Public Health England

Chartered Institute of Environmental Health

Food Standards Agency
food.gov.uk

Recommendations for the Public Health Management of Gastrointestinal Infections 2019

Principles and practice

A joint guidance from Public Health England and the Chartered Institute of Environmental Health

About Public Health England

Public Health England exists to protect and improve the nation's health and wellbeing, and reduce health inequalities. We do this through world-leading science, research, knowledge and intelligence, advocacy, partnerships and the delivery of specialist public health services. We are an executive agency of the Department of Health and Social Care, and a distinct delivery organisation with operational autonomy. We provide government, local government, the NHS, Parliament, industry and the public with evidence-based professional, scientific and delivery expertise and support.

Public Health England
Wellington House
133-155 Waterloo Road
London SE1 8UG
Tel: 020 7654 8000
www.gov.uk/phe
Twitter: @PHE_uk
Facebook: www.facebook.com/PublicHealthEngland

Prepared by: Toyin Ejidokun, Jeremy Hawker, Lorraine Lighton, Karthik Paranthaman, Rhianwen Stiff and Gemma Ward. We are grateful for the contributions made by additional members of the guidelines working group, namely Bob Adak, Neil Anstey, Matthieu Pegorie and Ian Gray.

We are also grateful for the input provided by colleagues across Public Health England, the devolved administration, the Chartered Institute for Environmental Health and the Food Standards Agency. The document is being published as Interim recommendations.

Published January 2020
PHE publications
gateway number: GW-1020

PHE supports the UN
Sustainable Development Goals

Contents

Executive summary

This guidance has been developed to provide a quick reference evidence-based guide to enable professionals in Public Health and Environmental Health departments undertake risk assessments which inform effective public health actions to minimise the risk of transmission of gastrointestinal infections in the general population and in community settings.

It replaces the former Public Health Laboratory Service Advisory Committee on Gastrointestinal Infections guidance titled “Preventing person-to-person spread following gastrointestinal infections: guidelines for public health physicians and environmental health officers” published in 2004.

The main changes from the previous guidance are:

- revision of the definition of the risk groups for transmission of gastrointestinal infections
- organism specific information including the control of the human source, case definitions, causative organism, update of the epidemiology and further relevant guidance and reference materials
- update of the information about specific organisms in line with the updated national guidance documents
- links to the list of notifiable diseases and the Health Protection (Notification) Regulations 2010
- information leaflet for minimising the spread of gastrointestinal infections
- stool sample collection information leaflet

Definitions

Carrier: A person without symptoms who excretes an infectious pathogen in their faeces or urine. These people are also known as 'excreters'.

Case: A person with gastrointestinal symptoms due to an infectious pathogen or a microbiological intoxication which may or may not be laboratory confirmed.

Chronic carrier: A person who continues to excrete a pathogen for over a year.

Clinical surveillance: Observation of, or by, a patient for the development of symptoms.

Contact: A person who is likely to have been exposed to a case of an infectious illness.

Convalescent carrier: A person who has recovered from their infectious illness but who continues to excrete the pathogen for up to a year.

Food poisoning: An illness caused by the consumption of food or water contaminated with bacteria and/or their toxins, or with parasites, viruses, or chemicals.

Gastrointestinal infection: any infection, from whatever source, of the gastrointestinal (digestive) tract.

Microbiological clearance: the reduction in the number of pathogenic organisms in a case's specimen below that detectable by conventional culture methods of laboratory testing or a negative PCR test.

Microbiological screening: The submission of stool samples by contacts to determine the presence or absence of pathogenic organisms either culture methods or PCR.

Outbreak: Two or more cases associated in time and place.

Sporadic case: A single case which does not appear to have any links to another known case or carrier.

Standard exclusion period: A minimum of 48 hours symptom free/no loose stools

Introduction

In 2004, a working group from the former Public Health Laboratory Service (PHLS)[1] published guidance on the prevention of person-to-person spread of gastrointestinal infections. This guidance has been well used by public health and environmental health professionals to provide evidence-based advice and take effective public health actions to minimise the risk of transmission.

Over the last 10 years, there have been substantial developments in our understanding of organism specific risks, transmission pathways and effectiveness of interventions to control spread. Furthermore, the past decade has seen important changes in health protection legislation in the United Kingdom, with health now being a function of the devolved administrations.

The aim of this guidance document, as with the previous version, is to provide clear and concise advice to professionals working in Public Health and Environmental Health Departments regarding the prevention of person-to-person transmission of gastrointestinal infections.

The focus of this document is on the prevention of transmission from sporadic cases in the general population and community setting. Where available, links are provided to more detailed disease-specific guidance documents where additional information may be sourced. This guidance is intended to provide evidence-based information for professionals to assess risks and implement appropriate public health interventions. It should not deter the reader from seeking expert assistance if required. Additional advice may be sourced, as appropriate, from local microbiologists and health protection teams/centres, epidemiologists or reference laboratories. Links to the relevant legislation to support the notification of infectious diseases or organisms are provided in Appendix I of this guidance.

Involving the Food Standards Agency

The Food Standards Agency (FSA) should be informed by Environmental Health (in Northern Ireland) or Public Health (in England and Wales) of any serious localised or non-localised incidents where food may be involved at the earliest opportunity using the on-line report form on the Agency's website available here: http://incidents.foodapps.co.uk/login.aspx. General information about incidents and contact details for the FSA's Incidents team can be found here: https://www.food.gov.uk/business-guidance/food-incidents

The FSA's Incidents team provides a 24/7 incident response capability in relation to all food and feed incidents ensuring that measures are taken to remove unsafe products from the market. They are also the National Contact Point for the European Commission's Rapid Alert System for Food and Feed (RASFF) through which information and alerts relating to food safety is exchanged.

General advice

Symptoms of gastroenteritis such as diarrhoea and vomiting may be due to a variety of causes including infections, toxins and non-communicable diseases. However, as a general principle, all cases of gastroenteritis should be regarded as potentially infectious unless there is good evidence to suggest otherwise. Transmission of gastrointestinal infection from person-to-person may occur through one or more of a variety of different pathways, including faecal-oral, foodborne, environmental and airborne routes. The usual mode(s) of transmission vary depending on the organism or agent concerned, and practitioners should be aware of the need to tailor advice based on the pathogen involved (if known) and the case's individual circumstances. For example, exclusion from work may be indicated for some infections where the case is employed as a food-handler, or advice on safe sexual practices may be indicated for organisms such as *Shigella* where transmission amongst men who have sex with men has resulted in outbreaks of illness. A liquid or semi-formed stool is more likely than a formed stool to contaminate hands and the environment and consequently poses a greater risk of spreading faecal pathogens. Formed stools voided by asymptomatically infected people, or people who have recovered from illness, may contain pathogens, but are less likely to transmit infection if good personal hygiene practices are adopted. Vomit, like liquid stool, may be highly infectious.

Cases and all household contacts should always be provided with advice aimed at minimising the potential for spread of infection including personal hygiene, safe preparation of food and the enteric precautions outlined in **Appendix II – Minimising the spread of gastrointestinal illness.**

The importance of good personal and domestic cleanliness cannot be over emphasized in preventing transmission. All persons involved in caring for a case (professional carers, family members, teachers) should also follow enteric precautions.

Individuals who have been requested to submit a stool sample for examination may be provided with the leaflet in Appendix III – Stool sample collection instructions**.**

The specific pathogens for which a sample is tested may vary in different laboratories. Some pathogens included in this guidance document do not form part of routine testing protocols in all laboratories and it may be necessary to make direct contact with the relevant testing laboratory to obtain further information regarding testing.

If food is suspected as the source of an infection, it is important to liaise with the Public Health England Food, Water and Environmental (FWE) microbiology laboratory and the Food Standards Agency (FSA) promptly.

Exclusions from work, school and other institutional settings

All persons with gastroenteritis should be considered as potentially infectious to others and excluded from work, school or other institutional and social settings until a **minimum of 48 hours symptoms free/no loose stools.** The recommended exclusion duration and criteria for specific causes of gastroenteritis are provided within the relevant disease/organism specific section in the following pages. Some cases, or their contacts, may pose an increased risk of spreading the infection to other people **(see Table 1)** and additional measures may be required prior to re-commencing their usual activities, such as demonstration of microbiological clearance of the organism. Risk of transmission and illness will vary depending on host, agent, and environmental factors. Where required, a risk assessment should be conducted for each scenario and this should consider the factors that increase or decrease the likelihood of spread, before agreeing on interventions. In practice, each case, carrier or contact may require assessment on an individual basis in order that factors such as type of employment, provision of sanitation facilities at work, school or other institution and standards of personal hygiene can be considered. Discussion and agreement between the local Health Protection, Environmental Health and Public Health Microbiology teams is strongly recommended if considering an alternative to the exclusion advice provided in this guidance document and signposted disease specific guidance document. For example, a healthcare professional is very unlikely to spread *Shigella* in a healthcare setting where they wash hands so often and use appropriate personal protective equipment; however, a child wearing nappies may be of higher risk of spreading the infection.

The Food Standards Agency document *Food Handlers: Fitness to Work* provides regulatory and best practice advice for food businesses and food business employees with regard to illness, exclusion from work and returning to work: This is available at:

www.food.gov.uk/sites/default/files/media/document/fitnesstoworkguide.pdf

Local Authorities may exercise legal powers for health protection purposes, including exclusion, under Health Protection legislation in each devolved UK administration. For example, in England, the Health Protection Regulations 2010 is the most recent legislation and is supported by a companion toolkit that provides letters and notices to aid Environmental Health teams where circumstances require exclusion to be formalised.

Table 1: Risk groups for transmission of gastrointestinal pathogens

Risk Group	Description	Additional Comments
Group A	Any person who is unable to perform adequate personal hygiene due to lack of capacity or ability to comply OR has lack of access to hygiene facilities.	Risk assessment regarding access to hygiene facilities should consider the availability of toilets /handwashing/hand drying facilities in a work/educational setting.
Group B	All children aged 5 years old or under (up to the sixth birthday) who attend school, pre-school, nursery or other similar child care or minding groups.	For children aged 5 years and under who do not attend school, risk assessment for clearance purposes should explore potential for transmission within other settings e.g. household or attendance at parties.
Group C	People whose work involves preparing or serving unwrapped ready to eat food (including drink).	Consider informal food handlers e.g. someone who helps to prepare food for charity and community events.
Group D	Clinical, social care or nursery staff who work with young children, the elderly, or any other particularly vulnerable people, and whose activities increase the risk of transferring infection via the faecal -oral route.	Risk assessment should consider activities such as helping with feeding or handling objects that could be transferred to the mouth.

People not in these defined risk groups present a minimal risk of spreading gastrointestinal illness and may return to any form of work/school/child care facility a minimum of 48 hours after their stools have returned to normal consistency and symptoms have stopped.

For all organisms, including those where there is no recommended action for isolated single cases, Public Health follow-up may be required in cluster/outbreak situations where local outbreak procedures should be followed.

Amoebiasis/Amoebic dysentery/*Entamoeba histolytica*

Control of human source:	
Cases should be advised to follow usual enteric precautions. Specific advice on exclusion from nursery, school or work settings is given below.	
Public health follow-up required	**YES** - Public Health action for **CONFIRMED** cases Specific guidance exists. See 'Further relevant guidance and key references' below.
Cases	Clinical treatment advised for all confirmed cases Enteric precautions and hygiene advice Obtain travel history
Contacts	Advise testing of symptomatic and asymptomatic household, co-traveller and sexual contacts
Exclusions	A minimum of 48 hours symptom free/ no loose stools No exclusion for asymptomatic cases
Microbiological clearance	Repeat stool sample 1 week after treatment completion to confirm treatment success (not for exclusion purposes) .
Case definitions:	
A person with *E. histolytica* infection determined by demonstration of *E. histolytica* using PCR on a stool specimen OR A clinically compatible case AND demonstration of trophozoites on stool microscopy OR demonstration of trophozoites of *E. histolytica* in intestinal/rectal biopsy by histopathology OR A person with a clinical diagnosis of amoebic liver abscess and positive serology for antibodies to *E. histolytica*	
Causative agent:	
Cause	*Entamoeba histolytica*
Reservoir	Humans are the only known reservoir
Epidemiology	Infections occur worldwide but are endemic in countries with poor sanitation Most UK cases are imported by travellers to endemic areas
Transmission	Main route is through ingestion of contaminated food or water Person-to-person transmission may also occur between household and sexual contacts via faecal-oral route
Incubation period	Usually 2-4 weeks but may last months to several years
Common clinical features	90% of cases are asymptomatic. Diarrhoea with or without dysentery occurs in intestinal disease Amoebic liver abscess may occur which can be fatal
Period of infectiousness	Cases are considered infectious as long as cysts continue to be excreted which may last several years
Other relevant information	Confirmation via PCR is important to distinguish between *E. histolytica* and non-pathogenic strains e.g. *E. dispar*
Further relevant guidance and key references:	
Public Health England. *Interim Public Health Operational Guidelines for Amoebiasis (Entamoeba Histolytica)*	

Available at www.gov.uk/government/publications/amoebiasis-public-health-operational-guidelines
US Food and Drug Administration (2012) Bad Bug Book - Foodborne Pathogenic Microorganisms and Natural Toxins Handbook. Second Edition
Available at:
www.fda.gov/Food/FoodborneIllnessContaminants/CausesOfIllnessBadBugBook

Bacillus species food poisoning/ *Bacillus* species

Control of human source:	
Cases should be advised to follow usual enteric precautions. Specific advice on exclusion from nursery, school or work settings is given below.	
Public health follow-up required	**NO - unless in an outbreak situation** Not usually indicated unless case is identified as part of a cluster/outbreak. In those circumstances, local outbreak procedures should be followed.
Cases	Enteric precautions Collect information on food consumption in 24-hour period prior to symptom onset
Contacts	No action required
Exclusions	Cases: a minimum of 48 hours symptom free/ no loose stools
Microbiological clearance	None required
Case definitions:	
Any person who meets at least one clinical criterion OR at least one laboratory criterion. Clinical: • sudden onset of nausea AND vomiting • abdominal cramps AND diarrhoea OR Laboratory: • isolation of ≥10^5 *B. cereus* organisms per gram or direct detection of *B. cereus* enterotoxin from epidemiologically implicated food in the setting of a person or persons with diarrhoea or vomiting • isolation of the organism from the stools of 2 or more ill persons but not from the stools of controls, in an outbreak situation	
Causative agent:	
Cause	*Bacillus* species, mainly *Bacillus cereus,* which produce toxins (enterotoxins) Gastrointestinal infections also caused by *Bacillus subtilis* and *Bacillus licheniformis*
Reservoir	Ubiquitous in the environment, including soil Contaminated food sources also important route including cereal products, herbs and spices, dried foods, dairy and meat products No human or animal reservoirs
Epidemiology	*Bacillus* spp. are found worldwide but reported food poisoning caused by the bacteria is rare due to the high infectious dose required and under-reporting; but known to cause outbreaks associated with contaminated food sources. Annual numbers of reported *B. cereus* food poisoning outbreaks in the UK have varied between 1992 and 2013 from 0 to 8, with a large outbreak in 2012 affecting 200 individuals.
Transmission	Transmission occurs via consumption of contaminated cooked foods subjected to inadequate post-cooking temperature control which has allowed bacterial growth.

