E. coli O157: Control of Cross Contamination

Revised Guidance July 2014

ABC Food Safety Online
This course is based on the Food Standards Agency’s revised "E. COLI O157 CONTROL OF CROSS-CONTAMINATION Guidance for food business operators and enforcement authorities" published in July 2014 and is reproduced here under the terms of the Open Government Licence scheme.

The text of the course has been produced by the FSA but the self-test quizzes, photographs and end of module tests have been produced by ABC Food Safety.

Aim

The aim of this course is to familiarise food enforcement officers with the FSA guidance.

Objectives

On completion of the course, the reader will be able to recognise:

- The risks associated with E.coli O157
- Sources of E.coli O157 contamination in food businesses.
- E.coli O157 cross contamination risks in food businesses
- Relevant controls to prevent E.coli O157 cross contamination.

This guidance comprises three elements:

- Links are provided to the legal requirements contained in Regulation (EC) No 852/2004 with which food businesses must comply.

- GUIDE TO COMPLIANCE sets out recommended means by which food businesses may comply with the regulations in order to control cross-contamination with E. coli O157. Where possible, it provides different options for compliance, the suitability of which will be dependent on the activities and particular circumstances relating to each business.

  It is for the business to determine the controls that are appropriate given their activities and for the relevant local authority to verify the suitability of the controls. Whilst businesses are advised to follow this guide to compliance, it is open to a business to demonstrate to their local authority that it can achieve the objectives of the regulations in other ways.

- ADVICE ON GOOD PRACTICE provides guidance on good practice within food businesses.
Module Description

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* Please note that this figure is provided to help plan your training. The actual time spent on each section may vary depending on your prior knowledge of the topic area.

User Hints

To complete this module, simply read through the on-screen text, click on the links for further information and make notes in this handbook where appropriate. It is recommended that you place these notes in a ring-binder and print out any additional notes from the course as required.

Remember to click on “next page” to progress through the course whenever it appears in orange text at the bottom right of the screen. If this is not highlighted then click on “next section”.

To leave and return to a course simply bookmark the page that you are using, logout and then click on the bookmark when you are ready to return to the course.

If you would like to undertake some further reading on this topic, click on the “library” button to view links to legislation, codes of practice etc.
Section 1 - Introduction

Escherichia coli O157 (commonly abbreviated E. coli O157) is a harmful bacterium that is particularly dangerous because it has the ability to survive during refrigeration and freezing and has been shown to be tolerant of acid, salt and dry conditions. If consumed, even at very low doses, it can lead to death or serious untreatable illness.

Even after recovery from infection, some cases are left with permanent kidney or brain damage. Special attention should always be regarded to vulnerable groups, such as young children or the elderly.

The primary objective of this guidance is to ensure the food produced and sold in the UK is safe to eat and consumers are protected. The risk of cross-contamination with E. coli O157 must be considered and controlled in any food business where both raw and ready-to-eat (RTE) foods are handled.

E. coli O157 is a hazard that needs to be controlled through the business' food safety management system. To help businesses comply with this requirement the guidance clarifies:

- the circumstances in which E. coli O157 cross-contamination hazards should be considered,
- the control measures that can be applied to control cross-contamination with E. coli O157, and
- that if such controls fail, there is an imminent risk to consumers with potentially severe consequences.

By following the steps provided in this guidance a food business will help control cross-contamination from other foodborne bacteria such as Campylobacter, Salmonella and other E. coli strains.

The control measures required will vary between different businesses and should be proportionate to the risk posed in accordance with the specific activities of the business.
This guidance lays down the legal requirements and the FSA's interpretation of how to comply with these requirements followed by good practice. Businesses are advised to follow this guide to compliance, but it is open to a business to demonstrate to their local authority that it can achieve the objectives of the regulations in other ways.

There is a risk of cross-contamination if the same piece of complex equipment is used to process raw and RTE foods. The risk may be adequately controlled by an effective cleaning and disinfection process, but requires that all surfaces that could potentially be contaminated either directly or indirectly, are subjected to the required chemical or heat disinfection.

Due to the complexity of certain types of machinery, including vacuum packers, slicers and mincers, it is considered that it would be too difficult to effectively clean such equipment between uses during the normal operation of a business.

This guidance discusses the different approaches in more detail on all types of equipment.

**Who is this guidance for?**

This guidance is for all types of businesses that handle both raw foods (that can be a source of E. coli O157) and RTE foods. It will also help LAs during their inspections of food premises to ensure that the risk of cross-contamination with E. coli O157 is under control.

