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Welcome to the Level 3 Award in Food Safety

This training course is presented as twenty modules and looks at how to supervise the safe production, sale and service of food.

You will be familiar with some of this material, as you will have already covered in to some degree in the Level 2 course. However, a higher level of detail is required at Level 3.

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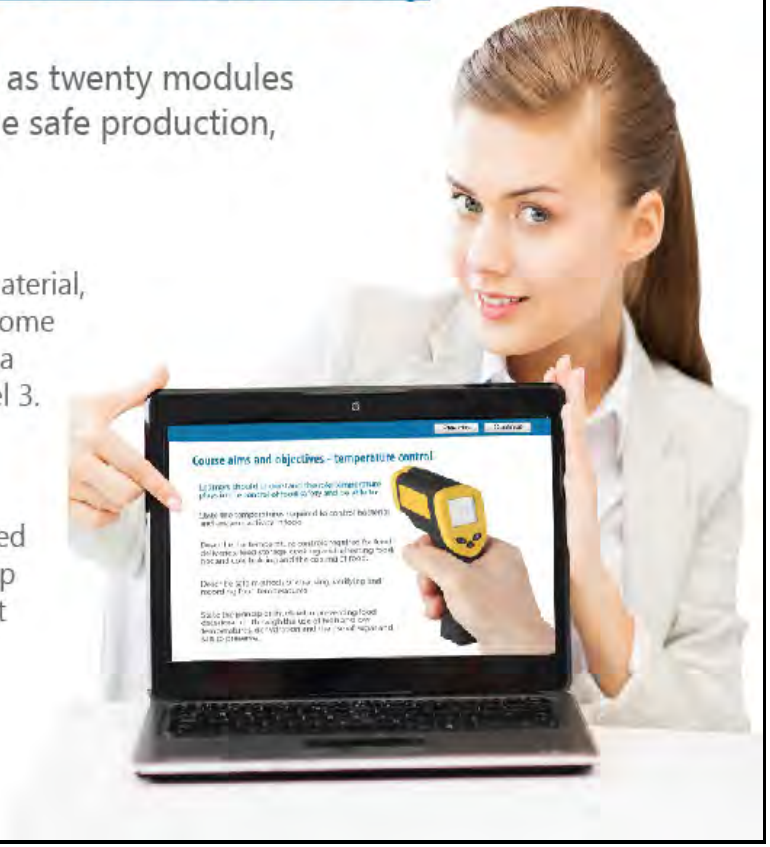

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Welcome to the Level 3 Award in Food Safety Course

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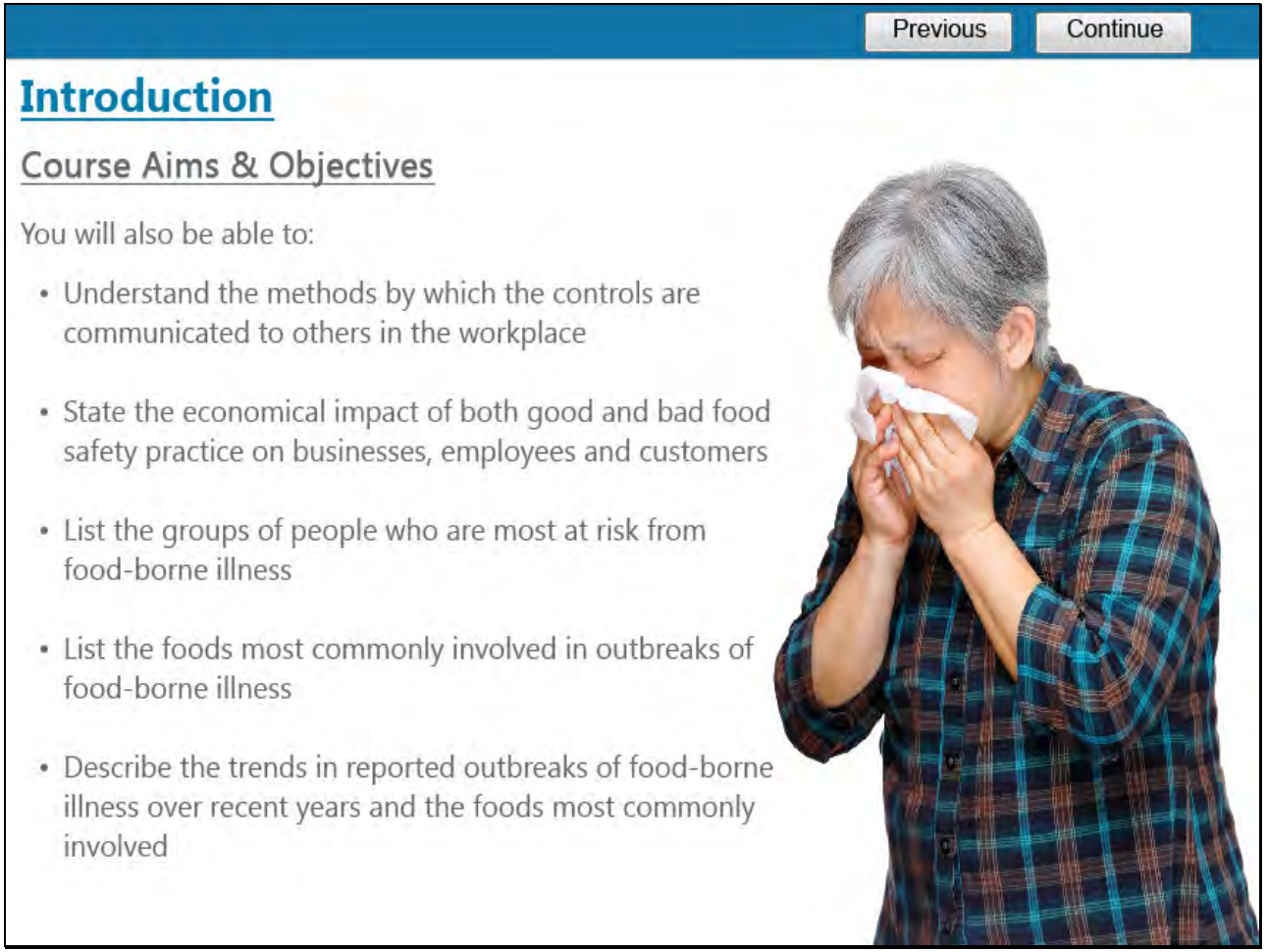

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Legislation

Course Aims & Objectives

Learners should be aware of UK and European food safety legislation, to ensure compliance in a food business. They should also be able to:

- State the current food safety legislation which relates to food premises and be aware of where guidance on the law may be sought
- Describe the role and power that Enforcement Officers have in respect to food safety
- Explain the consequences of non-compliance with food safety legislation
- State the responsibilities employers and employees have with regard to keeping food safe
- Explain the concept of due diligence
- Describe the role of the supervisor in the investigation of an outbreak of food-borne illness

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Applying & Monitoring Good Hygiene Practice

Course Aims & Objectives

Learners should understand the concept of contamination and the risks it poses to food safety, and be able to:

- Define the terms, and give examples of physical, chemical, microbial and allergen contaminants, and explain the concept of cross-contamination
- Describe the procedures used to prevent food from being contaminated on receipt, and during storage, preparation, cooking, service and display
- Explain the procedures available for the detection of contaminants and any corrective actions that may be taken

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Previous Continue

Applying & Monitoring Good Hygiene Practice

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- State the sources, level of incidence, onset times and symptoms for common food-borne diseases
- Describe the process of binary fission and list the factors influencing bacterial reproduction

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Workplace & Equipment Design

Course Aims & Objectives

Learners should understand the importance of good workplace and equipment design to ensure food safety and be able to:

- List the design features of a suitable premise for the preparation of food, including the importance of layout and food flow
- State the requirements for adequate lighting and ventilation
- Describe suitable finishes for fixtures and fittings
- Describe the properties of equipment for use in food premises
- Develop and implement effective recording and labelling systems for the receipt and storage of food

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Waste Disposal, Cleaning & Disinfection

Course Aims & Objectives

Learners should understand the importance of supervising high standards of cleanliness in food premises and be able to:

- Describe suitable methods for the storage and removal of waste
- Describe ways to adequately supervise cleaning processes
- State the need for, and benefits of, systematic cleaning and how it can be implemented and supervised
- Explain the products employed in cleaning, disinfecting, sanitising and sterilising, and the methods of cleaning food equipment, food and hand contact surfaces and other surfaces in the food premises

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Pest Control

Course Aims & Objectives

Learners should understand the importance of good pest control practice and be able to:

- List common food pests and describe the risks they pose to food safety
- Describe the different methods of pest control that can be used
- Describe the role of supervisory management in controlling food pests

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Personal Hygiene of Staff

Course Aims & Objectives

Learners should understand the need for high standards of personal hygiene and be able to:

- Explain the importance of personal hygiene, the responsibilities of food handlers and how hygiene standards can be monitored
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- State that suspected cases of persons suffering from food-borne illnesses should be excluded from food handling duties

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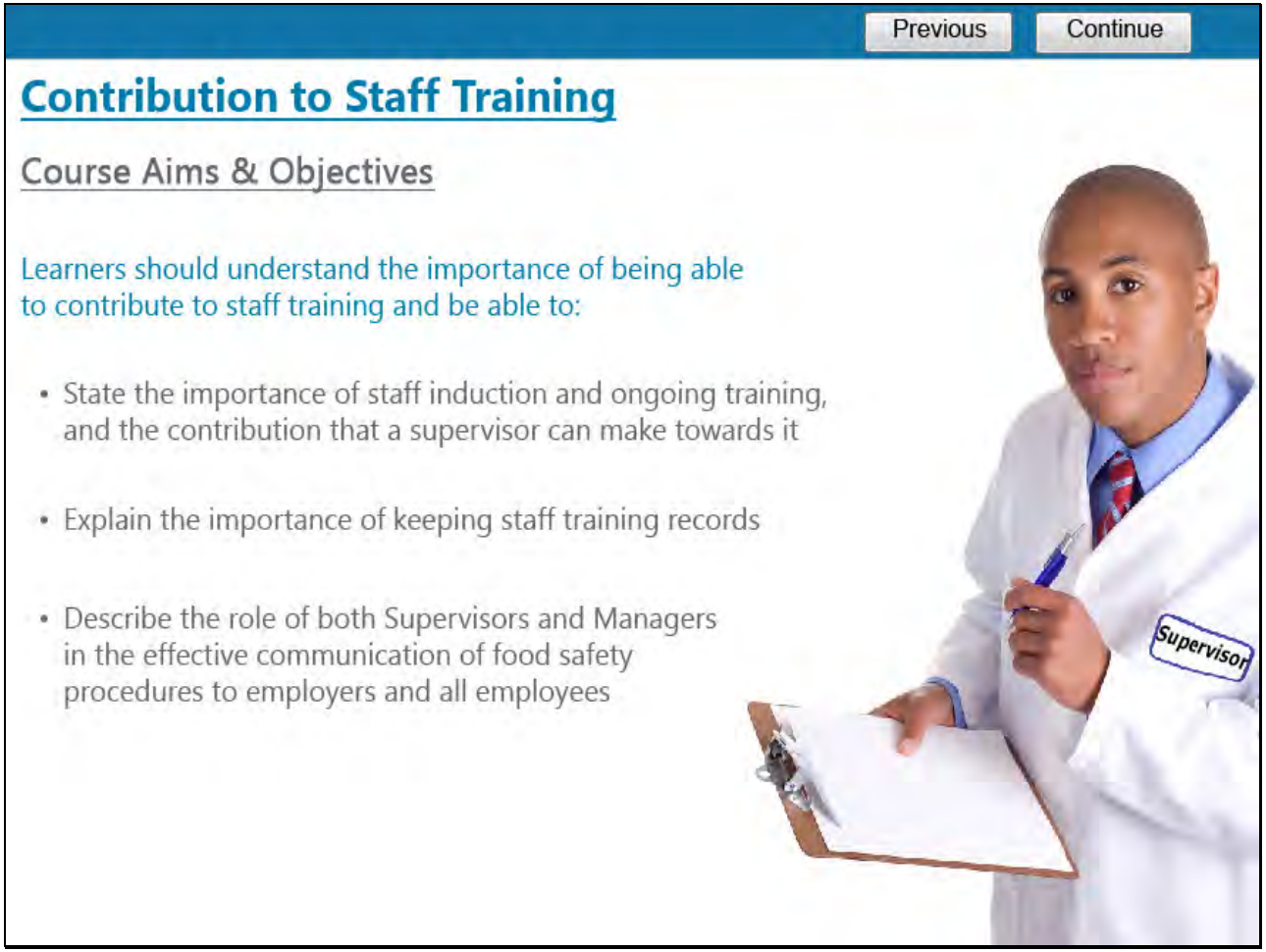

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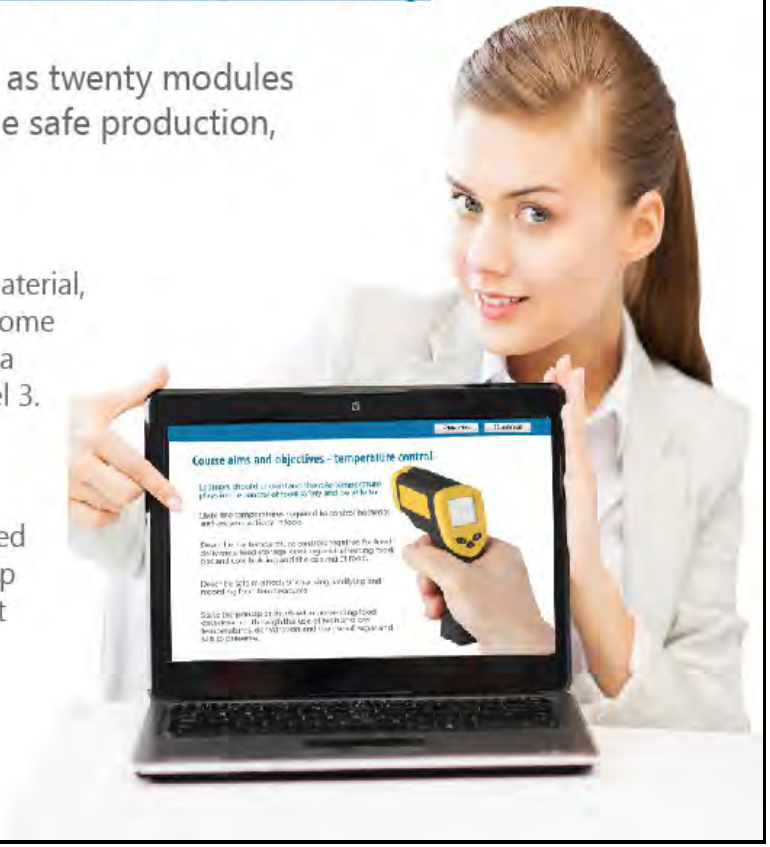

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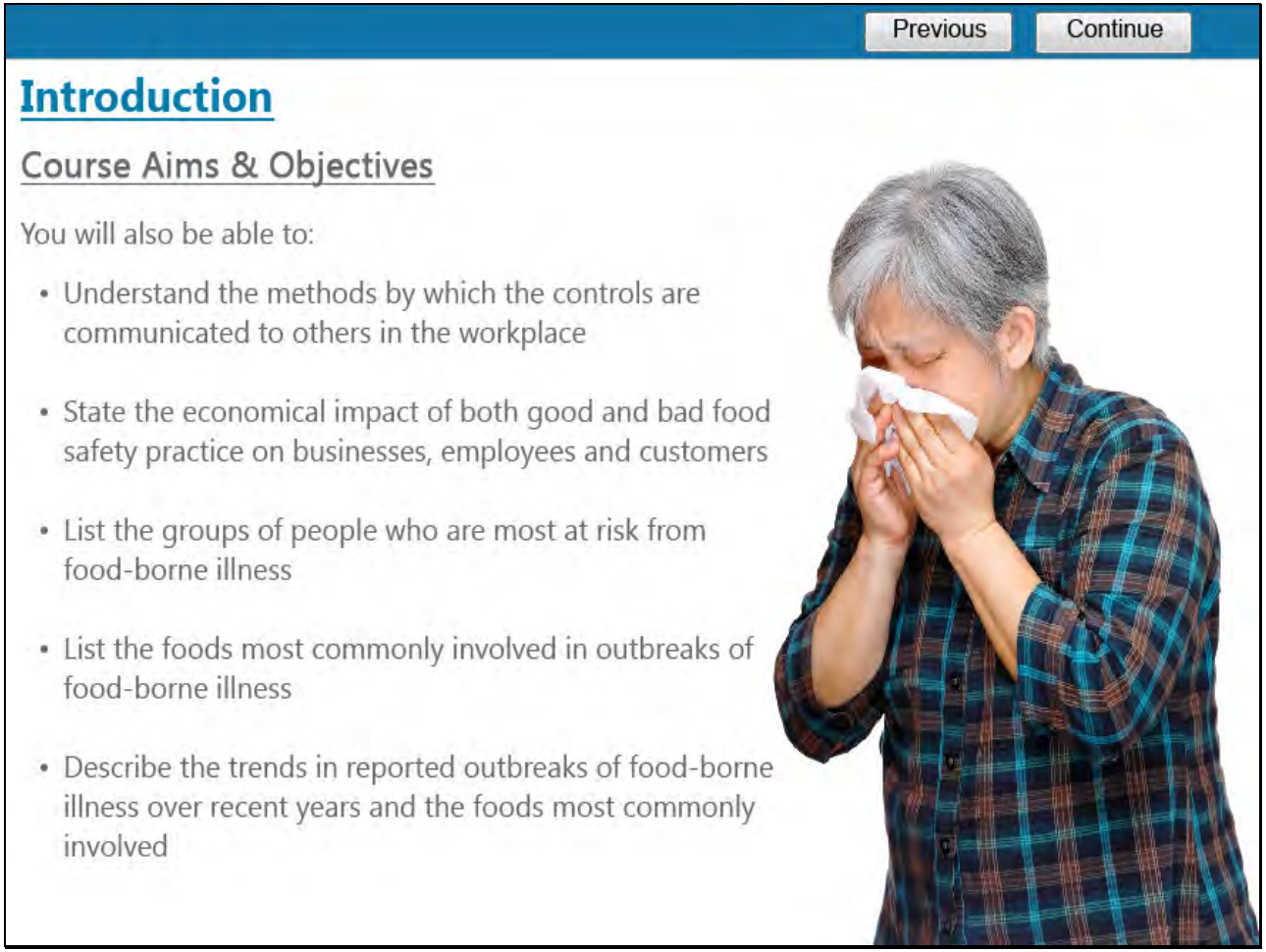

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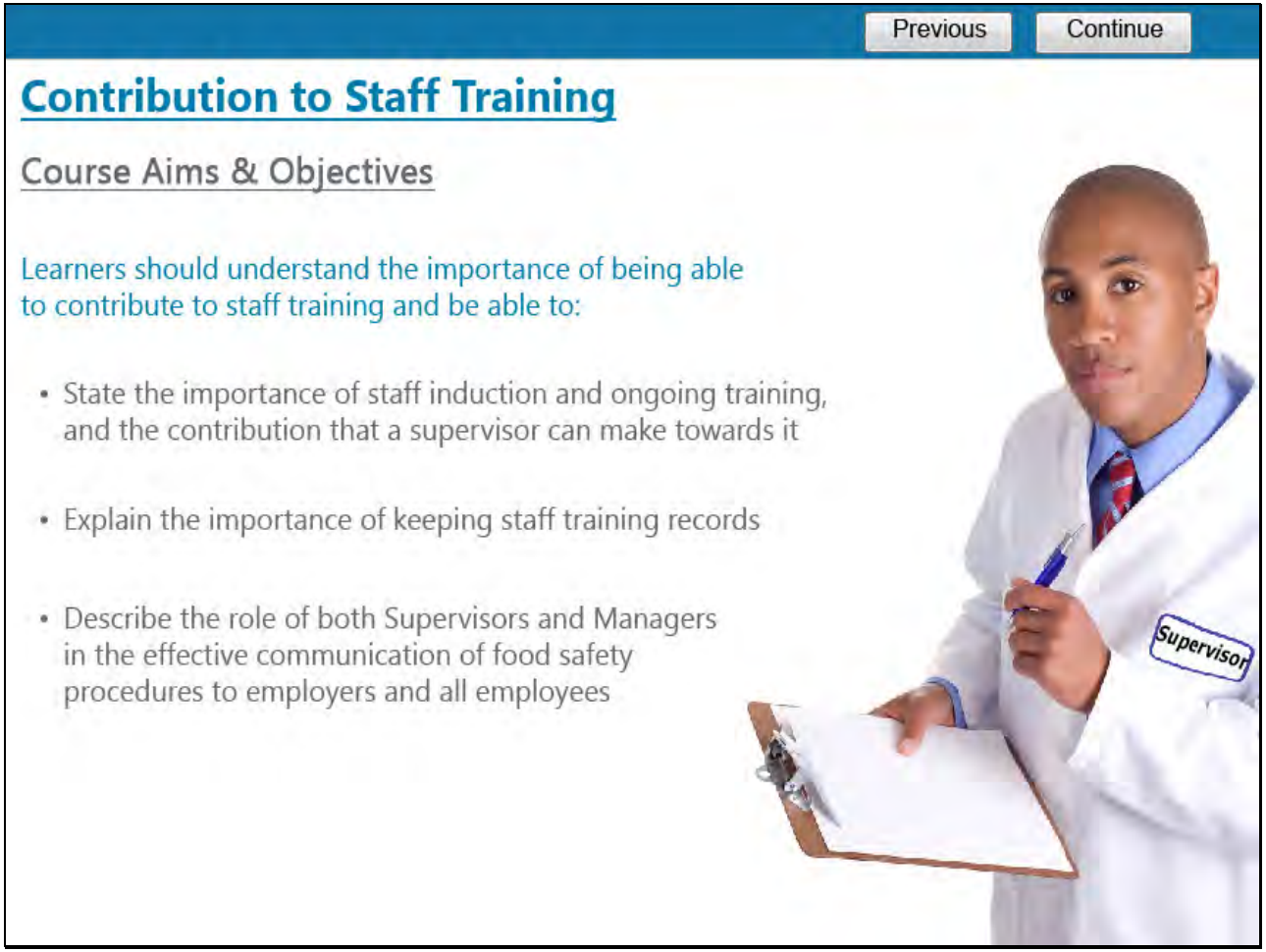

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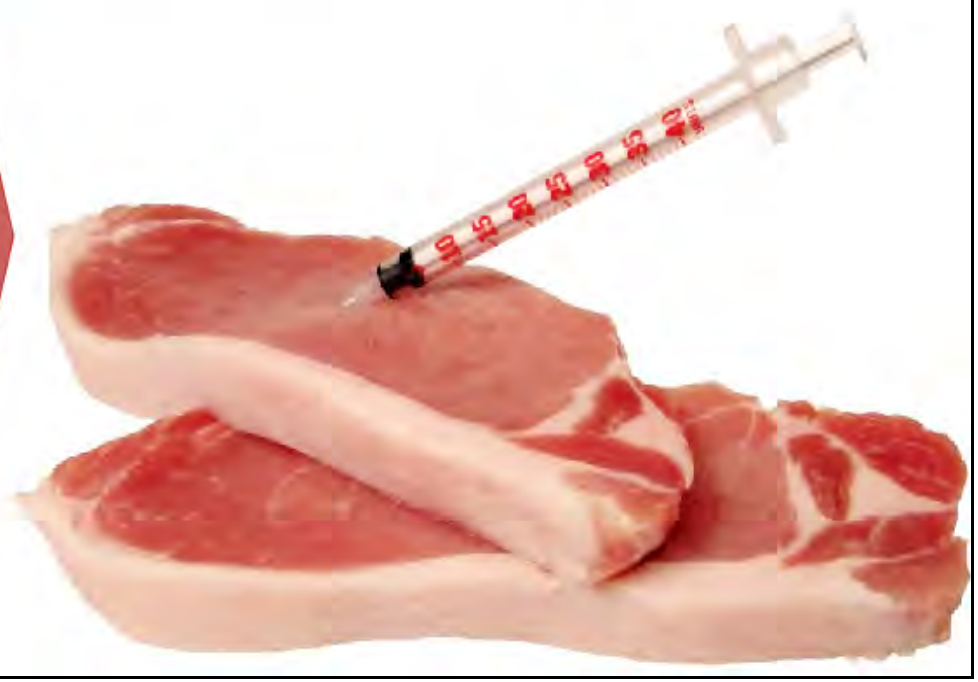
Food Poisoning

Food poisoning is an acute illness that usually develops rapidly after eating contaminated or poisonous food.

The symptoms vary, but often include abdominal pain, diarrhoea, vomiting and nausea.

Food poisoning is caused by:

- Bacteria or their toxins
- Chemicals and metals
- Viruses



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High Risk Foods

High risk foods are ready-to-eat foods which under the right conditions, support the multiplication of pathogenic bacteria. These foods are intended for consumption without undergoing treatment that would destroy the harmful organisms.

High risk foods are most likely to be involved in cases of food poisoning. They are usually high in protein and moisture, and require strict temperature control and protection from contamination.

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Examples of High Risk Foods

- All cooked meat and poultry
- Cooked meat products including gravy, stock, pate and meat pies
- Milk, cream, artificial cream, custards and dairy products
- Cooked eggs or egg products, especially those made with raw eggs and not thoroughly cooked for example mousse, mayonaisse and home made ice cream
- Shellfish and other seafood, for example, cooked prawns and oysters
- Cooked rice (although not high in protein, rice does contain bacteria)
- Poisonous plants or fish

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Risk Groups

Some groups of people have a much greater risk of getting a food borne illness, and if they do, the illness is likely to be more serious and death is more frequent.

Risk groups include:

- Babies and very young children
- Elderly people
- People already ill
- Pregnant women
- Immuno-compromised people
  e.g. transplant patients, drug abusers

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Low Risk Foods

Low risk foods are rarely implicated in food poisoning and may be stored, suitably packaged, at ambient temperatures. **They do not support the multiplication of food poisoning bacteria.**

Examples of low risk foods include:

- Preserved food e.g. jam
- Sterilised or UHT food
- Canned food (whilst unopenened)
- Dried foods or food with little available moisture e.g. flour, rice, bread, biscuits
- Acidic foods e.g. vinegar
- Fermented foods e.g. pickles, soy sauce
- Foods with high fat or sugar content e.g. oils, chocolate (although chocolate is occasionally responsible for salmonella outbreaks)

NOTE! If liquid is added to dried food, the food becomes high risk.

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Food Hygiene Activities

Back Submit

Match the activites in Column 1 to their missing words in Co

Try again

to continue.