	Bacillus cereus – mainly rice dishes (e.g. outbreaks of fried rice in Chinese restaurants), also pasta, meat or vegetable dishes and dairy products. *Bacillus subtilis* and *licheniformis* – mainly meat or vegetable with pastry products, cooked meat and poultry products, also bakery products and ethnic meats Possible transmission has been linked to organ preservation fluid and contaminated parenteral nutrition Person-to-person spread is not documented
Incubation period	*Bacillus cereus* Emetic syndrome - average 2-3 hours (range 1-6) hours Diarrhoeal syndrome - 8-12 hours (range 6-24 hours) *Bacillus subtilis* – 10 minutes–4 hours (average 2.5 hours) *Bacillus licheniformis* – 2–14 hours (average 8 hours)
Common clinical features	*Bacillus cereus* – 2 clinical syndromes may occur caused by different toxins: Emetic syndrome (heat-stable toxin) – nausea and vomiting, abdominal pain with or without diarrhoea. Generally, a mild illness lasting <12 hours Diarrhoeal syndrome (heat-labile toxin) – diarrhoea (which may be profuse and watery) and abdominal pain with or without nausea and vomiting lasting around 24 hours *Bacillus subtilis* – nausea, vomiting and diarrhoea *Bacillus licheniformis* – diarrhoea and abdominal pain
Period of infectiousness	Not applicable as no risk of person-to-person spread
Other relevant information	Severe non-foodborne infection can occur in cases that are immunocompromised, have intravascular catheters or are intravenous drug users. A high infectious dose is required. As this is via inoculation of bacillus into the bloodstream or growth within a wound, it is not foodborne and there is no person-to-person spread and no exclusion is required.

Further relevant guidance and key references:

Public Health England: www.gov.uk/government/collections/bacillus-species-food-poisoning

Hawker J, Begg N, Blair I, Reintjes R, Weinberg J & Ekdahl K. (2012) *Communicable Disease Control and Health Protection Handbook – Third Edition*. Wiley-Blackwell.

US Food and Drug Administration (2012) Bad Bug Book - Foodborne Pathogenic Microorganisms and Natural Toxins Handbook. Second Edition
Available at:
www.fda.gov/Food/FoodborneIllnessContaminants/CausesOfIllnessBadBugBook

Botulism/ Clostridium botulinum toxin

Control of human source:	
Cases should be advised to follow usual enteric precautions. Specific advice on exclusion is given below.	
Public health follow-up required	**YES** **A single case of botulism should be considered a potential public health emergency. Prompt actions should be undertaken to identify the source.** Specific guidance exists. See 'Further relevant guidance and key references' below.
Cases	Antitoxin treatment based on clinical diagnosis as appropriate Obtain urgent risk factor history from case/parent/household contact May need to obtain food samples – liaison between Environmental Health and Health Protection Teams recommended
Contacts	Clinical surveillance: seek medical help if unwell Obtain risk factor history – they may have been exposed to the same source
Exclusions	None usually required. However, consider exclusion of cases of infant botulism from childminder/crèche settings because large numbers of organisms are excreted in faeces and there may be a risk of exposure to other infants
Microbiological clearance	None required
Case definitions:	
Foodborne botulism: Clinical syndrome and history compatible with foodborne botulism. Confirmation of a clinical diagnosis is by detection of botulinum toxin in serum or faecal specimens or detection and isolation of C*. botulinum* from faeces. Confirmation will also be obtained from isolation and toxin detection in food samples. Infant botulism: Clinical syndrome and history compatible with infant botulism. Confirmation of a clinical diagnosis is by detection of *C. botulinum* in faeces by PCR and subsequent isolation of *C. botulinum* from infant faeces or rectal wash out or detection of botulinum toxin in these specimens as well as in serum. Wound botulism: Clinical syndrome and history compatible with wound botulism. There is an association with substance misuse, especially injecting heroin. Confirmation of the clinical diagnosis is by the demonstration of botulinum toxin in serum or wound specimens, or by PCR detection and subsequent isolation of *C. botulinum* from specimens. In the UK, wound botulism is exclusive to drug injectors.	
Causative agent:	
Cause	*Clostridum botulinum* neurotoxin. Cases also associated with neurotoxin produced by *Clostridium* butyricum *and Clostridium baratii.*
Reservoir	Widespread in the environment – *C. botulinum* heat resistant spores exist in soil, dust, untreated water and the gastrointestinal tracts of animals and fish. Under the appropriate anaerobic conditions, the spores germinate and produce toxin.

Epidemiology	Rare: 100-200 cases reported in the EU annually. Three naturally occurring forms of botulism: food-borne, wound and infant (or intestinal) botulism. Inhalation botulism is extremely rare.
Transmission	Foodborne: ingestion of food contaminated by toxin. A variety of meat, fish and vegetables have been implicated. Associated with under processed food, and home preservation. Wound: inoculation of spores that germinate in the tissue producing toxin and capable of causing systemic symptoms. Infant: ingestion of *C. botulinum* spores in food (e.g. in honey) or from the environment which germinate and produce toxin in the infant intestine. Persons with open lesions on their hands should wear gloves when handling soiled diapers from these patients. Cases of infant botulism caused by *C. butyricum* have been associated with pet terrapins in the UK and Ireland. Person-to-person spread does not occur in food or wound botulism. There is a risk of cross-infection to other infants with infant botulism due to excretion of organisms in faeces which may be prolonged. Stools should be discarded as hazardous material. Cross-infection control measures include scrupulous hand washing when handling infants and during nappy changing and avoiding close contact with other infants, including not sharing toys, bedding and cots.
Incubation period	Foodborne: 2 hours to 8 days (usually 12-72 hours). More severe disease may be associated with a shorter incubation period. Wound botulism: 4-21 days Inhalation: few hours to 4 days
Common clinical features	Characteristic symmetric descending flaccid paralysis of motor and autonomic nerves: slurred speech, double vision, difficulty in swallowing, ptosis, respiratory muscle paralysis. In food botulism, diarrhoea and vomiting may precede neurological symptoms by a few hours. In infants, constipation is a frequent, often over-looked symptom.
Period of infectiousness	*C. botulinum* may be detected in the stool and although person-to-person spread does not occur for food or wound botulism, in infant botulism, cross-infection control measures should be followed.
Other relevant information	**The hospital microbiologist and Consultant in Communicable Disease Control/Health Protection should be contacted urgently**. If food is suspected as a source, the Food Standards Agency Incident Branch should be informed. Foodborne botulism is a public health emergency and may require a food product recall. Urgent arrangements should be made to contact the Botulism service at PHE Colindale for clinical risk assessment and testing of clinical specimens and suspect food by the Gastrointestinal Bacteria Reference Laboratory at Colindale. Botulism is a clinical diagnosis which laboratory tests can confirm but not refute. Antitoxin must be administered as soon as

	possible after symptom onset to prevent toxin binding at the site of action. Antitoxin should be given based on a clinical diagnosis and should not be delayed for awaiting laboratory testing results. Advice on clinical management of suspected cases of botulism is available from Dr Gauri Godbole on 07826 859642 in liaison with the regional Public Health laboratories and information on obtaining antitoxin for all forms of botulism is available via the Colindale duty doctor during working hours and out of hours. **NI arrangements**: Supplies are strictly arranged by contacting a Consultant Microbiologist at the Regional Virus Laboratory Tel: 028 9063 2662 (Mon-Fri 9am-6pm), or outside office hours, the Microbiologist on call, via Royal Victoria Hospital Belfast switchboard Tel: 028 9024 0503. The Consultant Microbiologist or Microbiologist on call will then contact Belfast City Hospital pharmacy (via BCH switchboard Tel: 028 9032 9241) to authorise supply to the requesting clinician or hospital.

Further relevant guidance and key references:

Public Health England: www.gov.uk/government/collections/botulism-diagnosis-data-and-analysis

Public Health England (July 2012) *Botulism: clinical and public health management* Available at: www.gov.uk/government/publications/botulism-clinical-and-public-health-management

Hawker J, Begg N, Blair I, Reintjes R, Weinberg J & Ekdahl K. (2012) *Communicable Disease Control and Health Protection Handbook – Third Edition*. Wiley-Blackwell.

Food Standards Agency Incident teams available at: https://www.food.gov.uk/enforcement/enforcework/report. US Food and Drug Administration (2012) Bad Bug Book - Foodborne Pathogenic Microorganisms and Natural Toxins Handbook. Second Edition
Available at:
www.fda.gov/Food/FoodborneIllnessContaminants/CausesOfIllnessBadBugBook

Campylobacteriosis/ *Campylobacter* species

Control of human source:	
Cases should be advised to follow usual enteric precautions. Specific advice on exclusion from nursery, school or work settings is given below.	
Public health follow-up required	**Practice varies across the UK** England and Northern Ireland: Not usually indicated unless case is identified as part of an outbreak. In those circumstances, local outbreak procedures should be followed. Wales: Follow up of individual cases as per local protocol. If identified as part of a cluster or outbreak, local outbreak procedures should be followed.
Cases	Clinical treatment if thought appropriate by clinician Enteric precautions
Contacts	Not applicable
Exclusions	A minimum of 48 hours symptom free/no loose stools
Microbiological clearance	None required
Case definitions:	
A person with symptoms of gastroenteritis and identification of *Campylobacter spp.* from an appropriate clinical specimen, most often from a stool specimen	
Causative agent:	
Cause	*Campylobacter jejuni* accounts for most cases, followed by *Campylobacter coli.* *C. fetus* and *C. lari* are uncommon causes but may cause severe illness in immunosuppressed individuals
Reservoir	Gastrointestinal tract of birds (especially poultry) and mammals (e.g. cattle, sheep, domestic pets); *C. coli* is particularly associated with pigs. *Campylobacter spp*. cannot multiply outside the host but may exist in environmental sources such as soil, manure and water sources
Epidemiology	*Campylobacter* species are the commonest bacterial cause of infectious gastrointestinal disease in developed countries and one of the most common causes of traveller's diarrhoea in the UK The infection follows a seasonal pattern in temperate regions with a peak in the late spring/summer months.
Transmission	Primarily ingestion of contaminated food or drink (e.g. inadequate cooking of raw meats and offal, cross-contamination between raw and cooked foods, raw drinking milk), or water The organism is unable to multiply outside a host, but food-borne outbreaks do occur. Transmission may also be via direct contact with infected animals e.g. domestic pets or farm animals Person-to-person spread may occur, but the risk is low (mainly via young children who are not toilet trained)
Incubation period	Usually 2-5 days (range of 1-10 days)
Common clinical features	Most cases have symptoms of diarrhoea, abdominal pain (which may be prominent) and fever

	Some may experience bloody stools and vomiting and feeling generally unwell Infection may be asymptomatic (25-50%) Most cases are self-limiting within 2-3 days (80-90% resolve within 1 week) Complications are rare but potentially serious, including Guillain-Barre syndrome, reactive arthritis and haemolytic uraemic syndrome
Period of infectiousness	Cases are considered infectious whilst symptomatic
Other relevant information	Infections are highest in children aged <5 years Groups at highest risk are those with the increased exposure to a contaminated source including occupational contact with farm animals or raw poultry or meat, overseas travellers, men who have sex with men and family contacts of a case. The infectious dose is considered to be low.
Further relevant guidance and key references:	
Public Health England: www.gov.uk/government/collections/campylobacter-guidance-data-and-analysis Public Health Wales: www.wales.nhs.uk/sitesplus/888/page/43695 Hawker J, Begg N, Blair I, Reintjes R, Weinberg J & Ekdahl K. (2012) *Communicable Disease Control and Health Protection Handbook – Third Edition*. Wiley-Blackwell. Centers for Disease Control and Prevention: www.cdc.gov/nczved/divisions/dfbmd/diseases/campylobacter Food Standards Agency: www.food.gov.uk/science/microbiology/campylobacterevidenceprogramme US Food and Drug Administration (2012) Bad Bug Book - Foodborne Pathogenic Microorganisms and Natural Toxins Handbook. Second Edition Available at: www.fda.gov/Food/FoodborneIllnessContaminants/CausesOfIllnessBadBugBook	

Cholera/ *Vibrio cholerae* O1 and O139

Control of human source:	
Cases should be advised to follow usual enteric precautions. Specific advice on exclusion from nursery, school or work settings is given below	
Public health follow-up required	**YES**
Cases	Clinical management as appropriate Enteric precautions Obtain travel history
Contacts	No action required for asymptomatic close contacts Screen symptomatic co-travellers and household contacts Provide 'inform and advise' information to co-travellers
Exclusions	A minimum of 48 hours symptom free/no loose stools
Microbiological clearance	Not routinely required for cases in risk groups where risk assessment of personal hygiene and facilities is satisfactory. A single microbiological clearance specimen may be required where sanitary facilities and personal hygiene are considered inadequate.
Case definitions:	
Clinical features of cholera infection and isolation of toxigenic *Vibrio cholerae* O1 or O139 from stool or vomitus or serological evidence of recent infection	
Causative agent:	
Cause	Toxigenic *Vibrio cholerae* serogroups O1 (biotypes 'classical' and 'El Tor') and O139 Non-O1 and non-O139 may cause milder gastroenteritis but not cholera
Reservoir	Humans and the environment
Epidemiology	Cases in the UK occur in travellers returning from endemic areas (Africa, Asia, Central and South America, Caribbean) An average of 16 cases of cholera caused by *Vibrio cholera* O1 and O139 have been reported in England and Wales between 2004 and 2012. No confirmed cases have been reported from Northern Ireland since 2004.
Transmission	Transmission is via the faecal-oral route primarily via drinking water contaminated by faeces Consumption of contaminated food, especially shellfish, is also a route of transmission. A large infectious dose is required so secondary transmission is not likely in countries with good sanitation systems (e.g. UK).
Incubation period	Usually 24-72 hours (range 2 hours - 5 days) but is dependent on the dose ingested
Common clinical features	Symptoms include abrupt onset of watery, brown stools which quickly change to large volumes of pale fluid stools ('rice-water' stools). Cases usually recover spontaneously once dehydration is corrected. Severe disease is related to the infectious dose and health status of the case and occurs due to significant fluid loss and

	dehydration which can be fatal. Babies, children, the elderly and those with poor general health are most at risk of dehydration and severe disease.
Period of infectiousness	Cases are considered infectious whilst diarrhoea is present and up to 7 days after. Since secondary transmission is unlikely in the UK due to good sanitation, exclusion for 48 hours after first normal stool is usually applied. Occasionally, some cases might become 'carriers' for a few months
Other relevant information	Large epidemics are common following the breakdown of public health measures such as areas experiencing war, famine and natural disasters. A vaccination against cholera is available but is not considered to be highly effective and is therefore not generally recommended.
Further relevant guidance and key references:	
Public Health England: www.gov.uk/cholera Hawker J, Begg N, Blair I, Reintjes R, Weinberg J & Ekdahl K. (2012) *Communicable Disease Control and Health Protection Handbook – Third Edition*. Wiley-Blackwell. US Food and Drug Administration (2012) Bad Bug Book - Foodborne Pathogenic Microorganisms and Natural Toxins Handbook. Second Edition Available at: www.fda.gov/Food/FoodborneIllnessContaminants/CausesOfIllnessBadBugBook	

Clostridium difficile infection/ *Clostridium difficile* toxin

Control of human source:	
Community cases should be advised to follow usual enteric precautions. Specific advice on exclusion from nursery, school or work settings is given below. Cases in a hospital, care home or other institutional setting should be isolated and enteric precautions followed until a minimum of 48 hours symptom free/no loose stools, with management led by hospital/other appropriate infection prevention control team.	
Public health follow-up required	**England: No - unless in an outbreak situation** Not usually indicated unless case is identified as part of a cluster/outbreak. In those circumstances, local outbreak procedures should be followed. Northern Ireland: Follow up of individual cases as per local protocol. In short – collection of risk factor information; provision of IPC advice to care/residential home setting where this applies See 'Further relevant guidance and key references' below.
Cases	Clinical management as appropriate Enteric precautions Isolation in healthcare and social care settings until considered non-infectious
Contacts	Clinical surveillance Screen symptomatic contacts
Exclusions	A minimum of 48 hours symptom free/no loose stools
Microbiological clearance	None
Case definitions:	
Diarrhoeal stool specimen which is *Clostridium difficile* GDH EIA (or NAAT) positive, and toxin EIA positive (PPV = 91.4%), which makes it most likely that *C. difficile* is present OR Toxic megacolon or ileus with specimen positive for *C. difficile* GDH EIA (or NAAT) positive, and toxin EIA positive OR Endoscopic/Computerised Tomographic evidence of pseudomembranous colitis with supportive clinical findings e.g. raised White Cell Count	
Causative agent:	
Cause	*Clostridium difficile* toxins (A and B)
Reservoir	Human gastrointestinal tract Spores may be present on environmental surfaces contaminated by symptomatic persons
Epidemiology	*C. difficile* is found in faeces of approximately 3% of healthy adults, 66% of healthy infants, 7% of asymptomatic care-home residents and 20% of elderly patients on long-term wards without causing symptoms of disease (i.e. asymptomatic carriers). Clinical infection occurs when the normal flora of the gut is disturbed, usually using antibiotics, enabling *C. difficile* to grow and produce toxins. The main risk factors are antibiotic use and increased age (also concurrent illness, nasogastric intubation, alteration of gut motility and the use of cytotoxic agents).

