2: High risk groups for ongoing transmission

Group A: Any person of doubtful personal hygiene or with unsatisfactory toilet, hand-washing or hand drying facilities at home, work or school. Particular consideration should be given as to whether individual infant-school-aged children (aged 6 or 7 years) are able to satisfactorily observe good personal hygiene. Health protection personnel (LA and HPU) should agree locally on how to make this assessment in engagement with parents or teachers/carers.

Group B: All children aged 5 years old or under, including those who attend school, pre-school, nursery or other similar child care or minding groups.

Group C: People whose work involves preparing or serving unwrapped food to be served raw or not subjected to further heating.

Group D: Clinical, social care or nursery staff who work with young children, the elderly, or any other particularly vulnerable persons, and whose activities increase the risk of transferring infection via the faeco-oral route. Such activities include helping with feeding, or handling objects that could be transferred to the mouth.

Each of the items (A to D) outlined in Box 1 are described in more detail below:

A. OBTAIN INFORMATION AND CONDUCT A RISK ASSESSMENT

The local HPU is responsible for the risk assessment. The individual actions required to complete the risk assessment may be carried out by the HPU or the local Environmental Health Department, depending on clearly agreed local arrangements.

Obtain case information: name, date of birth, full contact details including address and phone, GP details, current location (home, hospital, ward)

Obtain clinical and laboratory details:

- Clinical condition, including HUS
- Specimens collected (blood, stool) and results

Interview the case, or, if appropriate a relative, household member or close friend with adequate knowledge to obtain a detailed history for the seven days prior to illness⁴ using the **HPA VTEC Enhanced Surveillance Questionnaire (ESQ)**.
http://www.hpa.org.uk/web/HPAweb&HPAwebStandard/HPAweb_C/1246952918295.

Note particular factors suggesting ongoing source of primary exposure, or factors associated with increased risk of secondary transmission, for example:

- Employment details: food handler, healthcare worker
- Childcare, nursery or school details
- Travel history or time away from home in past seven days

⁴ Although the incubation period may be longer than seven days, this is very uncommon. It is usually three to four days. So, including potential exposures in the seven day period before symptoms should capture most potential exposures. In rare cases at the discretion of the investigating team, it may be considered useful to extend the history beyond the 7-day period up to 14 days, such as if a cluster is suspected but no common sources are identified in the 7 days preceding symptoms. This could be through retrospective re-interview if appropriate. For cases of HUS, exposures prior to the onset of preceding diarrhoea should be sought.

Obtain information about **household members or close contacts**:-

- Attendance of any children in the household at a pre-school nursery, school, or similar facility. Note name and contact details of institution.
- The occupation or relevant hobbies of all members of the household, especially if they have close contact with farm animals or manure.

Determine whether any household contacts are in high risk groups for ongoing transmission (see Box 2).

Email or fax the ESQ (according to local agreement) to named people at the Regional Epidemiology Unit (REU) and HPA (Gastrointestinal and Emerging Infections) the same or the next working day if out of hours.

Define the case(s) as possible, probable, or confirmed (see Table 1)

- Document the case definition clearly in HPZone, and keep under review.
- When communicating with the case, family, or professionals use the correct term (POSSIBLE, PROBABLE or CONFIRMED), so that they are aware that the case may not yet be confirmed. .

Record-keeping: Every case of VTEC should be logged on HPZone in a timely manner as a matter of routine. Any exposures identified in the questionnaire should be entered as a 'context' on HPZone.

Check for links to known or suspected outbreaks

Checking for links to known or suspected outbreaks requires work across all levels of the HPA.

Part B of this Operational Manual gives more detailed information on responsibilities of the HPA for the identification and alerting of VTEC cases and clusters at local, regional and national level.

HPUs should:

- Ensure that any relevant cases and possible exposures are reported promptly to national and regional surveillance systems and to local authority environmental health departments.
- Urgently notify other HPUs of possible exposures that may have occurred in another HPU area and ensure that the local authority notifies the appropriate local authority - see item E, on communications, below.
- Check for associated VTEC cases, common exposures and potential outbreaks by reviewing previous cases/situations on HPZone, and, if appropriate, checking relevant HPA databases such as IRIS (the HPA Incident Reporting & Information System) to determine if other cases have reported similar exposures.