Column 1		Column 2
2.	Protecting food against any type of _____.	1. premises
4.	Preventing organisms from multiplying to levels that risk health or result in _____.	2. food spoilage
1.	Destroying any harmful bacteria in food _____.	3. human consumption
3.	Removing contaminated food so that it cannot be used for _____.	4. food poisoning

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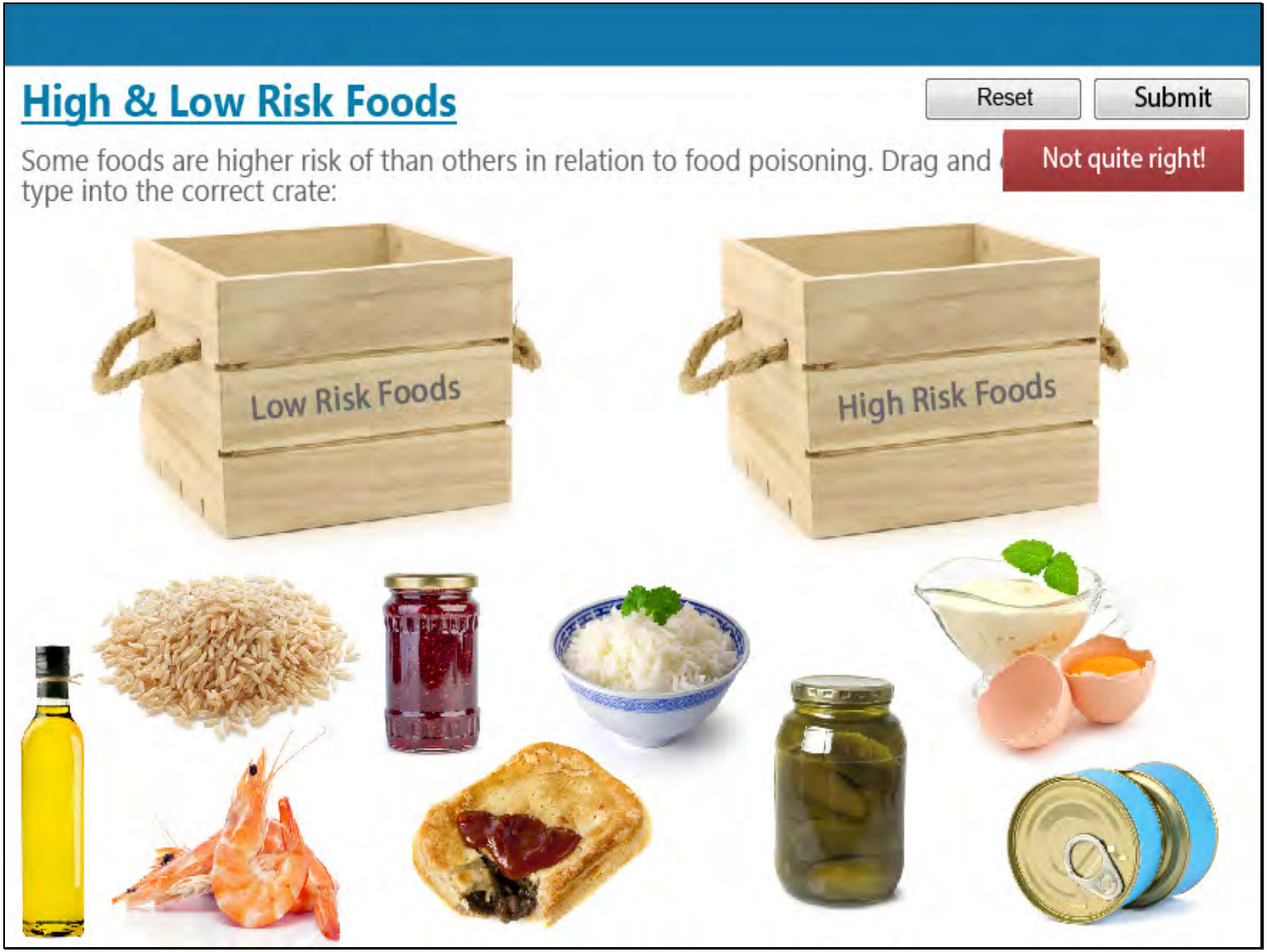

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Food Poisoning

Back | Submit

Try again

Which of the following groups of people are at high risk of fo poisoning?

(Select as many as apply)

- [x] A) Babies and young children
- [x] B) People who are already ill
- [ ] C) Teenagers
- [x] D) Immuno-compromised people
- [ ] E) Men age 26 - 55
- [x] F) Elderly people
- [x] G) Pregnant women
- [ ] H) Unfit people

Question 1 of 2

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Raw Foods (Intended for Cooking or Processing)

Raw foods are often contaminated with large numbers of food poisoning bacteria.

If raw foods are perishable, they should be stored in a refrigerator separate from high risk and ready to eat food.

Examples include:

- Raw meat
- Milk
- Poultry
- Eggs
- Root vegetables contaminated with soil

Raw food may present a serious risk of food poisoning if not heat treated or cooked thoroughly, especially poultry, products made with raw eggs, bivalves (e.g. oysters) and raw milk.

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Ready To Eat Raw Food

An increasing number of outbreaks of foodborne illness are attributed to the consumption of raw, ready to eat foods which are stored at ambient temperatures.

These foods don't usually support the multiplication of pathogens, but the organisms involved are capable of causing illness in very low numbers, for example viruses, E. coli 0157, shigella and parasites.

Salmonella outbreaks have been associated with cut melon, lettuce and apple juice to name but a few, whilst lettuce, raspberries and apple juice have been the food vehicle for outbreaks of viral illness and E. coli 0157.

Sewage contamination or bad hygiene practices during harvesting are the most likely causes of outbreaks.

NOTE! Ready to eat raw foods should be washed and preferably disinfected before use.

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Benefits of High Standards of Hygiene

The public has a great interest in food safety and high expectations of those involved in the food business, but general confidence is sometimes shaken by food scares.

It is therefore important that food businesses have high standards of food hygiene.

High standards help to create a good reputation for food businesses, and keep you, the food handler, on the right side of the law.

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Cost of Poor Hygiene

Persons carrying on a food business have legal, commercial and moral obligations to provide safe food.

The costs resulting from food poisoning and poor hygiene can be very high.

These costs, both financial and social, fall on employers and employees as well as those persons who are ill.

It's a dirty little secret of food poisoning; E. coli and certain other foodborne illnesses can sometimes trigger serious health problems months or even years after patients survived that initial bout.

Scientists only now are unraveling a legacy that has largely gone unnoticed, and what they've spotted so far is troubling.

They described high blood pressure, kidney damage, even full kidney failure striking 10 to 20 years later in people who survived severe E. coli infection as children, arthritis after a bout of salmonella or shigella, and a mysterious paralysis that can attack people who just had mild symptoms of campylobacter.

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Summary of Key Points

- Food safety is the practice of managing food, so as not to cause harm or injury to the consumer
- The number of people who are ill with food poisoning each year is unknown, but high
- Understanding the obligations of a food business owner
- A business that causes food poisoning may become the subject of legal action, closure and claims for civil compensation
- Different groups of people are at more risk than others
- Differences between high and low risk foods

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Food Safety Quiz

Submit

Food safety is the practice of _____ _____ , so as not cause har
the consumer.

Try again
anywhere to continue.

- legal compliance
- food poisoning
- civil obligation
- lowering risk
- good cooking
- managing food
- food hygiene
- food success

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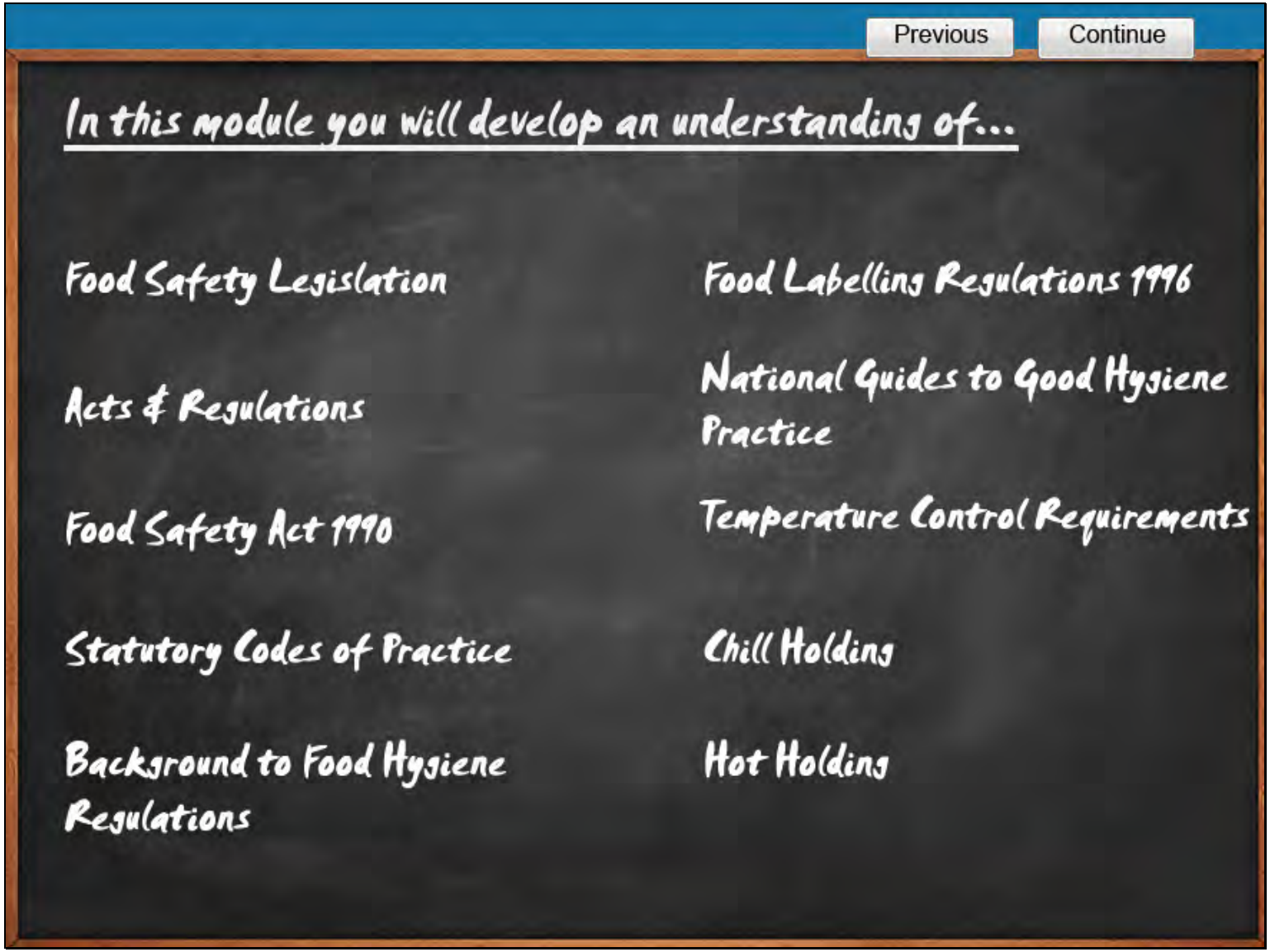

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Food Safety Legislation - Introduction

The law is complex and can be confusing and difficult to interpret. However, **ignorance of the law is no defence in the event of a prosecution,** and supervisors must make a special effort to become conversant with the legislation which affects their workplace.

Laws on food safety exist to protect everyone from illness and harm. All supervisory staff must ensure that they understand the laws affecting their workplace activities and the food produced. In the UK we must be aware of national legislation as well as European Legislation relating to food safety.

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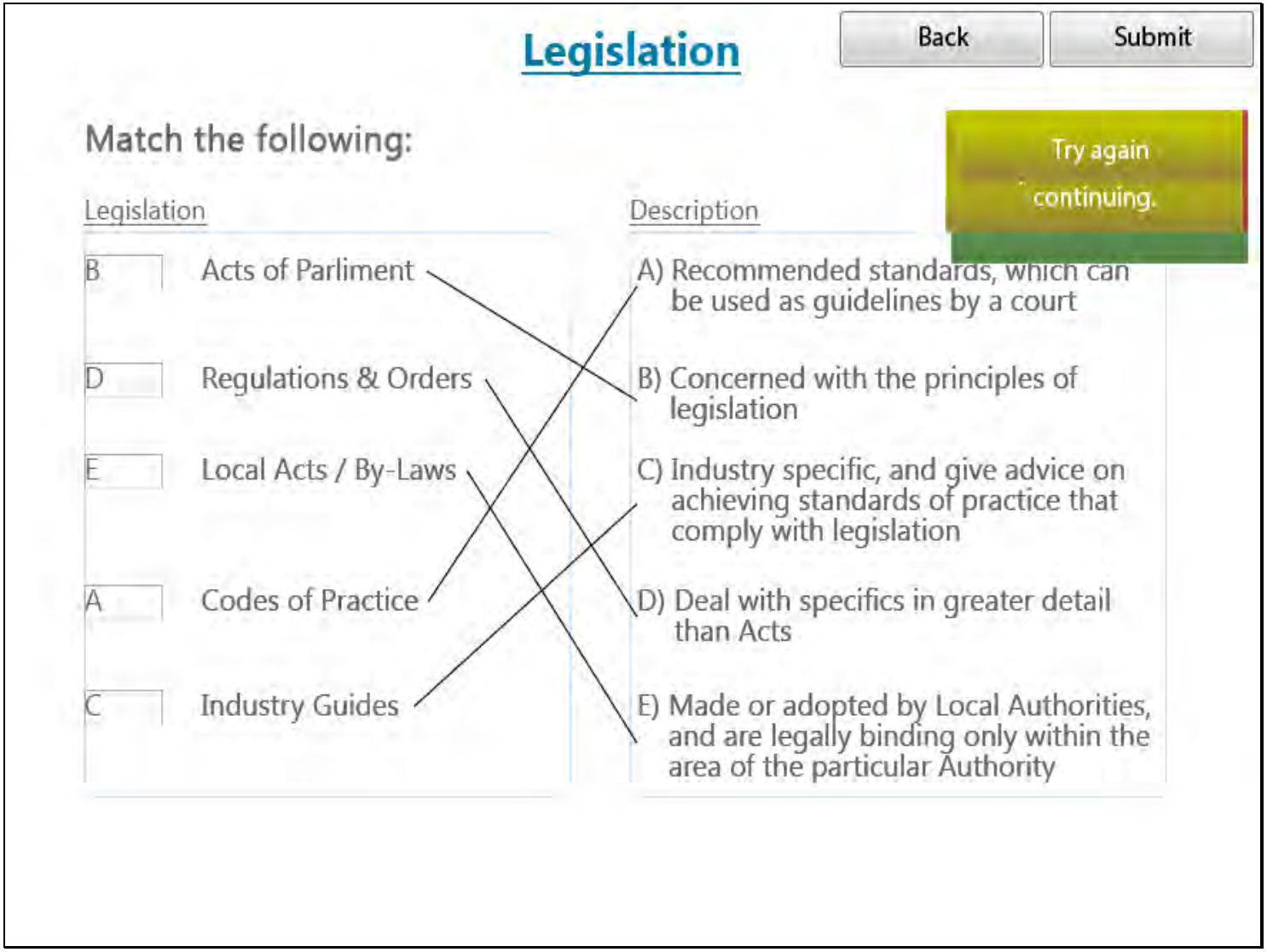

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Acts & Regulations

Acts and regulations applicable to the food industry are concerned with:

- Preventing the production or sale of injurious, unsafe or unfit food
- Preventing the contamination of food and food equipment
- The hygiene of food premises, equipment and personnel (including training)
- Hygiene practices, including temperature control and the control and monitoring of hazards at points which are critical to food safety

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Acts & Regulations

Acts and regulations applicable to the food industry are concerned with:

- Provision of sanitary accommodation, water, supplies and washing facilities
- Control of food poisoning
- Importation of food
- Composition and labelling of food
- Registration and licensing of food premises and vehicles

NOTE! Caterers need to be fully aware of all these acts and regulations, to ensure they are operating within the law.

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Food Safety Act 1990

As a result of the EU Hygiene Regulations and the Food Hygiene (England) (Wales) (Scotland) (NI) Regulations 2006, this Act is now primarily concerned with food standards.

An overview of the relevant sections is as follows:

Section 2

Extends the meaning of 'sale' to include food which is offered as a prize or reward or given away in connection with any entertainment for the public.

Section 3

Food, or ingredients, commonly used for human consumption are presumed, until the contrary is proved, to be intended for sale for human consumption.

Section 7

It is an offence to treat food so as to render it injurious to health with the intent that the food will be sold in that state. Regard shall be had to the cumulative effect of foods consumed over a long period.

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Food Safety Act 1990

Section 9

An authorised officer of a food authority may seize or detain food (for up to 21 days) which fails to comply with food safety requirements or which is likely to cause food poisoning or a food borne disease.

Food which is seized must be dealt with by a Justice of the Peace. Any person liable to be prosecuted in respect of such food is entitled to make representations to the Justice of the Peace.

If the food is not condemned, or detained food is cleared, compensation can be claimed. Any expenses incurred in the destruction of condemned food must be paid by the owner of the food.

Section 14

It is an offence to sell, to the prejudice of the purchaser, any food which is not of the nature (different kind or variety) or substance (not containing proper ingredients) or quality (inferior, for example, stale bread) demanded by the purchaser.

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Food Safety Act 1990

Section 15

It is an offence to sell, display or have in possession for the purpose of sale, food that is falsely described or labelled, which is misleading as to the nature or substance or quality.

Section 16

The penalty for most offences is:
on conviction on indictment to an unlimited fine and/or up to two years imprisonment; on summary conviction to a fine not exceeding the relevant amount and/or imprisonment for up to six months. (In the case of Sections 7,8 or 14 the relevant amount is £20,000; the amount for the other sections is £5,000).

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Food Safety Act 1990

Section 20

Enables proceedings to be taken against another person when the offence was due to his act or default.

Section 21

It is a defence for a person to prove that he took all reasonable precautions and exercised all due diligence to avoid the commission of the offence, by himself or by a person under his control.

Section 40

This section empowers ministers to issue codes of practice to guide food authorities on the enforcement of food safety legislation. This is intended to assist in uniform standards of enforcement. The codes of practice are not legally binding but food authorities must have regard to them.

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The Food Hygiene Regulations 2006

Regulation 7

If a food business operator is convicted of an offence under the above regulations and the court is satisfied that the business, any process or treatment, the construction or condition of any premises, or the use or condition of any equipment involves a risk of injury to health, they shall impose a hygiene prohibition order.

A hygiene prohibition order can apply to the use of a process or treatment, the premises (or part thereof) or any equipment. A copy of the hygiene prohibition order must be conspicuously fixed on the premises and contravention of the order is an offence.

The hygiene prohibition order ceases to have effect when the enforcement authority issues a certificate, which states that there is no longer a health risk. On application by the food business operator, the enforcement authority must determine within 14 days whether the health risk has been removed and if so satisfied, issue the certificate within three days.

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The Food Hygiene Regulations 2006

Regulation 8

If an authorised officer of an enforcement authority is satisfied that there is an imminent risk of injury to health, he/she may issue a hygiene emergency prohibition notice requiring the immediate closure of the premises.

An application for a hygiene emergency prohibition order must then be made to the court within three days (five days in Scotland) of serving the notice, and at least one day before the date of application, the food business operator must be advised of this intention. (Saturdays, Sundays and Bank Holidays are excluded.)

The hygiene emergency prohibition notice and hygiene emergency prohibition order must be served on the food business operator and conspicuously displayed on the premises. Any contravention is an offence. A hygiene emergency prohibition notice ceases to have effect if no application for an order is made to the court. A hygiene emergency prohibition notice/order ceases to have effect when the enforcement authority issues a certificate, stating that there is no longer a health risk.

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The Food Hygiene Regulations 2006

Regulation 11

It is a defence for the accused to prove that he took all reasonable precautions and exercised all due diligence to avoid commission of the offence by himself or by a person under his control.

Regulation 12 & 13

Empowers an authorized officer to purchase or take samples of food, food sources, contact materials or any article or substance required as evidence.

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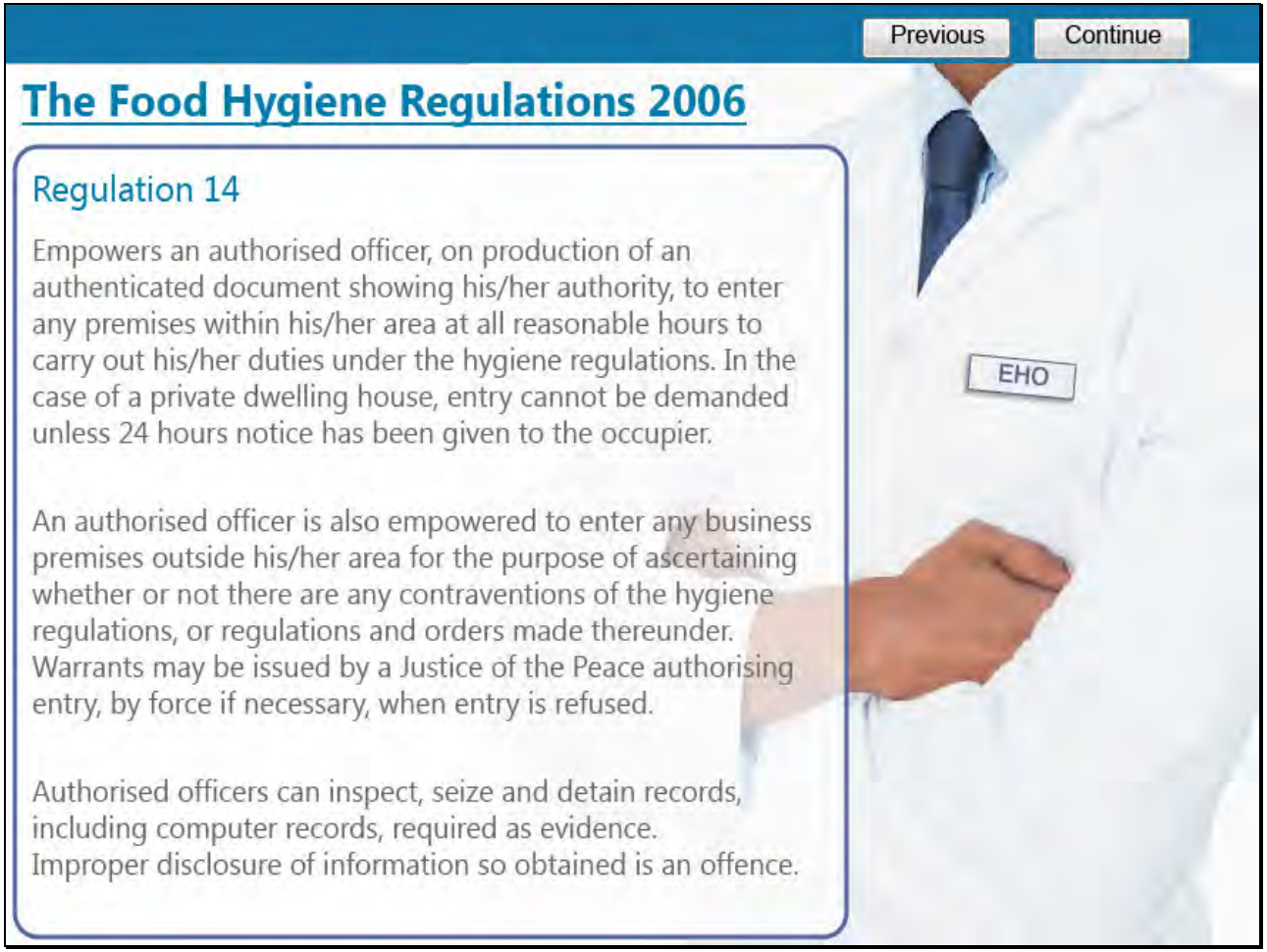

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The Food Hygiene Regulations 2006

Regulation 17

A person guilty of an offence under these regulations shall be liable on:

a) Summary conviction to a fine not exceeding the statutory maximum (level 5*); or
b) Conviction on indictment to imprisonment for up to two years and/or an unlimited fine

The penalty for obstruction on summary conviction shall be a fine not exceeding Level 5* and/or up to three months' imprisonment.

Regulation 18

Where an offence by a body corporate has been committed with the consent or connivance or due to the neglect on the part of any director, manager, secretary or similar officer, he shall also be liable to prosecution.

* Statutory fine levels detailed on next slide

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The Food Hygiene Regulations 2006

Regulation 20 & 21

Enables aggrieved persons to appeal to the Magistrates' Court or the Crown Court.

Regulation 22

Allows for appeals against hygiene improvement notices and remedial action notices.

Regulation 23

Section 9 of the Food Safety Act 1990 (inspection and seizure of suspected food) applies to these regulations as regards an authorised officer of an enforcement authority.

The Criminal Justice Act, 1991 provided fines for summary offences in magistrates' courts to be placed on a scale of levels 1 to 5, unless otherwise stipulated in a particular act.

Level 1 - £200
Level 2 - £500
Level 3 - £ 1,000
Level 4 - £2,500
Level 5 - £5,000

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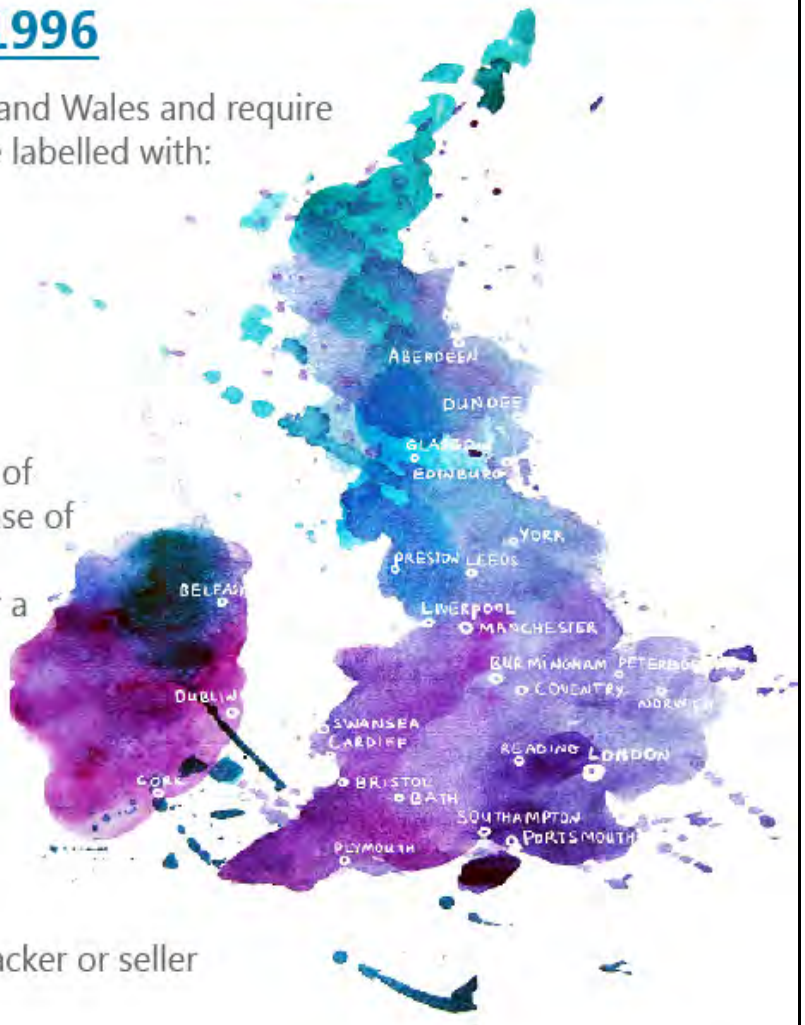
Food Labelling Regulations 1996

These regulations apply in England, Scotland and Wales and require most food sold for human consumption to be labelled with:

- Name of the food
- List of ingredients
- 'Best Before' date, providing an indication of minimum durability (shelf life), or in the case of food which, micro-biologically, is highly perishable and in consequence likely, after a short period, to constitute an immediate danger to human health, a 'Use By' date
- Special storage conditions or conditions of use
- Name and address of the manufacturer, packer or seller



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Statutory Codes of Practice

Section 40 of the Food Safety Act 1990, Regulation 24 of the Food Hygiene Regulations 2006, and Regulation 6 of the official Feed and Food Controls Regulations 2006, permit Ministers to issue codes of practice for enforcing authorities regarding the execution and enforcement of food law.

Currently there is one Food Law Code of Practice to which enforcement authorities must have regard when discharging their duties.

There is also additional advice provided in Food Law Practice Guidance to which enforcement officers may wish to adhere.