The guidance does not apply to the following types of food businesses:

- primary producers and growers (for example farmers);
- food businesses that handle only pre- wrapped/pre-packaged food in a way that prevents cross-contamination such as distributors, warehouses and some retailers where open food is not handled or packed on site; and
- approved manufacturing processors such as cheese manufacturers or raw milk processors (such as those pasteurising milk), which already have their own established systems to control cross-contamination.

However, the above mentioned businesses are still required to comply with food hygiene regulations and are recommended to follow specific guidance on good hygiene practices.

**What is cross-contamination?**

Cross-contamination is one of the most common causes of food poisoning. It happens when harmful bacteria are spread onto food from either other food sources (known as direct cross-contamination) or from surfaces, hands or equipment that have been contaminated (known as indirect cross-contamination).
Steps to control cross-contamination

The key control measures outlined in this guidance to control cross contamination with E. coli O157 are:

- Separation between raw and RTE foods.
- Effective cleaning and disinfection procedures.
- Personal hygiene, particularly hand washing, and handling practices.
- Effective management controls and training.

Sources of E. coli O157 in food

E. coli O157 can be found in the following sources, and all these products are required to be handled as if E. coli O157 is present: Raw meat; Fresh produce; Raw milk and; Water.

Question 1

What are the key control measures to control cross contamination with E.coli O157?

Answer:
Section 2 - Separation

The design of any food premises should permit good food hygiene practices, including protection against contamination with E. coli O157 and other harmful bacteria.

Raw food contaminated with E. coli O157 may transfer bacteria to RTE foods either by

- direct contact through unsafe handling and storage, or by
- indirect contact through staff movement and poor personal hygiene or unsafe use of equipment, utensils and food contact surfaces.

Identifying separate work and storage areas, food contact surfaces, equipment and utensils for raw and for RTE foods is the most effective way to prevent cross-contamination. If physical separation is not possible the adequate cleaning and disinfection of the areas used to prepare food will be the main control.

Guide to compliance for the separation of food in preparation rooms

When both raw and RTE foods are handled and prepared from the same premises, there must be effective procedures in place to prevent cross-contamination. How to ensure this will depend on the activities undertaken by the business, as well as what is achievable for the business. See the separation of areas decision tree to determine what is appropriate.

The options for a food establishment are:

1. Using a permanent separate room for RTE food only. Or
2. Using an area designated for the handling and preparation of RTE food (also referred to as 'clean area') on a permanent basis. Or
3. Using an area designated for RTE foods based on time separation (also referred to as a 'temporary clean area').

Advice on good practice for the separation of food in preparation rooms.

It is **recommended** that separate areas are provided for raw and RTE foods. Where practicable, use separate rooms that include:

- separate fridges, freezers, display units,
- separate designated staff/uniforms,
- separate equipment,
- separate utensils,
- separate sinks,
- separate wash-hand basins.

When time separation is used, it is recommended, where possible, to prepare RTE foods first in a designated area before undertaking preparation of raw foods.
Guide to compliance for separation of food in storage and display

If practical, use separate storage and display facilities for raw and RTE foods. However the same storage (for example same fridge/freezer) or display unit can be used for raw and RTE foods as long as the storage space is of sufficient size and the storage is planned in such a way that contamination is avoided. Door handles can be a potential source of cross-contamination. Staff need to be instructed on adequate separation within storage and display equipment so that they are clear on where to store food safely.

Question 2

All food businesses must provide separate fridges for raw and RTE food. True or false?

Advice on good practice for the separation of food in storage and display

It is good practice to:

- use separate storage and display facilities including refrigerators, freezers and display units for raw and RTE foods.
- store raw and RTE foods in separate designated areas even if the food is in sealed containers.
- label designated areas to make them clearly identifiable to all staff as being for the storage of RTE or for the storage of raw foods.

Door handles should be included on cleaning checklists/schedules.

Ensure packaging is robust, not damaged or leaking and food is checked regularly to ensure integrity and adequate condition of packaging.

Guide to compliance for separation of equipment

If equipment and utensils (for example chopping boards, containers, tongs) are to be used for raw and RTE foods, they must be disinfected by heat or an adequate dishwasher cycle between uses (see Section 3: Cleaning and disinfection).

If heat disinfection is not possible, separate equipment and utensils must be used for handling raw and RTE foods and must be stored and washed separately.
Equipment, utensils, dishes and wrapping materials used for RTE foods are not to be stored in open storage (i.e. a storage area that cannot be closed) underneath a worktop where preparation of raw foods is undertaken as this could lead to cross-contamination.