HPA, GEZI is responsible for:

- Regularly reviewing and analysing
 - Reports and ESQs from local HPUs, REUs and RMN/LGP
 - National surveillance data

- International incident alerts and reports, including those from the devolved administrations.
- Alerting
 - LaRS, RMN and other HPA Divisions as appropriate of VTEC clusters and outbreaks
 - ECDC of incidents that might have international significance.

If there are two or more linked probable or confirmed cases outside a household setting, convene an outbreak control team urgently, within 24 hours unless initial investigations provides strong evidence that the cases have a different source (see section 4).

Ensure laboratory samples are arranged

Arrange faecal sampling of household members or close contacts who are ill, either via their GP or the EHOs. Stool specimens should be sent to the relevant local laboratory and the laboratory should be fully informed of why they are being sent.

For presumptive (locally confirmed) isolates, liaise with the local laboratory to ensure that the isolates are forwarded to the HPA Laboratory of Gastrointestinal Pathogens (LGP) for confirmation of identity, the presence and type of VT genes and phage typing.

Note that reports from the LGP will be sent back to the reporting local lab and will be available via the web-based reporting from HPA.

If a clinically suspicious case (e.g. child with HUS) has negative stool samples at the local laboratory level, liaise with the local microbiologist and the LGP to ensure that a serum sample is sent for testing for the presence of antibodies to the surface antigen of *E. coli* O157 and a limited range of other VTEC. Negative stool samples may be sent to the LGP for testing by culture and PCR methods.

In the event that a presumptive isolate of *E. coli* O157 is negative for VT genes, public health action such as screening and exclusions should not be automatically discontinued. The HPU should review the risk assessment, taking account of the total clinical and epidemiological circumstances. Advice should be sought from the reference laboratory on the pathogenicity of the strain, which will also take account of phage typing and surveillance questionnaires and follow up of similar strains. In some cases it may be deemed suitable to discontinue public health action provided that the usual 48 hour symptom free exclusion criteria is applied to a symptomatic person. However, HPUs may decide to continue public health action on the basis of their risk assessment, particularly if the situation is linked to a case of HUS.

Additional microbiological investigation may be required depending on the particular setting, for example testing of environmental, food and animal samples. However, this would usually only be appropriate if there is more than one linked case. For additional testing of human specimens contact the Consultant Microbiologist at the Regional HPA laboratory or the local RMN collaborating laboratory and for food, water or environmental samples the nearest RMN FW&E laboratory.

B. IMPLEMENT CONTROL MEASURES TO PREVENT FURTHER PRIMARY CASES AND SECONDARY TRANSMISSION

Hygiene and infection control measures apply to all gastrointestinal disease and many other pathogens. They should ideally be in place even in the absence of a case of VTEC infection and should be applied whether or not cases and contacts are excluded. Ensure cases and contacts are given appropriate verbal and written information about VTEC/VTEC O157 and good hygiene practice.

The control of the source of infection will depend on what source is suspected. **Further details on investigation and management of potential sources and vehicle are provided in 5.3 of the VTEC Support Document.** More details for outbreaks in open farms and nursery/school settings are in Sections 5 and 6 below.

Exclusions and microbiological clearance:

All cases and contacts should be assessed to determine whether they require exclusion and/or testing for microbiological clearance.

A contact is any person who is believed to have had significant risk of direct or indirect exposure to the excreta of an infectious person. Examples of people who may be considered contacts are given below:

- A person living in the same household as the index case or regularly sharing food or toilet facilities with the index case during the infectious period, e.g extended family members who frequently visit the household and childminders and their families.
- A person who has regularly eaten food prepared by the index case during the infectious period, or who ate food prepared by the index case on a single occasion during the infectious period if there is concern about the hygiene practices of the index case or if the index case had diarrhoea at the time of food preparation.
- Any person who has been involved in nappy changing or assistance with toileting of the index case during the infectious period, if the index case is a child in nappies or requiring assistance with toileting.

In each circumstance, undertake a risk assessment to determine whether the case or contact is at particular risk of spreading infection by the faecal-oral route, and determine the risk group classification of each case and contact (Box 2). Decisions about risk, exclusion and timing of microbiological clearance can be highly dependent on specific local circumstances.

Recommendations for exclusions and microbiological clearance for cases and contacts are shown in Box 3 and further detail is provided in Section 5.1.3 of the VTEC Support Document.