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Temperature Control Requirements

Potentially hazardous food should be stored, displayed and transported under temperature control, that is, below 8°C or above 63°C.

However food may be kept above 8°C if the manufacturer has undertaken a scientific assessment confirming there is no risk and the shelf life is not exceeded.

Chill Holding Tolerance Periods

Food on display, or for service, may be kept above 8°C for up to four hours on a single occasion. Food may also be kept above 8°C during loading or unloading or for unavoidable reasons, such as defrosting equipment or breakdowns, provided this is consistent with food safety.

Hot Holding Requirements

Hot food on display must not be kept below 63°C. Food may be kept below 63°C if a scientific assessment has indicated there is no health risk.

Hot food for service or display may be kept below 63°C for up to two hours on a single occasion.

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Four-Hour/Two-Hour Rule

Some food businesses may choose to adopt an alternative method of temperature control.

One of the alternative methods of temperature control is referred to as the Four-Hour/Two-Hour Rule.

The Four-Hour/Two-Hour rule relates to how long potentially hazardous food may remain outside of temperature control.

You must remember that the time frames on the following slide relate to the total time a particular food is outside of temperature control including time during preparation, storage, display and transport.

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Four-Hour/Two-Hour Rule

Under two hours

Food must be used or placed back under temperature control (8°C or less or 63°C or greater)

2-4 hrs

Two to four hours, food must be used immediately – it cannot be re-refrigerated

4+ hrs

Four plus hours, food must be discarded – it may have harmful levels of bacteria.

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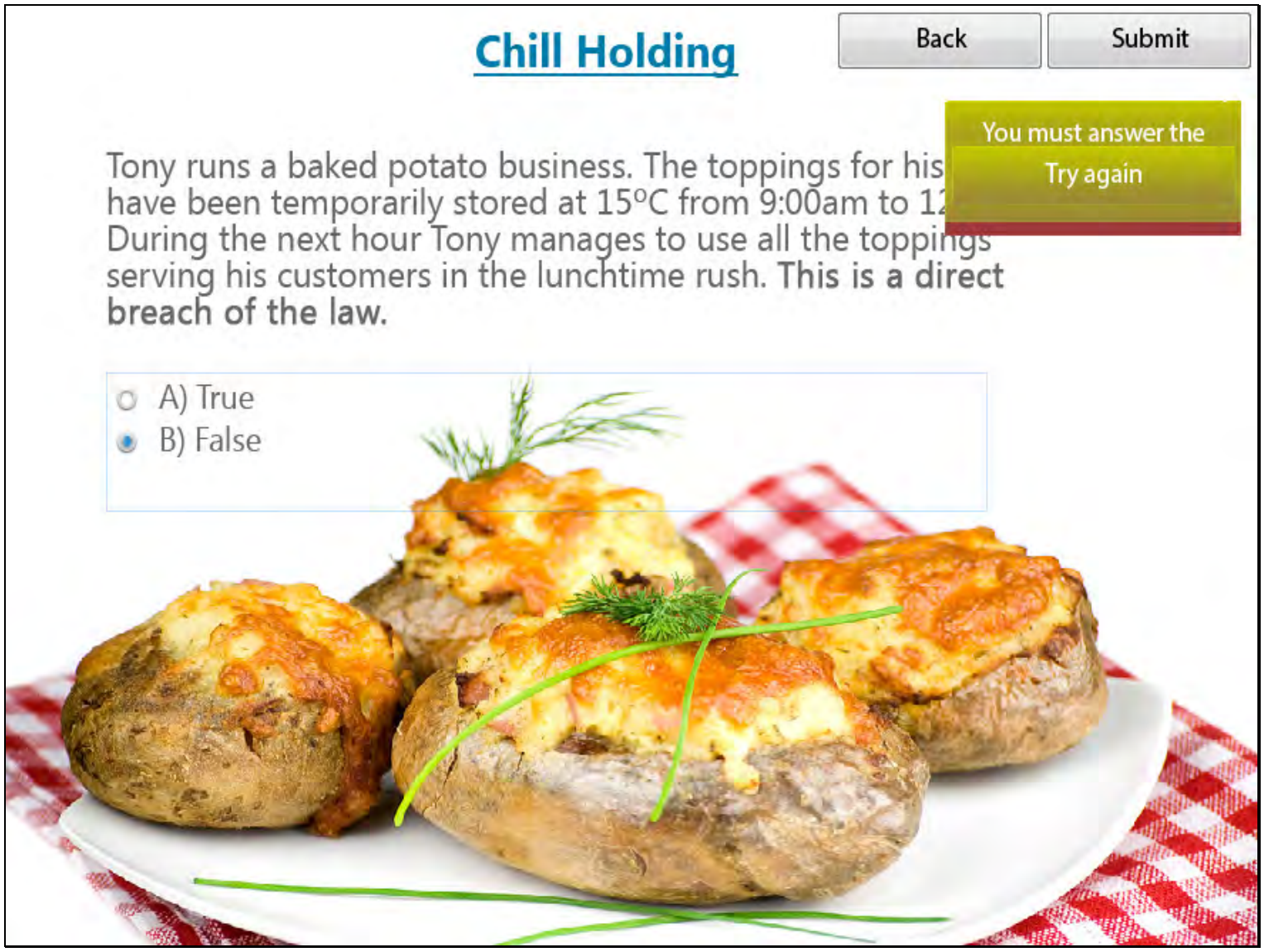

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Chill Holding

Back | Submit

You must answer the
Try again

If Tony had **not** used all his toppings in 4hrs, he could re
them to below 8°C and use the toppings again the next day.

- A) True
- B) False

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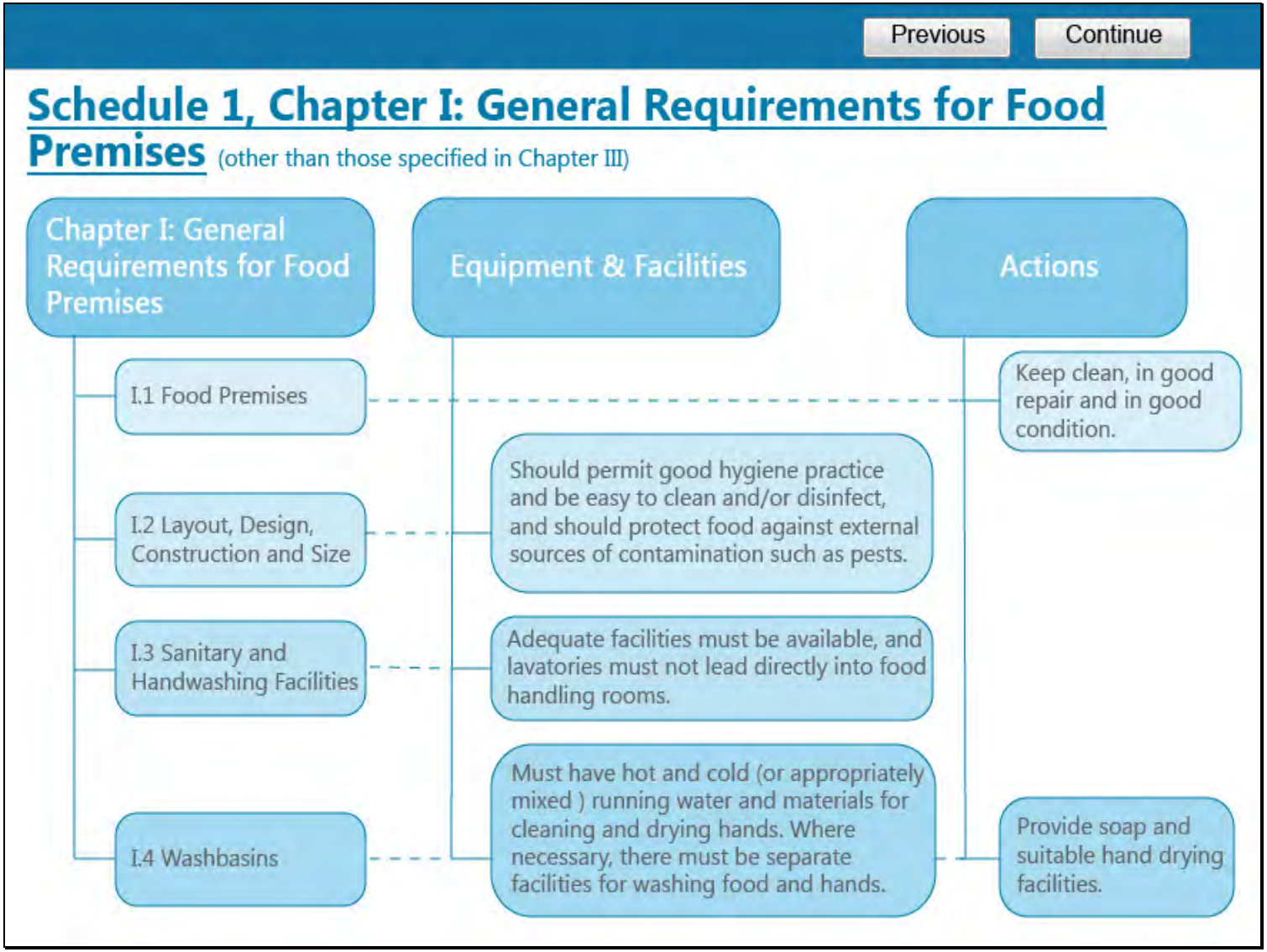

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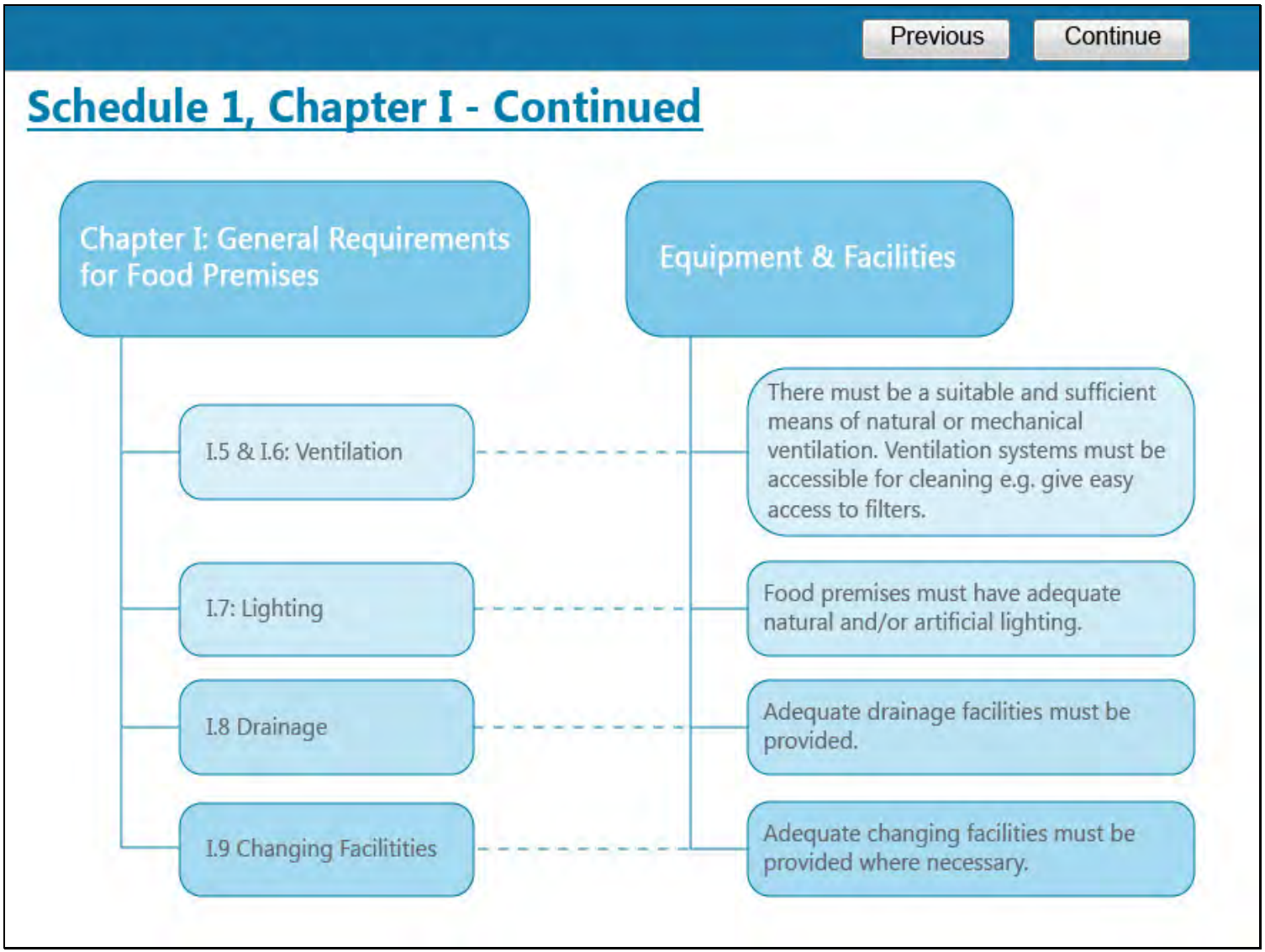

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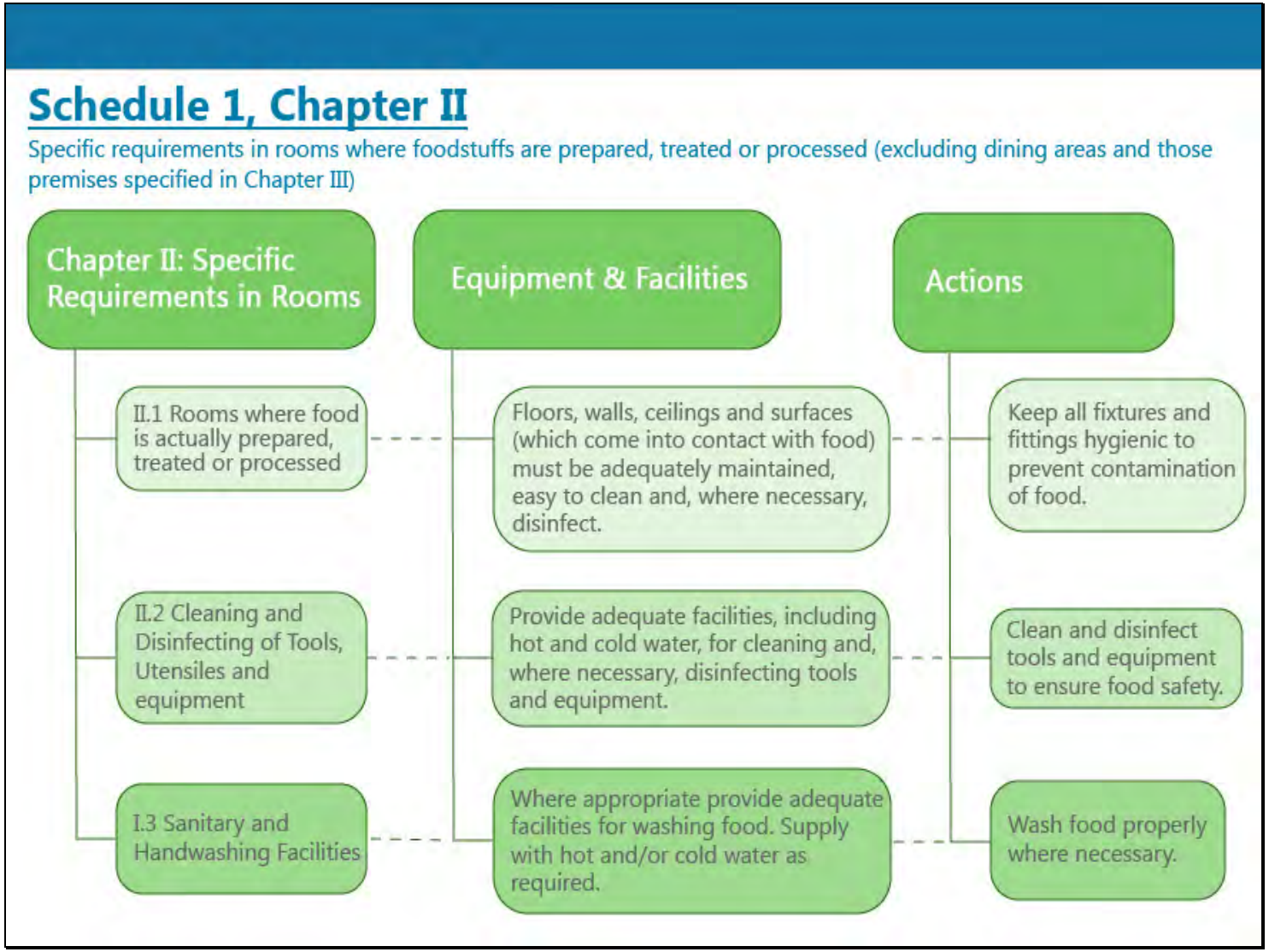

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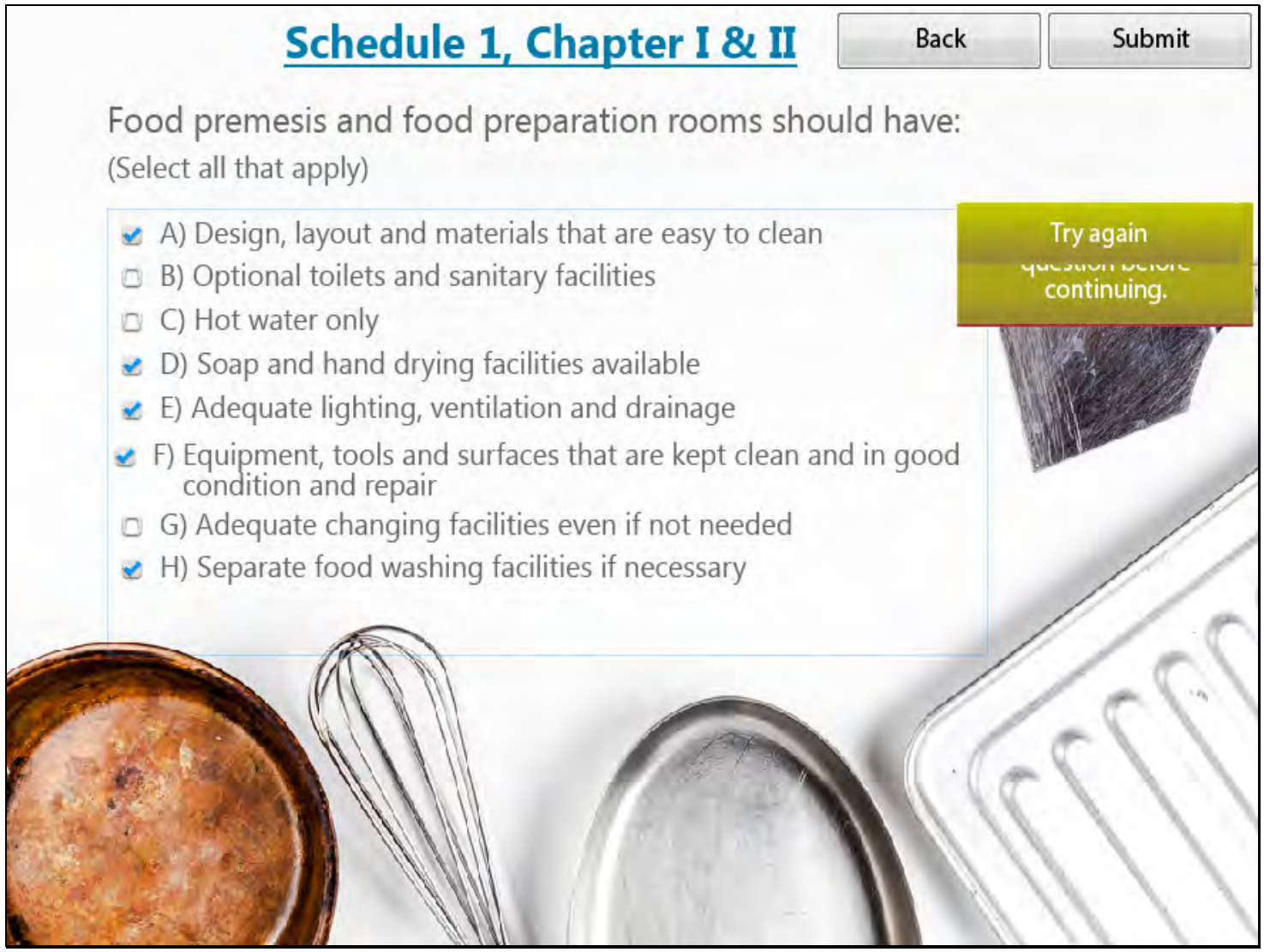

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Schedule 1, Chapter III

Requirements for movable and/or temporary premises (such as marquees, market stalls, mobile sales vehicles), premises used primarily as a private dwelling, premises used occasionally for catering purposes, and vending machines

III.1 Requirements for Premesis and Vending Machines

Equipment & Facilities:
The siting, design and construction must aim to avoid contamination of food and the harbouring of pest.

Actions
Keep clean and in good repair to avoid food contamination.

III.2 (a) Working Practices for Movable and Temporary Premises

Equipment & Facilities:
Provide appropriate facilities for personal hygiene.

Actions
Take all reasonable and practical steps to avoid the risk of contamination of food or ingredients.

III.2 (b) Working Practices for Movable and Temporary Premises

Equipment & Facilities:
Surfaces in contact with food must be easy to clean and, where necessary, disinfecting of utensils and equipment.

Actions
Take all reasonable and practical steps to avoid the risk of contamination of food or ingredients.

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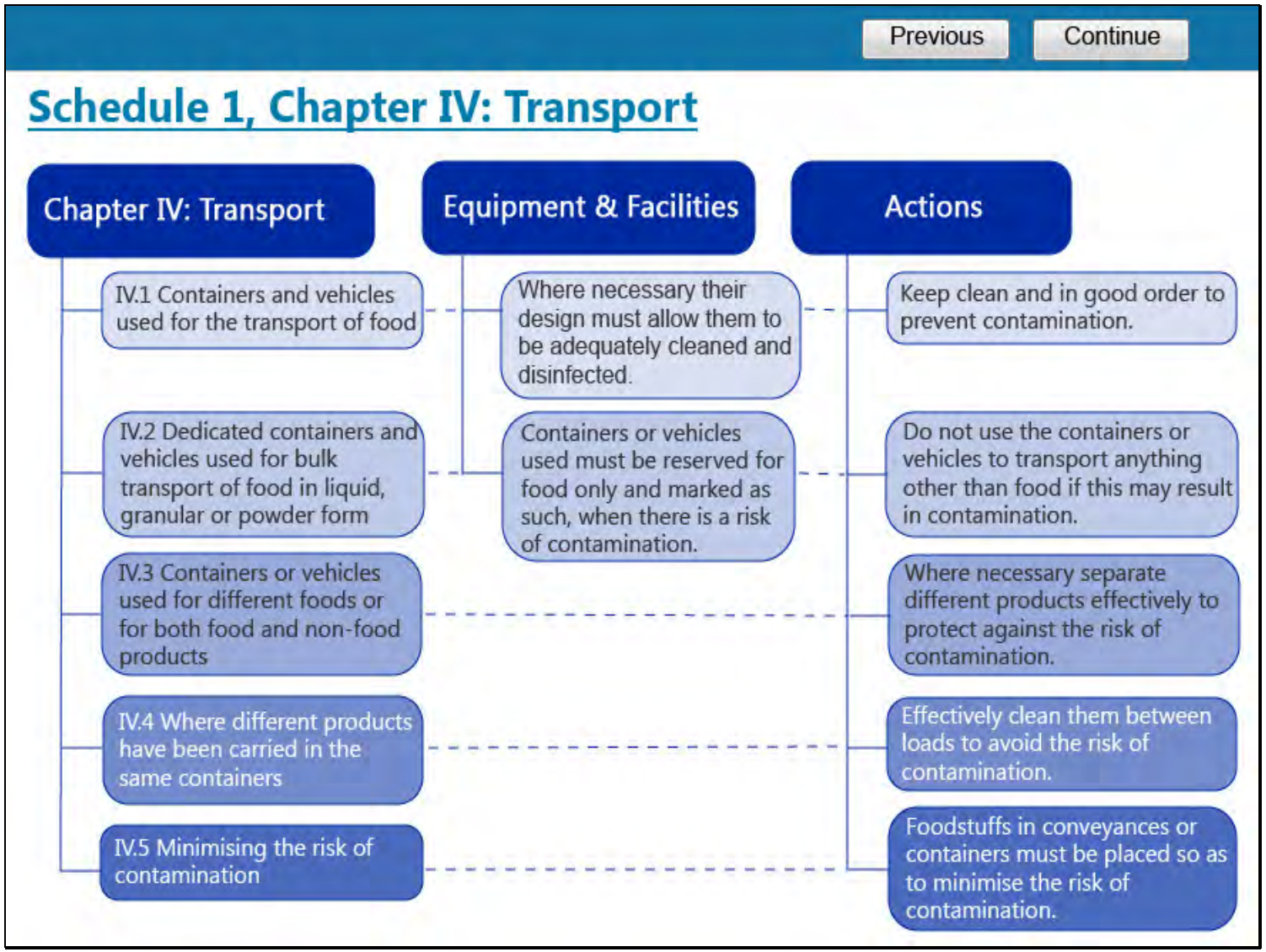

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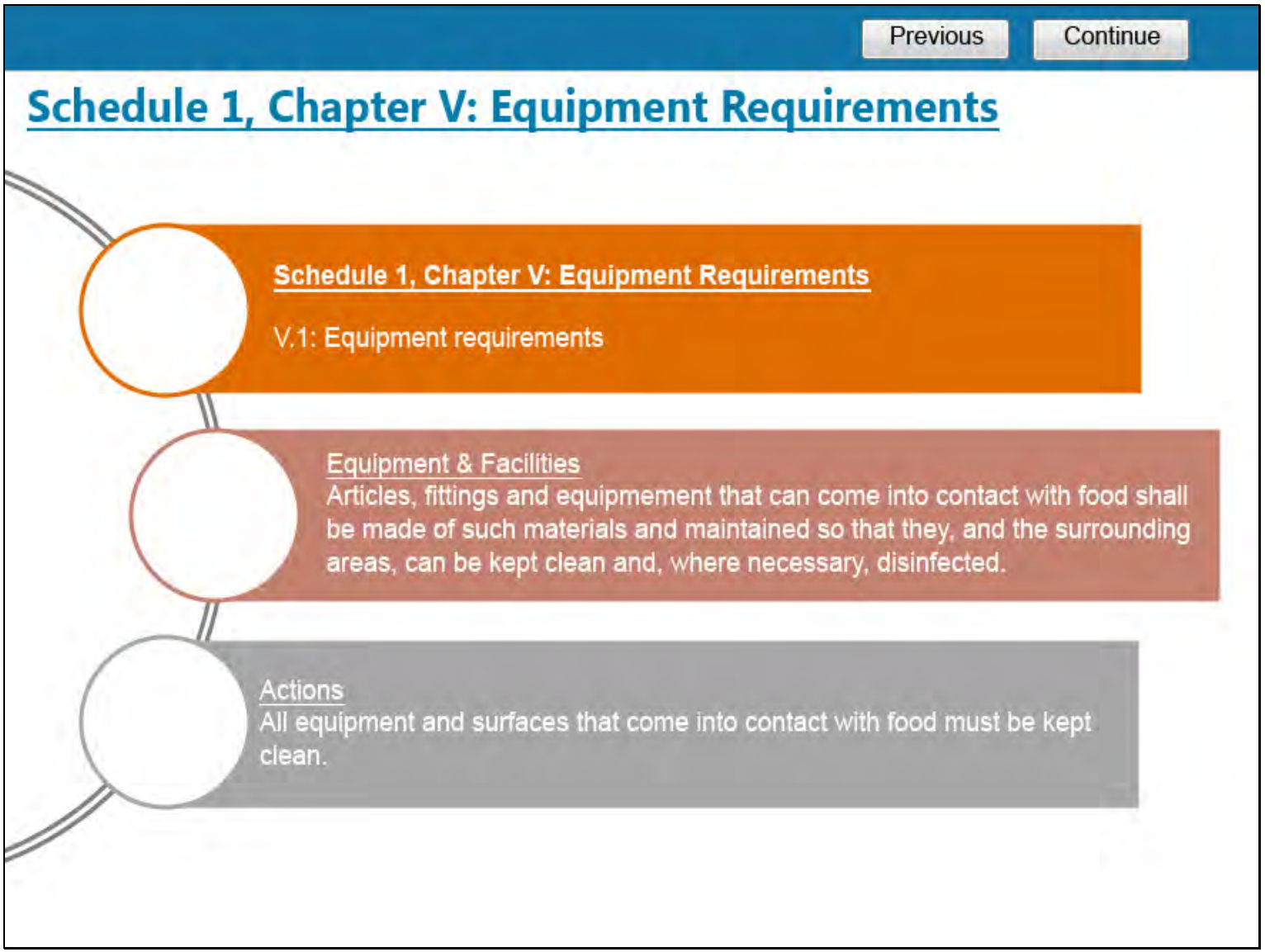