	It is the most important cause of healthcare-associated diarrhoea in developed countries.
Transmission	Person-to-person spread from symptomatic patients either directly or indirectly via contaminated hands of healthcare/other care workers Via contact with environmentally contaminated surfaces e.g. commodes Spread does not occur from asymptomatic carriers.
Incubation period	Difficult to establish incubation period Among patients commencing antibiotics, diarrhoea usually starts within 1-2 days of commencing antibiotics but can occur several weeks after antibiotic treatment
Common clinical features	Watery diarrhoea (ranging from mild to severe) with or without fever, nausea, loss of appetite and abdominal pain Complications include dehydration, pseudomembranous colitis, toxic megacolon, intestinal perforation and death in severe cases
Period of infectiousness	Most infectious when symptomatic Infectiousness reduces with treatment and decreasing severity of symptoms Stopping the implicated antibiotics (if possible) may be indicated
Other relevant information	*C. difficile* spores are hardy and may remain on environmental surfaces for many weeks. Thorough environmental cleaning with suitable agents e.g. chlorine containing products is required to reduce transmission.
Further relevant guidance and key references:	
Public Health England: www.gov.uk/government/collections/clostridium-difficile-guidance-data-and-analysis Public Health Wales: www.wales.nhs.uk/sites3/page.cfm?orgid=379&pid=13577 Department of Health: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/215135/dh_133016.pdf Public Health England (June 2013) *Updated guidance on the management and treatment of Clostridium difficile infection* Available at: www.gov.uk/government/publications/clostridium-difficile-infection-guidance-on-management-and-treatment Hawker J, Begg N, Blair I, Reintjes R, Weinberg J & Ekdahl K. (2012) *Communicable Disease Control and Health Protection Handbook – Third Edition*. Wiley-Blackwell. Centers for Disease Control and Prevention: www.cdc.gov/HAI/organisms/cdiff/Cdiff_infect.html	

Clostridium perfringens food poisoning/ *Clostridium perfringens* enterotoxin

Control of human source:	
Cases should be advised to follow usual enteric precautions. Specific advice on exclusion from nursery, school or work settings is given below.	
Public health follow-up required	**NO – unless in an outbreak** Not usually indicated unless case is identified as part of a cluster/outbreak. In those circumstances, local outbreak procedures should be followed.
Cases	Clinical management as appropriate Enteric precautions
Contacts	No action required
Exclusions	A minimum of 48 hrs symptom free/no loose stools
Microbiological clearance	None required
Case definitions:	
An individual with diarrhoea and/or abdominal pain (rarely vomiting) and detection of *Clostridium perfringens* enterotoxin from a stool specimen	
Causative agent:	
Cause	*Clostridium perfringens* enterotoxin
Reservoir	Ubiquitous in soil and gastrointestinal tract of mammals and birds; frequently present in raw meat. Enterotoxin is produced only by some strains and thus *C. perfringens* can live in the human intestine without producing symptoms of disease. Only strains able to produce enterotoxin cause gastrointestinal illness.
Epidemiology	Reported cases in the UK are higher in autumn and winter months. There are estimated to be >100,000 UK cases per year, but these are greatly under-reported and under-detected. *C. perfringens* food poisoning outbreaks are particularly associated with institutional catering where food is inadequately refrigerated before serving allowing the bacterium to grow. Enterotoxigenic strains can also cause non-foodborne infections or antibiotic associated diarrhoeal illness and outbreaks
Transmission	Food poisoning occurs via ingestion of high numbers of *C. perfringens* vegetative cells in contaminated foods, especially meat and meat products. The organism can grow at temperatures of 15-50°C and heat-resistant spores survive normal cooking temperatures. Inadequate storage and insufficient reheating of contaminated food allows growth of the organism to high numbers. *C.* perfringens *vegetative* cells are ingested with the food and then sporulate and release toxin in the small intestine
Incubation period	Usually 8-18 hours (range 6-24 hours)
Common clinical features	Diarrhoea (watery and often violent) and abdominal pain Symptoms resolve within 24 hours for most cases
Period of infectiousness	Not applicable as no risk of person-to-person spread

Other relevant information	The elderly, very young and those with underlying medical conditions may experience more severe disease. Testing for this enterotoxin is not routinely undertaken, and a specific request will need to be made to the reference laboratory to have this performed Likewise, the ability of *C. perfringens* isolates to encode enterotoxin genes which can be determined by PCR and is performed by the PHE Reference Laboratory at Colindale
Further relevant guidance and key references:	
Public Health England: www.gov.uk/clostridium-perfringens Hawker J, Begg N, Blair I, Reintjes R, Weinberg J & Ekdahl K. (2012) *Communicable Disease Control and Health Protection Handbook – Third Edition*. Wiley-Blackwell.	

Cryptosporidiosis/ *Cryptosporidium* species

Control of human source:	
Cases should be advised to follow usual enteric precautions. Specific advice on exclusion from nursery, school or work settings is given below	
Public health follow-up required	**YES** Specific guidance exists. See 'Further relevant guidance and key references' below.
Cases	No specific treatment is currently licenced within the UK. Clinicians should seek expert advice for profoundly immunosuppressed patients. Complete questionnaire.
Contacts	Clinical surveillance Screen symptomatic contacts
Exclusions	A minimum of 48 hrs symptom free/no loose stools Cases should not use swimming pools for 2 weeks after diarrhoea and vomiting symptoms have stopped
Microbiological clearance	None required
Case definitions:	
A person with symptoms of a gastrointestinal illness AND laboratory evidence of *Cryptosporidium* organisms or DNA in an appropriate sample, usually stool/faeces.	
Causative agent:	
Cause	*Cryptosporidium,* a protozoan parasite*. C.hominis* and *C. parvum* cause most laboratory confirmed cases in the UK. Species are determined by reference genotyping.
Reservoir	Gastrointestinal tracts of humans and animals. Asymptomatic carriage has been documented in humans and animals.
Epidemiology	One of the most common protozoal causes of gastroenteritis in the UK.
Transmission	Approximately 40% of laboratory confirmed cases occur in children below 5 years of age. Most cases are acquired within the UK; approximately 20% report recent foreign travel. Ingestion of oocysts Faeco-oral spread: Direct or indirect contact with infected animals. Person to person spread, particularly in households, healthcare and nurseries. Water contaminated directly or indirectly with faeces. Outbreaks have been associated with public and private water supplies, swimming pools and, more rarely, contaminated food. Seasonal outbreaks are associated with farm visits to feed and handle lambs and calves.
Incubation period	Incubation period is dose dependent. Usual range 3 – 12 days (usual median 5-7 days)
Common clinical features	Profuse watery diarrhoea accompanied by abdominal cramps. (96% of patients who present for consultation), vomiting (65%), mild fever (59%), and loss of appetite.

	Mean duration of symptoms reported as 12.7 days, but they may persist for up to a month. After apparent cessation, recurrence of symptoms is reported in around 1/3 of cases. Profoundly immunocompromised patients may experience chronic or intractable disease, and potentially life-threatening complications.
Period of infectiousness	Whilst symptomatic and for up to 2 weeks after symptoms have stopped.
Other relevant information	Immunocompromised individuals (particularly people with profound T cell immunodeficiencies) are at increased risk of experiencing severe/prolonged symptoms and of complications. Complications may be severe and life threatening, and may include pancreatitis, sclerosing cholangitis and biliary cirrhosis (rare) or pneumoretroperitoneum / pneumomediastinum (very rare). Clinicians treating immunocompromised cases should seek expert advice. Laboratories may not routinely test for *Cryptosporidium* species so prompt microbiological diagnosis should be discussed with routine diagnostic laboratories. Oocysts are highly resistant to disinfection with levels of chlorination usually used in drinking water treatment and swimming pools.
Further relevant guidance and key references:	
Public Health Wales: www.wales.nhs.uk/sitesplus/888/page/44044 Cryptosporidium Reference Unit: www.wales.nhs.uk/sites3/page.cfm?orgid=457&pid=25284 Public Health England: https://www.gov.uk/government/collections/cryptosporidiosis-guidance-data-and-analysis Public Health Wales (2014) *Guidance for the investigation of Cryptosporidium linked to swimming pools.* Available at: www.wales.nhs.uk/sites3/page.cfm?orgid=457&pid=49029 US Food and Drug Administration (2012) *Bad Bug Book - Foodborne Pathogenic Microorganisms and Natural Toxins Handbook*. Second Edition Available at: www.fda.gov/Food/FoodborneIllnessContaminants/CausesOfIllnessBadBugBook	

Cyclosporiasis/ *Cyclospora cayetanensis*

Control of human source:	
Cases should be advised to follow usual enteric precautions. Specific advice on exclusion from nursery, school or work settings is given below.	
Public health follow-up required	**NO – unless in an outbreak situation** Not usually indicated unless case is identified as part of a cluster/outbreak: in these circumstances local outbreak procedures should be followed.
Cases	Clinical treatment with Trimethoprim-sulfamethoxazole Obtain travel history and complete questionnaire Enteric precautions
Contacts	No action required
Exclusions	A minimum of 48 hours symptom free/no loose stools
Microbiological clearance	None required
Case definitions:	
A person with diarrhoea and the identification of *Cyclospora cayetanensis* oocysts in a stool sample (Multiple specimens may be required as cases may not shed sufficient oocysts in stools)	
Causative agent:	
Cause	*Cyclospora cayetanensis, a protozoan parasite*
Reservoir	Humans
Epidemiology	Cases are usually associated with travel to Central or South America, the Caribbean islands, Indian subcontinents and South East Asia Infection occurs worldwide however the parasite is not endemic in the UK. Since 2015, large outbreaks have been reported in the UK from travellers returning from Mexico.
Transmission	Direct person-to-person spread is unlikely. *Cyclospora cayetanensis* is transmitted by ingesting infective oocysts. Oocysts are excreted in faeces of human hosts in a non-infective form. They must then sporulate (mature) over 7-15 days in the environment to become infective. Ingestion of sporulated oocysts from sources such as drinking water, and fresh foods cause infection. Outbreaks linked to imported fresh berries, herbs and salad leaves have been documented in developed countries.
Incubation period	Usually 7 days (range 1-14 days)
Common clinical features	Watery diarrhoea which may be prolonged Other symptoms often include abdominal pain, fatigue, nausea, flatulence, weight loss and loss of appetite. Vomiting, headache and fever may also occur. Some cases may be asymptomatic.
Period of infectiousness	Direct person-to-person spread is unlikely
Other relevant information	Immunocompromised cases may remain infected for several months, but treatment will clear infection.

	In a cluster/outbreak situation, a travel history should be sought and if none, a detailed food history (including raw fruits, salads, herbs and imported foods) should be undertaken.

Further relevant guidance and key references:

Public Health England: www.gov.uk/guidance/cyclospora-clinical-and-travel-guidance

Questionnaire: http://phenet.phe.gov.uk/Resources/duty-doctors/Documents/20170710-Cyclospora- Questionnaire-V4.docx or Select Survey

Hawker J, Begg N, Blair I, Reintjes R, Weinberg J & Ekdahl K. (2012) *Communicable Disease Control and Health Protection Handbook – Third Edition*. Wiley-Blackwell.

Centers for Disease Control and Prevention: www.cdc.gov/parasites/cyclosporiasis
US Food and Drug Administration (2012) *Bad Bug Book - Foodborne Pathogenic Microorganisms and Natural Toxins Handbook*. Second Edition
Available at:
www.fda.gov/Food/FoodborneIllnessContaminants/CausesOfIllnessBadBugBook

Enteric fever: typhoid and paratyphoid fevers/ *Salmonella enterica* subsp. *Enteric/* serovar Typhi (commonly *S. typhi)* and *Salmonella enterica* subsp. *enterica* serovar Paratyphi – A, B and C (commonly *S.* Paratyphi A, B and C)

Control of human source:	
Cases should be advised to follow usual enteric precautions. Specific advice on exclusion from nursery, school or work settings is given below.	
Public health follow-up required	**YES -** Take action based on a clinical notification of illness or a presumptive laboratory result. Do not wait until Reference Laboratory confirmation of results. See *Links to further relevant guidance and key references* below.
Cases	Clinical management of cases as appropriate Enteric precautions Clinical sample as soon as possible from any possible case for diagnosis
Contacts	If the case's infection is likely travel related: - Co-travelling contacts who have consistently similar exposures to case and who are in risk-groups A-D require ONE faecal sample as soon as possible for screening, "Warn and inform" and hygiene information. All other contacts require "Warn and inform" & hygiene advice information, but no screening samples unless symptomatic. If the case's infection is *not* travel-related: Consider extensive investigation to identify source (even if case is not in risk group). Household and other close contacts should provide one faecal sample for screening and should receive "Warn and inform" and hygiene advice. *Any* contact who is/becomes symptomatic, or who has a positive screening sample should be managed as a case. A wider risk assessment of child-care/education/employment setting may be required if a case attended such a session whilst symptomatic.
Exclusions	Possible case: Whilst symptomatic and for a minimum of 48 hours after symptoms have stopped. Group C – anyone suspecting they are suffering from this illness or have previously had it, or who has a lot of contact with someone who has it, should be excluded from food handling and food handling areas until medical clearance Probable/confirmed case not in a risk group: Whilst symptomatic and for a minimum of 48 hours after symptoms have stopped. Probable/confirmed case in risk group A-D:

	Exclusion from risk activities or redeployment until microbiological clearance. Asymptomatic contacts: exclusion not required.
Microbiological clearance	Probable/confirmed case not in risk group: Microbiological clearance not required Recovered/asymptomatic possible case in risk groups A-D: I faecal sample obtained Probable/confirmed case in risk groups A-D: Faecal sampling should commence 1 week after completion of antibiotic treatment. THREE consecutive negative samples required, taken at least 48 hours apart.
Case definitions:	
Confirmed Case: A person with *S*. Typhi or *S*. Paratyphi infection determined by the Public Health England Gastrointestinal Bacteria Reference Unit OR A person with documented confirmatory evidence from a recognised overseas reference laboratory Probable Case: Local laboratory presumptive identification of Salmonella Typhi or Paratyphi on faecal and/or blood culture or culture of another sterile site (e.g. urine), with or without clinical history compatible with enteric fever. OR A returning traveller giving a clinical history compatible with enteric fever and documentation of a positive blood/faecal culture (or positive PCR for *S.*Typhi / *S.*Paratyphi on blood) and/or treatment for enteric fever overseas. Possible Case: A person with a clinical history compatible with enteric fever and where the clinician suspects typhoid or paratyphoid as the most likely diagnosis OR A person with clinical history of fever and malaise and/or gastrointestinal symptoms with an epidemiological link to a source of enteric fever e.g. if they have 'Warn and inform' information OR A returning traveller reporting a diagnosis abroad with positive serological testing or Salmonella PCR from faeces but no documented evidence of a positive blood or faecal culture positivity.	
Causative agent:	
Cause	*Salmonella enterica* subsp. *enterica* serovar Typhi (commonly *S.* Typhi). *Salmonella* enterica subsp. *enterica* serovar Paratyphi – A, B, C (commonly *S.* Paratyphi A, B and C).