Agree with EHOs and clinicians responsibilities for faecal sampling, exclusion and microbiological clearance, follow up of results, and other control measures.

Excluded individuals should be requested to avoid all situations with potential for infection transmission, such as schools and play areas for children, or relevant occupational activities such as food handling.

Box 3: Summary of recommendations for exclusions and microbiological clearance

CASES [see also Section 5.1.3 of the VTEC Support Document]

Risk Group A – D*:

- Exclude until two negative results of faecal specimens taken at intervals of not less than 24 hours are obtained. The first clearance samples should not be taken until 24 hours after symptoms have ceased.
- Emphasise the need for good personal hygiene

Not in risk group:

- Exclusion until 48 hrs after first normal stool.
- Emphasise the need for good personal hygiene and consider isolation during acute diarrhoeal phase if feasible.

CONTACTS [see also Section 5.1.3 of the VTEC Support Document]

In Risk Group A-D* - with or without symptoms

Exclude until microbiologically clear (two clear stool samples at least 24 hours apart.) If stool sample is positive for VTEC **treat as a new VTEC case**, taking all the appropriate actions for cases in risk groups.

Not in Risk Group – suspicious symptoms Microbiological testing recommended (one stool sample) and exclude until results available. If positive for VTEC treat as case in a non-risk group.

Not in Risk Group – asymptomatic

No routine testing/exclusion. However, an individual risk assessment should be carried out to determine whether screening such asymptomatic contacts would be appropriate.

**Risk groups described in Box 2*

C. COMMUNICATE WITH RELEVANT ORGANISATIONS AND PERSONS

The HPU will need to agree and task the public health actions which will be undertaken by or with other agencies and professionals, for example local authority EHOs, GPs, laboratories and others. The HPU will need to communicate and liaise effectively and ensure actions are undertaken.

Communications should be documented, including e-mails, fax and telephone calls. All routine precautions should be taken to ensure security and confidentiality of information. Confirmation of receipt of faxes and e-mails should be requested.

i. **Families and contacts:** Ensure cases, their families and household contacts are given appropriate information about VTEC/VTEC O157 and good hygiene practice. The HPA website is a useful source of information.

<http://www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/EscherichiaColiO157/>

Asymptomatic contacts should be advised to seek attention if they develop symptoms.

ii. Professionals

Ensure that the case's GP is aware.

Inform local laboratory: Stool specimens must be sent to the appropriate local laboratory and the laboratory must be fully informed of why they are being sent.

If local EHOs not already involved, inform them of the case and fax/email a copy of the ESQ to them. Discuss and agree full plans for:

- microbiological clearance specimens and exclusions for cases and contacts in risk groups
- investigation of potential sources of exposure
- onward communication within the local authority, or with other local authorities as appropriate. For example, for cases resident outside the investigating HPU area (for example for education and childcare settings, care homes within a local authority area or the case is resident in another local authority area)

Report to REU and HPA national surveillance systems.

Inform other HPUs and REUs if exposures have occurred outside the area of the investigating HPU. Task the other HPU to inform and liaise with the relevant local authority.

Other agencies: Depending on the likely risk factor identified for a case (or cluster), contact the relevant agency. A variety of organisations may need to be involved and may have fundamentally crucial roles. Full details of any implicated setting should be recorded and passed on to others involved in managing the public health response. These include:

- **Child care settings:**
 - If a probable or confirmed case aged 5 years or under attended their pre-school, nursery or infant school in the 7 days prior to onset, or while symptomatic, **contact the institution** to find out if any others in the same class have had diarrhoea.
 - Appropriate enquiries at the preschool nursery or day care facility should be made to ascertain the possibility of an outbreak. Children with recent diarrhoea (in the previous 7 days) should be identified and faecal samples obtained. Consider whether it is appropriate to write to parents of children in the same class to inform them that there has been a case of VTEC in the class and give relevant advice (in consultation with nursery manager or head teacher).
 - Appropriate advice should also be given to support hygiene measures in the school. Supervised hand washing of children in nurseries and infant schools is recommended where there has been a single case who attended a nursery class while symptomatic or during the incubation period for at least 7 days.
 - Liaise with local authority to ensure coordinated approach.
 - Note that secondary spread of VTEC has occasionally been observed in infant school settings in children over the age of five. HPUs should consider these settings carefully.
- **Open farms:** If the case had any exposure to an open farm within the 7 day exposure period, inform the REU, GEZI, and urgently consider need to inform relevant non-HPA organisations and appropriate HPU if farm in a different area. More detailed information is in Section 5 below.