**Advice on good practice for separation of equipment**

Equipment and utensils should be washed in a dishwasher following the manufacturer's instructions.

Designated equipment and utensils used for raw and RTE foods should be easily identifiable for example colour coded.

**Guide to compliance for complex equipment**

There is a risk of cross-contamination where the same piece of complex equipment, such as vacuum packers, slicers and mincers, are used to process raw and RTE foods. Depending on the complexity of equipment the contamination may not be adequately removed during routine cleaning and disinfection process and can result in any RTE foods subsequently processed becoming contaminated. FBOs must ensure that:

Vacuum packers, slicers and mincers are not to be dual used as there is a risk of cross-contamination, unless the equipment is fully dismantled and disinfected between uses. The reason is that contamination can occur throughout the internal components of the machines that cannot be adequately disinfected without a full dismantle.

For other types of less complex equipment, such as temperature probes, mixers and weighing scales, the FBO needs to determine whether it is safe to dual use during the normal operations of a working day.

**Advice on good practice for complex equipment**

It is recommended to label or colour code complex equipment so all staff are aware of its intended use. If permanent areas for raw and RTE food preparation have been designated then complex equipment should be located in the suitable area depending on its use.

**Question 3**

What controls should be in place where utensils are to be used for both raw and RTE foods?
Guide to compliance for cash registers

Cash registers and other non-food contact equipment (for example pens, phones, chip and pin machines, light switches, etc.) may be shared by staff handling raw and RTE foods. The main control is that staff wash their hands before handling any RTE foods (see Section 4: Personal hygiene and handling practices).

Advice on good practice for cash registers

Good practice would be to have separate cash registers ensuring one is kept in the raw area and one is kept in the RTE area. Cash registers should be included in the cleaning schedules.

Question 4

What is "complex equipment"?

Guide to compliance for sinks

If reasonably possible, separate sinks should be used for raw and RTE foods and equipment. However sinks can be shared provided that the sink, including the taps and any other fittings, is cleaned and disinfected between uses.

When the sink is shared for raw and RTE foods, the food must not come into direct contact with the sink. A container can be used to avoid direct contact. Disinfectants used to disinfect shared sinks are required to comply with the BS EN 1276 or 13697 or equivalent standards (see Section 3: Cleaning and disinfection).

Advice on good practice for sinks

It is recommended to have separate sinks:

- one for washing equipment and utensils used for raw foods and /or for rinsing raw foods such as fruits and vegetables
- one for washing equipment and utensils used for RTE foods and /or for rinsing RTE foods such as cooked rice or pasta.

It is not recommended to wash raw meat (for example poultry), due to the increased risk of splashing bacteria onto surrounding surfaces. It is not recommended to rewash vegetables or fruit that have been supplied as RTE.

Question 5

Under what circumstances may sinks be shared for raw and RTE food?
Guide to compliance for wrapping and packaging materials

Materials used to wrap and/or pack RTE foods must be stored in a designated area and the wrapping material must be kept free from contamination at all times. Staff handling wrapping and packaging materials must ensure that their clothes and hands are not vehicles for contamination when loading or removing wrapping and packaging materials.

Food businesses must ensure that food received wrapped and/or packaged from other establishments is visually checked to ensure that the integrity and condition of the packaging do not pose a risk of cross-contamination, and that the separation between raw and RTE foods during transport is adequate. When unpacking/unwrapping packaged foods, ensure that packaging and wrapping materials are removed hygienically and are not a source of contamination.

Advice on good practice for wrapping and packaging materials

It may be possible to establish an assured standard of cleanliness of the wrapping and packaging material through contractual arrangements with the supplier. For example, auditing the packaging material supplier or requesting written confirmation detailing the hygienic procedures followed to ensure that the wrapping/packaging materials are safe to be used with RTE food.

Food businesses may consider having a written agreement with their suppliers about the delivery requirements. Where necessary, raw foods should be unpacked and/or unwrapped and placed in designated containers before they are brought into the kitchen or storage area.

Guide to compliance for staff

Staff must not be a source of contamination. Staff need to be supervised, instructed and/or trained to ensure movement between raw and RTE areas is managed in such a way that the risk of cross-contamination is minimised. In areas designated for RTE foods based on time separation and in catering environments, shops and similar premises where it may not be practical to have permanent separate staff for different tasks, it is essential that staff are trained to the required standard and that the highest levels of training and personal hygiene are to be maintained to ensure that staff are not vehicles of cross-contamination (see Section 4: Personal hygiene and handling practices).

Advice on good practice for staff

Good practice, where appropriate, is to have separate staff for handling raw and RTE foods.