Reservoir	The main reservoir for both typhoid and paratyphoid is the human intestinal tract
Epidemiology	Majority of cases (95%) reported in the UK are related to travel to endemic areas. In developed countries where standards of sanitation are high, the diseases are sporadic and are mainly associated with foreign travel. In the UK, approximately 55% of enteric fever cases are due to *S.* Typhi and 45% to *S.* Paratyphi (majority paratyphoid A).
Transmission	Primarily faecal-oral following ingestion of food or water contaminated by faeces (or, occasionally, urine) of acutely ill cases or chronic carriers. Direct faecal–oral transmission can also occur in poor hygiene conditions and, rarely, through sexual contact. The risk of contracting typhoid and paratyphoid fever is highest for travellers to areas of high endemicity. The estimated incidence of typhoid among travellers to developing countries is 3–30 cases per 100,000 travellers.
Incubation period	Incubation period depends on host factors and the size of the infectious dose. *S.*Typhi: usually 8-14 days; but can range from 3-60 days. *S.*Paratyphi: usually 1-10 days National guidance suggests onset of travel related infection can occur up to 28-60 days after end of travel.
Common clinical features	Typhoid fever: Insidious onset of a systemic illness: symptoms may include sustained fever, marked headache, malaise, anorexia, abdominal pain, diarrhoea. There is a wide variation in clinical severity. Complications may include intestinal haemorrhage or perforation (about 1-4% of cases), renal failure or osteomyelitis. Other rare complications include cholecystitis, meningitis and pneumonia. The case-fatality rate of 10–20% observed in the pre-antibiotic era can fall below 1% with prompt antibiotic therapy. 5–20% of patients may experience relapses. In the UK, faecal carriage and relapse rates are estimated at <3%. Paratyphoid fever: Clinically similar but usually less severe than typhoid. Complications are less common. Relapses may occur in up to 9% of cases. *S.*Paratyphi C infections are rare. Enteric fever can be successfully treated with antibiotic therapy and general medical support. Treatment should be subject to clinical opinion and antibiotic sensitivity.

Period of infectiousness	Variable. People are infectious for the duration of excretion of bacteria. Cases are not considered infectious prior to symptom onset. Further risk assessment may be required for convalescent and chronic carriers in risk groups to consider potential ongoing risk to public health, and appropriate interventions. *S.*Typhi: - Approximately10% of untreated patients will excrete bacteria for at least 3 months after the onset of acute symptoms. - Approximately 2-5% become chronic carriers, which may last many years. *S.*Paratyphi*:* - Most people will excrete bacteria for 5-6 weeks after onset of acute symptoms - A small minority continue excreting for months or even years.
Other relevant information	Serovar Paratyphi B var. Java is associated with gastrointestinal disease and is difficult to distinguish by conventional microbiological tests from invasive biotypes associated with paratyphoid fever.
Further relevant guidance and key references:	
Public Health England: www.gov.uk/government/collections/typhoid-and-paratyphoid-guidance-data-and-analysis Public Health Wales: www.wales.nhs.uk/sitesplus/888/page/43751 US Food and Drug Administration (2012) *Bad Bug Book - Foodborne Pathogenic Microorganisms and Natural Toxins Handbook*. Second Edition Available at: www.fda.gov/Food/FoodborneIllnessContaminants/CausesOfIllnessBadBugBook	

Escherichia coli infections/ *Escherichia coli* other than STEC

Control of human source:	
Cases should be advised to follow usual enteric precautions. Specific advice on exclusion from nursery, school or work settings is given below	
Public health follow-up required	**Practice varies across the UK** **England: Yes** **Northern Ireland: No routine follow-up**
Cases	Obtain potential risk factor history
Contacts	Clinical surveillance – others may have been exposed to the same risk
Exclusions	Cases and symptomatic contacts in risk groups: a minimum of 48 hours symptom free/ no loose stools Group C - anyone who has household contact with someone with E. Coli 0157 should inform their business manager; exclusion should be considered for such food handlers if managers are concerned they have poor hygiene or if contact with the infected person is unavoidable.
Microbiological clearance	Medical clearance should be sought for Group C. This will usually require 2 consecutive, negative, faecal samples, the second sample being taken 48 hours after the symptoms have stopped naturally.
Case definitions:	
Laboratory identification of *Escherichia.coli* spp. other than STEC from a stool specimen. *E. coli* causing gastroenteritis may be classified as (STEC, EHEC), Enterotoxigenic (ETEC), Enteropathogenic (EPEC), Enteroinvasive (EIEC), Enteroaggregative (EAEC, EAggEC), Diffuse-adherent (DAEC) or Cytolethal distending toxin producing (CDT producing).	
Causative agent:	
Cause	*Escherichia coli*
Reservoir	Gastrointestinal tract of humans and animals.
Epidemiology	May be associated with travel to developing countries. May cause cases of gastroenteritis and outbreaks in developed countries.
Transmission	Faecal-oral from person to person (EPEC), foodborne (ETEC, EPEC, EIEC) or waterborne (ETEC, EPEC, EIEC) spread.
Incubation period	Reported range from 1 hour to 7 days. Most cases within about 10-50 hours (ETEC, EIEC) or about 8-18 hours (EPEC, EAEC).
Common clinical features	Diarrhoea (all types), often watery. Abdominal pain common (ETEC, EPEC, EIEC). Nausea, vomiting and fever may occur (all) and/or blood and mucus (EIEC, EAEC).
Period of infectiousness	Whilst symptomatic and for 48 hours after diarrhoea has stopped.
Other relevant information	Excretion often longer than 48 hours after remission, but infectious risk low if normal stools.
Further relevant guidance and key references:	
Public Health England: www.gov.uk/government/collections/escherichia-coli-e-coli-guidance-data-and-analysis Public Health Wales: www.wales.nhs.uk/sitesplus/888/page/43885 Hawker J, Begg N, Blair I, Reintjes R, Weinberg J & Ekdahl K. (2012) *Communicable Disease Control and Health Protection Handbook – Third Edition*. Wiley-Blackwell.	

US Food and Drug Administration (2012) *Bad Bug Book - Foodborne Pathogenic Microorganisms and Natural Toxins Handbook*. Second Edition
Available at:
www.fda.gov/Food/FoodborneIllnessContaminants/CausesOfIllnessBadBugBook

Giardiasis/ *Giardia duodenalis*

Control of human source:	
Cases should be advised to follow usual enteric precautions. Specific advice on exclusion from nursery, school or work settings is given below	
Public health follow-up required	**YES**
Cases	Enteric precautions Antimicrobial treatment is required Undertake enhanced surveillance as per local protocol.
Contacts	Screen symptomatic contacts Practice may vary across the UK (household contacts may be screened in Wales)
Exclusions	A minimum of 48 hours symptom free/no loose stools Cases should not go swimming for 2 weeks after symptoms have stopped. Northern Ireland have not routinely provided this advice
Microbiological clearance	None required
Case definitions:	
A person with symptoms consistent with Giardiasis and *Giardia spp. cysts or trophozoites* detected in a stool specimen via routine diagnostic laboratory methods.	
Causative agent:	
Cause	***Giardia spp.*** *Giardia duodenalis (syn. Giardia lamblia; syn. Giardia intestinalis)*
Reservoir	Gastrointestinal tracts of humans and animals.
Epidemiology	Cases may be associated with recent foreign travel. Family clusters are common.
Transmission	Faecal-oral spread, by direct or indirect contact with the faeces of infected people or animals: - Person-to-person spread is common, particularly within families/households. - Waterborne, including swimming in contaminated recreational water. - Direct contact with infected animals - Foodborne transmission - Sexual transmission, particularly amongst MSM - Direct contact with infected animals (rare) Outbreaks have been associated with infected food handlers, drinking water and swimming pools.
Incubation period	Usually 5-16 days (median 7-10 days); extremes of 1-28 days reported
Common clinical features	Diarrhoea, abdominal pain, malaise, flatulence and, less often, nausea. Prolonged diarrhoea, malabsorption and weight loss may occur. Asymptomatic infection also occurs particularly in children.
Period of infectiousness	Whilst symptomatic and for up to 2 weeks after symptoms have stopped.

	Risk of transmission to others decreases after symptoms have stopped, but cysts continue to be shed after symptoms have stopped. Since cysts are resistant to normal chlorine levels used in swimming pools, cases should not go swimming for 2 weeks after symptoms have stopped due to the potential to contaminate the pool environment and cause onward transmission.
Other relevant information	Cysts are moderately resistant to disinfection with levels of chlorination usually used in drinking water treatment and swimming pools.
Further relevant guidance and key references:	
Public Health England: www.gov.uk/giardia US Food and Drug Administration (2012) *Bad Bug Book - Foodborne Pathogenic Microorganisms and Natural Toxins Handbook*. Second Edition Available at: www.fda.gov/Food/FoodborneIllnessContaminants/CausesOfIllnessBadBugBook	

Hepatitis A/ Hepatitis A virus

Control of human source:	
Cases should be advised to follow usual enteric precautions. Specific advice on exclusion from nursery, school or work settings is given below	
Public health follow-up required	**YES** Take action based on notification of a CONFIRMED or PROBABLE case. Specific guidance exists. See links to further relevant guidance and key references below.
Cases	Clinical management as appropriate Hygiene advice Complete national surveillance questionnaire to identify possible source of infection www.gov.uk/government/publications/hepatitis-a-case-questionnaire Undertake risk assessment particularly if case occurs in a non-household setting
Contacts	All contacts should be provided with hygiene advice. Active or passive immunisation may be indicated for contacts in specific age-groups, and settings and for those with specific pre-existing medical conditions. For details, consult Public health control and management of hepatitis A Pregnant or breastfeeding contacts should be treated the same as other contacts. Wider prophylaxis beyond household contacts is not usually indicated if a single case is identified in a hospital, secondary school or workplace.
Exclusions	Exclude case from work, school or nursery until 7 days after the onset of jaundice or in the absence of jaundice, from the onset of symptoms such as fatigue, nausea or fever Exclude close contacts who fulfil ALL of the following criteria: are food handlers, have not been immunised within 14 days of exposure, cannot restrict activities to those which do not involve preparing and handling unwrapped ready-to-eat foods until 30 days post-exposure and cannot achieve scrupulous hand hygiene
Microbiological clearance	None required.
Case definitions:	
Confirmed: A person that meets the clinical case definition AND is confirmed through IgM and IgG antibodies to hepatitis A OR A person with hepatitis A RNA (HAV RNA) detected regardless of clinical features OR An asymptomatic person with no recent history of immunisation with anti-HAV IgM from oral fluid or serum AND an epidemiological link to a confirmed hepatitis A case **Probable:** A person that meets the clinical case definition and has an epidemiological link to a confirmed hepatitis A case OR A person that meets the clinical case definition AND has IgM antibody to the hepatitis A virus (anti-HAV IgM)	

NB: Individuals with an IgM result only should be discussed with the local Microbiologist or Virologist to request quantitative IgG and IgM results and to consider the laboratory findings in the broader clinical and epidemiological context

Causative agent:	
Cause	Hepatitis A virus
Reservoir	Human gastrointestinal tract
Epidemiology	Hepatitis A is no longer endemic in the UK and cases represent either importation following acquisition abroad or the importation of contaminated food. Frozen food or food components have been associated with outbreaks in mainland Europe, Ireland and the USA. Clusters, often in families or social groups, commonly occur around the primary case but onward transmission is otherwise uncommon
Transmission	Faeco-oral route. Transmission can also occur during sexual contact, particularly amongst MSM and through injecting drug use. Transmission within households is very common. Children <6 years are particularly effective transmitters, especially in schools
Incubation period	Average = 28 days (Range 15-50)
Common clinical features	Extremely variable. Severity of illness increases with increasing age 80-95% of infections in children <5 years of age are asymptomatic, while in adults 70-95% of infections result in clinical illness Common symptoms include malaise, fever and jaundice Fulminant hepatitis occurs rarely (approximately 1% of notified cases), but rates are higher with increasing age and in those with underlying chronic liver disease (e.g. chronic hepatitis B or C infection)
Period of infectiousness	Two weeks before the onset of symptoms to one week after the onset of jaundice. Where jaundice is not reported, a history of dark urine or pale stools should be enquired about. If there are no symptoms of jaundice, onset of other symptoms (such as fatigue, nausea, and fever) should be used. Shedding may continue for many weeks but does not appear to be associated with transmission of infection A chronic carrier state is not known to follow acute infection
Other relevant information	Improved standards of living and hygiene in the UK have led to a dramatic decline in incidence of hepatitis A infection, and it is no longer a common childhood infection in the UK Prevalence of antibodies to HAV is declining with consequently high susceptibility amongst people born in the UK – a fact which may be overlooked when visiting family members in high endemicity countries Infection is followed by lifelong immunity against further clinical illness IgM reactivity in the absence of acute hepatitis A virus infection may be detected in older patients including those with pre-existing liver disease and should be interpreted with care.
Further relevant guidance and key references:	

Public Health England: Public health control and management of hepatitis A (June 2017)
www.gov.uk/government/uploads/system/uploads/attachment_data/file/363023/Guidance_for_the_Prevention_and_Control_of_Hepatitis_A_Infection.pdf

Questionnaire: www.gov.uk/government/publications/hepatitis-a-case-questionnaire

Public Health Wales: www.wales.nhs.uk/sitesplus/888/page/43692

US Food and Drug Administration (2012) *Bad Bug Book - Foodborne Pathogenic Microorganisms and Natural Toxins Handbook*. Second Edition
Available at: www.fda.gov/Food/FoodborneIllnessContaminants/CausesOfIllnessBadBugBook

Hepatitis E/ Hepatitis E virus

Control of human source:	
Cases should be advised to follow usual enteric precautions	
Public health follow-up required	**YES** Public Health action for **CONFIRMED** cases Specific guidance exists. See 'Further relevant guidance and key references' below.
Cases	Clinical treatment as appropriate. Complete surveillance questionnaire. Obtain travel history Immunocompromised individuals, pregnant women and those with a history of liver disease, liver injury or heavy alcohol consumption could be at risk of more serious or prolonged illness
Contacts	No action required
Exclusions	None required.
Microbiological clearance	None required
Case definitions:	
Acute Hepatitis E infection in a patient with acute hepatitis - HEV IgM AND IgG positive - HEV RNA positive (with or without detectable HEV antibodies) A case of chronic Hepatitis E infection in a person with acute hepatitis: - HEV RNA persisting for at least 3 months (with or without detectable HEV antibodies)	
Causative agent:	
Cause	Hepatitis E virus Genotypes 1-4
Reservoir	Humans (G1/2) and animals including swine (G3/4)
Epidemiology	Endemic/epidemic (G1/2) in countries with poor sanitation (Africa, Asia and Central America) Zoonotic (G3/4) in industrialised countries including UK
Transmission	In developed countries, a zoonosis primarily through consumption of undercooked/raw pork products especially those retailed un-cooked. Onward person-to-person transmission is only documented via blood transfusion and transplantation Faeco-oral transmission via sewage-contaminated food and water in the developing world and epidemic in dispossessed populations Person-to-person spread is rare
Incubation period	Average 40 days (range 15-60 days)
Common clinical features	98% of cases are asymptomatic. Symptoms are more commonly associated with G1/2 infection Symptoms include jaundice, dark urine, pale stools, tiredness, fever, nausea, vomiting, abdominal pain and loss of appetite Usually self-limiting with recovery in 4-6 weeks
Period of infectiousness	Good personal hygiene probably reduces the very minimal infection risk to effectively zero risk
Other relevant information	If infection in a pregnant woman is thought to have been acquired from a country where G1/G2 are endemic, genotyping should be

	undertaken to exclude G1. If a G1 infection is identified in a pregnant woman she may require closer monitoring due to the potential serious outcome of G1 infection in pregnancy Immunocompromised individuals presenting with acute hepatitis E should be investigated for pre-existing persisting infection and the development of persistence
Further relevant guidance and key references:	
Public Health England (January 2015) *Hepatitis E: public health operational guidelines* Available at: www.gov.uk/government/publications/hepatitis-e-health-protection-response-to-reports-of-infection Public Health Wales: www.wales.nhs.uk/sitesplus/888/page/55047 Food Standards Agency: http://www.food.gov.uk/science/microbiology/hepatitis-e	