- **Utility companies:** e.g. where the water supply is implicated
In settings such as care homes or food businesses, and environment-related also including water-borne: work with the Local Authority and Primary Care Trust to confirm source of infection, identify and agree control measures, including any necessary additional microbiological investigation e.g. testing of food. Water and environmental samples by the RMN FW&E laboratory and animal samples by the local State Veterinary Laboratory.
- **LA, HSE and DEFRA:** A single case with a weak association to an Open Farm (for example, the Open Farm was one of several plausible sources) may prompt a telephone call by the Local Authority to the farm to alert them to the possibility of a developing situation. Organisations that may be involved will be the relevant Local Authority and include HSE and DEFRA. Particular advice relating to Open Farms is provided in Section 5 (below).
- **Veterinary Laboratories Agency (VLA):** If there are reasonable grounds to suspect linkage with a particular herd or farm (e.g. 2 or more linked cases), the Veterinary Laboratories Agency should be contacted and consulted about risk and on-site investigations.
- **Food Standards Agency (FSA):** Liaison with the FSA is required if infections are identified as associated with the production and distribution of contaminated food items.
- **Health care settings:** An example is a situation in which a healthcare worker continues to work in a healthcare setting whilst symptomatic with *E. coli* O157.

Key steps to be considered are:

- Rapid intervention for prevention of spread as soon as the situation comes to light
- Early identification of secondary cases
- Assess risk to patients and staff
- Decision on the need for surveillance and testing

iii. Media

Inform the communications department especially if there are particular features about a case that may attract external comment, such as death, association with other cases, or socially sensitive settings e.g. schools or nurseries.

D. REVIEW AND CONSIDER FURTHER ACTION

Information, investigation and control measures should be reviewed on a regular basis, initially at least daily.

4. OUTBREAKS

An outbreak must be suspected to have occurred if two or more probable or confirmed linked cases outside a household setting have been identified unless initial investigations provides strong evidence that the cases have a different source.

All VTEC outbreaks must be investigated and managed according to standard outbreak control procedures in HPU outbreak control plans, and in accordance with the HPA IERP. A risk assessment must inform and direct actions including escalation.

All incidents where there are two or more linked cases or where there is a suspected outbreak outside a household setting should be entered onto **IRIS** (Level 1).

This section considers outbreak measures specific to VTEC. **If the outbreak or cluster is associated with an Open Farm**, in addition follow the specific guidance in Section 5 of this document. For guidance on support from the RMN please see the Supporting document: "The Role of RMN Laboratories in the Investigation of Outbreaks."

Establish Outbreak Control Team (OCT) with a remit to:

- 1) Establish whether an outbreak has occurred
- 2) Identify and control the source
- 3) Identify all associated cases
- 4) Prevent secondary cases
- 5) Minimise the harm from this outbreak
- 6) Ensure lessons are learnt to reduce risk of further episodes
- 7) Report writing and dissemination to all stakeholders after the outbreak.

The group should include representation from the PCT, the Regional HPA Laboratory, the local microbiologist, the Local Authority and HPA (GEZI and LGP). Representatives from other agencies such as the Veterinary Laboratories Agency, Health and Safety Executive and Food Standards Agency. will depend on the particular situation.

All OCT meetings must be minuted. All OCT actions must be recorded and assigned to named individuals, with a deadline for completion.

Agree **communications** strategy including identification of a lead officer and media spokesperson.

Establish case definition and set up active case finding within the HPU area.

Alert REU, the local PCT, Epidemiology Services and GEZI. Report the outbreak on IRIS.

Discuss laboratory typing results with the Consultant Microbiologist at the HPA Regional Laboratory and/or the LGP, and arrange for molecular typing to compare isolates from human and non-human sources.

Enforcement actions. The requirement for appropriate enforcement actions as part of control measures should be considered for settings such as:

- food businesses;
- farms;

- zoos;
- and environment-related including water-borne,

The responsibility for any necessary action will need to be discussed with relevant bodies with enforcement powers such as the Local Authority and the HSE, and should be clarified on a situation by situation basis.