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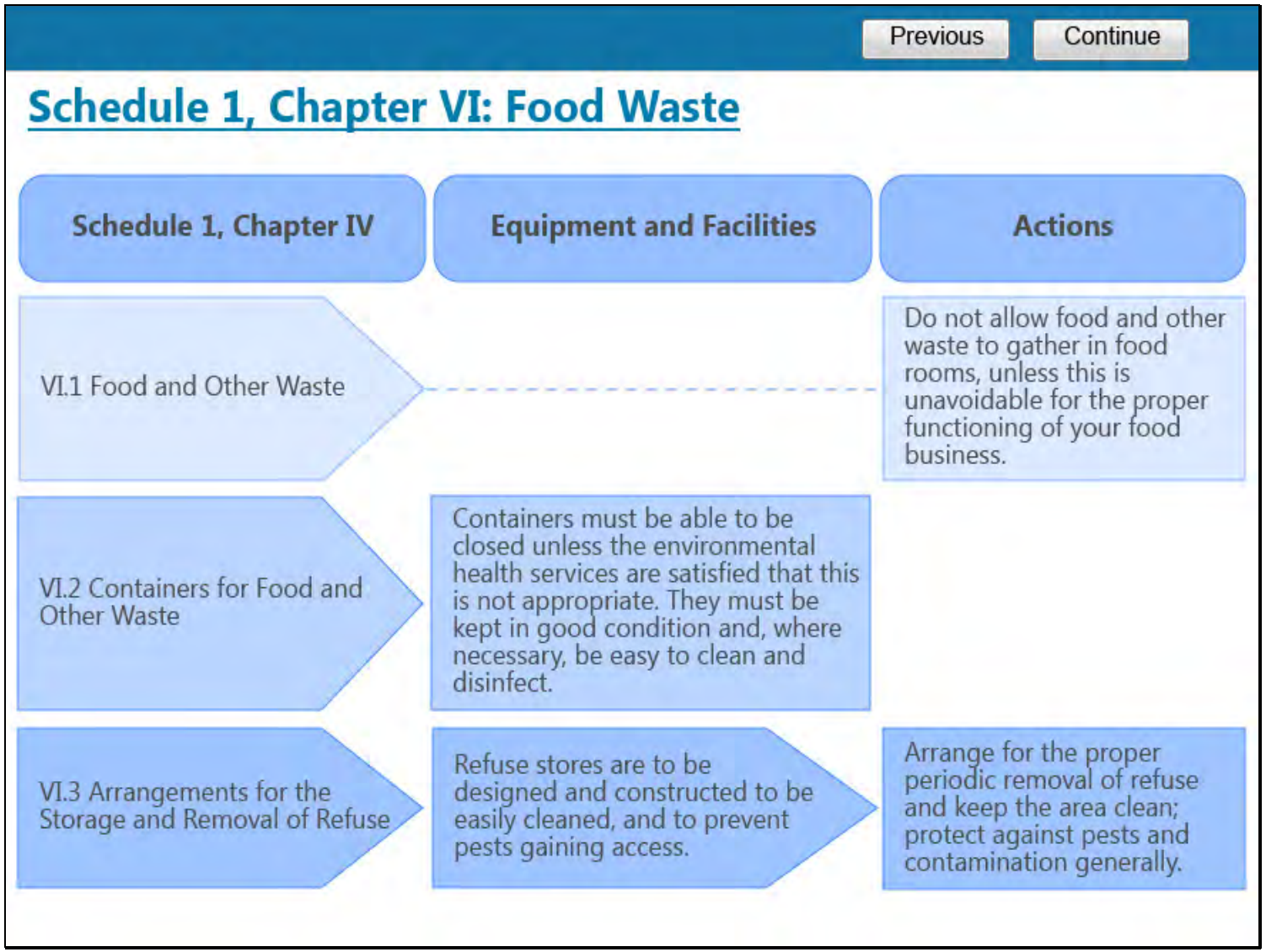

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Schedule 1, Chapter VII: Water Supply

VII.1 Water Supply

There must be an adequate supply of potable (drinking) water.

Where necesary for food safety, use potable water to prevent contamination.

VII.2 Ice

Where appropriate, ice must be made from potable water to prevent contamination. Ice should be stored and handled carefully to protect it.

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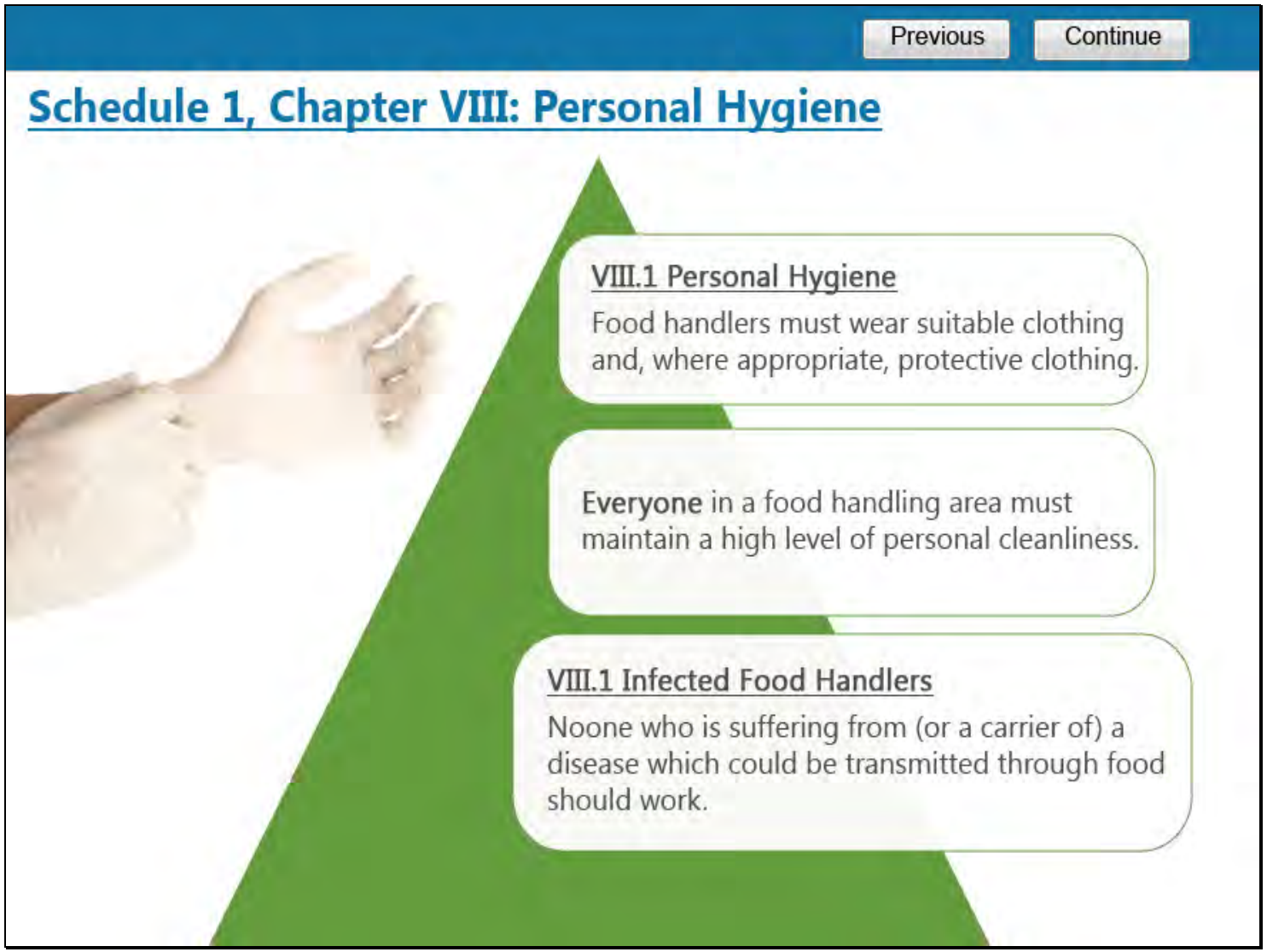

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Schedule 1, Chapter IX & X: Provisions Applicable to Foodstuffs & Training

IX.1 Raw Materials

No raw materials or ingredients should be accepted if known or suspected of being contaminated and which would still be unfit after normal sorting or processing.

X.1 Training

All food handlers must be supervised and instructed and/or trained in food hygiene matters to a level appropriate to their job.

IX.2 Protection of Raw Materials from Contamination

At any stage of the business operation food must be protected from contamination likely to render it unfit.

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Schedule 1, Chapter VIII

Back Submit

Sarah, one of the employees of your sandwich delivery business is ill and suffering from relatively mild diahorrea and vomiting. She hasn't vomited for two hours, and is starting to feel better. Sarah knows you are already staffed, and kindly volunteers to come in to work.

Try again continuing.

Will you still be operating within the law if you allow her to work her shift?

- A) Yes
- B) No

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Schedule 1, Chapter IX

Back Submit

It's early Saturday morning and the first food deliveries for your sushi shop are coming in. You are having a crate of raw fish delivered for your award winning sashimi, but when it arrives, it doesn't feel very cold and you suspec fish is developing unsafe numbers of bacteria.

Try again

continuing.

What do you do?

- A) Accept the delivery, after all, there's not much of a smell...
- B) Accept the delivery, if you chill it down straight away it will probably be fine
- C) Don't accept the delivery, you can't risk your customers getting food poisoning

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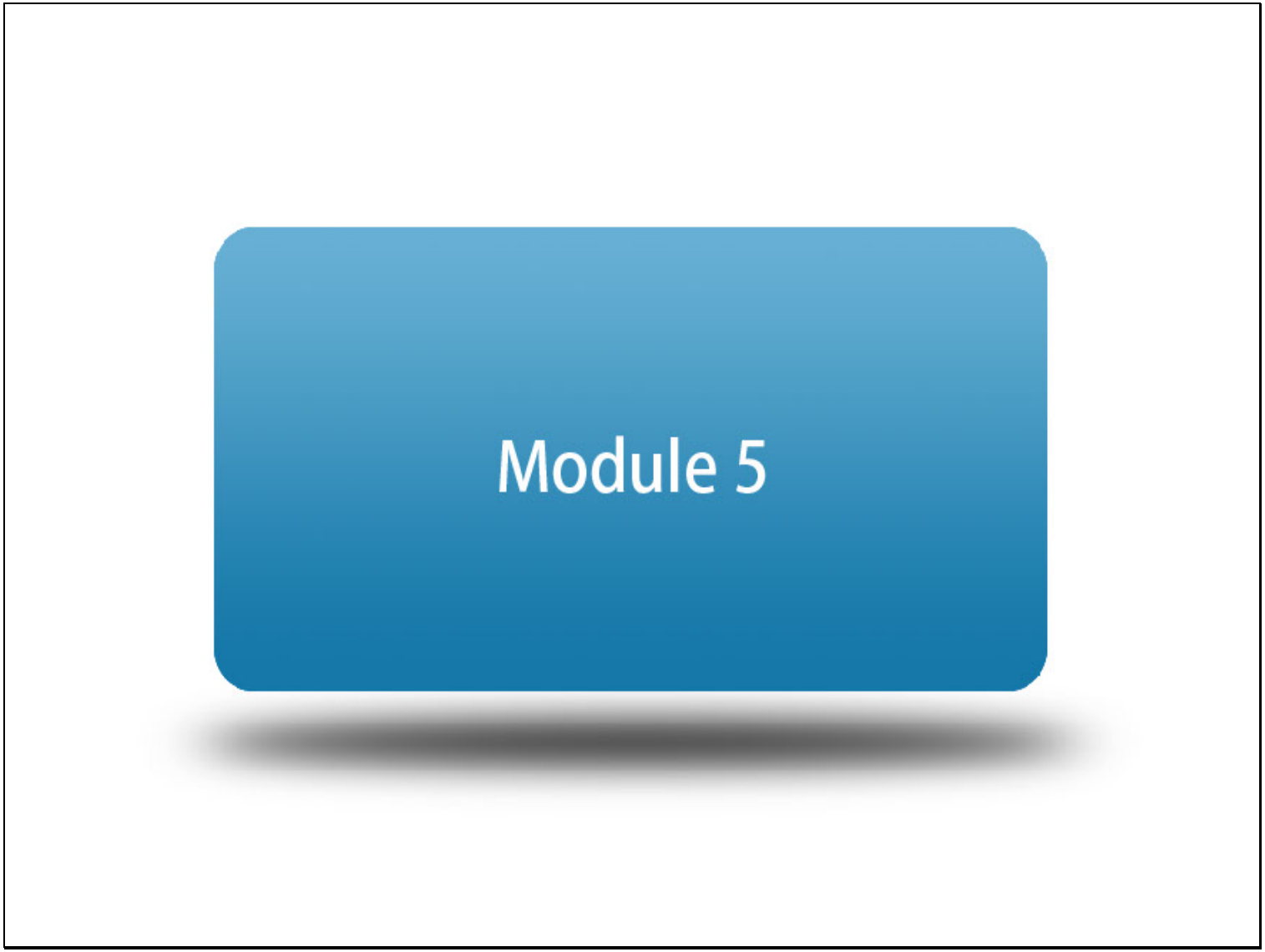

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Sources, Vehicles & Routes of Contamination

Some of the terminology used in this module is defined as follows:

Contamination
The presence or introduction of a hazard. There are four types of hazard/contamination; microbiological, foreign bodies (physical contamination), chemical and allergens.

Sources
Where the contamination comes from; including people, raw foods, pests and the environment.

Vehicles
The way in which the contaminant comes in contact with the food; including hands, cloths, equipment, hand-contact surfaces and food-contact surfaces.

Routes
The path the contamination takes when being transferred from sources to high-risk food. Routes can be disrupted by good design, good practice, cleaning and disinfection.

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Sources, Vehicles & Routes of Contamination

Prevention of contamination depends on either removing the sources, or putting barriers between the source and the vehicles or between the source and the food.

Thus, human access to food must be restricted, raw foods handled in separate areas, vermin excluded and work areas enclosed in suitably constructed and ventilated rooms.

Similarly, vehicles must, where possible, be excluded. Handling should be minimized, wiping cloths used sparingly or destroyed after each use, if possible hand-contact surfaces, such as tap handles are better replaced with knee, foot or electronically operated taps, and the number of surfaces with which the food comes into contact limited.

Routes of contamination must be disrupted by cleaning and disinfection. For example, if a work surface comes into contact with a contaminated source, raw meat for instance, the surface must be cleaned and disinfected before it is used for cooked meat.

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Contamination

Back Submit

Clarence has just finished disinfecting some chopping boards. Ignoring correct procedure, Clarence begins prepping the food for the day without washing his hands, and the food is contaminated.

Identify the source, vehicle and route:

You must answer the question before

Try again

C Source

A Vehicle

B Route

A) Clarence's hands

B) Prepping food with unwashed hands

C) Disinfectant

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Preventing Contamination

There will always be food safety hazards, but they can be controlled if you know how food becomes contaminated and how to prevent if from happening.

Contamination of food is a major hazard and may be considered as the occurrence of any objectionable matter in or on the food.

For instance, carcasses may be contaminated with faecal material, high-risk food may be contaminated with spoilage or food poisoning bacteria and flour may be contaminated with weevils.

To prevent the consumption of food which is unsafe or unacceptable, contamination must be kept to a minimum.

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Preventing Contamination

Microbiological hazards:

Caused by bacteria, moulds, viruses (micro-organisms) or parasites. Usually occurs in food premises because of ignorance, inadequate space, poor design or because of food handlers taking short cuts. Contamination of this sort is the most serious and may result in food spoilage, food poisoning or even death.

Physical hazards from foreign bodies:

Physical contamination may render food unfit or unsafe and is usually unpleasant or a nuisance.

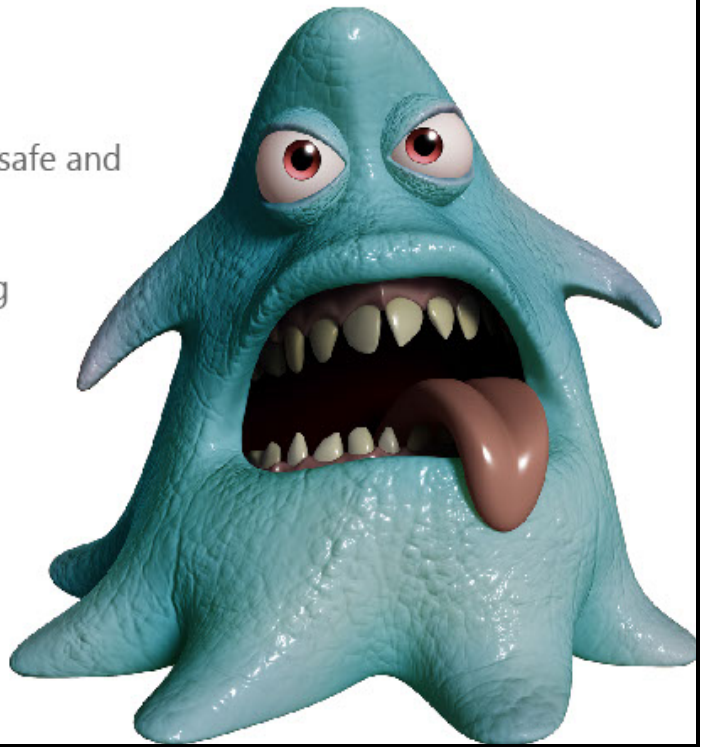
Examples include insects, paper, plastic, metal, string

Chemical hazards:

For example, pesticides and fertilizers on fruit and vegetables, residues from cleaning chemicals

Allergenic hazards:

Examples include peanuts, milk, eggs, gluten, cereals, shellfish



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Contamination Control - Key Points

Contamination is a major concern, and may be defined as:

The presence or introduction of a hazard.

There are four types of hazard or contamination:

1. Microbiological
2. Physical (foreign bodies)
3. Chemicals
4. Allergens

Sources of food poisoning bacteria include people, raw foods, pests and the environment.

Vehicles of contamination include hands, cloths and equipment, hand-contact surfaces and food-contact surfaces.

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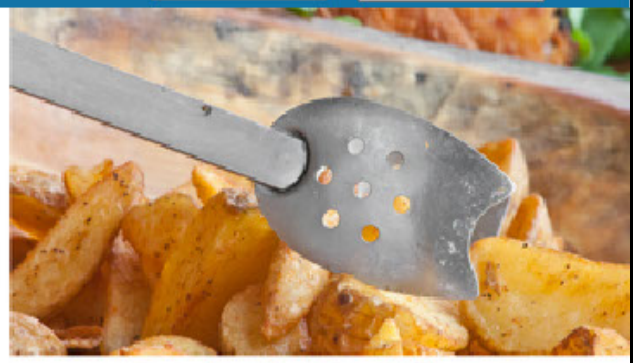
Contamination Control - Key Points

Routes are the path bacteria take when being transferred from sources to high-risk food.

Routes can be disrupted by good design, good practice and cleaning and disinfection.

Physical contamination results from packaging, the building and equipment notices, food handlers, cleaning activities, pests and customer contamination.

All reasonable precautions and all due diligence should be taken to avoid prosecution as a result of the sale of contaminated food.



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Cross-Contamination - Introduction

Cross-contamination of food is a common factor in the cause of food borne illness.

Foods can become contaminated by microorganisms (bacteria and viruses) from many different sources during the food preparation and storage procedures. Preventing cross-contamination is one step to help eliminate food borne illness.

The path along which bacteria are transferred from the source to the food is known as **the route**.

Knowledge of sources, vehicles and routes is vital to food poisoning prevention, as different controls apply to each.

NOTE! It must be assumed that all sources are contaminated, i.e. every worker is a carrier and all raw meat, milk, animals, insects, used equipment and the surrounding environment is contaminated.

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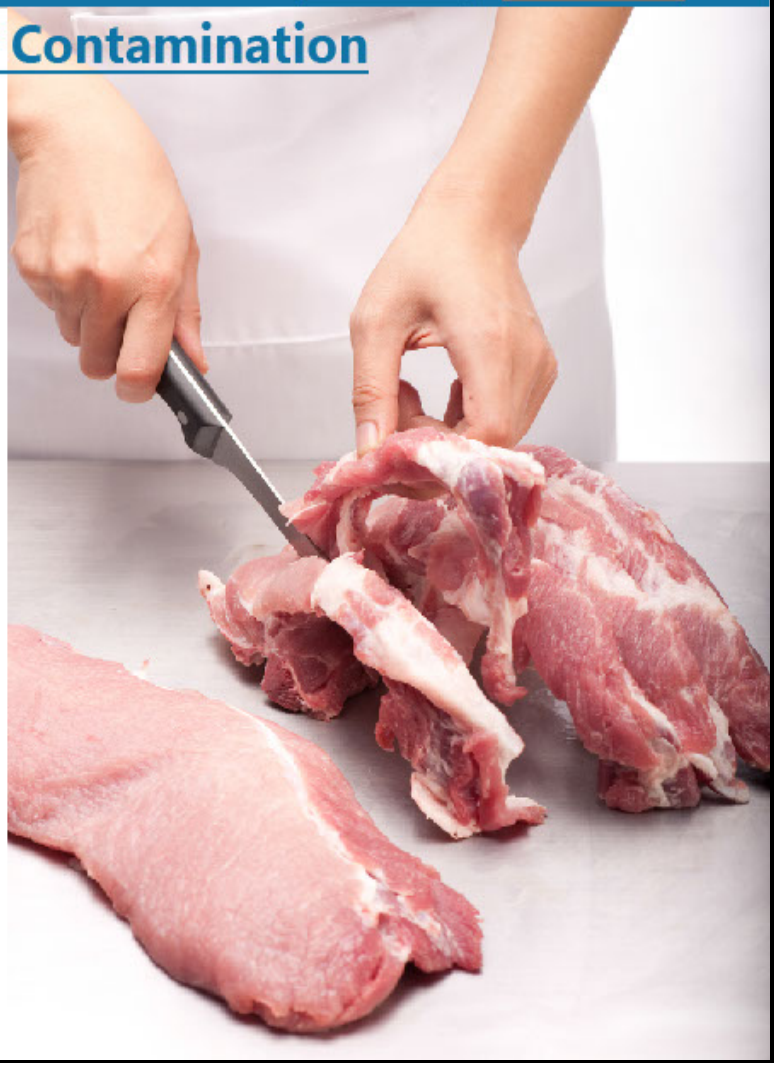
Sources, Vehicles & Routes of Contamination

It is the nature of food preparation, that routes between sources and vehicles can survive, giving rise to contaminated vehicles. Consequently, routes must be disrupted by cleaning and disinfection.

For example, should a work surface come into contact with a contaminated source, raw meat for instance, the surface must be cleaned and disinfected before it is used for cooked meat.

There are three (3) main ways cross-contamination can occur:

1. Food to Food
2. Equipment to Food
3. People to Food



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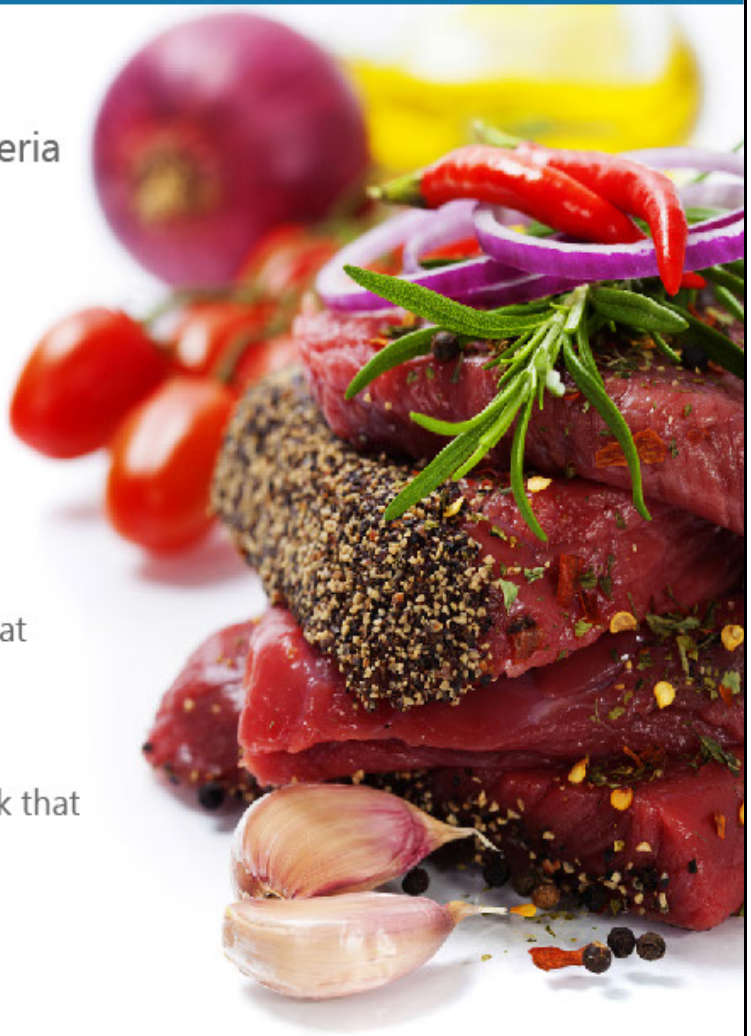
Food to Food

Food can become contaminated by bacteria from other foods.

This type of cross-contamination is especially dangerous if raw foods come into contact with cooked or ready to eat foods.

Here are some examples of food to food cross-contamination:

- In a refrigerator, meat drippings from raw meat store on a top shelf may drip onto cooked vegetables placed on a lower shelf.
- Raw chicken placed on a grill touching a steak that is being cooked.



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Equipment to Food

Cross-contamination can also occur from kitchen equipment and utensils to food.

This type of contamination occurs because the equipment or utensils were not properly cleaned and sanitized between each use.

Some examples are:

- Using equipment that has not been properly cleaned to prepare food, such as slicers, can openers and utensils
- Using the same cutting board and knife when cutting different types of foods, such as cutting raw chicken followed by salad preparation
- Storage of a cooked product, such as a sauce, in an unsanitised container that previously stored raw meat

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Colour Coded Equipment

We recommend that you use colour-coded equipment.

Colour coded equipment is readily available from most catering equipment suppliers, but systems using colour-coded cutting boards and knives will only work if your staff are trained to use them and understand why colour-coding is being used.