Histamine fish poisoning (previously known as scombrotoxic fish poisoning, scombroid, pseudo allergic fish poisoning, mahi mahi flush)/ histamine poisoning

Control of human source:	
Cases should be advised to follow usual enteric precautions.	
Public health follow-up required	**NO– unless in an outbreak situation** **Involvement of the Food Standards Agency may be indicated.**
Cases	Obtain full food history: identify potential individuals, restaurant, supplier and country of origin of food
Contacts	Clinical surveillance. Fellow consumers of the fish may also experience symptoms.
Exclusions	None required
Microbiological clearance	None required
Case definitions:	
A person with clinical symptoms and a food history consistent with marine biotoxin ingestion (NOTE: also consider other potential food sources such as cheese) Diagnosis is made on clinical presentation but toxins may be identified from the suspected food source.	
Causative agent:	
Cause	Histamine. Inadequate refrigeration allows multiplication of bacteria that contain the enzyme histidine decarboxylase (HDC). HDC converts histidine in fish tissues to histamine. Subsequent cooking / smoking does not diminish the levels of histamine. Histamine can also be present as a consequence of fermentation in the production of foods such as certain cheeses or sausages
Reservoir	Inadequately preserved and improperly refrigerated fish. Approximately 100 different species have been implicated: - scombroid dark-meat fish e.g. tuna, mackerel, skipjack, bonito, marlin (most commonly); - nonscombroid species e.g. mahi-mahi (dolphin fish), amber jack, sardine, yellowtail, herring, and bluefish; - whitefish (very rarely) - has also been associated with the consumption of cheese and other fermented foods
Epidemiology	Accounts for approximately 5% of food-borne disease outbreaks reported to US Centers for Disease Control and Prevention (CDC). During 1998-2008, 262 confirmed and 71 suspected outbreaks were reported to CDC. Seasonal variation is observed with more cases occurring during summer months. Between 2001 and 2007, there were 2 reported incidents to the UK Food Standards Agency linked to histamine in cheese; between 2008 and 2015, there were twenty such reported incidents

Transmission	Person-to-person spread does not occur.
Incubation period	2 minutes – 2 hours after ingestion
Common clinical features	Flushing, sweating, rash, diarrhoea, vomiting, abdominal pain and headache. Occasionally, a metallic taste or burning/swelling of the mouth. Symptoms usually resolve within a few hours. Cases with a history of atopy or those taking certain medications (e.g. isoniazid or doxycycline which slow histamine metabolism by the liver) may have more severe symptoms and/or prolonged illness. Rare complications include bronchospasm, angioedema, hypotension, pulmonary oedema, and cardiogenic shock. Long term health consequences have not been reported.
Period of infectiousness	Person-to-person spread does not occur. Suspected fish/foods should be discarded to prevent further cases as cooking, canning, smoking or other processing does not diminish the levels of histamine.
Other relevant information	Temperature control is vital at all stages after catching, including display for sale. Those eating the same meal may experience variation in symptom severity due to: - individual differences in sensitivity to or metabolism of histamine - size of portion consumed - amount of histamine in consumed portion - whether the portion was from the same fish Diagnosis is based on clinical symptoms and history of fish/suspect food consumption. Laboratory tests for cases are not indicated, and levels of plasma or urinary histamine/histamine metabolites correlate poorly with clinical severity. Uneaten portions of suspect fish/suspect food may be tested for histamine levels by Public Analyst Laboratories. The Food Standards Agency should be informed if an outbreak or wider problem is suspected.
Further relevant guidance and key references:	
Advisory committee on the microbiological safety of food- Discussion paper: www.food.gov.uk/sites/default/files/acm_1193_histamine%20in%20cheese%20(paper).pdf Medscape: http://emedicine.medscape.com/article/1009464-overview#a0101 Centers for Disease Control and Prevention: www.cdc.gov/nczved/divisions/dfbmd/diseases/marine_toxins US Food and Drug Administration (2012) *Bad Bug Book - Foodborne Pathogenic Microorganisms and Natural Toxins Handbook*. Second Edition Available at: www.fda.gov/Food/FoodborneIllnessContaminants/CausesOfIllnessBadBugBook Food Standards Agency: https://www.foodstandards.gov.scot/downloads/Risk_Management.pdf	

Listeriosis/ *Listeria monocytogenes*

Control of human source:	
Cases should be advised to follow usual enteric precautions. Specific advice on exclusion from nursery, school or work settings is given below.	
Public health follow-up required	**Practice varies across the UK** **England: Yes** **Northern Ireland: Does not have an enhanced surveillance system**
Cases	Clinical management as appropriate Obtain food history Undertake enhanced surveillance as per local protocol Discuss need for additional actions with the local Health Protection Team
Contacts	No action required
Exclusions	None required
Microbiological clearance	None required
Case definitions:	
A person with symptoms consistent with Listeriosis infection and *Listeria monocytogenes* detected in normally sterile sites (e.g. blood or CSF) using routine diagnostic laboratory methods. All isolates of *L. monocytogenes* should be sent to the Laboratory of PHE Gastrointestinal Bacteria Reference Unit, Colindale for whole genome sequencing	
Causative agent:	
Cause	***Listeria monocytogenes***
Reservoir	Gastrointestinal tracts of humans, birds, cattle, sheep and other animals. Widespread in the environment: soil, vegetation, water, silage/sewage, mammal/fish/bird faeces. Occurs in raw foods, food components and ready to eat foods: most commonly in foods because of contamination from sites in food production environments
Epidemiology	Listeriosis is a rare but severe systemic infection that includes bacteraemia, meningitis, encephalitis and in pregnant women can lead to miscarriage and stillbirth. It most often affects those who have a weakened immune system including pregnant women, their unborn and new born infants, the elderly and individuals who are immunocompromised by a pre-existing medical condition or treatments for an existing illness. Occasionally, healthy people can become infected. Listeriosis has a high mortality rate of 20-30% and in the UK is the most common cause of death from a foodborne illness. The annual number of laboratory-confirmed cases of listeriosis averaged 180 a year between 2005-14.
Transmission	The majority of cases are foodborne. Cases and outbreaks have been associated with a variety of foodstuffs, the most common in England and Wales being pre-prepared sandwiches but other foods have included soft cheeses, cooked and processed meats

	(e.g. pâté and sliced meat), smoked fish, butter, olives and melon in the US. Mother-to-baby transmission is important: - in utero transmission, - vertical transmission during birth, or - person-to-person spread soon after delivery Direct contact with infected animals can occasionally cause infection Pregnant women, individuals who are immunocompromised and those (< 1 month and >60 years of age) are more susceptible to infection. *L. monocytogenes* can be present in the faeces of approximately 5% of the population but is likely to be transitory
Incubation period	For invasive disease, the incubation period ranges from 1-70 days
Common clinical features	Initial symptoms of listeriosis include fever and flu-like symptoms, which may or may not be preceded by a febrile gastroenteritis. Pregnant women may be asymptomatic or have mild symptoms. A person of any age and immune-state *may* experience any of the following symptoms or remain asymptomatic. Below are the most common presentations for particular patient groups. Healthy adults and older children: - Asymptomatic infection - Acute gastroenteritis with fever - Non-specific symptoms such as fever, muscle aches, headache (often goes undiagnosed/unrecognised). Pregnant women - no/mild non-specific flu-like symptoms (as above) - Foetal loss, stillbirth, pre-term delivery with severe infection in the newborn (some with pre-term delivery) and neonatal meningitis. Immunosuppressed persons / older adults - Septicaemia, meningitis or meningo-encephalitis Immunocompetent persons can also present with severe disease such as septicaemia or meningitis
Period of infectiousness	Not applicable except at and shortly after delivery due to contact (hand or fomites) from an infected infant to an apparently healthy infant who develops meningitis
Other relevant information	*L. monocytogenes* can grow over a wide temperature range in certain foods from ≤0°C (refrigerator temperature) to about 40° C. Investigation of food and food preparation areas (including isolation of *L. monocytogenes*) is essential for control of foodborne illness.
Further relevant guidance and key references:	
Public Health England: www.gov.uk/government/collections/listeria-guidance-data-and-analysis Hawker J, Begg N, Blair I, Reintjes R, Weinberg J & Ekdahl K. (2012) *Communicable Disease Control and Health Protection Handbook – Third Edition*. Wiley-Blackwell.	

Food Standards Agency: www.food.gov.uk/science/microbiology/listeria
Centers for Disease Control and Prevention: www.cdc.gov/listeria
US Food and Drug Administration (2012) *Bad Bug Book - Foodborne Pathogenic Microorganisms and Natural Toxins Handbook*. Second Edition
Available at:
www.fda.gov/Food/FoodborneIllnessContaminants/CausesOfIllnessBadBugBook

Marine algal shellfish poisoning syndromes and ciguatera poisoning/ Marine biotoxins

Control of human source:	
No evidence of person-to-person transmission. Cases should be advised to follow usual enteric precautions.	
Public health follow-up required	**NO – unless in an outbreak situation** Not usually indicated unless case is identified as part of a cluster/outbreak. In those circumstances, local outbreak procedures should be followed. Involvement of the Food Standards Agency may be indicated.
Cases	Obtain food history: identify potential individual, restaurant, supplier or growing area
Contacts	Clinical surveillance. Other consumers of the fish/shellfish may also experience symptoms.
Exclusions	None required
Microbiological clearance	None required
Case definitions:	
A person with clinical symptoms and a food history consistent with marine biotoxin intoxication. Diagnosis is made on clinical presentation, but toxins may be identified from the suspected food	
Causative agent:	
Cause	Multiple naturally occurring biotoxins produced by marine organisms, retained by certain filter feeding bivalves and fish. Some carnivorous gastropods, crustaceans and fish concentrate the toxin in the food chain, leading to toxic effects following ingestion by humans
Reservoir	Seafood
Epidemiology	Seasonal variation is observed with more cases occurring during summer months when dinoflagellates growth is greatest. Likely to be an under-reported cause of food-poisoning due to mild cases being un-recognised un-diagnosed by healthcare professionals. The most common syndromes are diarrhetic shellfish poisoning, ciguatera poisoning, neurotoxic shellfish poisoning, paralytic shellfish poisoning and amnesic shellfish poisoning
Transmission	Consumption of seafood contaminated by toxin. Person-to-person spread does not occur. Toxins can survive most cooking and freezing processes applied to food
Incubation period	Few minutes to 24 hours after ingestion
Common clinical features	Symptoms vary depending on the specific causative agent and amount ingested. **Ciguatera poisoning:** Nausea, vomiting, diarrhoea, cramps, excessive sweating, headache and muscle aches. Neurological symptoms may also occur including altered sensation (burning or pins-and-needles),

	weakness, itching, dizziness, reversal of temperature sensation, altered taste sensations, nightmares, or hallucinations. Onset: minutes to 6 hours after ingestion Duration: 1-4 weeks Rarely fatal Due to ciguatera toxins produced by dinoflagellates that accumulate in tropical reef fish (barracuda, grouper, sea bass, snapper, mullet and others). Cases have occurred in UK due to consumption of imported fish. **Paralytic shellfish poisoning:** Numbness or tingling of face, arms, and legs, headache, dizziness, nausea and incoordination. Muscle paralysis and respiratory failure can occur in severe cases and may be fatal Onset: 15 minutes to 10 hours after ingestion (usually within 2 hours) Due to a different red-brown coloured dinoflagellate whose toxin concentrates within certain shellfish (mussels, cockles, clams, scallops, oysters, crabs, and lobsters). Associated with red algal tides. Cases have occurred in UK due to consumption of UK grown and imported shell fish. **Diarrhetic Shellfish Poisoning:** Diarrhoea, nausea and abdominal pain. Onset: 30 minutes to 12 hours, duration 3-4 days. Due to dinoflagellate whose toxin accumulates in certain shellfish (mussels, cockles, scallops, oysters and crabs). Associated with red algal tides. Cases have occurred in UK due to consumption of UK grown and imported shellfish. **Neurotoxic shellfish poisoning:** Numbness, tingling in the mouth, arms and legs, incoordination and gastrointestinal upset. Some patients report temperature reversal Onset: 1-3 hours Duration: 2-3 days Rarely fatal Due to a third type of dinoflagellate toxin found in oysters, clams, and mussels **Amnesic shellfish poisoning:** Diarrhoea and vomiting, and occasionally dizziness, headache, disorientation, and permanent short-term memory loss. In severe poisoning, seizures, focal weakness or paralysis and death may occur Onset: within 24hours of consumption May cause long-term problems with short-term memory.

	Rare syndrome caused by a toxin made by the diatom *Nitzchia pungens* and concentrated in mussels and other shellfish
Period of infectiousness	Person-to-person spread does not occur Suspected shellfish/fish should be discarded to prevent further cases as cooking, canning, smoking or other processing does not diminish the levels of toxic chemicals
Other relevant information	Diagnosis is based on clinical symptoms and relevant history of fish/shellfish consumption. Laboratory tests for cases are not indicated. Uneaten portions of suspect fish may be tested for specific toxin, but this does not aid treatment of the case.
Further relevant guidance and key references:	
Centers for Disease Control and Prevention: www.cdc.gov/nczved/divisions/dfbmd/diseases/marine_toxins US Food and Drug Administration (2012) *Bad Bug Book - Foodborne Pathogenic Microorganisms and Natural Toxins Handbook*. Second Edition Available at: www.fda.gov/Food/FoodborneIllnessContaminants/CausesOfIllnessBadBugBook	

Norovirus gastroenteritis/ *Norovirus*

Control of human source:	
Community cases should be advised to follow usual enteric precautions. Specific advice on exclusion from nursery, school or work settings is given below. Cases occurring within hospital, care homes or other institutional settings should follow usual enteric precautions and be managed under the appropriate local policy.	
Public health follow-up required	**NO – unless in an outbreak situation** Not usually indicated unless case is identified as part of a cluster/outbreak. In those circumstances, local outbreak procedures should be followed. Specific guidance exists. See 'Further relevant guidance and key references' below.
Cases	Enteric precautions
Contacts	Clinical surveillance Group C – persons with household contact should inform the food business manager.
Exclusions	A minimum of 48 hours after symptoms have stopped/no loose stools Group C – best practice to exclude *suspected* infected persons
Microbiological clearance	None required
Case definitions:	
A symptomatic person and laboratory identification of *Norovirus* from a clinical specimen, most often a stool specimen.	
Causative agent:	
Cause	*Noroviruses* (formally known as Norwalk like viruses and small round structured viruses)
Reservoir	Gastrointestinal tract of humans Capable of surviving in the environment
Epidemiology	Commonest cause of gastroenteritis in England and Wales. Increased prevalence during colder months. Persons of all ages are at risk from infection. The elderly and very young are at greater risk of developing dehydration. Most people with Norovirus do not access health care services. Outbreaks are very common in semi-closed environments such as schools, hospitals and nursing homes.
Transmission	Faecal-oral route (vomit is also infectious) - person-to-person spread - inhalation of aerosols following an episode of projectile vomiting - ingestion of contaminated food (oysters) or water. Organisms survive freezing processes and frozen berries have been implicated in transmission. - environment-to-person spread via contaminated surfaces e.g. toilets, soft furnishings, floors - contaminated water
Incubation period	Usually 12-62 hours, rarely 6-84 hours

Common clinical features	Sudden onset of nausea, followed by episodes of projectile vomiting and watery diarrhoea. These may be accompanied by fever, headache, abdominal pain and/or aching limbs.
Period of infectiousness	Whilst symptomatic and for 48-72 hours after diarrhoea has stopped.
Other relevant information	The ease of person-to-person transmission, low infectious dose and ability to survive in the environment for several days all contribute to the high number of outbreaks caused by Norovirus. Immunity is short-lived; infection with one strain of Norovirus is not protective against other strains. Laboratories may not routinely test for Norovirus, hence prompt discussion with routine diagnostic laboratories may be indicated.