Consider the need for analytical epidemiological investigation drawing on expert advice as required.

Consider any necessary arrangements for longer term follow up or monitoring.

5. SPECIAL OUTBREAK SETTING: OUTBREAKS ASSOCIATED WITH OPEN FARMS

INTRODUCTION

The measures outlined in this section are specific to outbreaks associated with open farms, and additional to the core measures adopted for the management of VTEC cases for all sources.

The **objective** is to ensure public protection; minimising the number of primary and secondary cases and reducing harm to individuals, families and communities.

The **HPU's responsibilities** are to help lead and co-ordinate the outbreak management; provide key partners with professional advice; and work with partners to direct support where required.

Key partners may include the Local Authority; HSE; VLA/DEFRA; FSA; and other HPA divisions, particularly Regional Microbiology Network and Gastrointestinal, Emerging Zoonotic Infections/LGP/ Food Water Environmental Laboratory. Acute hospitals may be involved, and there may be other HPUs throughout the country with patients who have visited the farm or their contacts. The confidence and cooperation of the implicated Open Farm is vital.

ACTIONS

Priority actions (within 24 - 48 hours)

If initial risk assessment supports the likelihood that there are linked cases (i.e. two or more suspected cases) associated with an open farm:

Inform the Local Authority (LA) and all required HPA levels and other relevant partners. The local authority (or HSE) should contact the implicated farm to advise them of the problem, arrange an urgent visit to the farm and discuss initial control measures.

Convene a formal Outbreak Control Team meeting or teleconference as soon as possible. Outbreak Control Team (OCT) members should include HPU, RMN, LA, HSE, VLA/DEFRA, GEZI, PCT, communications/media, and any other organisations that may be germane to the particular setting. Some urgent actions may occur before an outbreak control team meeting is convened.

Urgent control measures should include:

- a. Immediate restriction of public access to animals: This is crucial in minimising risk to public and can be implemented reasonably easily
- b. Immediate steps to minimise contact of persons with animal faecal matter: The OCT should advise and liaise with farm managers to take all practical steps to minimise public contact with animal faecal matter – recognising that complete avoidance is impractical in a farm environment. It may be useful to discuss restricting access to any areas of the farm where contamination is more likely.
- c. **Farm closure** may be considered, depending on the risk assessment. Local authorities are responsible for enforcement. It is important that clear criteria for reopening a farm should be carefully discussed and agreed if any closure action is initiated. Further information on considerations for criteria for reopening farms is provided in Box 4.

Key points in risk assessment include:

- Context of the outbreak
- Seriousness of illness
- Spread of infection
- Confidence in hypothesis (has VTEC/VTEC O157 been confirmed in the LGP and what is the strength of association with a particular Open Farm, as many of the exposed will also have other possible risk exposures).

Incident may come to light out of hours and/or there may be developments outside normal working hours. Staff on call should have access to guidelines and have confidence in calling on additional resources if required. There should be local arrangements for out of hours contact with the Environmental Health Department.

Seek additional information: There should be:

- active case finding (e.g. through the local health community, neighbouring HPUs and GEZI);
- further epidemiological analysis as required;
- microbiological sampling from farm animals and the farm environment;
- monitoring of the running, range of activities, visitor numbers and physical layout of the farm as long as the outbreak remains open.

Communications and media: A media and communications approach should be in place and agreed between stakeholders.

Ensure that all good practices established in HSE Agriculture Information Sheet 'Avoiding ill health at Open Farms – Advice to farmers (with teachers' supplement)' AIS23 are complied with. Ensure there is effective action to remedy any areas that are not compliant.

Review of mitigation steps in operation: Confirm mitigations steps are being taken and that they work as intended.

Provide LA and/or HSE with continuing support in any enforcement actions.

Later action – time scale as appropriate to situation

Decide when criteria have been reached for withdrawing any temporary mitigation steps. For this to happen the following must be in place:

- Confidence that no new cases associated with the Open Farm are being identified (this may be a lengthy and demanding process that may require review of ESQs from a broad area as visitors to the farm may be widespread)
- Confidence that all long term mitigation steps, such as signage, wash basins, hot water and layout changes are in place, or are being implemented to an agreed time frame.
- Confidence that the farm complies with HSE guidance paying particular attention to advice on hygiene and supervision of children washing their hands after any animal contact.
- Visitors are advised on risks and what they should do and not do and how they can protect themselves

If closed, farm re-opening should be considered as and when appropriate (refer to HSE and HPA guidance).

