Questions and Answers on EHEC outbreak

What is EHEC?

EHEC is an abbreviation for enterohaemorrhagic Escherichia coli. 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 EHEC, can cause severe foodborne disease. Investigations have now concluded that a Shiga toxin-producing Escherichia coli (STEC) bacteria is responsible for the current outbreak. Other types of enterohemorrhagic E. coli include the relatively important serotype E. coli O157:H7, and more than 100 other non-O157 strains such as O111 and O26.

It is transmitted to humans primarily through contaminated food or water and contact with animals. A wide variety of food can be a potential source of contamination, including raw (unpasteurised) milk and cheese, undercooked beef, as well as fresh produce. 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. Person-to-person transmission is also possible among close contacts (families, childcare centres, nursing homes, etc).

In humans, EHEC bacteria set free dangerous toxins that can cause life-threatening diseases. Symptoms of the diseases caused by EHEC 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 three to eight days, with a median of three to four 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 life-threatening disease, such as haemolytic uremic syndrome (HUS). HUS is characterized by acute renal failure, haemolytic anaemia and thrombocytopenia. It is estimated that up to 10% of patients with EHEC infection may develop HUS, with a case-fatality rate ranging from 3% to 5%.

Each year, on average 1,000 symptomatic STEC-infections and approximately 60 cases of HUS are notified in Germany, affecting mostly young children under five years of age. In 2010 there were two fatal HUS cases. The current events represent one of the largest described outbreaks of HUS/STEC worldwide and the largest in Germany, with a very atypical age and sex distribution of the cases.
What control and prevention methods are being / can be undertaken?

The prevention of infections 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 the domestic environment. The sector itself works all the time according to strict and high hygiene rules, standards and guidelines, which are laid down in specific measures for the prevention of bacterial pollution. Certification schemes such as GlobalGAP or on a national level for example in Germany QS (Qualität und Sicherheit / Quality and Safety) are in place. Moreover, well established traceability schemes enable the tracing of commodities from the final consumer back to the producer. In addition, Freshfel has advised the whole sector from production down to retail to increase the awareness and even increase the sanitary procedures already in place.

It is also of importance that consumers are applying the necessary hygiene standards, as set out by the World Health Organization (WHO):

- Keep clean (e.g. washing hands; washing and sanitizing all surfaces and equipment used for food preparation)
- Separate raw and cooked (e.g. using separate equipment and utensils such as knives and cutting boards for handling raw foods; storing food in containers to avoid contact between raw and prepared foods)
- Cook thoroughly (e.g. bringing foods to boiling to make sure that they have reached 70°C)
- Keep food at safe temperatures (e.g. not leaving cooked food at room temperature for more than 2 hours; not storing food too long even in the refrigerator)
- Use safe water and raw materials (e.g. using safe water or treat it to make it safe)

What legislation is in place on a European level?

EU requirements (Directive 2003/99/EC) impose a full epidemiological investigation of the food-borne outbreak in order to identify the source and its spread. All food business operators have to comply with requirements for good hygiene practice in accordance with Regulation (EC) No 852/2004, preventing the contamination of food of animal and plant origin. In addition, most establishments must implement procedures based on the HACCP principles to monitor effectively the risks. Standards on the presence of E. coli have been laid down in Regulation (EC) No 2073/2005 e.g. for ready to eat fruit and vegetables, juices, meat, milk products, egg products, crustaceans and molluscan shellfish. Food containing shigatoxin-producing E. coli (STEC/EHEC) is considered unsafe for human consumption and must be withdrawn from the market in accordance with the General Food Law (R 178/2002).
How did the incident start?

Since the second week of May the number of cases of bloody diarrhoea associated with so called haemolytic uremic syndrome (HUS) has been increasing in Germany. Laboratory results from samples taken from patients have identified STEC strain of serotype O104:H4 (Stx2-positive, eae-negative). Although the majority of cases have occurred in northern parts of the country, several cases were notified in the southern and eastern states. On 22 May Germany informed the European Commission’s Early Warning and Response System (EWRS) of a significant increase in the number of patients with hemolytic uremic syndrome (HUS) and bloody diarrhea caused by enterohemorrhagic E. coli (EHEC).

The source of the outbreak has not yet been confirmed and intensive investigations are ongoing. German health authorities suspect that contaminated food is the vehicle of the outbreak, based on the epidemiological description (e.g. age and geographical distribution) of the cases. On May 25, the Robert Koch Institute together with the Federal Institute for Risk Assessment presented the results of the epidemiological investigation that show significantly more frequent consumption of raw tomatoes, cucumbers and lettuce by patients from the EHEC outbreak compared to the healthy study participants. The detection of the pathogen on cucumbers was reported by the Institute for Hygiene and the Environment in Hamburg (HU) at the Ministry for Health and Consumer Protection (BGV) on 26 May.

Until now, German authorities reported in total around 1,400 suspected respectively confirmed cases, with apparently 15 people having died due to EHEC. While HUS cases are usually observed in children under 5 years of age, in this outbreak 87% are adults, with a clear predominance of women (68%). Other cases reported from European countries, such as Sweden (36), Denmark (9), France (3), Switzerland (3), UK (3), Austria (3) or the Netherlands (1) and Poland (1), are concerning people either being German nationals visiting the other affected countries or persons who had been visiting Germany. No case of locally acquired infection has been reported in any EU Member State other than Germany as of today.

What additional measures have been taken by the sector?

The sector is closely cooperating with all relevant authorities to investigate the source of the outbreak. It is for the first time that the sector is facing an alleged food borne disease with such a dimension / impact, indeed food borne outbreaks related to fresh fruit and vegetables are rare. According to the latest EFSA (European Food Safety Authority) report on food borne outbreaks fruit and vegetables were implicated in 4.4 % of outbreaks, these were primarily caused by frozen raspberries contaminated with norovirus.

Operators have been requested to take additional measures, such as further reinforcing hygiene provisions, taking additional samples, etc.
What is next?

National and European authorities continue to closely monitor and investigate the situation, as the exact source of the outbreak has still not been identified. It is unclear whether the results from Hamburg can be extrapolated to the whole of Germany. Furthermore, it cannot be excluded that an alternative food item is the vehicle of infection. The definite source of the infection remains to be confirmed.

Where to find more information?

European Commission: DG Health and Consumers:
http://ec.europa.eu/food/food/coli_outbreak_germany_en.htm

ECDC Rapid Risk Assessment: Outbreak of Shiga toxin-producing E. coli (STEC) in Germany (27 May 2011):


WHO: Enterohaemorrhagic Escherichia coli (EHEC), Fact sheet Nº125 (May 2005):
http://www.who.int/mediacentre/factsheets/fs125/en/


Robert Koch Institut: http://www.rki.de/EN/Home/homepage_node.html