To remind staff, it is a good idea to display laminated charts in the work areas showing the relevant colours and their uses.

If you can't provide separate or colour-coded equipment, you must make sure that all equipment is thoroughly washed and disinfected after using it for raw foods.

It is important that you check that this cleaning is taking place effectively.

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Cross-Contamination

Back Submit

Try again

continuing.

or press 'y' to continue.

Match the following scenarios to the corresponding type
cross-contamination:

Type		Scenario
C	Food to Food	A) Tanya washes her hands and then ties back her hair before starting cooking
B	Equipment to Food	B) Jack uses the same knife to slice cooked chicken and raw carrots
A	People to Food	C) Colin has his raw burgers out ready to grill, but someone moves the burger buns and they come in contact with the raw meat

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Colour Coded Equipment

Match the colour of the knife to the correct product:

You must answer the question before continuing.

Colours		Product
B	Blue	B) Raw fish
A	Green	A) Fruit and vegetables
D	White	D) Bakery and dairy products
C	Brown	C) Free for allocation to food group
F	Red	F) Raw meat
E	Yellow	E) Cooked meats

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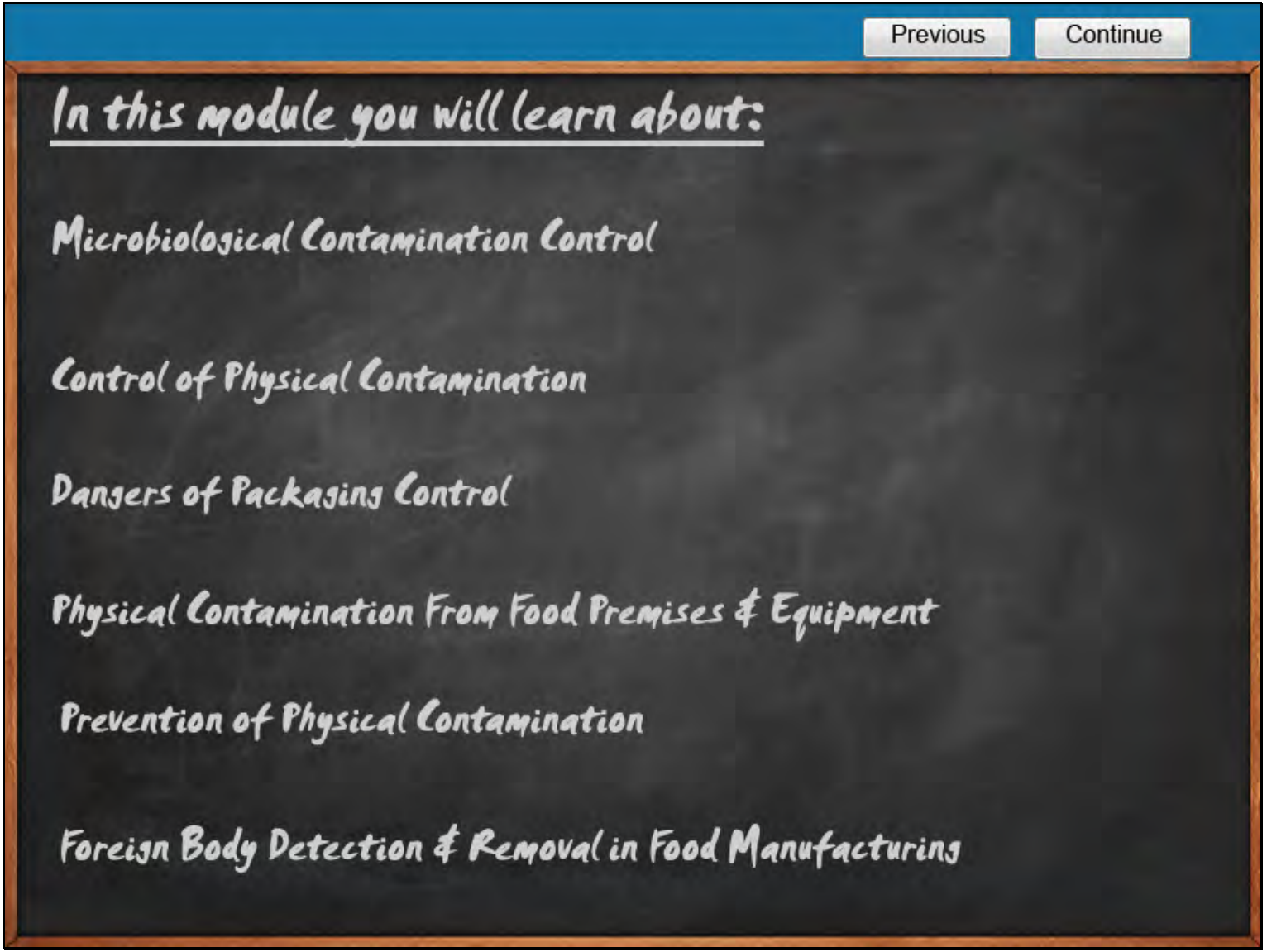

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Microbiological Contamination Control - Bacteria

Bacterial contamination is the most significant type of food contamination.

It results in large amounts of spoilt food and unacceptable numbers of food poisoning cases.

Food poisoning bacteria may be brought into food premises by many sources, including:

- Food handlers
- Visitors
- Raw foods (including poultry, meat, eggs, milk, fish, shellfish and water, especially when polluted with sewage or animal faeces)
- Vegetables and fruit (may become contaminated from manure or polluted irrigation water)
- Insects, rodents, animals and birds
- From the environment, including soil and dust

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Microbiological Contamination Control - Moulds

Mould growth often occurs if food is stored at the wrong temperature, at high humidity and in excess of the recommended shelf life.

Mould spores will also be present in the atmosphere, on surfaces, especially damp surfaces, and on mouldy food.

Mouldy food must be segregated to avoid further contamination.

Canned foods that are punctured can also give rise to mould growth inside the can.

Mould must also not be allowed to grow on walls, ceilings and window frames.

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Checklist for Microbiological Contamination Control

Delivery and Raw Materials

- ❑ Purchase food and raw materials from known, reliable and hygienic suppliers

- ❑ Accept deliveries only if transported in clean, properly equipped vehicles, with clean drivers wearing satisfactory protective clothing. Refrigerated vehicles may be necessary
- ❑ After checking, remove deliveries immediately to appropriate storage, refrigerator or cold store - unsatisfactory deliveries must be rejected

- ❑ Keep any unfit food, chemicals and refuse away from stored food; use only food containers for storing food
- ❑ Keep high risk foods apart from raw foods at all times, in separate areas with separate utensils and equipment - colour coding is useful, and separate food handlers are recommended

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Checklist for Microbiological Contamination Control

Cleaning & Hygiene

- ❑ Maintain scrupulous personal hygiene at all times and handle food as little as possible, taking care to exclude potential carriers
- ❑ Keep food covered or otherwise protected unless it is actually being processed or prepared, in which case, bring food out only when needed and do not leave food lying around
- ❑ Keep premises, equipment and utensils clean and in good condition and repair; report or remedy defects with the minimum of delay
- ❑ Disinfect food contact surfaces, hand-contact surfaces and cleaning equipment; ensure that all empty containers are clean and disinfected prior to filling with food
- ❑ Control cleaning materials, particularly wiping cloths, keeping cleaning materials well away from food
- ❑ Remove food and food containers before cleaning. Care must be taken to ensure that all cleaning residues, including water, are drained from food equipment and pipes
- ❑ Always clean from high-risk areas to low-risk areas

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Checklist for Microbiological Contamination Control

Contamination Control

- ❑ Remove waste food and refuse from food areas as soon as practicable, and store in appropriate containers, away from food
- ❑ Maintain an active pest control program
- ❑ Control visitors and maintenance workers in high risk areas - ensure hygiene disciplines apply to all personnel, including management
- ❑ Ensure adequate thawing of foods, separate from other foods
- ❑ Make suitable provisions for cooling food prior to refrigeration
- ❑ Inspect food areas and processes frequently, act on any defects or unhygienic practices
- ❑ Train staff and monitor performance - food handlers and engineers must be aware of the bacteriological and physical contamination they may introduce

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Control of Physical Contamination

Before using raw materials:

- Cleaning, washing and inspection needs to be carried out
- Physical contamination is to be removed by food handlers as vegetables pass along an illuminated inspection belt

Filtration in food production:

- Liquids used in food production should be filtered
- Powders should be sieved
- Filters, screens and sieves should be as fine as possible
- Sieves are to be cleaned and checked regularly
- Worn equipment must be replaced
- Wooden-framed sieves are usually unacceptable

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Control of Physical Contamination - Pakaging Materials

Packaging may be a source of extraneous matter in the form of warehouse and transport dirt and dust, wood from pallets, paper and polythene strips from overwraps, and a variety of insects and even rodents.

Containers (cans, jars, bottles and plastic pots) may be used directly for filling with minimal cleaning, and any rogue material in the container (metal splinters, glass, dirt, insects, etc.) may end up in the final product.

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Dangers of Packaging Materials

Food may be delivered in various containers including paper sacks, cardboard boxes and polythene bags. Particular care is necessary when emptying containers to avoid contamination of food.

As far as practicable, all unpacking and packing should be carried out in areas separate from food production or preparation, if open food is exposed to risk of contamination.

String removed from hessian sacks and ties removed from bags should immediately be placed in suitable containers provided specifically for the purpose. As an extra precaution, coloured string may be specified to aid detection should it end up in the product.

Paper sacks should be cut open, although care must be exercised to ensure pieces of paper do not finish up in the food. It is preferable for raw materials to be emptied into suitable lidded containers and not dispensed direct from paper sacks.

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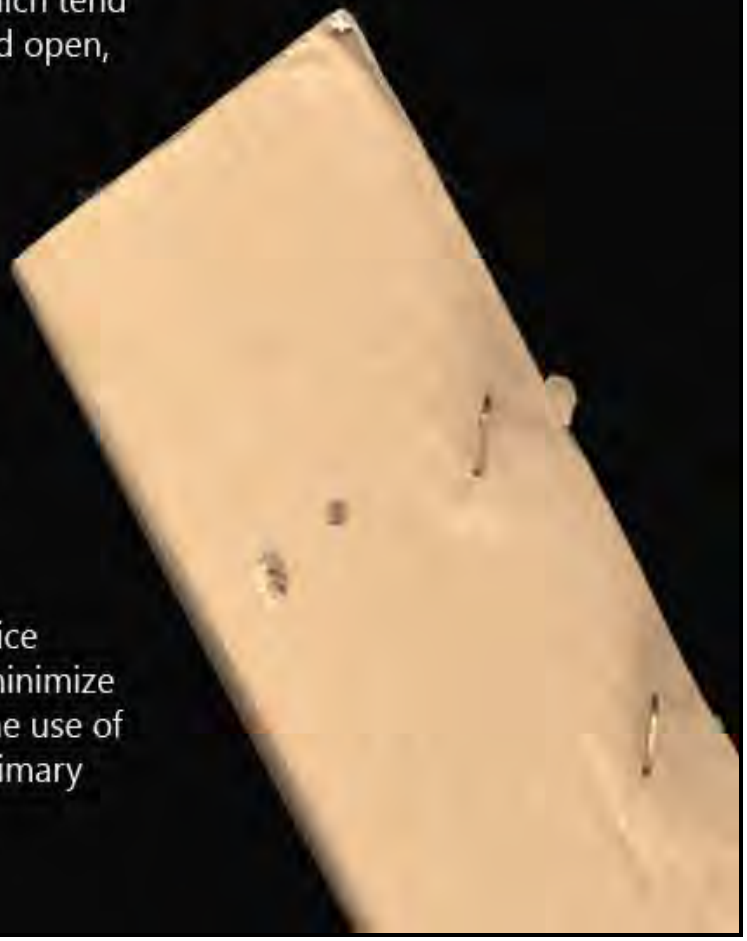
Dangers of Packaging Materials

Particular care is needed to ensure that staples, which tend to fly considerable distances when boxes are prised open, do not contaminate food.

Suppliers should be requested to use adhesive tape to fasten boxes, instead of staples.

Many products are delivered in black polythene bags and small pieces of polythene often end up in the product.

Effective measures in terms of good hygiene practice should be adopted within the HACCP scheme to minimize the risk of contamination. An example would be the use of secondary packaging which is removed prior to primary packaging material entering a high risk area.



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Control of Physical Contamination - Personnel

Contaminants, which originate from personnel include:

- Earrings
- Hair
- Fingernails
- Buttons
- Combs
- Pen tops

The personal hygiene of food handlers must be beyond reproach. Protective clothing, including head coverings, must be of a suitable type and worn correctly. Earrings and jewellery, other than wedding rings, should not be worn.

Pencils, pens and pieces of chalk must not be used in situations which expose food to risk of contamination, for example, near filling hoppers and mixing vessels.

Sweet papers, cigarette ends and matches are common contaminants and staff should not eat sweets, chew gum or smoke in food rooms. Regular training and reinforcement, such as posters, should be used together with strict supervision and enforcement of company rules.

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Physical Contamination - Cleaning

Care must be taken during cleaning and all staff involved should be trained to ensure they do not expose products to risk of contamination by using worn equipment, especially brushes which are likely to lose their bristles, or by using inappropriate methods such as high pressure spraying during the production of open food.

Particular care must be exercised when using paper towels or cloths to ensure small pieces of paper or cloth do not end up in the product.

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Physical Contamination During Maintenance

Engineers must be trained and briefed to take extra care when working with food equipment.

They must ensure that they do not leave loose nuts, swarf, debris and pieces of wire in food rooms on completion of maintenance.

Written instructions may be useful.

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Physical Contamination During Maintenance

Temporary repairs with string should be avoided.

It is good practice for managers to check areas where engineers or contractors have been working before food handling commences.

During production, areas which are being decorated or where repair or maintenance work is being carried out must be suitably segregated by screens, such as heavy-duty polythene, to avoid exposing product to risk of contamination.

Workers should be closely supervised during maintenance activities.

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Physical Contamination During Maintenance

Maintenance workers should not wear soiled overalls, and suitable protective clothing may be provided by the food business.

They should not stand on or climb over machinery or open food if there is the slightest risk of introducing contamination.

They should not smoke or eat sweets and should observe good hygiene practices.

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Physical Contamination During Maintenance

If necessary, all food and food containers should be removed or protected with clean polythene sheeting.

The use of ladders over open food or hoppers can result in dirt falling off shoes or rungs and ending up in the final product.

After the work has been completed all tools, screws, swarf, grease, etc. must be removed and the area cleaned and, if necessary, disinfected before use.

Whenever possible, equipment should be removed from food areas for repair.

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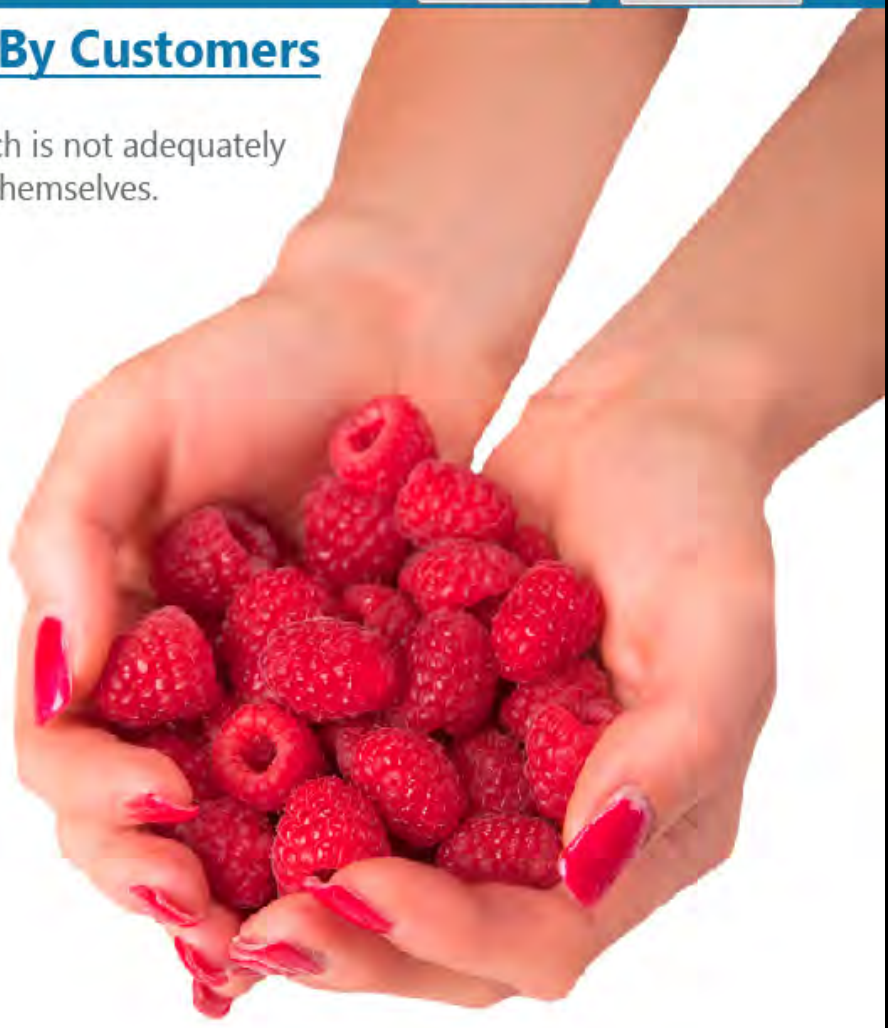
Physical Contamination By Customers

Customers may contaminate food which is not adequately protected, especially when they serve themselves.

Handling and sneezing over food is probable, and inquisitive customers may break seals to examine the contents of jars and tubs.

Furthermore, malicious tampering of products in supermarkets continues to pose a threat to manufacturers and retailers.

Finally, contamination of the product may occur in the consumer's home and this should be considered when investigating a complaint.



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Physical Contamination from Pests

Insects, larvae and eggs may also be present in raw materials, although some may find their way into food rooms via openings.

Several types of insect multiply rapidly and infestations can soon spread throughout food premises. Infested food should be discarded and appropriate control measures introduced.

A reputable pest control contractor, experienced at working with food businesses, should be employed to lay rodent bait or traps and control pest infestations should they arise.

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Physical Contamination from Pests

Bad pest control is likely to result in food contamination. For example, electronic fly killers positioned above open food, work surfaces or containers will probably result in dead insects in the food.

Similarly, the use of insecticides to destroy flying insects, for example, sprays, in the presence of open food may result in both physical and chemical contamination of the food.

Cleaners and other staff must be instructed not to touch bait boxes, unless authorized to do so, and never to put bait boxes on shelves above open products whilst cleaning is being undertaken.

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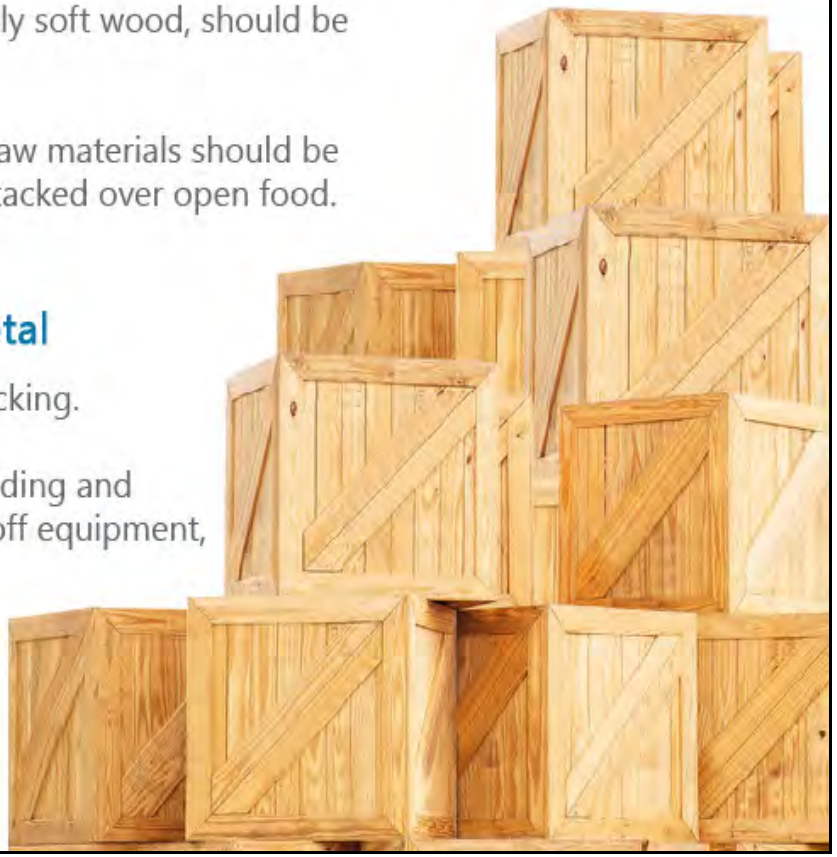
Physical Contamination from Premises & Equipment

Wood splinters

As far as possible the use of wood, especially soft wood, should be eliminated from food production areas.

Wooden containers used for transporting raw materials should be phased out. Pallets should not be double stacked over open food.



Bolts, nuts and other pieces of metal

As far as practicable, nuts should be self-locking.

Bolts, nuts and screws should be non-corroding and positioned to ensure that, should they fall off equipment, they do not drop into the food.

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Physical Contamination from Premises & Equipment

Flaking Paint or Rust

Ceiling structure, pipes or equipment should be non-flaking and rust-free. This is especially important when such fixtures are positioned directly above open products.

In some older factories this problem is very difficult to overcome and consequently additional protection is necessary, for example, enclosed systems for conveying food and empty containers such as cans.

New food premises should be designed so that fixtures, ducts and pipes are not suspended over working areas or food if the product is exposed to risk of contamination, for example, from condensation.

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Physical Contamination from Premises & Equipment

Grease and Oil

Wherever necessary, food-grade grease and lubricants should be used.

It is important that engineers use the minimum amount necessary to lubricate moving parts and that grease is not left on the machine. Careful control will ensure the absence of complaints relating to grease in food.

It is preferable for motors not to be positioned above open food. When this occurs, suitable non-corroding, cleanable drip-trays should be fixed underneath to catch oil spillages.

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Physical Contamination from Premises & Equipment

Glass

As far as practicable the use of ordinary glass should be minimized in food rooms.

Perspex or wired glass windows should be used.

Protective sleeves or diffusers should be fitted to fluorescent tubes in any rooms where breakage would expose food to risk of contamination. When replacing or cleaning fluorescent tubes or diffusers, food and containers should be removed or protected so there is no risk of contamination.

Dials and gauges on equipment should be unbreakable.

Mirrors and glass thermometers should not be used. Unauthorized glass containers or equipment should not be brought into food rooms.

All food businesses should have a glass policy especially to deal with glass breakages.

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Physical Contamination from Premises & Equipment

Glass

In the event of breakage, food preparation should stop.

All potentially contaminated food should be discarded. Food containers should be checked for broken glass and cleaned.

All broken glass should be swept up and disposed of in a safe manner, and the brush used should be discarded as it is likely to contain broken glass.

The area should be fully cleaned and inspected before food preparation starts again.

Staff will require appropriate instruction and training to ensure they respond correctly to breakages.

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Physical Contamination from Premises & Equipment

Glass

In factories, optical scanners, filters, sieves, x-ray machines and air separation systems may be used to detect and/or remove glass from food.

In the event of products being contaminated with glass it may be necessary to recall the food and notify the environmental health department.

Breakages when filling glass jars or bottles are always likely and particular care is needed to ensure containers adjacent to fillers when a breakage occurs are discarded.

Furthermore, a suitable system, e.g. inverting and washing or blasting with air, is necessary to minimize the risk of broken glass being present in a container just prior to filling.

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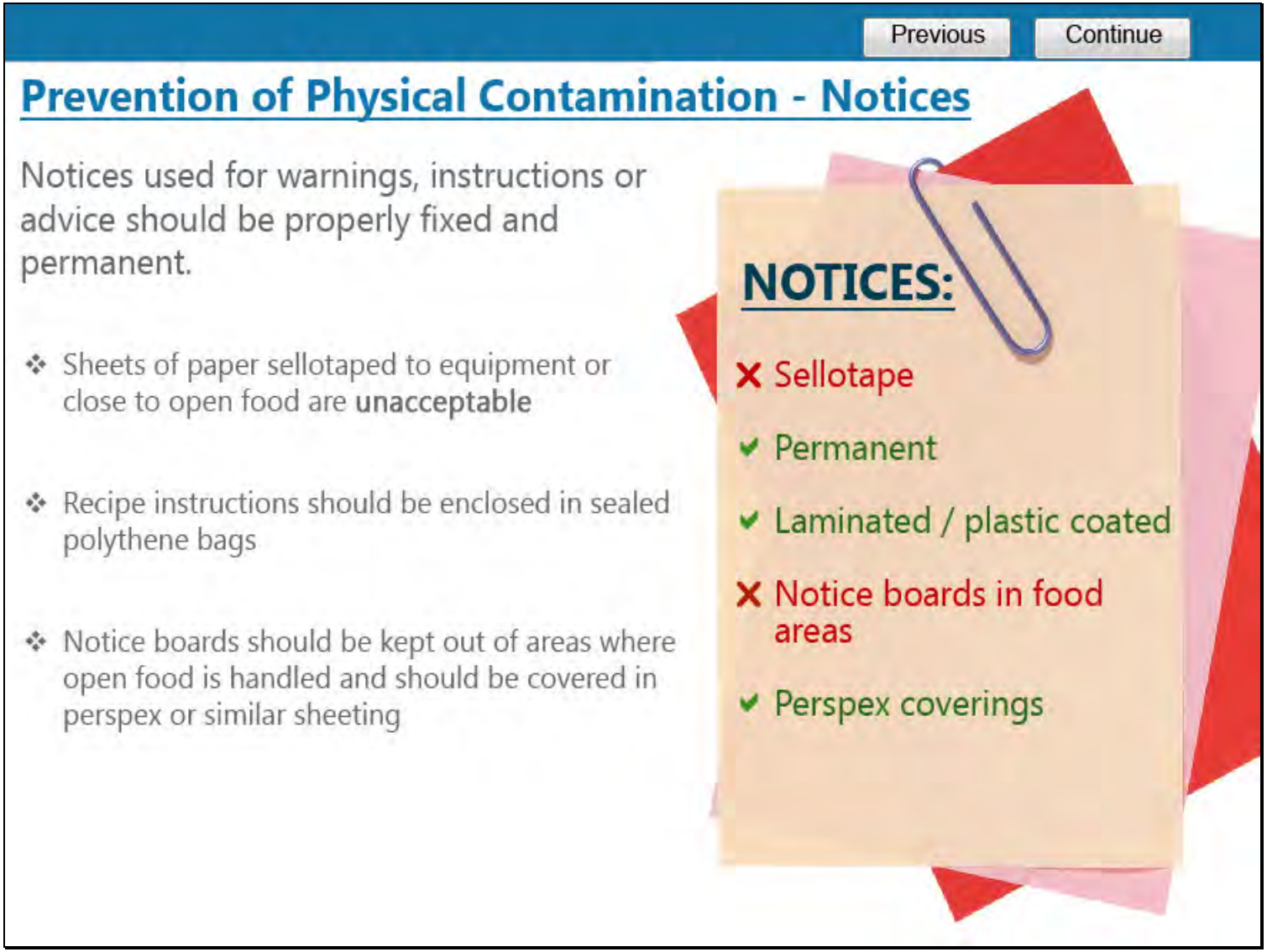

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Prevention of Physical Contamination & Due Dilligence

A food company facing prosecution as a result of selling a contaminated product will need to demonstrate that they have installed and used an effective, documented detection and rejection system which is checked regularly, if they are to successfully use the due diligence defence provided in food safety legislation.