Provide LA and/or HSE with continuing support in any enforcement actions or prosecutions.

Closure of outbreak: When all public health actions are implemented and no new cases have arisen during the maximum incubation period following mitigation steps, i.e. 14 days (see Section 2.1 of the **VTEC Support Document**).

Production of outbreak report: The report should outline the outbreak's epidemiology, lessons identified and recommend appropriate action. Implementation of any changes should be allocated to named persons with a time scale for completion and further review.

Box 4: Criteria for re-opening farms affected by VTEC, where farm closure considered

The outbreak control team may wish to consider the following issues when developing criteria for re-opening farms affected by VTEC (where closure considered):

The results of any inspections from regulatory bodies (LA or HSE) on the farm's compliance with HSE guidance *Avoiding ill health at open farms – Advice to farmers* [with teachers' supplement]) (<http://www.hse.gov.uk/pubns/ais23.pdf>) including the advice on:

- The availability and location of suitable hand washing facilities;
- Supervision of children washing their hands after any animal contact;
- Preventing the access of animals to picnic and play areas, and other measures to minimise contamination;
- Suitable cleaning and disinfection of animal quarters;
- On-site food production, kiosks, and other local risk factors.

Information leaflets and posters on VTEC are available and clearly displayed on the farm, including the importance of good hygiene, and supervision of children.

Consideration should be given to awaiting the final results of all investigations where:

- Significant breakdown in existing hygiene measures, exposure beyond the scope of those hygiene measures, or unrecognised factors might have played a role in the transmission of infection;
- There is high level of concern, as when there has been unusual illness severity.

6. SPECIAL OUTBREAK SETTING: OUTBREAKS IN NURSERIES AND PRIMARY SCHOOLS

INTRODUCTION

The measures outlined in this section are specific to outbreaks associated with childcare nurseries and infant schools, and additional to the core measures adopted for the management of VTEC cases for all sources.

Key partners: The cooperation of the nursery/school is vital, including early engagement with the Head Teacher, key staff, and parents. Other key partners include the LA (particularly the education/early years department and environmental health department) and other HPA divisions (particularly RMN and GEZI). The local PCT (and other NHS bodies including GPs and hospitals) should be involved as appropriate. Consider the need to involve other HPUs if children who attend the institution live in other HPU areas.

ACTIONS

Priority actions (within 24 - 48 hours):

If an initial risk assessment reveals that there are linked cases (i.e. two or more probable or confirmed cases not from the same household/domestic setting) associated with a nursery or infant school this would suggest an outbreak.

An Outbreak Control Team meeting or teleconference should be convened as soon as possible, usually within 24 hours. Outbreak Control Team members should usually include the HPU, the LA (EHD and children's services), GEZI, PCT, public health microbiologist, communications/media, and any other relevant organisations. Engagement of the Head Teacher or a representative of the nursery or school will be critical in ensuring successful response, although if this person is a member of the outbreak team, consideration should be given to whether this association may compromise later enforcement actions. The decision to invite school representatives to OCT meetings may be reviewed as the outbreak progresses.

Some urgent actions may occur before an outbreak control team meeting is convened.

Key points in risk assessment include:

- Confidence that an outbreak linked with the institution has occurred
 - Has VTEC/VTEC O157 been confirmed in the LGP?
 - What is the strength of association with the particular nursery/school (e.g. is there another common source of potential exposure)?
- Any initial hypotheses about the source of infection
 - Does the initial distribution of cases / epi curve suggest a point source, ongoing source and/or person-to-person transmission?
 - Are there any factors suggesting a potential common source within the institution? (e.g. school food, school trips)?
 - What are the links between the affected children *within* the institution? (e.g. same class/year group, common toileting facilities etc.)
 - Are there any links between the affected children *outside* the institution? (e.g. social networks outside of school, attendance at parties etc.)

