

THE DIRTY DOZEN – THE 'LEAST WANTED' LIST OF FOODBORNE PATHOGENS

Basic information on our selection of the twelve most important foodborne pathogens in the UK, providing details regarding name, incubation period, symptoms, foods commonly involved and relevant control measures.

[Campylobacter](#)

[Salmonella](#)

[Cryptosporidium parvum](#)

[Shigella](#)

[Norovirus](#)

[Clostridium perfringens](#)

[E. coli O157 \(VTEC\)](#)

[Salmonella Typhi and Paratyphi](#)

[Yersinia enterocolitica](#)

[Listeria monocytogenes](#)

[Bacillus cereus](#)

[Staphylococcus aureus](#)

1. CAMPYLOBACTER

Incubation Period: 2 - 5 days

Symptoms: A 'flu-like stage of 1-2 days, followed by severe diarrhoea (may be sticky, watery and may contain blood), headache, fever and abdominal pain.

Foods Commonly Involved: Mainly undercooked meat (especially poultry) and offal. These could also cross-contaminate other foods.

Controls:

- Thorough cooking of poultry, meat and offal
- Adequate refrigerated storage temperatures
- Separation of raw and ready-to-eat foods
- Prevention of cross-contamination by proper cleansing of food contact surfaces and utensils
- Food handlers to have good standards of personal hygiene and food hygiene knowledge
- Good hygiene after handling pets

2. SALMONELLA

Typical Incubation Period: 12 – 48 hours

Symptoms: Fever, headache & general malaise; abdominal cramps; diarrhoea and vomiting; dehydration

Food Commonly Involved: Raw foods of animal origin (e.g. meat, poultry, milk & dairy products, eggs & egg products, seafood) or fruit and vegetables

contaminated on the farm or later via cross-contamination with contaminated products.

Controls:

- Thorough cooking
- Adequate refrigerated storage temperatures
- Separation of raw and ready-to-eat foods
- Prevention of cross-contamination by proper cleaning of food contact surfaces and utensils
- Food handlers to have good standards of personal hygiene and food hygiene knowledge
- Effective pest control

3. CRYPTOSPORIDIUM PARVUM

Incubation Period: 2 – 14 days

Symptoms: Severe watery diarrhoea; abdominal cramps; fever; loss of appetite & weight loss

Food Commonly Involved: Primarily spread by faecally-contaminated water and infected food handlers. Any food could be contaminated by these routes. (Also spread by contact with animals)

Controls:

- Avoid contaminated water supplies and any food that might be contaminated
- Wash and/or peel all raw vegetables and fruits before eating
- Use safe, uncontaminated water to wash all food that is to be eaten raw
- Cook food thoroughly
- Avoid eating uncooked foods when travelling in countries with minimal water treatment and sanitation systems
- Food handlers to have good standards of personal hygiene and food hygiene knowledge

4. SHIGELLA

Incubation Period: 7 – 36 hours

Symptoms: Abdominal pain; tenesmus (clenching of gut & anus); vomiting; fever; diarrhoea (which can range from bloody stools containing mucus and pus to a watery diarrhoea).

Food Commonly Involved: Although spread is usually person-to-person, foods that have been implicated are those receiving extensive handling, such as salads (e.g. potato, tuna, shrimp, chicken), fruit and vegetables, milk & dairy products, shellfish & seafood, poultry, and egg dishes.

Controls:

- Preventing a carrier or someone recovering from the disease from handling food
- Ensuring that all food handlers understand and practice good personal hygiene
- Proper standards of sanitary hygiene and facilities
- Thorough cooking
- Adequate refrigerated storage temperatures
- Supervision of hand washing by children in nurseries and infant schools

5. NOROVIRUS

Incubation Period: 24 – 48 hours

Symptoms: (Projectile) vomiting; diarrhoea; abdominal pain; headache; low grade fever.

Food Commonly Involved: Filter-feeding bivalve shellfish (e.g. oysters, mussels, clams and cockles); any food that is handled extensively, and which is either eaten raw/lightly cooked or which is not subject to further heating prior to consumption. Such foods include soft fruit (particularly berries), salad vegetables, desserts, bakery products, prepared salads and sandwiches.

Controls:

Normal cooking processes - but note that NOVs are not always inactivated in shellfish given only minimal heat treatment.* Good standards of personal hygiene and hand washing

Thorough and regular cleaning and disinfection of surfaces, equipment, utensils etc.

Thorough cleaning and disinfection after any vomiting incident.

Thorough washing of all salad items, fresh fruit and raw vegetables prior to consumption.

Consume shellfish only from approved/classified waters.

6. CLOSTRIDIUM PERFRINGENS

Incubation Period: 8 –12 hours

Symptoms: Mainly diarrhoea and acute abdominal pain; sometimes nausea; very occasionally fever and vomiting.

Food Commonly Involved: Meat and poultry e.g. stews, gravies, roasts, pies.

Controls:

- Thorough cooking
- Rapid & uniform cooling (refrigeration temperature reached within 90 minutes)
- Refrigerated storage below 8°C

- Reheating cooked meats thoroughly (once only, if done at all) so that the core temperature reaches 70°C for at least 2 minutes, or an equivalent time/temperature combination
- Hot holding of cooked meat above 63°C.
- Food handlers to have good standards of personal hygiene and food hygiene knowledge

7. E. COLI O157 (VTEC)

Incubation Period: 1 – 14 days

Symptoms: Severe abdominal cramps and diarrhoea, initially watery but becoming very bloody (although some stay watery only); in the young, this can progress to haemolytic uraemic syndrome (HUS) and kidney failure (and death); in the elderly, can progress to TTP – bleeding under the skin - which can lead to death.