Question 6
What must a FBO do before using less complex equipment for both raw and ready to eat food?

Section 3 - Cleaning and disinfection

When complete physical separation is not possible, cleaning and disinfection procedures are considered critical to control cross-contamination and to ensure food safety. E. coli O157 and other harmful bacteria have to be effectively removed from all surfaces and equipment before they can be used in the preparation of RTE foods.

If cleaning and disinfection is not performed properly, it may result in the contamination of food and subsequently a health risk for consumers. It is essential that staff designated for carrying out cleaning and disinfection procedures are adequately supervised, instructed and/or trained to ensure the procedures are carried out effectively every time.

Heat Disinfection Guide to compliance

Heat is the most reliable way to kill E. coli O157.

If the same utensils and equipment are used for both raw and RTE foods at separate times, they must be heat disinfected or put through the adequate dishwasher cycle between uses.

If heat disinfection is not available, food contact surfaces, equipment and utensils cannot be shared and need to be specifically designated for either raw or for RTE foods only (see Section 2: Separation).

Heat Disinfection Advice on good practice

The use of dishwashers to clean utensils and food equipment is good practice as long as they are properly maintained, serviced routinely and the full cycle is not interrupted once it has started. Where heat is not available it is good practice to use separate sinks to wash equipment and utensils designated for raw and RTE foods.

Chemical Disinfection Guide to compliance

When the same non-food contact surfaces such as worktops, sinks, etc. are used at different times to prepare raw and RTE foods, they must be cleaned and disinfected between uses. Chemical disinfectants used in these areas need to comply with BS EN standards 1276 and/or 13697 or equivalent.

Chemicals must always be used in accordance with the manufacturer’s instructions regarding dilution, contact times and rinsing. Staff involved in cleaning procedures must be supervised, instructed and/or trained as required (see Section 5: Management controls and training).

Chemical Disinfection Advice on good practice
It is good practice for businesses to ‘clean as you go’ to ensure that work areas, utensils and equipment are kept to the required levels of hygiene during the working day. When choosing disinfectants for chillers/freezers you should check with the supplier if the disinfectant chosen is effective when used at low temperatures.

Chemicals should be purchased from reputable suppliers. Training on cleaning procedures should include: all appropriate health & safety information; materials and equipment required; name of products; required dilutions and required contact times as well as the overall standard to be achieved as part of the cleaning and disinfection process.

**Standards for Disinfectants and Sanitisers** Guide to compliance

Any disinfectant or sanitiser used to control cross-contamination with E. coli O157 should at least meet the requirements of one of the following published standards at the recommended use, dilution and contact time: BS EN 1276; or BS EN 13697 or, as a minimum, other test standards that meet the conditions and requirements used in these standards. These standards provide assurance that the disinfectant (or sanitiser) is capable of reducing a range of harmful bacteria, including E. coli, to acceptable levels if used as stated by the manufacturer.

FBOs and staff must ensure that they are using the appropriate disinfectants; if the standard is not displayed on the product’s label they need to contact the supplier or manufacturer for confirmation.

**Standards for Disinfectants and Sanitisers** Advice on good practice

Disinfectants should be freshly prepared according to manufacturer’s instructions. A list of products that comply with BS EN 1276 and/or 13697 can be accessed at http://www.disinfectant-info.co.uk.

This list is maintained externally and the FSA has no responsibility for its content. We recommend to contact the chemicals’ suppliers to confirm that specific products comply with the required standard.

**Question 8**

What measures must be taken when the same non-food contact surfaces such as worktops, sinks, etc. are used at different times to prepare raw and RTE foods?

**Cleaning Materials** Guide to compliance

FBOs must ensure that the cleaning equipment is not a source of contamination. Cloths that have been used to clean raw food areas must not be used to clean RTE areas unless suitably washed between uses in such a way that ensures that E. coli O157 has been destroyed. Cleaning materials (for example cloths, brushes, etc.) used on the floor must be separated from materials used on other surfaces such as worktops. Cleaning of floors
must be carried out in a way that does not contaminate surfaces in a clean environment (for example by splashing).

**Advice on good practice**

Cleaning equipment should be in good condition and regularly cleaned and disinfected or replaced as required. For example, a suitably high temperature can be obtained using a hot cycle in a washing machine that typically operates at 90°C. The use of disposable single-use cloths is recommended to prevent cross-contamination. Cleaning materials for different areas should be easily identifiable (for example colour coded), and stored separately.

Floors can never be regarded as clean and any food or surfaces of food equipment that come into contact with any floor must be considered as potentially contaminated (food should be discarded and containers should be cleaned and disinfected).