Further relevant guidance and key references:

Public Health England: www.gov.uk/government/collections/norovirus-guidance-data-and-analysis

Public Health Wales: www.wales.nhs.uk/sitesplus/888/page/43919

HPA, British Infection Association, Healthcare Infection Society, Infection Prevention Society, National Concern for Healthcare Infections, NHS Confederation (March 2012) *Guidelines for the management of Norovirus outbreaks in acute and community health and social care settings*

Available at: www.gov.uk/government/publications/norovirus-managing-outbreaks-in-acute-and-community-health-and-social-care-settings

Health Protection Agency Norovirus Working Group (July 2007) *Guidance for the Management of Norovirus Infection in Cruise Ships.* Available at: www.gov.uk/government/publications/norovirus-managing-infection-in-cruise-ships

Food Standards Agency: www.food.gov.uk/science/microbiology/norovirus and Food Standards Agency: www.food.gov.uk/science/microbiology/norovirus and www.food.gov.uk/sites/default/files/multimedia/pdfs/publication/fitnesstoworkguide09v3.pdf

US Food and Drug Administration (2012) *Bad Bug Book - Foodborne Pathogenic Microorganisms and Natural Toxins Handbook*. Second Edition

Available at: www.fda.gov/Food/FoodborneIllnessContaminants/CausesOfIllnessBadBugBook

Rotavirus infection/ *Rotavirus*

Control of human source:	
Cases should be advised to follow usual enteric precautions. Specific advice on exclusion from nursery, school or work settings is given below.	
Public health follow-up required	**NO**
Cases	Clinical management as appropriate Enteric precautions
Contacts	Clinical surveillance and screening of symptomatic contacts
Exclusions	A minimum of 48 hours symptom free/no loose stools
Microbiological clearance	None required
Case definitions:	
Laboratory detection of Rotavirus in a symptomatic person	
Causative agent:	
Cause	Rotavirus 3 serogroups (A, B and C) with A being the most common
Reservoir	Humans Animal reservoirs exist but animal-to-human transmission does not occur
Epidemiology	Main cause of viral gastroenteritis in children in developed and developing countries Most cases occur in children aged 6 months -2 years Most cases in the UK occur in winter and spring, with a peak in March Outbreaks in settings such as nurseries are common, though with the implementation of a vaccination programme in the UK from 2014, the incidence has decreased, and the epidemiological picture may change.
Transmission	Person-to-person spread via faecal-oral route is most common Transmission may also occur via contact with contaminated environmental surfaces. The virus is resistant to many disinfectants (inactivated by chlorine)
Incubation period	1 - 4 days
Common clinical features	Watery diarrhoea and vomiting with/without fever, abdominal pain and dehydration Vomiting usually resolves within 1-3 days and diarrhoea within 5-7 days but it can take up to 2 weeks
Period of infectiousness	Infectious from 2 days before symptom onset to 10 days after symptoms resolve. May be longer in immunocompromised individuals
Other relevant information	Oral Rotavirus vaccine at 2 and 3 months is now part of the routine childhood vaccination schedule in the UK. Those involved in nappy changing of recently vaccinated babies should observe good personal hygiene as traces of the vaccine virus may be excreted in faeces and may enable onward transmission, particularly to persons with weakened immune systems

	If a child is tested for Rotavirus near the date of immunisation, the vaccine virus may be detected in stool and where the child presents with symptomatic gastroenteritis, testing for other infectious aetiologies should be considered. Up-to-date information on Rotavirus surveillance in England and Wales can be found on the PHE website: www.gov.uk/government/statistics/norovirus-national-update.
Further relevant guidance and key references:	
Public Health England: www.gov.uk/government/collections/rotavirus-guidance-data-and-analysis Hawker J, Begg N, Blair I, Reintjes R, Weinberg J & Ekdahl K. (2012) *Communicable Disease Control and Health Protection Handbook – Third Edition*. Wiley-Blackwell. NHS Choices: www.nhs.uk/Conditions/Rotavirus-gastroenteritis/Pages/Causes.aspx and: www.nhs.uk/Conditions/vaccinations/Pages/rotavirus-vaccine-questions-answers.aspx#which US Food and Drug Administration (2012) *Bad Bug Book - Foodborne Pathogenic Microorganisms and Natural Toxins Handbook*. Second Edition Available at: www.fda.gov/Food/FoodborneIllnessContaminants/CausesOfIllnessBadBugBook	

Salmonellosis excluding enteric fever/ *Salmonella* species excluding *S.* Typhi and *S.* Paratyphi

Control of human source:	
Cases should be advised to follow usual enteric precautions. Specific advice on exclusion from nursery, school or work settings is given below.	
Public health follow-up required	**Practice varies in the UK** Northern Ireland: Each case followed up and a case questionnaire completed. Risk factor data reviewed, surveillance data reviewed etc. for all cases to identify emerging cluster
Cases	Enteric precautions Complete enhanced surveillance questionnaire.
Contacts	Clinical surveillance Screen symptomatic contacts
Exclusions	A minimum of 48 hours symptom free/no loose stools
Microbiological clearance	None required
Case definitions:	
A symptomatic person with *Salmonella* spp. Infection determined by the local microbiology laboratory.	
Causative agent:	
Cause	*Salmonella* spp. **Excluding** *S. T*yphi. and *S. Paratyphi* A, B and C.
Reservoir	Gastrointestinal tract of wild and domestic animals, birds (especially poultry), reptiles, amphibians (for example, terrapins), and occasionally humans.
Epidemiology	There are >2500 serotypes of *Salmonella*. *Salmonella* Enterica serovar, *S.* Enteritidis and *S.* Typhimurium are the most commonly identified in the UK, Europe and USA. Cases often appear sporadic, but outbreaks occur in the general population and *institutions*.
Transmission	Predominantly through consuming foodstuffs (most often red and white meats, raw eggs, milk, and dairy products) following contamination of cooked food by raw food or failing to reach adequate cooking temperatures. Person to person spread, usually during the acute diarrhoeal phase of the illness and contact with infected animals can also cause infection. Waterborne outbreaks have also been reported.
Incubation period	Most commonly 12-48 hours but range of 4-120 hours has been reported Ingested dose will influence incubation period, symptoms and disease severity.
Common clinical features	Symptoms include watery and sometimes bloody diarrhoea, abdominal pain, headache, nausea, vomiting and fever. Duration of 4-7 days. Usually resolve without treatment.

	Septicaemia may occur and requires prompt hospitalisation and antibiotic therapy. The elderly, infants, and those with impaired immune systems are more likely to have severe illness and develop complications.
Period of infectiousness	Cases are considered infectious whilst symptomatic. However, organisms are excreted by convalescent carriers, asymptomatic carriers and (rarely) chronic carriers. Cases with diarrhoea, infants and faecally incontinent adults pose a greater risk of transmission than do asymptomatic people. Children aged <5 years may shed organisms for up to a year (median 10 weeks). Over the age of 5 years, the maximum duration of shedding appears to be up to 12 weeks (median 4).
Other relevant information	Rates have fallen in the UK since the mid-1990s due to factors including greater public awareness about food safety, and the compulsory vaccination of the UK egg-laying flock against Salmonella E*nteriditis*. Secondary cases are common in outbreaks. Food handlers who practice good hygiene are very rarely responsible for initiating outbreaks. Many reptiles, including those kept as pets, carry salmonella in their guts without exhibiting symptoms but may transmit infection to humans. Specific advice on reducing the risk of transmission is available from PHE (see below).
Further relevant guidance and key references:	
Public Health England: www.gov.uk/government/collections/salmonella-guidance-data-and-analysis Public Health England – reducing the risks of salmonella infection from reptiles: www.gov.uk/government/publications/salmonella-reducing-infection-from-reptiles Public Health Wales: www.wales.nhs.uk/sitesplus/888/page/43751 US Food and Drug Administration (2012) *Bad Bug Book - Foodborne Pathogenic Microorganisms and Natural Toxins Handbook*. Second Edition Available at: www.fda.gov/Food/FoodborneIllnessContaminants/CausesOfIllnessBadBugBook	

Sapovirus gastroenteritis/ *Sapovirus*

Control of human source:	
Community cases should be advised to follow usual enteric precautions. Specific advice on exclusion from nursery, school or work settings is given below. Cases and outbreaks occurring within hospital, care homes or other institutional settings should follow similar protocols to those developed for norovirus.	
Public health follow-up required	**NO – unless in an outbreak situation**
Cases	Enteric precautions
Contacts	Clinical surveillance
Exclusions	Cases: A minimum of 48 hours symptom free/no loose stools Symptomatic contacts in risk groups: A minimum of 48 hours symptom free/no loose stools
Microbiological clearance	None required
Case definitions:	
Laboratory identification of Sapovirus from a stool specimen from a person with diarrhoea. Sapovirus can be detected by electron microscopy or molecular methods	
Causative agent:	
Cause	Sapovirus (formerly known as a human classic Calicivirus)
Reservoir	Humans
Epidemiology	Responsible for about 9% of cases of gastroenteritis in the community and a similar proportion of those presenting to primary care Infection mainly in under-5's, although adult outbreaks do occur Outbreaks are most often in child care facilities, often with high attack rates. May also occur in hospitals, nursing homes, cruise ships and colleges
Transmission	Mostly person-to-person via the faeco-oral route Environmental contamination may occur, and waterborne or foodborne transmission may be possible
Incubation period	1-3 days (median 1.7 days)
Common clinical features	Diarrhoea, often with abdominal pain/cramps and vomiting. Vomiting usually a less prominent feature than in Norovirus infections Low grade fever, myalgia or headache may also occur Symptoms are usually mild and self-limiting Asymptomatic infection may occur
Period of infectiousness	Whilst symptomatic and for 48 hours after diarrhoea has stopped
Other relevant information	Faecal excretion of the organism lasts for up to 2 weeks and faeces have been shown to contain high levels of virus
Further relevant guidance and key references:	
Public Health England: www.gov.uk/government/collections/gastrointestinal-infections-guidance-data-and-analysis Hawker J, Begg N, Blair I, Reintjes R, Weinberg J & Ekdahl K. (2012) *Communicable Disease Control and Health Protection Handbook – Third Edition*. Wiley-Blackwell.	

Shiga toxin producing *Escherichia coli* (STEC) gastroenteritis (STEC O157 and non-O157), Haemolytic uraemic syndrome (HUS)

Control of human source:	
Cases should be advised to follow usual enteric precautions. Specific advice on exclusion from nursery, school or work settings is given below.	
Public health follow-up required	**Practice may vary across the UK** **YES** Public Health action for confirmed and probable cases Specific guidance exists. See 'Further relevant guidance and key references' below.
Cases	Undertake national enhanced surveillance questionnaire as guided by results of microbiological testing and risk assessment as per national guidance Clinical management as appropriate Enteric precautions
Contacts	Practice varies across the UK England: Screen symptomatic contacts and recovered/asymptomatic contacts in risk group B of cases of STEC O157. Management of contacts of non-O157 STEC should be guided by results of microbiological testing and risk assessment as per national guidance Wales: Screen all household contacts NI: Screen contacts in high risk groups
Exclusions	England: **STEC O157** <u>Cases not in a risk group:</u> Symptomatic cases: Until 48 hours symptom free Recovered/asymptomatic cases: No exclusion required <u>Cases in risk groups A - D:</u> Symptomatic cases: Exclude until microbiological clearance obtained Recovered/asymptomatic cases: Exclude until microbiological clearance obtained. Review risk assessment to determine whether restriction/redeployment/ supervised return to childcare may be appropriate whilst awaiting results of clearance **Non-O157 STEC** Exclude all symptomatic cases until 48 hours symptom free. Exclusion of cases in risk groups may be required as guided by results of microbiological testing and risk assessment as per national guidance

Microbiological clearance	England: **CASES** **STEC O157** <u>Cases not in a risk group:</u> No microbiological clearance required <u>Cases in risk groups A-D:</u> Two consecutive negative faecal specimens taken at least 24 hours apart, once the case is symptom free for at least 48 hours **Non-O157 STEC** Microbiological clearance for cases in risk groups may be required as guided by results of microbiological testing and risk assessment as per national guidance **CONTACTS** **STEC O157** <u>Contacts not in risk group:</u> No microbiological clearance required <u>Contacts in risk groups A, C and D:</u> No microbiological clearance routinely required <u>Contacts in risk group B:</u> Two consecutive negative faecal specimens taken at least 24 hours apart and undertake risk assessment **Non-O157 STEC** Microbiological clearance for contacts in risk groups may be required as guided by results of microbiological testing and risk assessment as per national guidance
Case definitions:	
Confirmed case: positive STEC culture or PCR shiga toxin positive result from PHE GBRU (with or without clinical features, with or without epidemiological link to a confirmed case) **Confirmed STEC-related HUS**: clinical features if HUS AND positive STEC culture or PCR shiga toxin positive result or serological confirmation of STEC from PHE GBRU OR Clinical features of HUS AND diagnostic/local laboratory PCR shiga toxin positive result **Probable case:** <u>Local O157 culture positive</u> – diagnostic/local laboratory positive culture presumptive STEC O157 with or without clinical features, with or without epidemiological link to a confirmed case <u>Probable STEC-related HUS</u> – clinical features of HUS, with or without epidemiological link to a confirmed case, awaiting results of microbiological testing <u>Epidemiological link</u> – epidemiological link to a confirmed case, awaiting results of microbiological testing OR diagnostic/local laboratory PCR shiga toxin positive, with or without clinical features of STEC <u>PCR probable</u> - diagnostic/local laboratory PCR shiga toxin positive BUT negative culture for STEC O157, bloody diarrhoea/hospitalisation for acute diarrhoea, without epidemiological link to a confirmed case	

Causative agent:	
Cause	Shiga toxin/verocytotoxin producing *Escherichia coli*
Reservoir	Gastrointestinal tract of ruminants (in the UK mainly cattle, sheep and goats). Other animals and birds acts as transmission vectors
Epidemiology	*E. coli* O157 is the most common serogroup of STEC causing infections in the UK. In England and Wales, almost 50% of STEC O157 cases are in children under 16 and rates of infection are highest in children under 5 years with the peak incidence in the 1-4 age group O157 is the only strain that can be routinely tested for in the majority of UK diagnostic laboratories by current methods. The use of PCR methods by diagnostic/local laboratories is increasing, leading to increased detection of non-O157 cases (confirmed by the PHE GBRU reference laboratory) STEC O157 and non-O157 (such as O104, O26 and O55) have been associated with outbreaks of HUS in the UK and internationally
Transmission	Faecal-oral route - ingestion of contaminated food (particularly undercooked meat, minced beef, salad products including water cress) water or unpasteurized milk - person-to-person spread - direct/indirect contact with an infected animal or their faeces - environmental exposure e.g. swimming/playing in contaminated water, streams or ponds Seasonal outbreaks have been associated with farm visits to feed and handle calves and lambs
Incubation period	Usually 2-4 days for STEC O157 and similar for most strains of non-O157 STEC
Common clinical features	Gastroenteritis: - May be asymptomatic - Non-bloody diarrhoea, fever, abdominal cramps and vomiting - Bloody diarrhoea and severe abdominal pain in more severe disease - Usually self-limiting with recovery in around 10 days Haemolytic uraemic syndrome (HUS): - Approximately 10% of STEC O157 cases develop HUS - Characterised by acute renal failure, thrombocytopenia and microangiopathic haemolytic anaemia - Children aged less than 5 years are at greatest risk of developing HUS, usually 1 week after onset of bloody diarrhoea - Around 50% may develop chronic renal complications. Mortality is between 3-5% Non-O157 infections show a similar spectrum of illness but several strains have been associated with more severe disease (bloody diarrhoea and HUS) including O26, O45 and others