It will be up to the courts to decide what is 'reasonable', having regard to good trade practice, industry hygiene guides and the risk and consequences in relation to cost.

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Foreign Body Detection & Removal in Food Manufacturing

There are many contaminant detection and removal systems available including:

- Metal detection systems
- Optical systems, including colour sorters and scanners
- X-ray systems
- Magnets
- Air or liquid separation systems
- Sieves and filtration
- The use of operatives, for example, as spotters on bottle lines or illuminated inspection belts

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Allergens

Control of Allergens

Manufacturers must exercise particular care during food production to ensure allergens do not contaminate other products. For example, they must ensure that dust from nuts does not end up contaminating a product that does not normally contain nuts.

Cleaning to remove all traces of contamination can be quite difficult and therefore many factories use completely separate production lines or even different factories.

Dust can be spread through ventilation systems, or involve cross-contamination from cloths, cleaning equipment or personnel.

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Control of Allergens

Food businesses should implement an allergen control system based on HACCP.

This will involve:

- Using reputable suppliers and branded goods
- All ingredients and foods clearly labelled
- Satisfactory packaging
- Segregated storage
- Using specific equipment for preparation, cooking etc.
- Segregated displays
- Separate serving utensils and clear labelling

Ingredient information must be available for all products, and staff should know how to check this.

In the event of a product becoming contaminated with an allergen, it must be discarded or dealt with as a contaminated product.

If there is any risk of a product containing an allergen, it must be clearly labelled.

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Control of Allergens

Requirements for labelling allergens are defined in the Food Labelling (Amendment) (England) (No.2) Regulations 2004.

Foods which are identified as most likely to be allergens must always be clearly labelled.

In catering, effective communication and knowledge of all ingredients are essential to reduce the risk from allergens. **Don't guess.**

Clear menu descriptions identifying potential allergenic ingredients should be provided e.g. cooked in ground nut oil.

Always update the menu when ingredients or recipes are changed. Staff must be instructed and trained about allergens and the implementation of effective control measures.

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Control of Allergens

Regular audits and effective supervision are important to ensure control measures are working.

When a customer confirms they are allergic to a particular food, the person taking the order must provide accurate information to the person preparing the food.

It is not just the menu item that may contain the allergen, it could be sauce used to make a garnish, it may be the oil used to cook the food or the allergen may be introduced because of a failure to effectively wash the hands or clean preparation equipment.

Allergens won't usually be destroyed by cooking.

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Control of Allergens

All staff should be aware of the action to take in the event of a customer having an anaphylaxic reaction (severe allergic reaction as a result of a susceptible person eating a food containing an allergen).

The customer may have a pre-loaded adrenaline injection kit which they use as soon as a serious reaction is suspected.

The customer should not be moved, and an ambulance with a paramedic should be called using the emergency number.

You should explain that the customer could have anaphylaxis.

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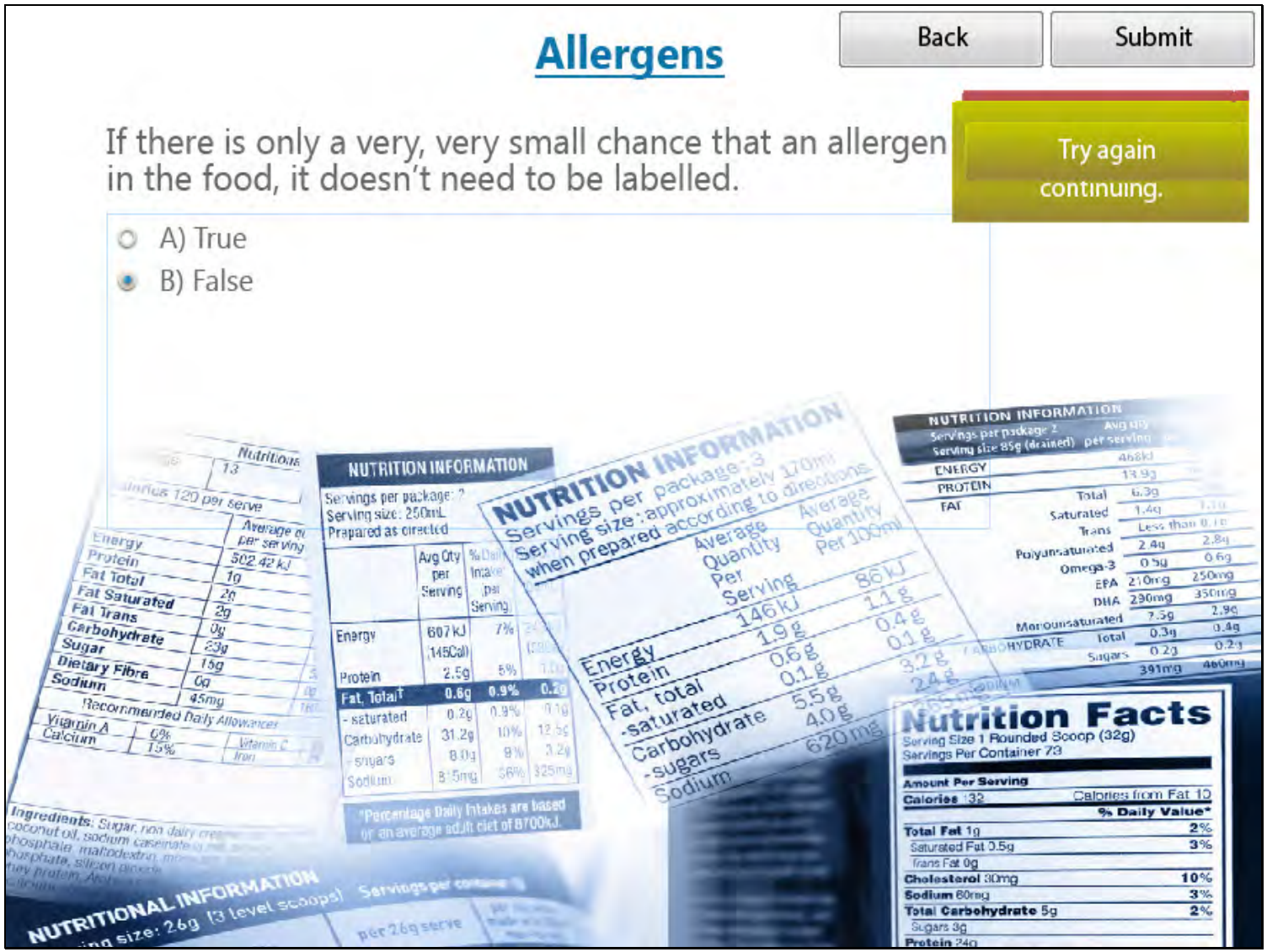

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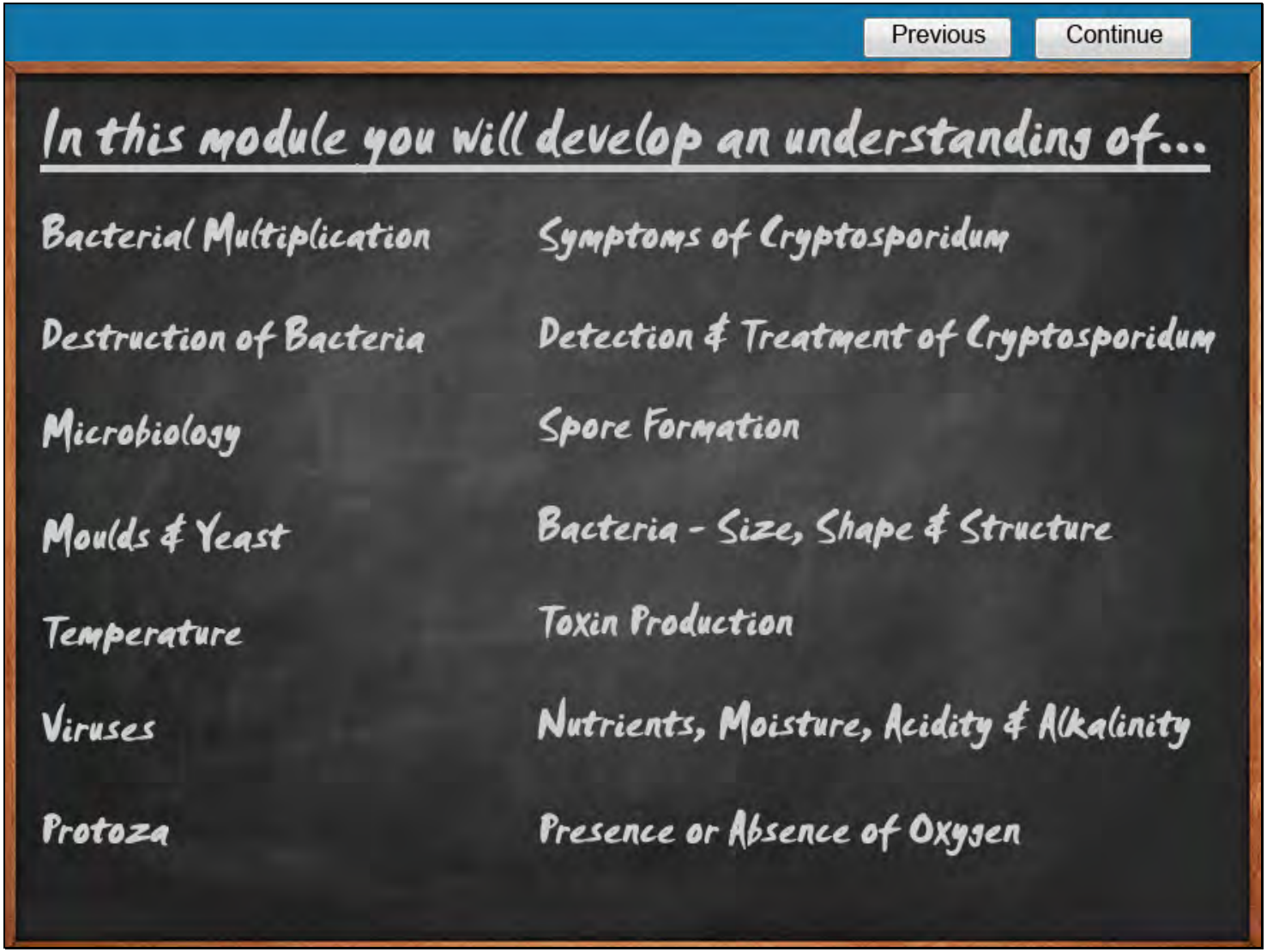

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Bacterial Multiplication

Bacterial Competition

When there are many different bacteria present, they will compete for the same food. Fortunately, most food poisoning bacteria are not as competitive as the normal flora found on food and, unless present in high numbers, will usually die.

Bacterial Multiplication

Bacteria reproduce by splitting into two. This process is known as binary fission and the time taken between each division (generation time) varies considerably depending on, among other things, temperature and the nutrients (food) available.

In optimum (ideal) conditions some food poisoning bacteria can split in two every ten minutes, although at temperatures of around 10°C it may take up to ten hours or they may stop multiplying. The average generation time of the common food poisoning bacteria under optimum conditions is usually considered to be around 20 minutes.

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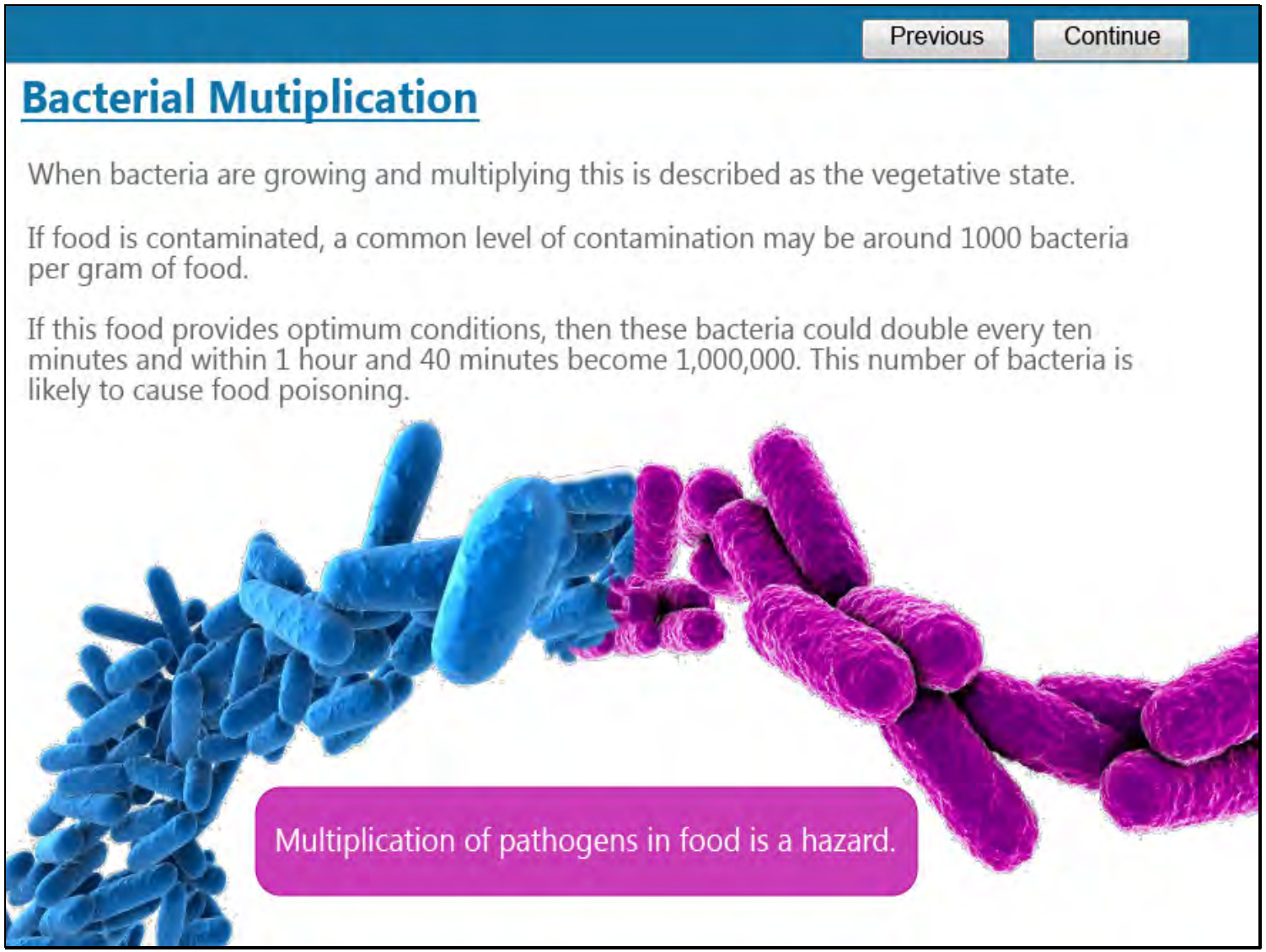

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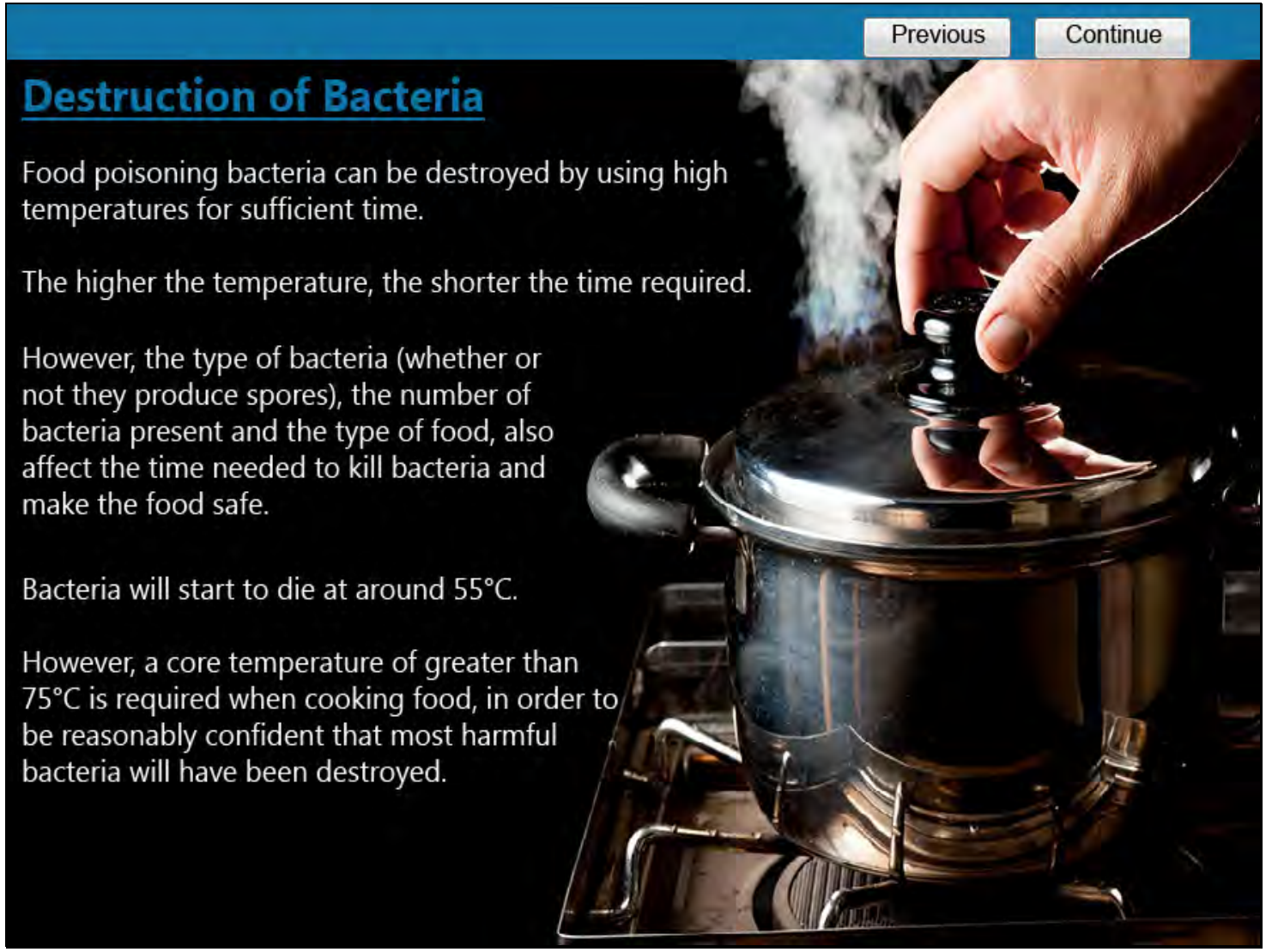

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Destruction of Bacteria

Unfortunately, much higher temperatures are required to destroy toxins and spores produced by some food poisoning bacteria.

Freezing cannot be used to destroy bacteria, as most will survive the freezing process and long periods of storage at freezing temperatures.

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Destruction of Bacteria

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Try again
continuing.

When cooking food, what is the core temperature requ
order to be reasonably confident that most harmful ba
been destroyed?

- 63°C
- 75°C
- 55°C
- 85°C

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Microbiology

Microbiology is the study of microscopic plants and animals, and this includes bacteria, moulds and yeasts.

The most important microorganisms of interest to the food industry are bacteria, and bacteriology is the study of bacteria.

If food handlers are to understand food safety and how to prevent food poisoning, they must have some understanding of basic bacteriology.

Bacteria are single celled microorganisms which are found everywhere. For example:

- Raw food
- People
- Soil
- Air
- Water

A microorganism is an organism that is so small it can only be seen under a powerful microscope.

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Moulds

Moulds are aerobic chlorophyll-free fungi which produce thread-like filaments (hyphae) and form a branched network of mycelium.

Moulds may be black, white or of various colours. They will grow on most foods, whether moist or dry, acid or alkaline, or high in salt or sugar concentrations.

The optimum growth temperature is usually 20-30°C. although they will grow well over a wide range of temperatures and may cause problems in refrigerators.

Growth has been recorded as low as -10°C. High humidities and fluctuating temperatures accelerate mould growth.

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Moulds

Moulds commonly affect bread and other bakery products, and although spores are usually destroyed in baking, subsequent contamination is difficult to avoid. Mould inhibitors are usually added to bread.

Food must always be stored in accordance with the manufacturer's instructions and never sold outside its use by date.

The mishandling of vacuum packs containing cheese may result in punctures and consequential mould growth.

As the mycelium grows over the food, hyphae penetrate the substance and consequently mould soon returns if scraped off the surface. Regular checking of stock is imperative to avoid customer complaints. The presence of mould on food is usually considered to render it unfit for human consumption (cheeses produced with specific moulds are an exception).

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Bacteria - Nutrients & Moisture

Nutrients

Food poisoning bacteria obtain their essential basic nutrients from amino acids, fats, vitamins and minerals, which are usually provided by high protein food such as meat, fish and dairy produce.

Foods with high sugar and salt content are usually unsuitable, and are therefore unlikely to support bacterial multiplication.

Moisture

Bacteria require water to transport nutrients into the cell and take away waste products. The AW (water activity) of food is the measure of the available water.

With the exception of dehydrated products such as milk powder, most foods contain sufficient moisture to enable bacteria to multiply. However, some bacteria can survive dehydration and when liquid is added to the dried food it once again becomes a high risk food and must be stored under refrigeration.

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Bacteria - Acidity & Alkalinity (pH)

The pH of a food is measured on a scale of 1 to 14 (hydrogen ion concentration).

Acid foods have pH values below 7
Alkaline foods have a pH above 7
A pH value of 7 is neutral

Most bacteria will not multiply in a pH below 4.0 (e.g. an acidic food such as fruit juice). However, if a large number of food poisoning bacteria are introduced into an acidic food, it may take some time for the bacteria to die.

For this reason, acidic foods must be protected from contamination at all times.

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Presence or Absence of Oxygen

Some bacteria can only multiply in the presence of oxygen and others can only multiply when there is no oxygen. The former are known as **aerobes** and the latter, **anaerobes**.

Many bacteria can multiply with or without the presence of oxygen and these are called **facultative anaerobes** (for example, salmonella).

Oxygen is normally present in food, except in the case of liquids which have been thoroughly boiled.

Cooking also drives off oxygen and the centre then provides ideal conditions for anaerobes (for example, joints of meat).

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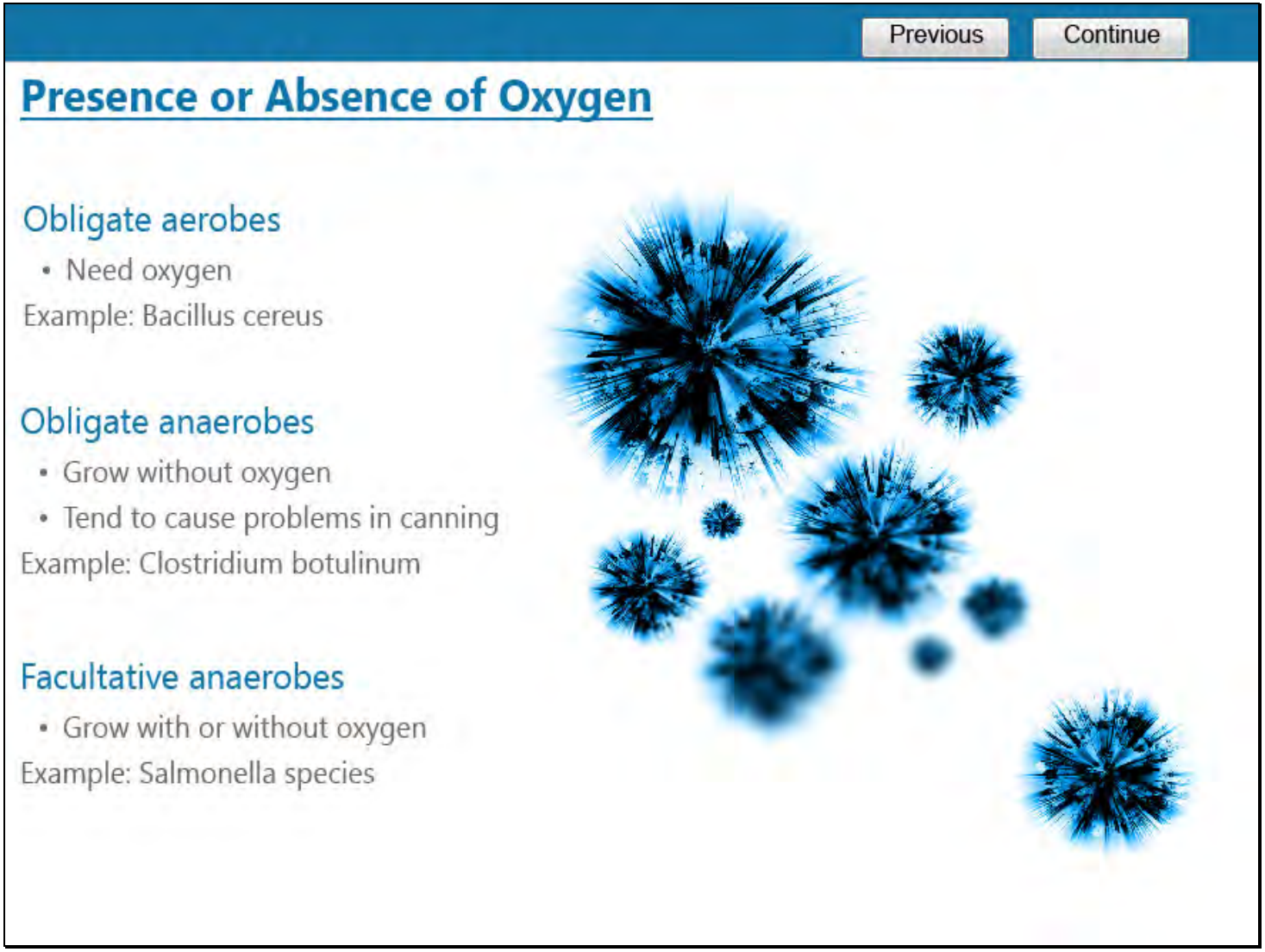

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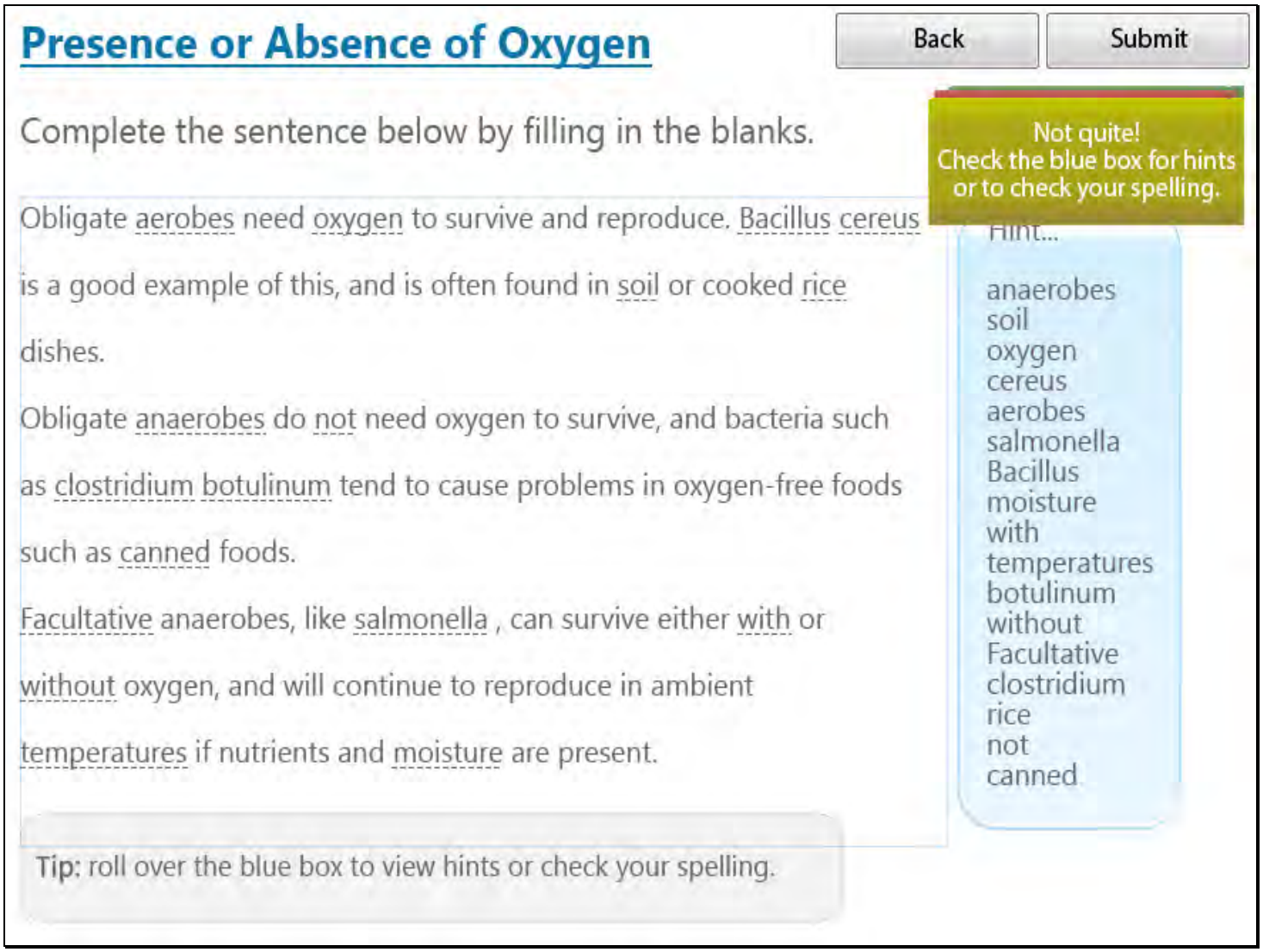

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Protozoa

Protozoa are single-celled organisms which form the basis of the food chain.