**Question 9**

Where can you find a list of disinfectants and sanitisers that comply with BS EN 1276 and /or 13697?

It is essential that staff follow good personal hygiene practices to help prevent cross-contamination of harmful bacteria to RTE foods. Effective handwashing and suitable clean protective clothing can help prevent harmful bacteria spreading to food, work surfaces, equipment etc. through hand contact or clothing.

There must be procedures in place to monitor and manage strict adherence to a documented handwashing procedure and to the appropriate use of protective clothing to control the risk of cross-contamination with E. coli O157.

**Handwashing Guide to compliance**

Washbasins must be located so as to prevent contamination of RTE foods by splashing, and have an adequate supply of hot and cold, or appropriately mixed, running water, cleaning materials and hygienic means of drying hands.

Taps can be a source of contamination, and therefore it may not be appropriate for hands to come into contact with taps after they have been washed. For example a disposable paper towel can be used to turn the taps off.

**Question 10**
Are anti-bacterial hand gels a suitable alternative to hand washing in the control of E.coli O157 contamination?

Handwashing Advice on good practice
It is good practice to use non-hand operated taps at handwashing facilities as they reduce the risk of cross-contamination.

Single use, disposable towels are recommended for hygienically drying hands. Re-usable towels are not recommended. For extra protection against harmful bacteria and contamination, it is recommended to use an anti-bacterial hand wash that has disinfectant properties conforming to the European standards BS EN 1499. Gloves are not a substitute for effective handwashing.

**Protective Clothing Guide to compliance**

Protective clothing must not present a cross-contamination risk, and therefore if contaminated it needs to be changed prior to handling RTE foods.

**Protective Clothing Advice on good practice**

Where appropriate, it is good practice for food businesses to have separate sets of clothing for handling raw and RTE foods (and ideally separate staff). When appropriate, food businesses may consider using designated colour coded aprons or disposable aprons for different activities.

There is not a recommended specific temperature to wash staff uniforms. The important point is that staff working with RTE foods should always wear suitable, clean clothing that does not present a risk of indirect cross-contamination.

**Section 5 - Management controls and training**

Effective food safety management controls are critical to control cross-contamination with E. coli O157.

**Documented Procedures Guide to compliance**

FBOs must keep up-to-date documented procedures that cover cross-contamination control and be part of the relevant staff training.

**Documented Procedures Advice on good practice**

You may find the following helpful: Safer Food Better Business (SFBB); Safe Catering; CookSafe
It is good practice to use labels to identify designated areas and/or to use colour coded equipment and utensils designated for RTE foods. It is recommended to display posters describing the correct hand washing technique and the personal hygiene rules.

**Record Keeping**  Guide to compliance

Record keeping is essential to demonstrate that procedures for the control of cross-contamination are adhered to.

**Record Keeping**  Advice on good practice

It is not necessary to set up complex systems – simple records easy to understand will be sufficient in accordance to the size of the business and the activities that it undertakes. Documents and records should be retained for a period of time which relates to factors such as the shelf life of the product, period of staff employment (for training records), frequency of scheduled cleaning programmes, etc. It is good practice to review the systems at least once a year. When things go wrong, such as a loss of control, it is essential to take immediate action to ensure food safety.

**Verification and Review**  Guide to compliance

Periodic reviews of all procedures established to control cross-contamination with E. coli O157 are required regularly and whenever there are significant changes to operations. Food businesses are required to check and confirm that the controls in place are effective during both quiet and busy periods, and particularly when a new procedure is introduced. Any verification check that establishes a loss of control must be considered a serious risk of cross-contamination and corrective actions are to be taken immediately.

**Corrective Actions**  Advice on good practice

Verification should ideally be carried out by someone other than the person responsible for monitoring and can be done in house or by external independent third party (for example if you are member of a specific scheme). Verification procedures can include: audits to suppliers, validation of critical limits, corrective actions taken, calibration of instruments used for monitoring, servicing of machinery, environmental sampling, etc.

**Training**  Guide to compliance

Staff must be instructed or trained in all safe methods that are relevant to the job they do and the competency of staff must be supervised and reviewed regularly to establish the need of refreshing any training. Staff responsible for the development and maintenance of the HACCP plan must receive specific training in HACCP.

**Training**  Advice on good practice
Although there is no legal requirement to attend a formal training course, food businesses may consider using recognised training courses specific to the requirements of their particular business. The necessary skills can also be obtained through other methods such as on-the-job training, self-study or relevant prior experience.