Food Commonly Involved: Mainly minced beef products (particularly beef burgers) and milk (unpasteurised or contaminated post-pasteurisation); also dairy produce (yoghurt, cheese), meat products (cooked meat, meat pies, dry cured salami), fresh produce (including salad and sprouted seeds) and unpasteurised fruit and vegetable juices.

Controls:

- Thorough cooking of all beef and other meat products, especially when minced or in the form of burgers.
- Adequate refrigerated storage temperatures - below 8°C
- Avoidance of cross-contamination from raw to cooked/ready-to-eat foods; includes effective cleaning and disinfection of surfaces and equipment
- Food handlers to have good standards of personal hygiene and food hygiene knowledge
- Wash fruits and vegetables (including salads) thoroughly. Consider use of a 'produce' or salad wash.
- Drink only pasteurised milk or fruit juices.

8. SALMONELLA TYPHI & PARATYPHI

Incubation Period: 12 – 20 days

Symptoms: First phase - fever; constipation; abdominal tenderness; rashes/red spots which fade on pressure. Second stage - inflammation and ulceration of the small intestine; persistence of fever; onset of diarrhoea (characteristic 'pea soup' stools); septicaemia; peritonitis.

Food Commonly Involved: Faecally contaminated foods e.g. milk, shellfish, raw fruit and vegetables.

Controls:

- Thorough cooking

- Adequate refrigerated storage temperatures
- Separation of raw and ready-to-eat foods
- Prevention of cross-contamination by proper cleaning of food contact surfaces and utensils
- Food handlers to have good standards of personal hygiene and food hygiene knowledge
- Proper sewage disposal

9. YERSINIA ENTEROCOLITICA

Incubation Period: 3 – 7 days

Symptoms: Abdominal pain; diarrhoea; mild fever; vomiting.

Food Commonly Involved: Mainly pork, but can also include other meats, milk and dairy products; poultry; fish and shellfish; fruits and vegetables.

Controls:

- Thorough cooking
- Adequate refrigerated storage temperatures N.B. Yersinia can grow at low temperatures. Keeping foods well chilled is a particularly important control.
- Separation of raw pork or porcine waste from ready-to-eat foods
- Prevention of cross-contamination by proper cleaning of food contact surfaces and utensils
- Food handlers to have good standards of personal hygiene and food hygiene knowledge

10. LISTERIA MONOCYTOGENES

Incubation Period: 3 – 70 days

Symptoms: First phase - a 'flu-like illness with malaise and mild fever (may go unnoticed); second stage – septicaemia; meningitis, encephalitis; intra-uterine and cervical infections in pregnant women, which can then result in abortion or still birth.

Food Commonly Involved: Ready-to-eat delicatessen items (e.g. soft ripened cheeses, meat-based patés, coleslaw, smoked fish and cooked meats), milk and dairy products, meat and poultry, and seafood.

Controls:

- Pregnant women and & immuno-compromised persons should avoid eating high risk foods such as certain ripened soft cheeses (e.g. camembert, brie) and some types of meat-based paté.
- All chilled meals should be thoroughly cooked/reheated.
- Adequate refrigerated storage temperatures N.B. Listeria can grow at low temperatures. Keeping foods well chilled is a particularly important control.

11. BACILLUS CEREUS

Incubation Period: Emetic (vomiting) type: 1 – 6 hours, most commonly 2-5 hours; diarrhoeal type: 6 –15 hours.

Symptoms:

Emetic syndrome - nausea, vomiting, abdominal cramps and perhaps some diarrhoea later.

Diarrhoeal syndrome - the milder of the two syndromes, with watery diarrhoea, abdominal cramps and possibly some vomiting (although this is rare).

Food Commonly Involved: Emetic strains - starchy & dried foods such as rice & pasta; diarrhoeal strains - meats, milk & dairy products, fish, vegetables.

Controls:

- Strict control of time and temperature in cooking, cooling, chilling & reheating high risk foods.
- Prevention of cross contamination
- Regarding the preparation of rice and fried rice, it is recommended that:
 - one should avoid preparing rice too far in advance of service wherever possible
 - prepared rice should be kept hot i.e. above 63⁰C, or cooled quickly (in no more than 1 ½ hours) to below 4⁰C.
 - refrigerating rice in small amounts and/or in shallow containers will facilitate rapid cooling.
 - if rice is to be reheated, it should only be done so once (thoroughly to at least 70⁰C) and served immediately

12. STAPHYLOCOCCUS AUREUS

Incubation Period: 1 – 6 hours

Symptoms: Severe vomiting and abdominal cramps; nausea, diarrhoea, sweating, and sometimes collapse/prostration.

Food Commonly Involved: Foods that require a lot of manual handling by food handlers e.g. cooked meats (especially hams), poultry products, bakery products with cream fillings, sandwich fillings, raw milk, cream and cheese.

Controls:

- Adequate temperature control, i.e. hot storage above 63⁰C, chill/cold storage at or below 4⁰C.
- Reducing food handling time (from initial preparation to eating) to a minimum
- Thorough cooking of foods
- Food handlers to have good standards of personal hygiene (particularly hands and skin) and food hygiene knowledge