They live in most habitats, including oceans, soil and decaying matter.

Some are pathogenic (biological agents that cause disease to their host), and they usually result in water borne outbreaks. They do not multiply in food but their cysts may remain infectious in foods for a long time.

They have a low infective dose, meaning that only small numbers of cysts are required to cause illness.

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Protozoa

Two pathogenic protozoa causing illness in the UK are Cryptosporidium parvum and Giardia lamblia.

Cryptosporidium parvum (also known as "Crypto") is a parasite that is too small to be seen with the naked eye.

It is found in water and food sources contaminated with the faeces of infected humans, cattle, and other mammals.

The infectious form of the parasite, known as an oocyst, is highly resistant to the levels of chlorine normally found in drinking water and swimming pools.

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Symptoms of Cryptosporidium

Cryptosporidiosis is the infection caused by ingestion of the Cryptosporidium parasite.

It causes painful abdominal cramping and profuse, watery diarrhoea. In addition to diarrhoea, symptoms of infection are fatigue, fever, nausea, vomiting, and loss of appetite.

On average, symptoms of Cryptosporidiosis appear around seven days after oocysts are swallowed, and normally last for two weeks or less in healthy adults.

People with compromised immune systems (including those with diabetes, those receiving cancer treatments, organ transplant patients and those infected with HIV/AIDS), the elderly, pregnant women, and small children are more likely to become infected, and will suffer more severe illnesses than healthy adults.

In some cases, Cryptosporidiosis can be life threatening, especially when those infected become dehydrated.

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Detection & Treament of Cryptosporidium

Infection with Cryptosporidium typically occurs after a person swallows contaminated water, eats contaminated food, or comes into direct contact with contaminated faeces.

There are hundreds of reported cases of infection in the UK every year, as well as several documented outbreaks over the last decade.

Cryptosporidium is predominantly waterborne, and infections are often associated with contaminated water sources, such as swimming pools, water parks and contaminated drinking water.

Cryptosporidium is a particular problem for swimming pools and drinking water because the oocysts are resistant to chlorine based disinfectants.

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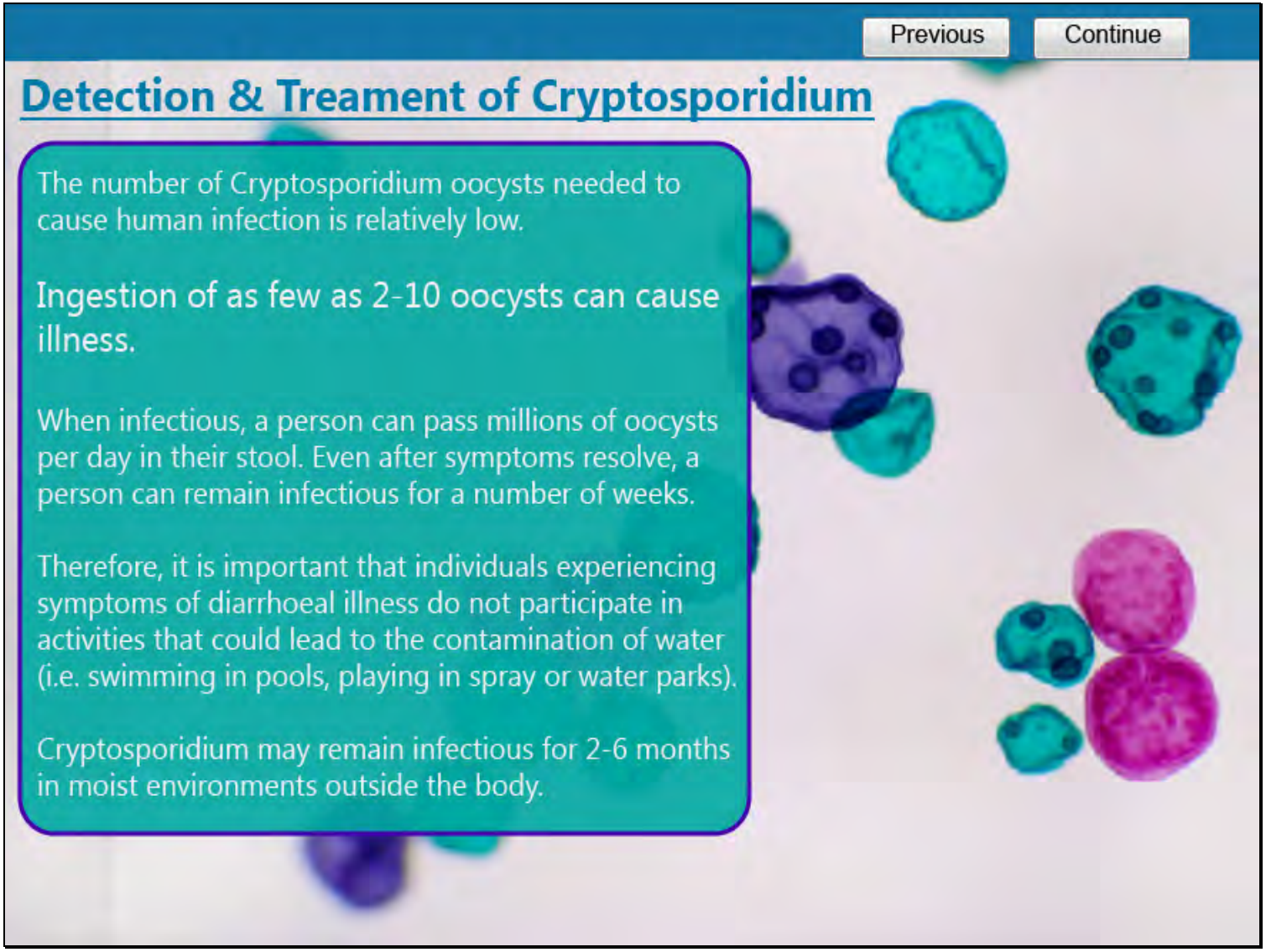

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Spore Formation

Some food poisoning bacteria, such as Clostridium Perfringens, Bacillus Cereus and Clostridium Botulinum are able to form spores which are capable of surviving unfavourable conditions such as high temperatures, dehydration and the use of disinfectants.

Spores are round protective bodies which form inside the bacterial cell and may allow survival for many years without food and water. They cannot be detected by visual inspection.

Spores survive normal cooking and germinate during long, slow cooling. The vegetative bacteria released will then start multiplying and may produce toxins.

Temperatures in excess of 100°C for long periods (as much as five hours) are often required to destroy spores. The temperature used to ensure the safety of low-acid canned food, by destroying spores of Clostridium botulinum, is the equivalent of 121°C for three minutes.

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Temperature

Bacteria have a maximum and minimum temperature for Logarithmic multiplication as well as an optimum temperature when multiplication is the most rapid. Most food poisoning bacteria grow best at around 37°C (body temperature), although Clostridium Perfringens prefers 46°C.

The common food poisoning bacteria will not multiply below 5°C or above 52°C. However, many can survive outside this temperature range and start multiplying again when temperatures are suitable.

The range of temperature which is likely to encourage the fastest multiplication, is between 20°C and 50°C.

Some pathogens will grow between 0°C and 20°C, but they multiply more slowly at the lower temperatures.

The lowest recorded temperature for the growth of pathogenic bacteria is -2°C and although pathogens can survive freezing they do not multiply.

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Temperature

Some food spoilage bacteria continue to multiply slowly under refrigeration, which is one of the reasons for food becoming unfit if stored longer than the recommended shelf life.

Psychrophiles are bacteria which prefer temperatures below 20°C.

Mesophiles prefer temperatures of 20°C to 50°C. This group includes the common food poisoning bacteria.

Thermophiles multiply most rapidly above 45°C.

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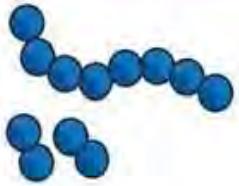
Bacteria - Size, Shape & Structure

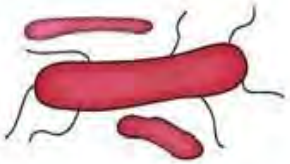
Bacteria vary considerably in shape:

Cocci are spherical



Spirochaetes are spiral shaped

Rods are sausage shaped



Vibrios are comma shaped

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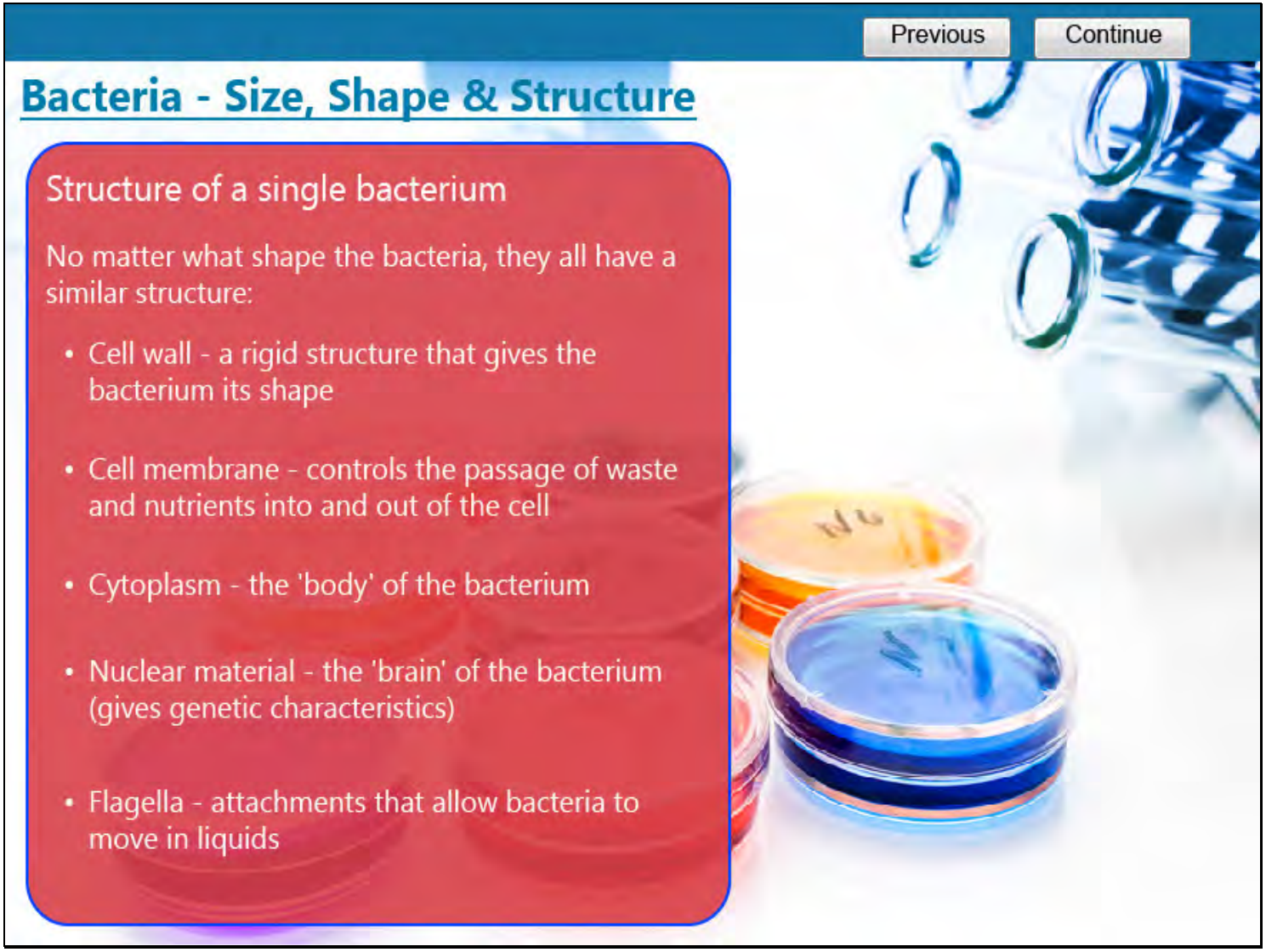

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Bacteria - Size, Shape & Structure

Although some bacteria can use flagella to swim around in liquids, most bacteria rely on other objects to move them about.

For example, moving from one food to another via a table top, a piece of equipment (e.g. a knife or spoon) or the hands of the food handler.

As food poisoning bacteria are commonly found on raw food and people, it is impracticable to operate a food business without food poisoning bacteria being present at one time or another.

It is therefore essential to deny them the conditions which would allow them to multiply to a level where they present a risk to customers.

Large numbers of bacteria usually need to be present in food to cause food poisoning, so they must be prevented from multiplying wherever possible.

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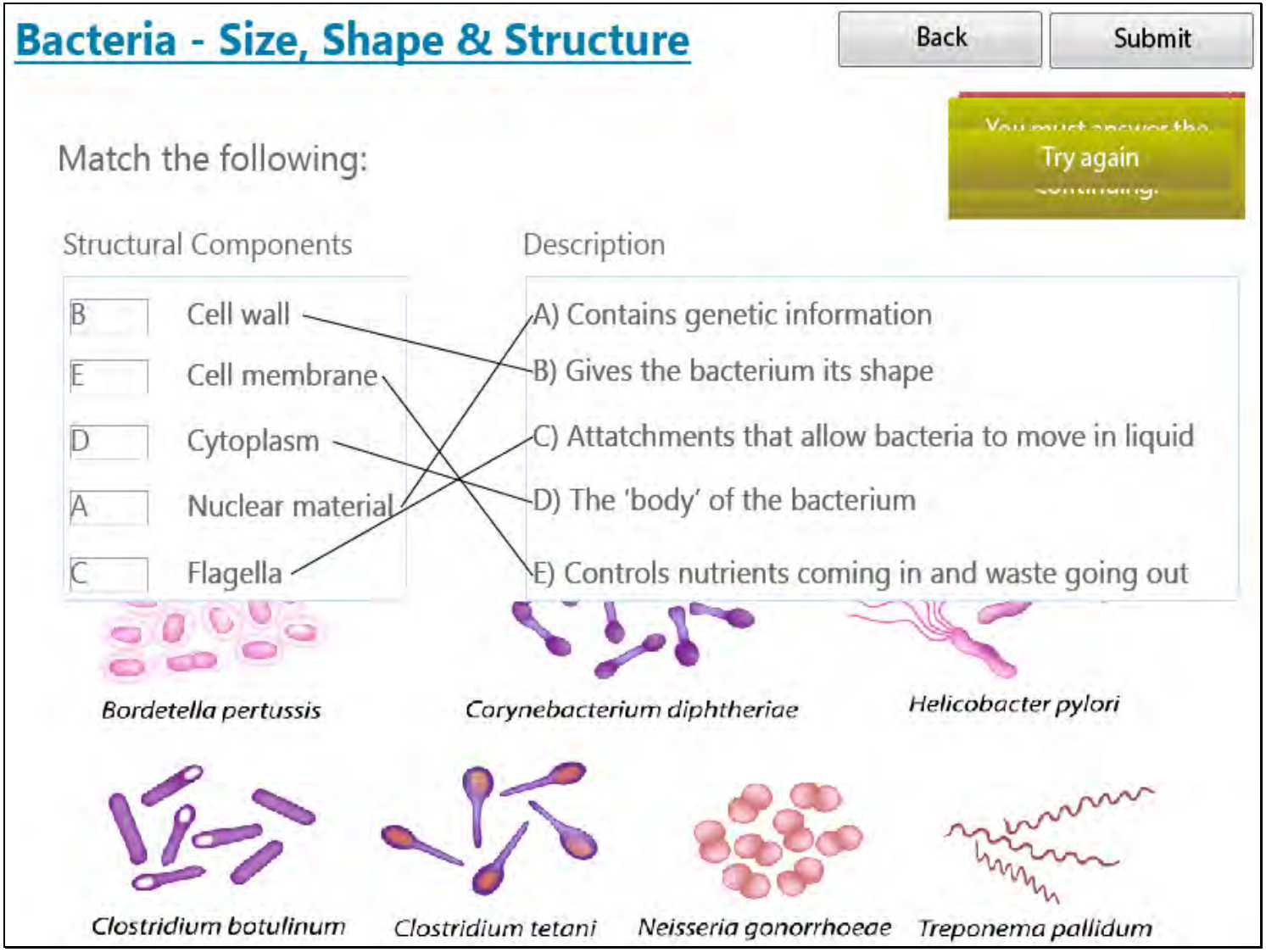

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Toxin Production

Food poisoning bacteria produce toxins (poisons) which cannot be detected by visual inspection.

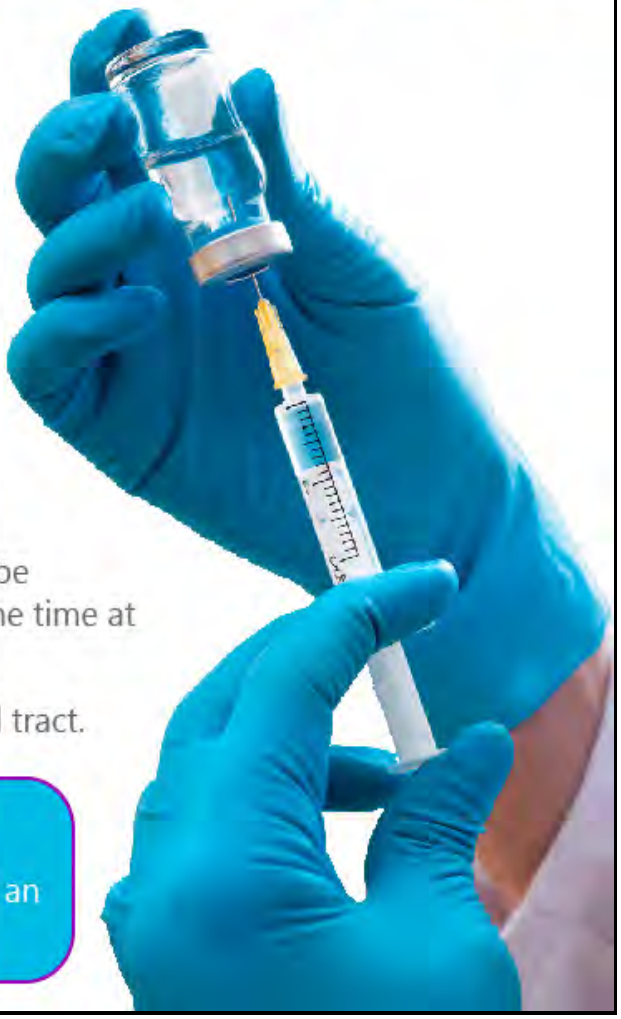
Toxins may be either **exotoxins** or **endotoxins**.

Exotoxins are produced during multiplication or sporulation of bacteria. Quite often these exotoxins are released into the food.

Many exotoxins are heat resistant, meaning that even if cooking destroys the bacteria, the toxin may remain and cause illness if the food is eaten.

This results in a short onset time. Usually, toxins will not be produced if food is kept below 5°C or above 63°C, and the time at ambient temperature is kept short.

Enterotoxins are exotoxins that affect the gastrointestinal tract.



Tetanus is a disease caused by an Exotoxin.

Ever cut yourself or stepped on a nail and had to have an injection? That was to prevent Tetanus.

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Toxin Production

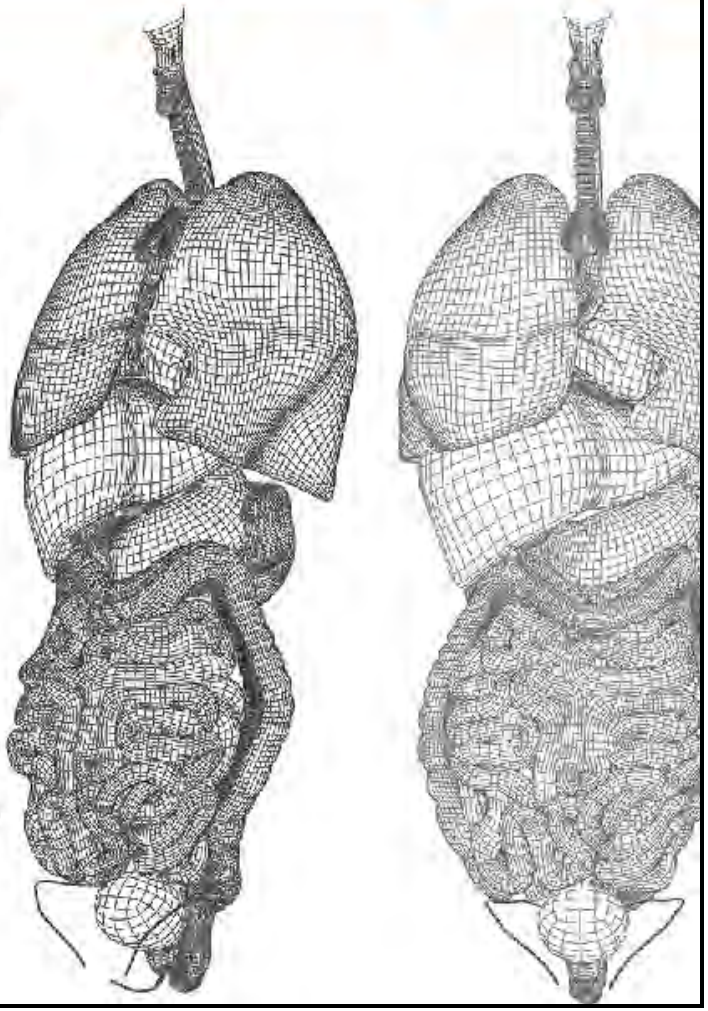
Endotoxins form part of the bacterial cell wall and are released on the death of the bacteria.

This usually occurs in the intestines of person who has consumed the contaminated food.

If the toxin is produced in the intestine, the onset period for the first symptoms to appear will usually be longer than if the toxin is in the food.

Endotoxins cause a range of symptoms including:

- Fever
- Body aches
- Weakness
- Damage to the vessels of the circulatory system



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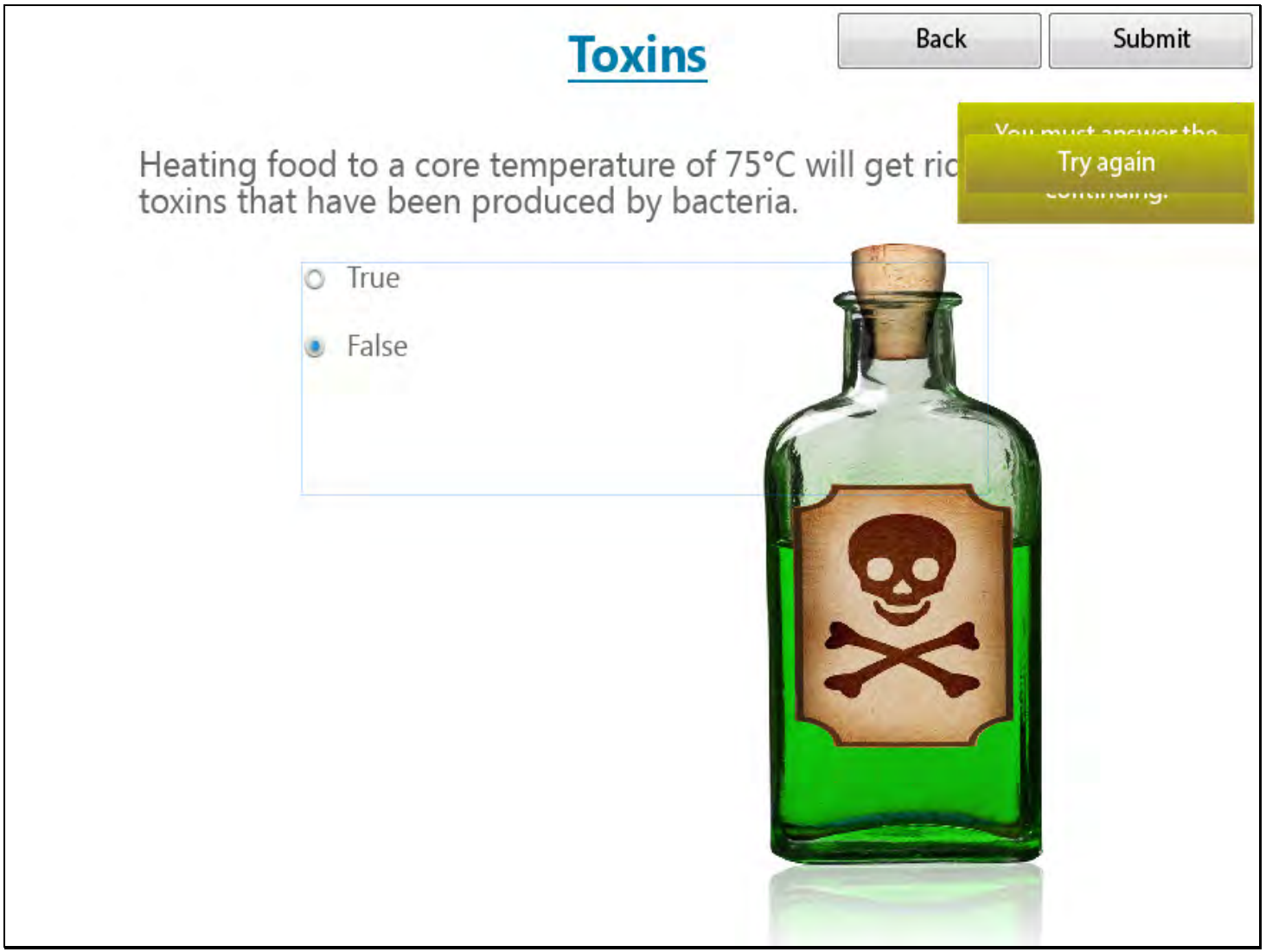

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Viruses

Viruses are even smaller than bacteria and can only be seen under a very powerful electron microscope.