- Likelihood of ongoing person-to-person transmission and initial assessment of population at risk, taking into account the following:
 - Person-to-person spread is particularly common amongst children aged 5 years and under, and the vast majority of institutional outbreaks with person-to-person transmission involve children of this age (see VTEC supporting document section 2.2, page 7)
 - Person-to-person spread can occur through direct physical contact, or through environmental contamination. To assess the risk of transmission, obtain and inspect details of mixing patterns between classes/year groups, sharing of toys and other equipment, and the physical layout of the institution, including use of play areas, dining and toileting facilities, and kitchens and food preparation areas.
 - In addition, identify if there are links between affected children and other schools and childcare settings including after-school clubs and child minders.

To aid the risk assessment an urgent visit to the institution should be arranged (usually a joint visit between the HPU and EHO as HPUs will not have power of entry) to include a preliminary inspection of the school layout and toilets, eating areas and food preparation areas.

Potential control measures to prevent further primary infection or secondary spread:

- Exclusion and microbiological clearance of cases in risk groups
- Exclusion and microbiological testing of any symptomatic children and staff
- If the risk assessment suggests that there is risk of ongoing environmental or person to person transmission it is advisable to undertake microbiological screening and exclusion of asymptomatic contacts within the population at risk (the definition of the population at risk should be reviewed at regular intervals)
- Improved hand hygiene within the institution – which may include supervision of children washing their hands, especially for children aged 5 and under and in relation to toilet use/nappy changes/meal times.
- Provide written information to parents informing them of the situation and control measures, and advising reinforced hygiene measures within the home
- Environmental control e.g. increased cleaning and decontamination, especially of high risk surfaces, toys, toilets and eating facilities. Consider need for a deep clean
- Changes to food preparation arrangements if any deficiencies identified
- Closure of part or all of the institution may be advisable if the risk assessment suggests there is a risk of ongoing environmental or person to person transmission. This option should be considered by the Outbreak Control Team. It should be noted that the OCT can make this recommendation but it will be the decision of the enforcing authority how this recommendation is implemented. If deemed necessary, voluntary closure may be the first option. Local authorities are responsible for any enforcement measures. If any closure action is initiated clear criteria for reopening a nursery/school should be agreed.

Seek additional information, including:

- active case finding (e.g. through the local health community, including GPs and A&Es, paediatric wards, local education and early years networks, neighbouring HPUs and GEZI);

- further epidemiological analysis, including the conduct of an analytical epidemiological study as required;
- if required, environmental sampling from nursery/school;

Communications and media: A media and communications approach should be in place and agreed between stakeholders. There is likely to be considerable concern amongst parents, so consider holding a meeting for parents early in the outbreak management process.

Ensure that appropriate levels of hygiene are maintained: HPA 'Guidance on Infection Control in Schools and Other Child Care Settings' should be complied with. Ensure there is effective action to remedy any areas that are not compliant.

Subsequent and further action:

Consider what control mitigation measures may be required, including physical changes to the layout or provision of wash basins and toilets

Provide LA with continuing support and relevant evidence needed for any enforcement actions.

Later action (time frames as considered appropriate):

Decide when criteria have been reached for withdrawing any temporary control measures. For this to happen the following must be in place:

- Confidence that no new cases associated with the nursery/school have been identified
- Confidence that all long term control measures are in place, or are being implemented in an agreed time frame.
- If closed, re-opening of the nursery/school should be considered at the earliest stage that it is considered safe and practicable and with advice from the relevant enforcing authority if necessary.

Provide LA with continuing support and relevant evidence needed for any enforcement actions.

Closure of outbreak: When all public health actions are implemented and no new cases have arisen during the maximum incubation period following mitigation steps, i.e. 14 days (see Section 2.1 of the **VTEC Support Document**).

Part B

Responsibilities within the HPA for the identification and alerting of individual cases and clusters of VTEC

