

E.COLI & FOOD POISONING



GOVERNMENT OF ZIMBABWE



Funded by the European Union

This publication was produced with the financial support of the European Union. Its contents are the sole responsibility of the Transforming Zimbabwe's Animal Health and Food Safety Systems for the Future (SAFE) and do not necessarily reflect the views of the European Union



Food and Agriculture
Organization of the
United Nations



Department of Veterinary Services

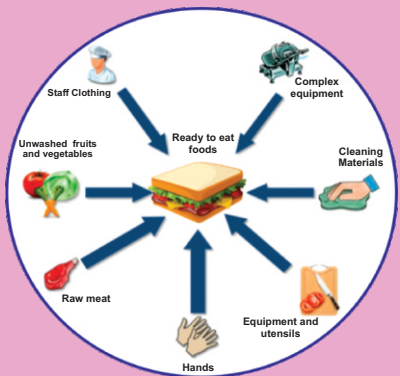
For more information on Food Safety contact:

Department of Environmental Health Services, Ministry of Health and Child Care
Kagavi Building 11th Floor, Central Avenue, Harare Telephone: +263-242-2901211.
Email denvironmentalhealth@mohcc.gov.zw

Key Facts

- **Escherichia coli (E. coli)** is a bacteria that is commonly found in the lower intestine of warm-blooded organisms. Most E. coli strains are harmless, but some can cause serious food poisoning.
- **Shiga toxin-producing E. coli (STEC)** is a bacterium that can cause severe foodborne disease.
- **Primary sources of STEC outbreaks** are raw or undercooked ground meat products, raw milk, and faecal contamination of food especially vegetables.
- **In most cases, the illness is self-limiting, but it may lead to a life-threatening disease including haemolytic uraemic syndrome (HUS), especially in young children and the elderly.**
- **STEC is heat-sensitive. In preparing food, be sure to follow basic food hygiene practices such as "cook thoroughly".**
- **Following the WHO "Five keys to safer food" is a key measure to prevent infections with foodborne pathogens such as STEC.**

Escherichia coli (E. coli) is a bacterium that is commonly found in the gut of humans and warm-blooded animals. Most strains of E. coli are harmless. Some strains however, such as Shiga toxin-producing E.coli (STEC), can cause severe foodborne disease. It is transmitted to humans primarily through consumption of contaminated

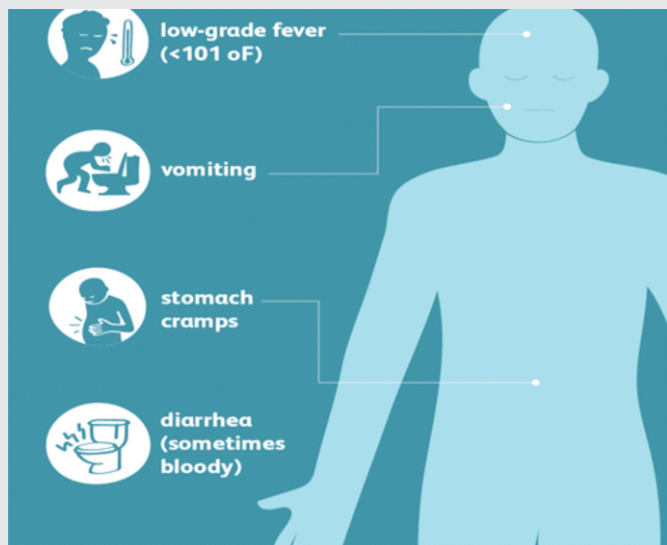


foods, such as raw or undercooked ground meat products, raw milk, and contaminated raw vegetables and sprouts.

STEC produces toxins, known as Shiga-toxins because of their similarity to the toxins produced by *Shigella dysenteriae*. STEC can grow in temperatures ranging from 7 °C to 50 °C, with an optimum temperature of 37 °C. Some STEC can grow in acidic foods, down to a pH of 4.4, and in foods with a minimum water activity (aW) of 0.95.

STEC is destroyed by thorough cooking of foods until all parts reach a temperature of 70 °C or higher. *E. coli* O157:H7 is the most important STEC serotype in relation to public health; however, other serotypes have frequently been involved in sporadic cases and outbreaks

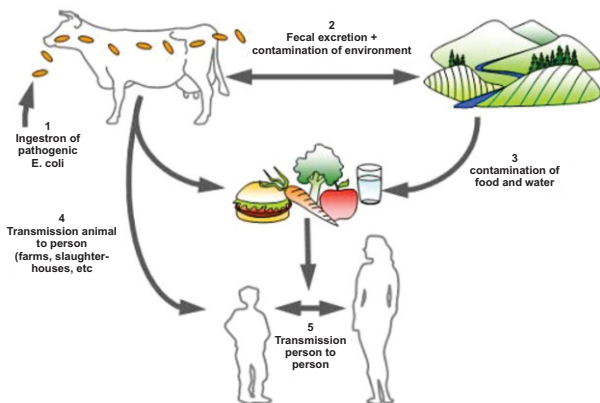
Symptoms



Symptoms of the diseases caused by STEC include abdominal cramps and diarrhoea that may in some cases progress to bloody diarrhoea (haemorrhagic colitis). Fever and vomiting may also occur. The incubation period can range from 3 to 8 days, with a median of 3 to 4 days. Most patients recover within 10 days, but in a small proportion of patients (particularly young children and the elderly), the infection may lead to a lifethreatening disease, such as haemolytic uraemic syndrome (HUS). HUS is characterized by acute renal failure, haemolytic anaemia and thrombocytopenia (low blood platelets).

