Training of Food Handlers
An essential prerequisite of any food safety management system is adequate staff training. Processors are required by law to ensure that staff who handle food are supervised and instructed and/or trained in food hygiene matters commensurate with their work activities.

All staff working in a food business should be given a basic level of formal hygiene training. There should be a continual process of food safety education in the workplace. Guide to Food Safety Training Level 1 – Induction Skills and Level 2 – Additional Skills, are now available from the FSAI.

Exclusion from Work of Infected Staff
Staff should stay at home if they have acute diarrhoea and in particular, if E. coli O157 infection has been diagnosed.

Spread of Infection
Food handlers can spread the infection by:
1. Handling contaminated food and then other food that will not be further processed without washing hands
2. Using the same utensils for raw meat and other foods
3. Insufficient cooking
4. Using unchlorinated water in food production
5. Attending work while infected
6. Poor personal hygiene.

Specific Guidance for Meat Processors
Minced meat and minced meat products are a major source of E. coli O157. The bacterium, if present, will normally be on the external surfaces of whole joints but during mincing it is redistributed throughout the product. Similarly, rolled joints where the meat surface is turned inside means that any surface bacteria become distributed to the centre of the joint where they are more difficult to kill. The risk of E. coli O157 multiplying in minced meat can be reduced by the following precautions:
- Meat should be kept below 2°C.
- Room temperatures in processing areas should be kept below 12°C.
- Processors should adopt a food safety management system based on the principles of HACCP.
- Mincing equipment should be regularly cleaned and sanitised.

The E.C. (Minced Meat and Meat Preparations) Regulations, 1996 (S.I. No. 243 of 1996) require processors to withdraw batches of product in the event of a human health risk from a suspect meat source. To enable these obligations to be met, processors should label discrete batches or lots of minced meat with a batch number. Correct identification may minimise the quantity of product recalled and will speed up the recall process thereby protecting consumers.

To further protect and inform consumers, processors should label minced meat and minced meat products with clear instructions:
- This product may contain harmful bacteria
- Instructions on handling to prevent cross contamination
- Instructions for correct cooking, “Mincing meat and minced meat products should be thoroughly cooked until the juices run clear and no pink meat remains.”

Human Infection
People can become infected with E. coli O157 by:
1. Coming into direct contact with livestock or livestock faeces
2. Drinking contaminated water or eating uncooked fruit and vegetables grown or washed using contaminated water
3. Eating contaminated food
4. Coming into contact with the faeces of an infected person, most commonly small infants or frail people where personal hygiene practices may be inadequate.

Leaflets in the E. coli O157 series available from the Food Safety Authority of Ireland include: Reducing the Risk on the Farm; Preventing the Spread of Infection in the Abattoir; Preventing the Spread of Infection in Catering and Retailing; Protecting Yourself and Your Family; Protecting Vulnerable Groups.
Effective Heat Treatment

Cooking should ensure that the centre of the food is heated to at least a temperature of 70°C. This is important to prevent the growth of harmful bacteria and to kill E. coli O157, which can cause kidney failure and death.

Adequate cooking kills this germ

Foods Implicated in Outbreaks

<table>
<thead>
<tr>
<th>Product Type</th>
<th>Foods Implicated in Outbreaks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meat and Meat</td>
<td>Minced meat, Beef burgers, Dry sausages, Minced meat (unpasteurised), Roast beef, Turkey roll</td>
</tr>
<tr>
<td>Fruit and Vegetables</td>
<td>Apples, Sausages, Unpasteurised milk, Lettuce, Cheese, Unpasteurised unprocessed apples</td>
</tr>
<tr>
<td>Dairy Products</td>
<td>Unpasteurised milk, Yoghurt, Peaches</td>
</tr>
</tbody>
</table>

HACCP

By law, food businesses must have a food safety management system based on the principles of Hazard Analysis Critical Control Points (HACCP). The standard - Food Safety Management Incorporating HACCP (I.S. 243:2000) is available from the National Standards Authority of Ireland (NSAI) to help fulfil this obligation. Within this system, processors should pay particular attention to the following control measures designed to reduce the risk of E. coli O157 infection:

- Prevention of cross-contamination between raw and ready-to-eat foods
- Effective heat treatment of food
- Careful management of food storage conditions such that hot food is kept hot (generally above 63°C) and cold food is kept cold (generally below 5°C).