Period of infectiousness	Shedding of organisms depending on strain of STEC and age of patient may be prolonged. It tends to be shorter in adults but there have been reports of children shedding for over 6 weeks

Further relevant guidance and key references:

2018 Operational guidance for Shiga Toxin producing Escherichia coli (STEC) – https://www.gov.uk/government/publications/shiga-toxin-producing-escherichia-coli-public-health-management

Health Protection Agency (February 2011) *VTEC Operational Manual: Operational guidance for HPA staff dealing with cases and incidents of VTEC infection*
Available at: www.gov.uk/government/publications/vero-cytotoxin-producing-escherichia-coli-operational-guidelines-for-public-health-management

Health Protection Agency (February 2011) *The VTEC Support Document. Background and evidence for the Public Health management of infection with verocytotoxigenic Escherichia coli (VTEC)* Available at: www.gov.uk/government/publications/vero-cytotoxin-producing-escherichia-coli-advice-for-public-health-management-teams

Public Health Wales: www.wales.nhs.uk/sitesplus/888/page/43884

Health Protection Agency (July 2011) *The management of acute bloody diarrhoea potentially caused by vero cytotoxin producing Escherichia coli in children*
Available at: www.gov.uk/government/publications/acute-bloody-diarrhoea-potentially-caused-by-vero-cytotoxin-producing-escherichia-coli-managing-cases-in-children

Food Standards Agency: www.food.gov.uk/business-industry/guidancenotes/hygguid/ecoliguide

US Food and Drug Administration (2012) *Bad Bug Book - Foodborne Pathogenic Microorganisms and Natural Toxins Handbook*. Second Edition
Available at:
www.fda.gov/Food/FoodborneIllnessContaminants/CausesOfIllnessBadBugBook/

Preventing or controlling ill health from animal contact at visitor attractions. Industry COP, June 2012 (updated March 2015) Available at: www.visitmyfarm.org/component/k2/item/339-industry-code-of-practice

Shigellosis/ *Shigella* species

Control of human source:	
Cases should be advised to follow usual enteric precautions. Specific advice on exclusion from nursery, school or work settings is given below.	
Public health follow-up required	**YES** Public Health action for confirmed and probable cases of *Shigella flexneri/boydii/dysenteria* and *Shigella spp.* Specific guidance exists. See 'Further relevant guidance and key references' below.
Cases	***Shigella sonnei*** Emphasise hygiene advice. Manage according to local arrangements. ***Shigella flexneri/boydiildysenteriae* (except type 1)/unspecified** Complete national *non-sonnei* questionnaire to identify travel/food/activity history, risk groups and contacts ***Shigella dysenteriae* type 1** Complete national *non-sonnei* questionnaire to identify travel/food/activity history, risk groups and contacts
Contacts	***Shigella sonnei*** Symptomatic contacts: emphasise hygiene advice and 48-hour exclusion after first normal stool. Seek medical advice and testing for diagnostic purposes. Asymptomatic contacts: no action required ***Shigella flexneri/boydiildysenteriae*/unspecified** England and Wales: All contacts to be given link to NHS Choices information Group C contacts should be excluded and seek medical clearance NI: All contacts to be given information Symptomatic contacts: seek medical advice and testing for diagnostic purposes
Exclusions	***Shigella sonnei*** A minimum of 48 hours after first normal stool ***Shigella flexneri/boydiildysenteriae* (except type 1)/unspecified** Cases in risk groups: until microbiological clearance completed Cases not in risk groups: A minimum of 48 hours after first normal stool and medical clearance Symptomatic contacts: manage as a probable case Asymptomatic contacts: no exclusion ***Shigella dysenteriae* (type 1)** Cases in risk groups: until microbiological clearance completed Cases not in risk groups: A minimum of 48 hours after first normal stool Symptomatic contacts: manage as a probable case Asymptomatic contacts in risk groups: until microbiological clearance completed

	Asymptomatic contacts not in risk groups: no exclusion
Microbiological clearance	***Shigella sonnei*** None required ***Shigella flexneri /boydii / dysenteriae* (except type 1)/unspecified** Cases in risk group: one negative sample a minimum of 48 hours after first normal stool or 48 hours after completing antibiotics, whichever is later Cases not in risk groups: no microbiological clearance samples required ***Shigella dysenteriae* (type 1)** Cases in risk group: 2 consecutive negative samples a minimum of 48 hours after first normal stool or 48 hours after completing antibiotics. Samples to be taken at least 24 hours apart Cases not in risk groups: A minimum of 48 hours after first normal stool Symptomatic contacts: manage as a probable case Asymptomatic contacts in risk groups: 2 consecutive negative samples taken at least 24 hours apart Asymptomatic contacts not in risk groups: no microbiological clearance samples required
Case definitions:	
Confirmed case: A person with speciated shigella infection determined by a local laboratory or the PHE Reference Laboratory **Probable case:** A person with a culture positive *Shigella spp.,* determined by a local laboratory in the UK or overseas OR A person with a clinical history compatible with bacterial dysentery and/or a Shigella PCR positive (ipaH) result AND an epidemiological link to a confirmed or probable case	
Causative agent:	
Cause	4 species of shigella: *Shigella sonnei, Shigella flexneri, Shigella boydii, Shigella dysenteriae*
Reservoir	Humans
Epidemiology	Infections peak in late summer in the UK Highest rates of infection occur in children aged < 5 years, followed by 5-14 year age group *S. sonnei* is the most common species in Western Europe and both *S. sonnei* and *S. flexneri* are endemic in UK Most cases of *S. boydii* and *S. dysenteriae* are imported but all strains may be travel-associated
Transmission	Faeco-oral transmission directly amongst households, nursery and infant schools is most common. Foodborne infections occur but are rare. Direct transmission between men-who-have-sex-with-men (MSM) is also an important transmission route

	Environmental contamination during episodes of acute diarrhoea can occur, where bacilli may be aerosolised during toilet flushing and settle on surrounding surfaces and survive for weeks in cool and humid locations.
Incubation period	12 hours – 4 days (usually 1-3 days) but up to 1 week for *S. dysenteriae*
Common clinical features	Clinical features vary depending on Shigella species *S. sonnei* causes mild illness in most cases with symptoms of diarrhoea (may be bloody in 10-50%) and abdominal pain with/without nausea, vomiting, headache and malaise lasting average of 4-5 days (range 1 day – 2 weeks) *S. flexneri* causes similar symptoms to *S. sonnei* but illness may be more severe with dysentery more prominent, longer duration of illness and hospitalisation rates higher. Complications include reactive arthritis and Reiter's syndrome *S. boydii* causes diarrhoeal illness like that of *S. flexneri* *S. dysenteriae* type 1 infection causes more severe illness, with dysentery in most cases and complications including haemolytic uraemic syndrome (HUS)
Period of infectiousness	Cases are most infectious when diarrhoea is present but considered infectious as long as organisms are excreted in stool (average of 2- 4 weeks but prolonged carriage of several months has been reported)
Other relevant information	See risk groups for transmission of gastrointestinal pathogens **(Table 1)** Other contacts for consideration: - sexual contacts of MSM while case was infectious and for a week after symptoms have ceased - wider contacts may need to be considered if the case was symptomatic whilst at a childcare setting or whilst working at a healthcare/food establishment Notifying clinicians should be reminded that any child <16 years presenting with infectious bloody diarrhoea should be managed as per the 2011 Royal College of Paediatrics and Child Health, RCGP and HPA guidelines "The management of acute bloody diarrhoea potentially caused by Vero cytotoxin producing *Escherichia coli* in children"
Further relevant guidance and key references:	
Public Health England *Interim public health operational guidelines for shigellosis* Available at: www.gov.uk/government/collections/shigella-guidance-data-and-analysis Hawker J, Begg N, Blair I, Reintjes R, Weinberg J & Ekdahl K. (2012) *Communicable Disease Control and Health Protection Handbook – Third Edition*. Wiley-Blackwell. US Food and Drug Administration (2012) *Bad Bug Book - Foodborne Pathogenic Microorganisms and Natural Toxins Handbook*. Second Edition Available at: www.fda.gov/Food/FoodborneIllnessContaminants/CausesOfIllnessBadBugBook	

Vibriosis/ *Vibrionaceae* species excluding *Vibrio cholera*

Control of human source:	
Cases should be advised to follow usual enteric precautions. Specific advice on exclusion from nursery, school or work settings is given below.	
Public health follow-up required	**NO**
Cases	Clinical treatment as appropriate Enteric precautions
Contacts	No actions required
Exclusions	A minimum of 48 hours symptom free/no loose stools
Microbiological clearance	None required
Case definitions:	
Laboratory identification of non-cholera *Vibrio spp.* in faeces, blood or wound specimen.	
Causative agent:	
Cause	*Vibrio spp.* excluding V*ibrio cholera*
Reservoir	Approximately 12 known pathogenic species. They are halophilic organisms, widely and naturally found within estuarine and marine waters. *Vibrio vulnificus* and *Vibrio parahaemolyticus* are the most commonly identified organisms.
Epidemiology	Greater number of cases occur during summer months associated with increased proliferation of *Vibrio* spp. during warmer weather.
Transmission	Consumption of raw or undercooked shellfish (particularly oysters harvested from warmer waters). Skin and wound infections may occur when wounds or soft tissues are exposed to warm seawater.
Incubation period	Most commonly 12-24 hours but extremes of 4-96 hours have been reported
Common clinical features	*V. parahaemolyticus:* - Watery diarrhoea, abdominal cramps, nausea, vomiting, fever, and (rarely) primary septicaemia. Wound and soft tissue infections are less common. - duration: 1-7 days (median 3 days) *V. vulnificus:* *- diarrhoea, vomiting, abdominal pain* *- skin infection possibly leading to skin breakdown, ulceration, bullae, fever, septicaemia and death* *- Approximately 50% case fatality among cases with pre-existing immunocompromise who develop septicaemia.* Persons with underlying medical conditions, such as alcoholism and chronic liver disease may be at increased risk of infection and serious complications.
Period of infectiousness	No evidence of person-to-person spread. Other people may have been exposed to the same risk factor(s).
Other relevant information	In a suspected cluster/outbreak situation, obtain detailed travel, activity and food history

Further relevant guidance and key references:

Centers for Disease Control and Prevention: www.cdc.gov/vibrio/index.html
US Food and Drug Administration (2012) *Bad Bug Book - Foodborne Pathogenic Microorganisms and Natural Toxins Handbook*. Second Edition
Available at:
www.fda.gov/Food/FoodborneIllnessContaminants/CausesOfIllnessBadBugBook

Worm infestation

Control of human source:	
Cases should be advised to follow usual enteric precautions.	
Public health follow-up required	**NO**
Cases	Clinical treatment as appropriate Enteric precautions: in particular good personal hygiene including keeping fingernails short and regular changing of clothes, bedding and towels Supervised handwashing of children
Contacts	Screen symptomatic contacts Some infections require coordinated treatment for all household contacts (e.g. *Enterobius vermicularis*)
Exclusions	None required
Microbiological clearance	None required
Case definitions:	
Identification of relevant parasite by microscopic examination of stool or other recognised laboratory methods	
Causative agent:	
Cause	Nematodes: Roundworm *(Ascaris lumbricoides, Strongyloides stercoralis* and *Toxocara canis)* Whipworm *(Trichuris trichiura)* Threadworm *(Enterobius vermicularis)* Hookworm *(Ancylostoma duodenale and* Necator *americanus)* Cestodes: Tapeworm *(Taenia solium* and *T. saginata, Diphyllobothrium* spp., *Echinococcus granulosus, Hymenolepsis nana)* Trematodes: Flukes *(Schistosoma* species, *Paragonimus westermani, Fasciolopsis. buski,* etc.)
Reservoir	Variable
Epidemiology	Variable Prevalent in areas with poor sanitation and food safety systems
Transmission	Variable; often direct person-to-person spread. Others are transmitted via contaminated foodborne sources
Incubation period	Variable
Common clinical features	Cases may be asymptomatic or symptomatic Typical symptoms include abdominal pain, diarrhoea, loss of appetite and passing worms in faeces
Period of infectiousness	Variable
Further relevant guidance and key references:	
Hawker J, Begg N, Blair I, Reintjes R, Weinberg J & Ekdahl K. (2012) *Communicable Disease Control and Health Protection Handbook – Third Edition*. Wiley-Blackwell.	

US Food and Drug Administration (2012) *Bad Bug Book - Foodborne Pathogenic Microorganisms and Natural Toxins Handbook*. Second Edition
Available at:
www.fda.gov/Food/FoodborneIllnessContaminants/CausesOfIllnessBadBugBook

Yersiniosis/ *Yersinia enterocolitica* (and Yersinia *pseudotuberculosis*)

Control of human source:	
Cases should be advised to follow usual enteric precautions. Specific advice on exclusion from nursery, school or work settings is given below	
Public health follow-up required	**NO – unless in an outbreak situation**
Cases	Obtain food and other potential risk factor history Enteric precautions
Contacts	Clinical surveillance
Exclusions	Case: A minimum of 48 hours symptom free/no loose stools Symptomatic contacts in risk groups: A minimum of 48 hours after diarrhoea has stopped
Microbiological clearance	None required
Case definitions:	
A symptomatic person with laboratory identification of *Yersinia* spp. in a stool specimen.	
Causative agent:	
Cause	*Yersinia enterocolitica* and *Yersinia pseudotuberculosis*
Reservoir	Asymptomatic carriage in the gastrointestinal tract of wild and domesticated animals and birds, particularly pigs for *Y. enterocolitica*
Epidemiology	Most commonly seen in those less than 15 years of age. Seasonal variation occurs - *Y. pseudotuberculosis* is more common in winter and *Y. enterocolitica* is more common from June to November
Transmission	Faecal-oral: Consumption of contaminated food or water, particularly pork or pork products. A wide variety of foodstuffs have been implicated in cases and outbreaks. Person-to-person: particularly within nurseries, schools and healthcare settings Direct contact with animals Via contaminated blood products
Incubation period	*Y. enterocolitica*: usually 3-7 days with extremes of 1-12 days reported *Y. pseudotuberculosis*: range of 2-25 days reported (median 5-8 days)
Common clinical features	*Y. enterocolitica*: - watery diarrhoea, abdominal pain, fever - duration: 2 days to 6 weeks - complications: reactive arthritis, erythema nodosum, septicaemia *Y. pseudotuberculosis*: - mesenteric adenitis, fever, abdominal pain often mimicking appendicitis - duration: 1-37 days (average 18 days) - complications: reactive arthritis, erythema nodosum, acute renal failure

Period of infectiousness	Excretion of the organism in stool may persist for several months after infection but infectivity decreases substantially after the first 4 days or so
Further relevant guidance and key references:	
Hawker J, Begg N, Blair I, Reintjes R, Weinberg J & Ekdahl K. (2012) *Communicable Disease Control and Health Protection Handbook – Third Edition*. Wiley-Blackwell. US Food and Drug Administration (2012) *Bad Bug Book - Foodborne Pathogenic Microorganisms and Natural Toxins Handbook*. Second Edition Available at: www.fda.gov/Food/FoodborneIllnessContaminants/CausesOfIllnessBadBugBook	

Membership of the guidelines working group

Main authors

Toyin Ejidokun (Consultant in Communicable Disease Control, PHE) **(Joint Chair)**
Jeremy Hawker (Consultant Epidemiologist, PHE)
Lorraine Lighton (Consultant in Communicable Disease Control, PHE- Retired) **(Joint Chair)**
Karthik Paranthaman (Consultant in Communicable Disease Control, PHE)
Rhianwen Stiff (Consultant in Communicable Disease Control, Public Health Wales)
Gemma Ward (Specialty Registrar in Public Health, PHE)