It is estimated that up to 10% of patients with STEC infection may develop HUS, with a casefatality rate

ranging from 3 to 5%. Overall, HUS is the most common cause of acute renal failure in young children. It can cause neurological complications (such as seizure, stroke and coma) in 25% of HUS patients and chronic renal sequelae, usually mild, in around 50% of survivors. Persons who experience bloody diarrhoea or severe abdominal cramps should seek medical care. Antibiotics are not part of the treatment of patients with STEC disease and may possibly increase the risk of subsequent HUS.



Sources and transmission

Most available information on STEC relates to serotype O157:H7, since it is easily differentiated biochemically from other *E. coli* strains. The reservoir of this pathogen appears to be mainly cattle. In addition, other ruminants such as sheep, goats, deer are considered significant reservoirs, while other mammals (such as pigs, horses, rabbits, dogs, and cats) and birds (such as chickens and turkeys) have been found infected.

E. coli O157:H7 is transmitted to humans primarily through consumption of contaminated foods, such as raw or undercooked ground meat products and raw milk. Faecal contamination of water and other foods, as well as cross contamination during food preparation (with beef and other meat products, contaminated surfaces and kitchen utensils), will also lead to infection.

Examples of foods implicated in outbreaks of *E. coli* O157:H7 include undercooked hamburgers, dried cured salami, unpasteurized fresh-pressed apple cider, yogurt, and cheese made from raw milk.

Most available information on STEC relates to serotype O157:H7, since it is easily differentiated biochemically from other *E. coli* strains. The reservoir of this pathogen appears to be mainly cattle. In addition, other ruminants such as sheep, goats, deer are considered significant reservoirs, while other mammals (such as pigs, horses, rabbits, dogs, and cats) and birds (such as chickens and turkeys) have been found infected.

E. coli O157:H7 is transmitted to humans primarily through consumption of contaminated foods, such as raw or undercooked ground meat products and raw milk. Faecal contamination of water and other foods, as well as cross contamination during food preparation (with beef and other meat products, contaminated surfaces and kitchen utensils), will also lead to infection.

Examples of foods implicated in outbreaks of *E. coli* O157:H7 include undercooked hamburgers, dried cured salami, unpasteurized fresh-pressed apple cider, yogurt, and cheese made from raw milk.

An increasing number of outbreaks are associated with

Prevention

The prevention of infection requires control measures at all stages of the food chain, from agricultural production on the farm to processing, manufacturing and preparation of foods in both commercial establishments and household kitchens.

Industry

The number of cases of disease might be reduced by various mitigation strategies for ground beef (for example, screening the animals pre-slaughter to reduce the introduction of large numbers of pathogens in the slaughtering environment). Good hygienic slaughtering practices reduce contamination of carcasses by faeces, but do not guarantee the absence of STEC from products.

Education in hygienic handling of foods for workers at farms, abattoirs and those involved in the food production is essential to keep microbiological contamination to a minimum. The only effective method of eliminating STEC from foods is to introduce a bactericidal treatment, such as heating (for example, cooking or pasteurization) or irradiation.

Household

Preventive measures for *E. coli* O157:H7 infection are similar to those recommended for other foodborne diseases. Basic good food hygiene practice, as

described in the WHO "Five keys to safer food", can prevent the transmission of pathogens responsible for many foodborne diseases, and also protect against foodborne diseases caused by STEC The five keys to safer food are:

- Keep clean.**
 - Separate raw and cooked.**
 - Cook thoroughly.**
 - Keep food at safe temperatures.**
 - Use safe water and raw materials.**
- Five keys to safer food manual**

Such recommendations should in all cases be implemented, especially "cook thoroughly" so that the centre of the food reaches at least 70 °C. Make sure to wash fruits and vegetables carefully, especially if they are eaten raw. If possible, vegetables and fruits should be peeled. Vulnerable populations (such as small children and the elderly) should avoid the consumption of raw or undercooked meat products, raw milk, and products made from raw milk.

Regular hand washing, particularly before food preparation or consumption and after toilet contact, is highly recommended, especially for people who take care of small children, the elderly or immunocompromised individuals, as the bacterium can be passed from person to person, as well as through food, water and direct contact with animals.

A number of STEC infections have been caused by contact with recreational water. Therefore, it is also important to protect such water areas, as well as drinking-water sources, from animal waste (4).

Producers of fruits and vegetables

WHO's "Five keys to growing safer fruits and vegetables" provides rural workers who grow fresh fruits and vegetables for themselves, their families and for sale in local markets, with key practices to prevent microbial contamination of fresh produces during planting, growing, harvesting and storing.

The five keys to growing safer fruits and vegetables are:

- Practice good personal hygiene.**
- Protect fields from animal faecal contamination.**
- Use treated faecal waste.**
- Evaluate and manage risks from irrigation water.**
- Keep harvest and storage equipment clean and dry.**