Prevention of Cross Contamination

E. coli O157 can be passed from raw food to cooked and ready-to-eat foods. Because consumers may not heat these foods before consumption they may be at risk from infection. Cross contamination can be prevented by taking the following steps:

- Physically separate raw and cooked or ready-to-eat foods at all times during processing, storage and distribution
- Where this is not possible, the handling of raw and cooked or ready-to-eat foods should be separated in time and by a thorough and adequate cleaning protocol
- Staff must wash their hands thoroughly between handling raw and cooked or ready-to-eat foods.

Effective Heat Treatment

Cooking should ensure that the centre of the food is heated to at least a temperature of 70°C for 2 minutes or an equivalent time/temperature process. This will kill any E. coli O157 that may be present. Effective heat treatment involves both a time and a temperature element.

Processing equipment that uses microwaves may not heat food evenly and processors must take care to avoid ‘cold spots’. Unlike food heated in conventional ovens, the centre may not necessarily be the coldest part for measurements used to confirm application of the correct cooking time and temperature.

Good Hygiene Practice

Good hygiene practice regarding the safe preparation, storage and distribution of food is essential to minimise the risk of E. coli O157 infection. HACCP does not replace good hygiene practice, rather it adds an extra layer of safety by specifically targeting the points critical to ensuring the requirements to comply with the European Communities (Hygiene of Foodstuffs) Regulations, 2000 (S.I. No. 165 of 2000).

Low Infectious Dose

Normally it takes hundreds if not thousands of germs to make someone ill. Unfortunately, with E. coli O157, the number required may be as little as 10 even a small number of germs can cause serious illness, particularly in the young, the elderly and those already suffering from other diseases.

Infection Reservoir

E. coli O157 is commonly found in the gut of healthy livestock and it is not currently feasible to eliminate it. It may also be present in unchlorinated water supplies or in contaminated ready-to-eat food. E. coli O157 can be passed from person to person.

This makes it so important to pay attention to food safety and hygiene at all stages of food production and preparation if foodborne illness is to be prevented.

Shared Responsibility

Because of the seriousness of the disease, steps must be taken to reduce the risks of E. coli O157 infection throughout the food chain: from farm to fork.

Farmers, processors, distributors, retailers, caterers and consumers all have their part to play. All share the responsibility to minimise the risks.

Control Measures for Food Factories

Since it is not possible to eliminate E. coli O157 from raw meat and vegetables at present it may find its way into the food factory. Processors should assume it is present and must employ a strategy whereby the bacterium is not allowed to multiply and where possible, employ a processing method to kill it. They should do this within a framework of a formal food safety management system.

E. coli O157 Can Kill

Escherichia coli (E. coli) is the name given to a large family of bacteria commonly found in the gut of humans and animals. The majority of E. coli are harmless however, some types can cause illness. One particular type, known as E. coli O157 may cause serious illness in humans ranging from diarrhoea to kidney failure. Up to 30% of people infected with E. coli O157 can develop kidney failure and 3-5% of these people die.

Human infection has been increasing worldwide since the early 1980s. In 1996 Scotland had a large outbreak that affected over 500 people and 21 people died.

The table below outlines the number of cases of VTEC O157 in Ireland from 1996-2000:

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of reported cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td>8</td>
</tr>
<tr>
<td>1997</td>
<td>31</td>
</tr>
<tr>
<td>1998</td>
<td>75</td>
</tr>
<tr>
<td>1999</td>
<td>51</td>
</tr>
<tr>
<td>2000</td>
<td>35 (41)*</td>
</tr>
</tbody>
</table>

* 41 cases notified but 6 of which occurred in non-Irish nationals.