

b Focus on foodborne diseases

Foodborne diseases (FBD) are of major public health importance worldwide. They are a common cause of diarrhoeal illness and have the potential to cause widespread outbreaks. FBD can be due to a range of bacteria, viruses, parasites, toxins and chemical agents. A FBD outbreak is defined as two or more cases of a similar gastro-intestinal (or neurological in the case of botulism) illness following consumption of a common food/beverage item(s). FBD outbreaks are notifiable in South Africa as a Category 1 notifiable medical condition and require reporting within 24 hours to facilitate prompt investigation. Rapid investigation of FBD outbreaks is paramount in identifying the cause and instituting control measures. Historically, FBD outbreaks are under-recognised and under-reported in SA, and even when recognised and reported, are often challenging to investigate.

It is critical that clinical and food/environmental specimens are obtained for microbiological analysis and the appropriate testing requested. The clinical specimen type is guided by the presenting clinical features, and may include stool, vomitus, and blood. In instances where stool specimens can not be readily obtained, rectal swabs should be collected. For some infections, specimens collected several days after illness onset may still be positive, as organisms can be excreted for prolonged periods. Specialised testing of clinical, food and environmental specimens for certain foodborne pathogens (e.g. enteric viruses) or bacterial toxins (such as those produced by *Clostridium perfringens*, *Staphylococcus aureus*, *Bacillus cereus*, *Clostridium botulinum* and Shiga toxin-producing *E. coli* (STEC)) can be indicated, but is not offered by all laboratories. Routine and specialised testing should be guided by the predominant symptoms and incubation period of illness, which give important clues as to likely infectious causes (Table 1). Healthcare professionals should liaise with the laboratory to ensure that specimens are referred to relevant clinical or public health laboratories.

Prevention and control of foodborne diseases

FBD outbreaks are often associated with food prepared in households or at community events, and often occur as a result of breaches in personal and food hygiene. According to the World Health Organization (WHO), a significant reduction in FBD in the African Region could be achieved by focusing on safe food preparation. FBD caused by viruses, *C. perfringens*, *S. aureus* and *B. cereus* can only be controlled by practicing safe food preparation. While control in food production processes can contribute to a decline in *Campylobacter* spp, *Salmonella* spp, *Listeria monocytogenes* and STEC infections, a substantial decrease could also be achieved through actions in the formal and informal

catering sectors and in households.

Health education for the public should focus on the WHO five keys to safer food, namely:

1. Keep hands, surfaces and utensils/ implements clean
2. Separate raw and cooked foods
3. Cook food thoroughly
4. Keep food at safe temperatures
5. Use safe water and raw materials

Available at : http://www.who.int/topics/food_safety/flyer_keys_en.pdf

What to do when a foodborne disease outbreak is suspected

1. The cases must be notified immediately to relevant stakeholders and to the NICD through the notifiable medical conditions (NMC) platform;
2. Case investigation forms (CIF) must be completed and emailed to relevant stakeholders and to the NICD. These may be obtained at: http://www.nicd.ac.za/assets/files/NICD_Foodborne_Outbreak_CIF.pdf;
3. Following notification, the relevant Outbreak Response Team/s (ORT) will be activated. The ORTs co-ordinate outbreak response activities;
4. Clinical (stools/rectal swabs/vomitus/blood/ etc. as indicated) and food/water/ environmental specimens must be collected as soon as possible and sent to the relevant laboratory for testing.

For further information contact the Centre for Enteric Diseases at ced@nicd.ac.za

Source: Centre for Enteric Diseases, NICD-NHLS; ced@nicd.ac.za

Table 1. Syndromes of foodborne disease and likely aetiologic agents

Predominant symptoms	Incubation period	Likely aetiologic agents	Comments
Nausea, vomiting and abdominal cramps	<1 hour	Heavy metals (copper, zinc, tin, cadmium)	Specialised toxicology analysis is required
Parasthesias	Up to 6 hours	Fish and shellfish poisoning syndromes	Vomiting, abdominal cramps and diarrhoea commonly occur with several types of fish/shellfish poisoning syndromes
Nausea and vomiting	1-6 hours	<i>Staphylococcus aureus</i> preformed enterotoxin <i>Bacillus cereus</i> preformed enterotoxin (short-incubation emetic syndrome)	Diarrhoea may also be present Illness usually lasts <12 hours
Abdominal cramps and diarrhoea	8-16 hours	<i>Clostridium perfringens</i> preformed enterotoxin <i>Bacillus cereus</i> preformed enterotoxin (long-incubation diarrhoeal syndrome)	Vomiting may also be present Illness usually lasts <24 hours
Fever, abdominal cramps and diarrhoea	6-48 hours	<i>Campylobacter jejuni</i> , <i>E. coli</i> (STEC), <i>Salmonella</i> spp., <i>Shigella</i> spp., <i>Vibrio parahaemolyticus</i>	Bloody diarrhoea and vomiting may also occur Illness usually lasts 2-7 days
Abdominal cramps and watery diarrhoea	16-72 hours	<i>E. coli</i> (ETEC), <i>Vibrio parahaemolyticus</i> , <i>Vibrio cholerae</i> .	
Vomiting and non-bloody diarrhoea	24-48 hours	Noroviruses	Vomiting usually predominates in children, and diarrhoea in adults. Low-grade fever may be present. Illness usually lasts 1-3 days.
Fever and abdominal cramps without diarrhoea	16-48 hours	<i>Yersinia enterocolitica</i>	Diarrhoea may occur in young children. Prolonged illness in older children and adults may mimic acute appendicitis. Illness usually lasts 24 hours – 4 weeks.
Bloody diarrhoea without fever	72-120 hours	<i>E. coli</i> (STEC)	Severe abdominal cramps common Uncomplicated illness usually lasts 1-12 days. Haemolytic-uraemic syndrome is an important complication – often preceded by development of fever and leucocytosis.
Nausea, vomiting, diarrhoea and paralysis	18-36 hours	<i>Clostridium botulinum</i> preformed toxins (botulism)	Acute gastrointestinal symptoms may occur just before or with the onset of descending weakness/paralysis. Illness may last from weeks to months.
Persistent diarrhoea	1-3 weeks	<i>Cyclospora</i> spp., <i>Cryptosporidium</i> spp., giardiasis	
Systemic illness (foodborne diseases that manifest mainly as invasive infections in immunocompromised persons)	Depends on aetiologic agent	<i>*Listeria monocytogenes</i> : - pregnant women, neonates, the elderly, and cell-mediated immunosuppressed persons at highest risk. - May present as a self-limiting febrile gastroenteritis - Presents as febrile illness or miscarriage in pregnancy, and as a flu-like illness/bacteraemia/meningitis in other risk groups <i>*Vibrio vulnificus</i> can cause bacteraemia after ingestion of raw seafood, particularly in patients with underlying liver disease.	
Other infections that may be foodborne and cause disease with primary symptoms outside the gastrointestinal tract include: typhoid fever, brucellosis (unpasteurised milk/cheese), anthrax (meat), Q fever (unpasteurised milk), hepatitis A and E (shellfish, fresh produce), and toxoplasmosis (meat).			