Additional core members of the guidelines working group

Bob Adak (Head of Gastrointestinal Disease Surveillance, NIS PHE)
Neil Anstey (Health Protection Practitioner, PHE)
Matthieu Pegorie (Consultant in Communicable Disease Control, PHE)
Ian Gray (The Chartered Institute of Environmental Health (retired))

Acknowledgements

In addition, we wish to thank the following colleagues for their valuable input into specific sections of these guidelines

General advice

Kate McPhedran (Senior Health Protection Practitioner, PHE)
Juli Treacey (Health Protection Practitioner, PHE)

Exclusions

Tony Lewis (Head of Policy, The Chartered Institute of Environmental Health)
Bernadette Nazareth (Consultant in Communicable Disease Control, PHE)
Deborah Wilson (Consultant in Communicable Disease Control, PHE)
Kevin Caroll (Consultant in Communicable Disease Control, PHE)
Roger Gajraj (Consultant in Communicable Disease Control, PHE)
Lisa Harvey-Vince (Senior Health Protection Practitioner, PHE)

Amoebiasis

Girija Dabke (Consultant in Communicable Disease Control, PHE)
Lisa Harvey-Vince (Senior Health Protection Practitioner, PHE)
Claire Alexander (Consultant Clinical Scientist and Honorary Clinical Senior Lecturer, Scottish Microbiology Reference Laboratories)

Bacillus

Jeremy Hawker (Consultant Epidemiologist, PHE)
Jim McLauchlin (Lead Public Health Microbiologist, PHE)
Karthik Paranthanam (Consultant in Communicable Disease Control, PHE)

Botulism

Kathie Grant (Head of Gastrointestinal Bacteria Reference Unit, PHE)
Rohini Manuel (Consultant Clinical Microbiologist, NIS PHE)

Campylobacteriosis

Jeremy Hawker (Consultant Epidemiologist, PHE)
Rohini Manuel (Consultant Clinical Microbiologist, PHE)

Cholera

Kathie Grant (Head of Gastrointestinal Bacteria Reference Unit, PHE)
Joanne Edge (Senior Scientific officer, Food Standards Agency)
Gauri Godbole (Consultant Medical Microbiologist and Parasitologist, NIS, PHE)
Girija Dabke (Consultant in Communicable Disease Control, PHE)

Clostridium botulinum

Jim McLauchlin (Lead Public Health Microbiologist, PHE)
Rohini Manuel (Consultant Clinical Microbiologist, PHE)
Kathie Grant (Head of Gastrointestinal Bacteria Reference Unit, PHE)
Gauri Godbole (Consultant Medical Microbiologist and Parasitologist, NIS, PHE)
Joanne Edge (Senior Scientific officer, Food Standards Agency)

Clostridium difficile infection

Rohini Manuel (Consultant Clinical Microbiologist, NIS PHE)

Gauri Godbole (Consultant Medical Microbiologist and Parasitologist, NIS, PHE)
Kathie Grant (Head of Gastrointestinal Bacteria Reference Unit, PHE)

Clostridium perfringens food poisoning

Kathie Grant (Head of Gastrointestinal Bacteria Reference Unit, PHE)
Rohini Manuel (Consultant Clinical Microbiologist, NIS PHE)
Gauri Godbole (Consultant Medical Microbiologist and Parasitologist, NIS, PHE)
Jim McLauchlin (Lead Public Health Microbiologist, PHE)

Cryptosporidiosis

Rachel Chalmers (Consultant in Communicable Disease Control, Public Health Wales)
Jim McLauchlin (Lead Public Health Microbiologist, PHE)
Emma Crawley-Bovey (Consultant in Communicable Disease Control, PHE)

Cyclosporiasis

Gauri Godbole (Consultant Medical Microbiologist and Parasitologist, NIS, PHE)
Karthik Paranthanam (Consultant in Communicable Disease Control, PHE)
Kathie Grant (Head, Gastrointestinal Bacteria Reference unit, PHE)
Jim McLauchlin (Lead Public Health Microbiologist, FWE Microbiology Services, PHE)

Enteric fever: typhoid and paratyphoid fevers

Members of the PHE Enteric Fever guidelines working group
Sooria Balasegaram (Consultant Epidemiologist, PHE)
Joanne Freedman (Senior Scientist, Travel and Migrant Health section, PHE)
Katherine Russell (Consultant Epidemiologist, PHE)
Kathie Grant (Head, Gastrointestinal Bacteria Reference unit, PHE)

Giardia

Jim McLauchlin (Lead Public Health Microbiologist, FWE Microbiology Services, PHE)
Jeremy Hawker (Consultant Epidemiologist, PHE)
Gauri Godbole (Consultant Microbiologist and Parasitologist, NIS, PHE)
Claire Alexander (Consultant Clinical Scientist and Honorary Clinical Senior Lecturer, Scottish Microbiology Reference Laboratories)

Hepatitis A infection

Members of the PHE Hepatitis A guidelines working group
Grainne Nixon (Nurse consultant, PHE)
Sema Mandal (Consultant epidemiologist, PHE)
Koye Balogun (Clinical Scientist, PHE)
Richard Tedder (Head Joint NHSBT/PHE Blood Borne Virus Unit/Consultant Virologist, PHE)
Smita Kapadia (Consultant in Communicable Disease Control, PHE)
Jim McLauchlin (Lead, Public Health Microbiologist, FWE Microbiology services, PHE)

Hepatitis E infection

Members of the PHE Hepatitis E guidelines working group
Miranda Mindlin (Consultant in Health Protection, PHE)
Grainne Nixon (Nurse consultant, PHE)
Smita Kapadia (Consultant in Communicable Disease Control, PHE)
Koye Balogun (Clinical Scientist, PHE)
Richard Tedder (Head, Joint NHSBT/PHE Blood Borne Virus Unit/Consultant Virologist, PHE)
Sema Mandal (Consultant epidemiologist, PHE)
Jim McLauchlin (Lead Public Health Microbiologist, FWE Microbiology Services, PHE)

Histamine poisoning

Jim McLauchlin (Lead Public Health Microbiologist, FWE Microbiology Services, PHE)
Neil Anstey (Health Protection practitioner, PHE)

Listeriosis

Kathie Grant (Head of Gastrointestinal Bacteria Reference Unit, PHE)
Jim McLauchlin (Lead Public Health Microbiologist, FWE Microbiology services, PHE)
Karthik Paranthanam (Consultant in Communicable Disease Control, PHE)
Jeremy Hawker (Consultant Epidemiologist, PHE)
Matthieu Pegorie (Consultant in Communicable Disease Control, PHE)

Marine algal shellfish poisoning syndromes and ciguatera poisoning

Jim McLauchin (Lead Public Health Microbiologist, FWE Microbiology Services)
Kathie Grant (Head, Gastrointestinal Disease Bacteria Reference unit, PHE)

Norovirus gastroenteritis

Kate McPhedran (Senior Health Protection Practitioner, PHE
Juli Treacy (Health Protection Practitioner, PHE)
Marie Chattaway (Pathogen lead for Salmonella Services, Gastrointestinal Bacteria Reference unit, PHE)

Rotavirus infection

Natalie Adams (Epidemiologist, Gastrointestinal, Emerging and Zoonoses Infections, PHE)
David James Allan (Unit Head, Enteric Virus Unit, Virus Reference Department)

Sapovirus gastroenteritis

Girija Dabke (Consultant in Communicable Disease Control, PHE)
Jeremy Hawker (Consultant Epidemiologist, PHE)

Shiga toxin producing *Escherichia coli gastroenteritis* (STEC), HUS

Members of the PHE STEC guidelines working group
Lisa Harvey-Vince (Senior Health Protection Practitioner, PHE)
Neil Anstey (Health Protection Practitioner, PHE)
Kathie Grant (Head, Gastrointestinal Bacteria Reference unit, PHE)
Jim McLauchlin (Lead Public Health microbiologist, FWE Microbiology Services, PHE)

Shigellosis

Bernadette Nazareth (Consultant in Communicable Disease Control, PHE)
Lisa Harvey-Vince (Senior Health Protection Practitioner, PHE)

Vibriosis

Jeremy Hawker (Consultant epidemiologist, PHE)
Kathie Grant (Head, Gastrointestinal Bacteria Reference unit, PHE)
Jim McLauchlin (Lead, Public Health Microbiologist, FWE Microbiology Services, PHE)

Worms

Karthik Paranthanam (Consultant in Communicable Disease Control, PHE)
Gauri Godbole (Consultant Medical Microbiologist and Parasitologist, NIS, PHE)

Yersiniosis

Jeremy Hawker (Consultant Epidemiologist, PHE)
Marie Chattaway (Pathogen lead for Salmonella services, Gastrointestinal bacteria reference Services, PHE)
Jim McLauchlin (Lead, Public Health Microbiologist, FWE Microbiology Services, PHE)

Guidelines as a whole

Deborah Wilson (Consultant in Communicable Disease Control, PHE)
Tony Lewis (Head of Policy, The Chartered Institute of Environmental Health)
Caroline Willis (Unit Head, Porton Food Water and Environmental microbiology lab)
Rohini Manuel (Consultant Medical Microbiologist, PHE)
Karthik Paranthanam (Consultant in Communicable Disease Control, PHE)
Joanne Edge (Senior Scientific officer, Microbiological risk assessment, Food Standards Agency)
Philip Randles (Head of Incident branch and members of the microbiological risk assessment branch, Food Standards Agency)
Bernadette Nazareth (Consultant in Communicable Disease Control, PHE)
Kevin Caroll (Consultant in Communicable Disease Control, PHE)
Roger Gajraj (Consultant in Communicable Disease Control PHE)
Lisa Harvey-Vince (Senior Health Protection practitioner, PHE)
Neil Anstey (Health Protection practitioner, PHE)

Abbreviations

Anti HAV IgM	Hepatitis A virus antibodies IgM
CDC	Centre for Disease Control
CSF	Cerebro Spinal Fluid
DNA	Deoxy Ribonucleic Acid
EIA	Enzyme Immuno Assay
FSA	Food Standards Agency
GDH	Glucose Dehydrogenase
HAV	Hepatitis A Virus
HDC	Histidine Decarboxylase
HEV	Hepatitis E Virus
HPA	Health Protection Agency
HUS	Haemolytic Uraemic Syndrome
IgG	Immunoglobulin G
IgM	Immunoglobulin M
ipaH	Invasion plasmid antigen H (gene found in Shigella and some enteroinvasive E.coli)
MSM	Men who have sex with Men
NAAT	Nucleic Acid Amplification Test
NBTS	National Blood Transfusion Service
NHS	National Health Service
NIS	National Infection Service
PCR	Polymerase Chain Reaction
PHE	Public Health England
PPV	Positive Predictive Value

RNA	Ribo Nucleic Acid
RCGP	Royal College of General Practitioners
STEC	Shiga Toxin producing Escherichia Coli
TTP	Thrombotic Thrombocytopenic Purpura
UK	United Kingdom
US	United States

Appendix I – Notifiable diseases and links to law

www.gov.uk/notifiable-diseases-and-causative-organisms-how-to-report

The Health Protection (Notification) Regulations 2010. Available at: www.legislation.gov.uk/uksi/2010/659/contents/made

The Health Protection (Notification) (Wales) Regulations 2010. Available at: www.legislation.gov.uk/wsi/2010/1546/made

The Health Protection (Local Authority Powers) Regulations 2010. Available at: www.legislation.gov.uk/uksi/2010/657/contents/made

The Health Protection (Local Authority Powers) (Wales) Regulations 2010. Available at: www.legislation.gov.uk/wsi/2010/1545/contents/made

The Health Protection (Part 2A Orders) Regulations 2010. Available at: www.legislation.gov.uk/uksi/2010/658/contents/made

The Health Protection (Part 2A Orders) (Wales) Regulations 2010. Available at: www.legislation.gov.uk/wsi/2010/1544/contents/made

Health Protection legislation guidance 2010. Available at: webarchive.nationalarchives.gov.uk/20130107105354/http:/www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_114510

Health Protection Regulations 2010 Toolkit. Available at: www.cieh.org/policy/health-protection-regulations-toolkit.html

NI Legislation is: Public Health Act (Northern Ireland) 1967
www.legislation.gov.uk/apni/1967/36

Appendix II – Information leaflet – Minimising the spread of gastrointestinal infection

<table>
<tr><td colspan="2">You may be asked to stay away from work to help reduce the risk of spreading gastrointestinal illness to other people. This is particularly important if you work with food or people who are particularly vulnerable.
Your child may be asked to stay away from crèche, nursery, school or other social activities to help reduce the spread of illness.</td></tr>
<tr><td>Personal hygiene</td><td>Hand washing is the single most important method of preventing and controlling the spread of infection
Hands should be washed thoroughly with warm running water and soap:
Before eating
Before handling, preparing or serving food
After visiting the toilet
After attending to any person who has diarrhoea or vomiting
After changing a baby’s nappy
After handling or washing soiled clothing or bedding or after cleaning the toilet or child’s potty
After handling pets, including reptiles, or non-domestic animals
Dry hands thoroughly after every wash using disposable paper towels, or ensure that each person has their own towel
Hand washing should be supervised for young children and other people for who, hand washing may be difficult
Do not share towels with someone who has diarrhoea or vomiting
Do not share, or allow children to share, a bath with someone with diarrhoea or vomiting
Where possible, avoid close contact, including sexual contact, with someone with diarrhoea or vomiting
Avoid preparing or handling food for other people until symptoms have resolved for at least 48 hours</td></tr>
<tr><td>Environmental cleaning</td><td>Toilet and Bathroom areas
Clean hard surfaces at least daily (or more frequently dependent on use) with separate disposable cloth using hot water and diluted bleach solution</td></tr>
</table>

	• Pay particular attention to potentially contaminated surfaces such as the toilet bowl and seat (surface and underneath), taps, flush handle (and surrounding area), and door handles **Spillages** • Deal with any spillage or contamination with faeces, vomit or urine immediately • Absorbent material such as paper towels, tissues, or sawdust may be used to limit the spread of liquid soiling and can be disposed of afterwards • Cleaning the soiled area with hot water and detergent is usually adequate • Always rinse with clean water and allow to dry before using the area again • After clearing a spillage from carpet, ideally use a proprietary carpet shampoo or steam cleaner to further clean the area **Soiled linen or clothing** • Before washing, carefully remove as much solid material as possible into the toilet bowl and flush away • Wash separately in the washing machine, using a pre-wash if possible, and on the hottest temperature possible for the fabric • Use a biological washing powder • Do not use the half wash button or the rapid wash function and do not overload the washing machine • Wipe down the outside surface of the washing machine after loading using a disposable cloth and hot soapy water • If heavily soiled items have been washed, consider running an empty hot (90°C) cycle before washing other items **General:** • Do not clean any soiled items in areas where food is prepared (e.g. do not use a domestic kitchen sink to clean soiled garments) • Ideally, wear disposable gloves and use disposable cloths/mop-heads whilst cleaning • Always wash hands thoroughly after cleaning is completed, including when gloves have been worn
Disposal of soiled materials	• Wherever possible, cases should use a toilet • If bedpans, commodes or urinals are required, empty these into the toilet bowl, wash the vessel with hot water and detergent, rinse and allow to dry • Ideally, use disposable plastic aprons when dealing with diarrhoea or vomit and soiled materials

	• Used gloves, aprons, cleaning cloths, mop-heads etc. may be disposed of by placing them in a plastic bag, sealing the neck and placing with household refuse • If rubber gloves or non-disposable cloths are used, thoroughly wash in hot water and detergent after use, rinse and allow drying. Ideally, these should be disposed of at the end of the episode of illness

Appendix III – Stool sample collection instructions leaflet

http://patient.info/health/poo-stool-sample