Level / Units	Responsibilities	Methods
Local Level: HPU	Identification of linked cases within own HPU area	<p><u>Day-to-day</u> scrutiny & review of cases/situations reported to HPU, including risk factors and premises implicated. With single cases, check for links with other recent cases. Continually update records as received, including lab results.</p> <p><u>Weekly</u> review of surveillance data, noting unusual increases and agreeing further investigation/action.</p>
	Vigilance for situations with escalation potential	<p>Take note of briefings & alerts from other areas regarding cases/outbreaks and remain vigilant for cases within own area.</p> <p>Vigilance includes a need for HPUs to have full, current, and easily accessible contact details of relevant key individuals and organisations at all levels, to ensure prompt and effective communications when required. These details should be equally readily available out-of-hours.</p>
	Alerting: Onward reporting	<p>Complete and send Enhanced Surveillance Questionnaire (ESQ) to Regional Epidemiology Unit (REU) and GEZI.</p> <p>Inform REU of incidents/clusters/outbreaks and report on IRIS. Single cases or household clusters do not normally need to be reported on IRIS unless there are wider public health aspects such as a possible source identified or awareness raising beyond the household.</p> <p>Inform relevant Local Authority via Environmental Health on the day the case is notified.</p> <p>If cases or potentially implicated settings come from outside own area, inform relevant HPU (or equivalent body) responsible for that area on the day the information becomes available. . This includes out of hours. The out of hours services for HPUs should have access to HPZone and carry out checks to see if any other cases have been reported with links to the implicated setting.</p>
Regional Level: Regional Epidemiology Unit	Identification of clusters/outbreaks within own region	<p><u>HPU reports:</u> Review HPU reports including ESQs and other information on incidents/clusters/outbreaks; review weekly information on cases and settings (in teleconference, meeting or via written summaries); check for links across HPU areas.</p> <p><u>Laboratory reports:</u> Review variations from expected rates in LabBase weekly (exceedence reports); review laboratory typing results from the LGP on VTEC in region.</p>
	Vigilance for situations with escalation potential	<p>Take note of briefings & alerts from other regions and remain vigilant for cases within own region.</p>

Level / Units	Responsibilities	Methods
	<p>Alerting of clusters/outbreaks/incidents with potential multi-regional significance</p>	<p>Feed back to appropriate HPUs if links are found across HPU areas. Alert HPUs of any relevant epidemiological trends or risks that may be found through scrutiny of the various reports from HPUs and laboratories.</p> <p>Report at weekly national teleconference - inform HPA GEZI and other appropriate bodies of serious/unusual cases or incidents/outbreaks that could spread more widely e.g. linked to a nationally distributed product.</p>
<p>Regional Level:</p> <p>Regional Microbiology Network & Reference Laboratories</p>	<p>Identification of clusters or serious/unusual organisms</p>	<p>Robust results reviewing and monitoring.</p>
	<p>Vigilance and alerting of clusters/outbreaks/incidents with potential wider spread</p>	<p>Inform HPU/REU/GEZI as appropriate, of serious/unusual cases or incidents/outbreaks that could spread more widely e.g. linked to a nationally distributed product.</p>
<p>National Level:</p> <p>HPA Gastrointestinal, Emerging and Zoonotic Infections</p>	<p>Identification of national clusters/outbreaks</p>	<p>Review reports from HPUs and/or REUs & RMN/LGP; including ESQs and other information about incidents/clusters/outbreaks or serious/unusual cases. Check for links across Regions/HPU areas.</p> <p>Review national surveillance data including LabBase (exceedence reports), and enhanced surveillance data, to identify clusters/outbreaks. LGP to feedback any data from molecular typing of sporadic isolates that may suggest cluster.</p>
	<p>Vigilance and alerting of relevant international clusters/outbreaks/incidents or trends</p>	<p>Review international reports (including Scotland and Northern Ireland); note incidents/clusters/outbreaks or serious/unusual cases with potential to affect England. Alert REUs/HPUs as appropriate, and agree further investigation/action.</p> <p>Report incidents that might have international significance to the European Centre for Disease Control and Prevention.</p>

REFERENCES, GUIDANCE, OTHER USEFUL LINKS

HPA web site: www.hpa.org.uk

Hawker J, et al. Communicable Disease Control Handbook, 2nd ed. Blackwell Publishing 2005

Communicable Disease and Public Health Guidelines Vol 7 No 4 December 2004

Guidelines for the Control of infection with Vero cytotoxin producing Escherichia coli (VTEC) PHLS 2000 <http://www.hpa.org.uk/cdph/issues/CDPHvol3/No1/vtec.pdf>

Gregg M. Field Epidemiology 3rd Edition. Oxford University Press. 2008.

Useful information for families and contacts:

http://www.hpa.org.uk/web/HPAwebFile/HPAweb_C/1254510413069

HSE advice at: <http://www.hse.gov.uk/pubns/ais23.pdf>