They multiply in living cells, not in food. Some viruses cause illness, including viral gastroenteritis and hepatitis A.

A virus isn't a cell and doesn't have any cellular parts.

A virus has no internal cellular structure, no cell wall, or cell membrane. They are only a protein coat that holds a coiled string of nucleic acid.

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Virus Reproduction

Viruses and bacteria multiply in very different ways. As previously discussed, bacteria use a process called binary fission. Viruses do not grow through cell division because they are acellular (meaning "no cells"), so they use a very different method of multiplying.

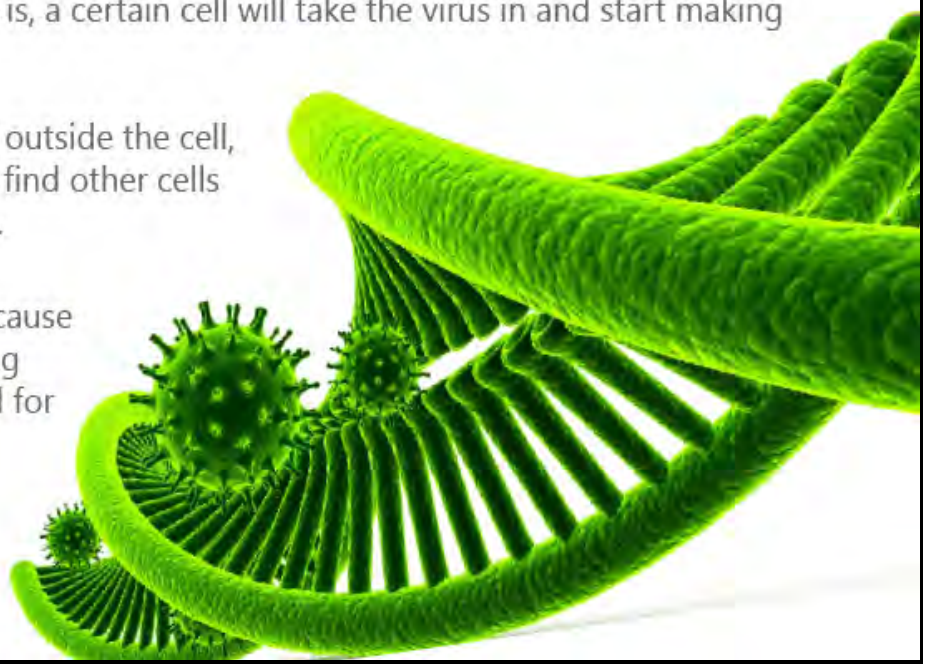
Viruses rely on other cells to multiply.

Depending on what shape the virus is, a certain cell will take the virus in and start making copies of the virus.

When the viruses are ready to "live" outside the cell, they will break through the cell and find other cells to repeat the multiplication process.

Viruses are considered parasites because they cannot "survive" without a living cell. Viruses don't do anything good for the organism host.

Viruses only have one purpose or goal: To multiply.



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Bacteria vs Virus

A disease caused by bacteria and a disease caused by a virus are two very different things.

In order to get rid of an infectious disease, one must take antibiotics to kill off the bacteria and to cure the infectious disease.

However, you cannot cure a disease caused by a virus. There really isn't any medicine you can take to get rid of a virus without damaging the host cells also.

You can take medicine to make the symptoms of a disease caused by a virus more bearable, like cough medicine for example. Cough medicine doesn't make the virus go away, it only relieves the symptoms.

To make a virus go away, you have to rely on your immune system to fight off the virus. You can also get vaccinations to help prevent yourself from suffering the affects of a virus, for example, flu virus injections.

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Yeasts

Yeasts are microscopic fungi which reproduce by budding. Most yeasts grow best in the presence of oxygen, although fermentative types may grow slowly anaerobically.

The majority of yeasts prefer acid foods (pH 4 to 4.5) with a reasonable level of available moisture. However, many yeasts will grow in high concentrations of sugar and salt. The optimum growth temperature for yeast is around 25°C to 30°C with a maximum of around 47°C. Some yeasts can grow slowly at 0°C and below.

Yeasts are used in the manufacture of foods such as bread, beer and vinegar. However, they cause spoilage of many foods including jam, fruit juice, honey, meats and wines.

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Mould

If mould is found on food, dispose of the entire contents (unless it is supposed to be there, as on some cheeses).

Since it is not possible to know how far the mould has penetrated, the whole thing should be thrown out when even a very small amount of mould is found.

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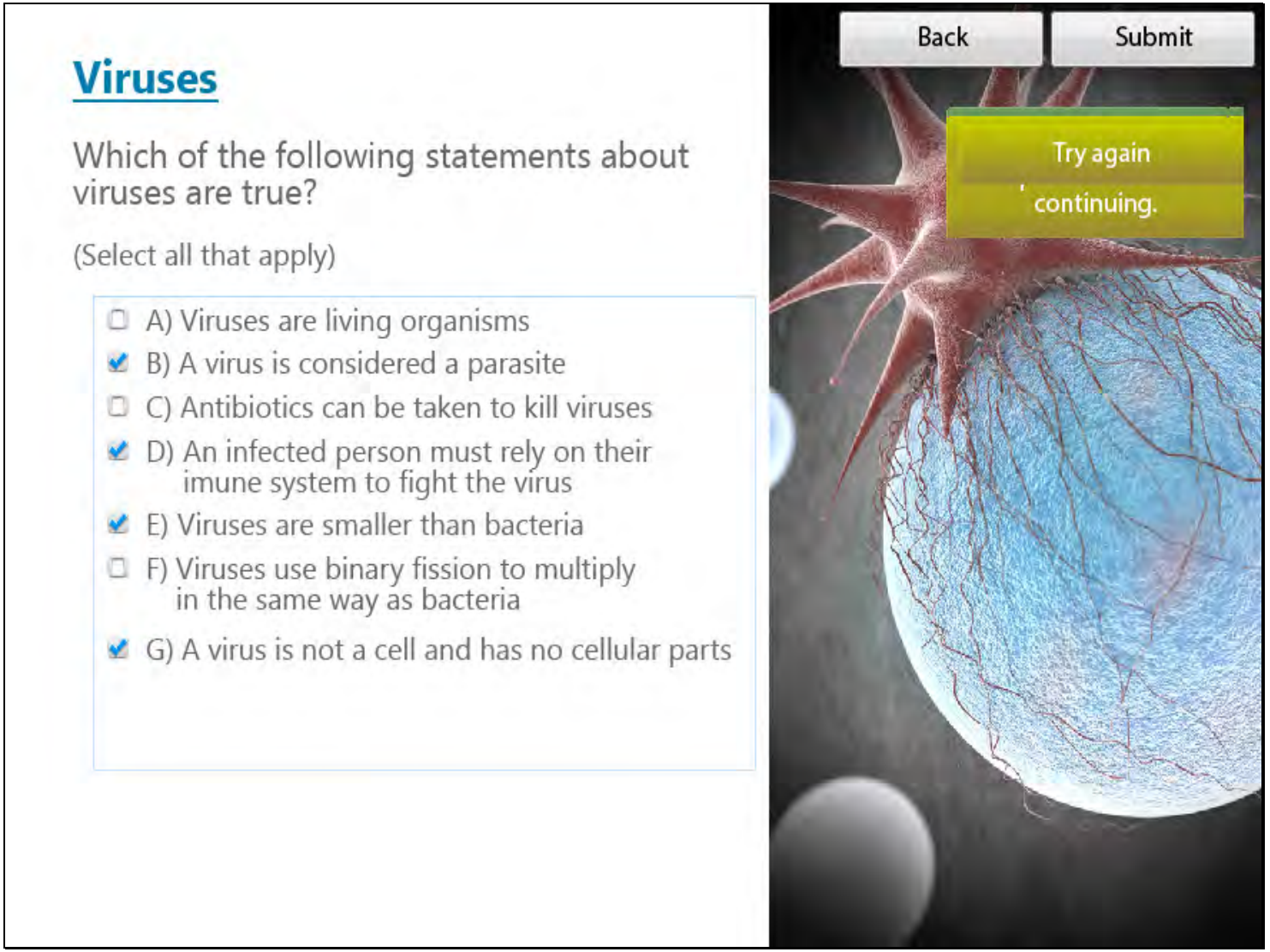

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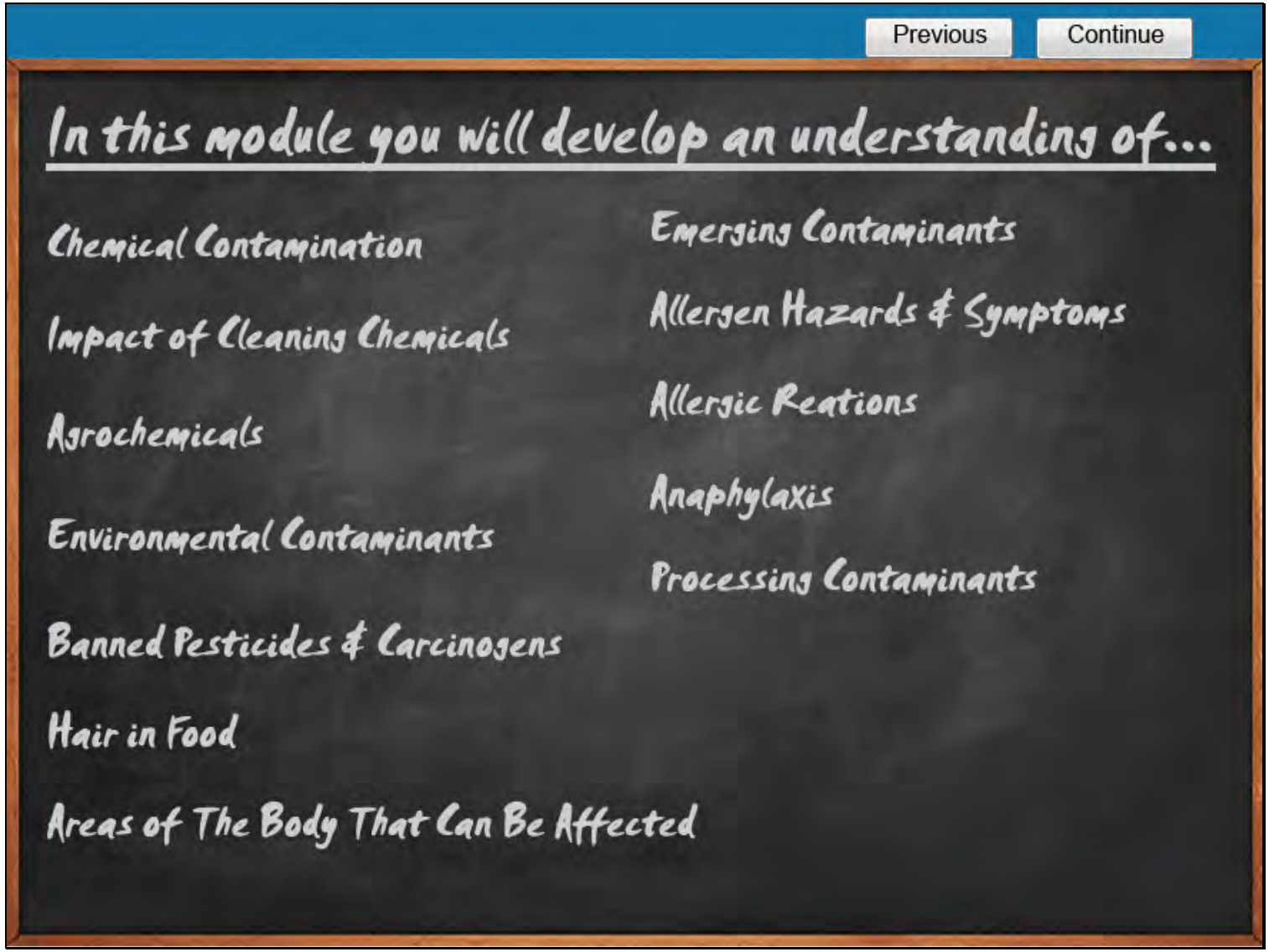

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Chemical Contamination

Food contamination refers to the presence in food of harmful chemicals and microorganisms which can cause consumer illness.

Chemicals may cause acute poisoning or cause long-term illnesses such as cancer.

Genetically modified food is a separate issue, as is the presence of ingredients from genetically modified organisms in foods, but both are also referred to as forms of food contamination.

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Chemical Contamination

Unwanted chemicals can enter foodstuffs at any stage of production including:

Growth

For example, veterinary drugs, fertilizers, pesticides and environmental contaminants such as lead or dioxins.

Processing or Food Preparation

For example, oil, cleaning chemicals or insecticides.

Transport

For example, as a result of spillage or leakage during transportation.

Display or Sale

For example, cleaning chemicals, insecticides and leaking of such things as plasticisers from packaging.

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Cleaning Chemicals

To avoid taint, some cleaning chemicals, such as phenols and perfumed soap, must not be used in food premises.

This is especially important for those handling dairy products or fatty foods.

All cleaning materials must be kept in properly labelled containers and stored in a manner which prevents any risk of contamination.

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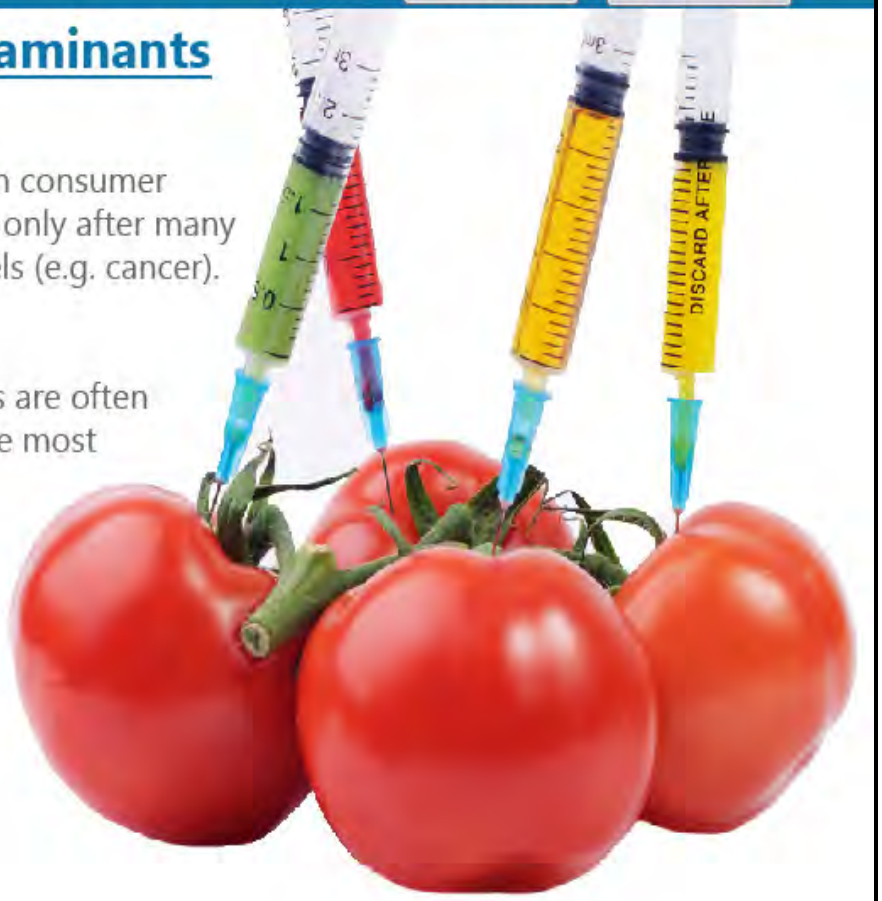
Impact of Chemical Contaminants

The impact of chemical contaminants on consumer health and well-being is often apparent only after many years of prolonged exposure at low levels (e.g. cancer).

Chemical contaminants present in foods are often unaffected by thermal processing (unlike most microbiological agents).

Chemical contaminants can be classified according to the source of contamination and the mechanism by which they enter the food product.



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Agrochemicals

Agrochemicals are chemicals used in agricultural practices and animal husbandry with the intent to increase crops and reduce costs.

Such agents include:

- Pesticides (e.g. insecticides, herbicides, rodenticides)
- Plant growth regulators
- Veterinary drugs (e.g. nitrofuran, fluoroquinolones, malachite green, chloramphenicol)
- Bovine somatotropin (rBST)

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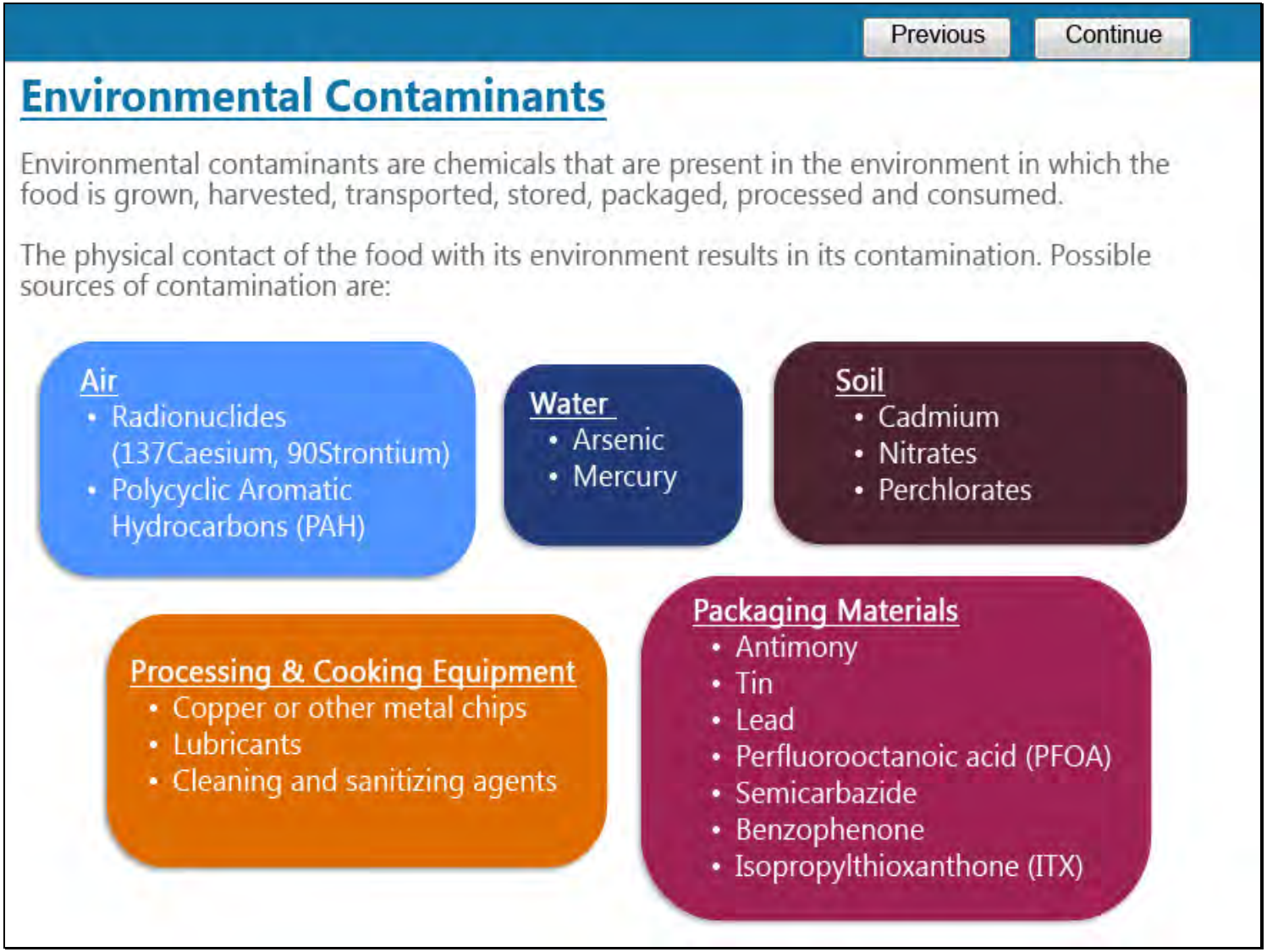

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Environmental Contaminants

Naturally Occurring Toxins

There are many types of naturally occurring toxins.
Some examples are:

- Mycotoxins
- Phytohaemagglutinin
- Pyrrolizidine alkaloids
- Grayanotoxin
- Mushroom toxins
- Scombrotoxin (histamine)
- Ciguatera
- Shellfish toxins (see shellfish poisoning)
- Tetrodotoxin

Polychlorinated biphenyls (PCB)

Dioxins, and polybrominated diphenyl ethers (PBDE), are ubiquitous chemicals which are present in air, water, soil and the entire biosphere.

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Banned Pesticides & Carcinogens

There are many cases of banned pesticides or carcinogens found in foods.

Greenpeace exposed in 2006, that in China, 25% of surveyed supermarket's agricultural products contained banned pesticides.

Over 70% of tomatoes that tested were found to have the banned pesticide Lindane, and almost 40% of the samples had a mix of three or more types of pesticides.

Fruits were also tested in this investigation. Samples of tangerines, strawberries and Kyofung grapes were found to be contaminated with banned pesticides, including the highly toxic Methamidophos.

These fruits can also be found in markets in Hong Kong, but Greenpeace says that there is no existing comprehensive monitoring on fruit produce in Hong Kong as of 2006.

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Banned Pesticides & Carcinogens

In India, soft drinks were found to be contaminated with high levels of pesticides and insecticides, including lindane, DDT, malathion and chlorpyrifos.

In July 2008, even Quality Assurance International (a USDA certified organization), had mistakenly certified as organic, powdered ginger produced in China. However, tests showed was contaminated with the banned pesticide Aldicarb.

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Hair in Food

Hair in food is a physical contaminant, and is particularly unpleasant.

However, there are certain risks to be considered from **chemical contaminants** on the hair itself.

Chemicals such as hairspray, waxes or other hair products may cause problems.

Hair in food was often a common cause of complaint from people eating food, before the introduction of complete capture hairnets.

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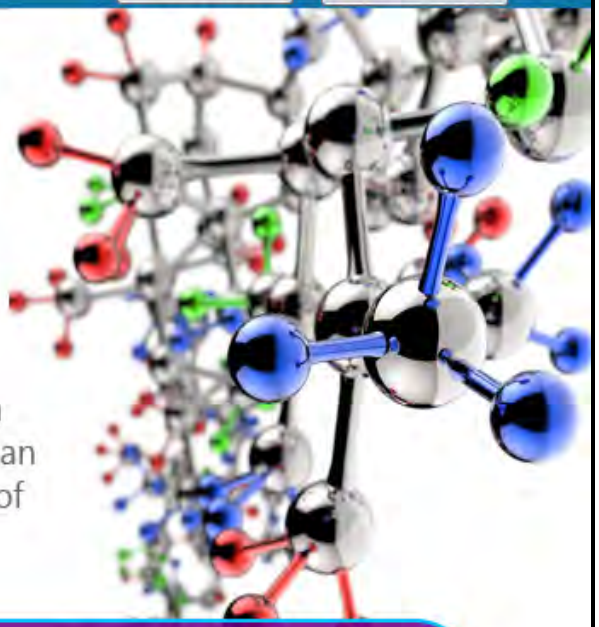
Processing Contaminants

Processing contaminants are generated during the processing of foods (e.g. heating, fermentation). They are absent in the raw materials, and are formed by chemical reactions between natural and/or added food constituents during processing.



The presence of these contaminants in processed foods can not be entirely avoided. However, technological processes can be adjusted and/or optimized in order to reduce the levels of formation of processing contaminants.

Examples are:

- Nitrosamines
- Polycyclic aromatic hydrocarbons (PAH)
- Heterocyclic amines
- Histamine
- Acrylamide
- Furan
- Benzene
- Trans fats
- Monochloropropanediol (MCPD)
- Semicarbazide
- 4-hydroxynonenal (4-HNE)
- Ethyl carbamate

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Emerging Food Contaminants

While many food contaminants have been known for decades, the formation and presence of certain chemicals in foods has been discovered relatively recently.

These are the so-called emerging food contaminants.

There are many such contaminants, some examples are:

- Acrylamide
- Furan
- Benzene
- Perchlorate
- Perfluorooctanoic acid (PFOA)

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Allergen Hazards

Food allergies are an increasing problem for the food industry, including caterers.

Food allergens cause the body's immune system to react, often within minutes, but sometimes it can take a few hours.

In serious cases a person may have anaphylactic shock, which is life threatening. Even minute amounts of the allergen can result in serious problems. Peanut and other nut allergies are often very severe.

The first exposure to a specific allergen does not always produce symptoms; however, subsequent exposure will result in an allergic response.

Food intolerances are usually less severe and do not involve the immune system. They may be due to a lack of enzymes or a response to an irritant.

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Typical Allergen Hazards

Foods which commonly contain allergens include:

Peanuts

Also called groundnuts, peanuts are found in many foods, including sauces, cakes and desserts. As well as being used whole, they can be processed to make flour and oil, and are regularly used in Indonesian, Thai, Indian and Bangladeshi dishes.

Nuts

These include walnuts, hazelnuts, brazil nuts, cashews, pecans, pistachios, macadamias (Queensland nuts) and almonds. Nuts are commonly found in sauces, desserts, crackers, bread, ice cream, oils, and marzipan.

Milk

This includes lactose in liquid or powder form, and dairy products such as yoghurt, cream, cheese, butter and other milk products. Ready-made or glazed dishes may contain milk powder.

Eggs

Most commonly found in mayonnaise, cakes, mousses, pasta, sauces and quiche. Eggs are sometimes used to bind meat in burgers, or to provide a glaze.

Fish

For example, anchovies used in salad dressings, sauces, relishes and on pizzas.

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Typical Allergen Hazards

Shellfish

For example oysters, prawns, scampi, mussels, lobster and crab. Products containing shellfish, such as shrimp paste and oyster sauce, are commonly found in Chinese, Thai and other Asian dishes.

Soya

Soy is a versatile product and may be found in many forms. Examples include tofu, bean curd, soya flour, soy milk, soy sauce, soy beans, and textured soya protein. Soy is also found in ice cream, sauces, desserts, meat products and vegetarian products, e.g. veggie burgers.

Gluten

Coeliacs need to avoid cereals containing gluten, such as wheat, rye, barley, oats, spelt and kamut, and any foods made from these. Bread, pasta, cakes, pastry, and meat products may contain gluten, as well as soups, stews, sauces, and dusted, battered or bread crumbed foods.

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Typical Allergen Hazards

Sesame Seeds

These are commonly used in bread and breadsticks. Sesame paste (tahini) is an ingredient used frequently in Greek, Turkish dishes, including hummus. Sesame seed oil used in cooking and salad dressings, and is common in Chinese, Japanese, Middle Eastern, Korean, and Southeast Asian cuisines.

Mustard

Apart from the familiar jars of mustard we see in supermarkets, mustard leaves, seeds, flowers and mustard oil are all ingredients that may cause an allergic reaction.

Celery & Celeriac

Celery sticks, root (celeriac), leaves and seeds are all commonly used in food. Celery salt is made using celery seeds, and is often used to flavour soups, stews, stocks, seasonings and drinks.

Other Allergens

Some fruits such as strawberries and kiwi fruit, and lupin flour can cause problems. Additionally, colourants, artificial flavourings and preservatives, such as sulphur dioxide and sulphites, all pose a risk to allergy sufferers.

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Symptoms

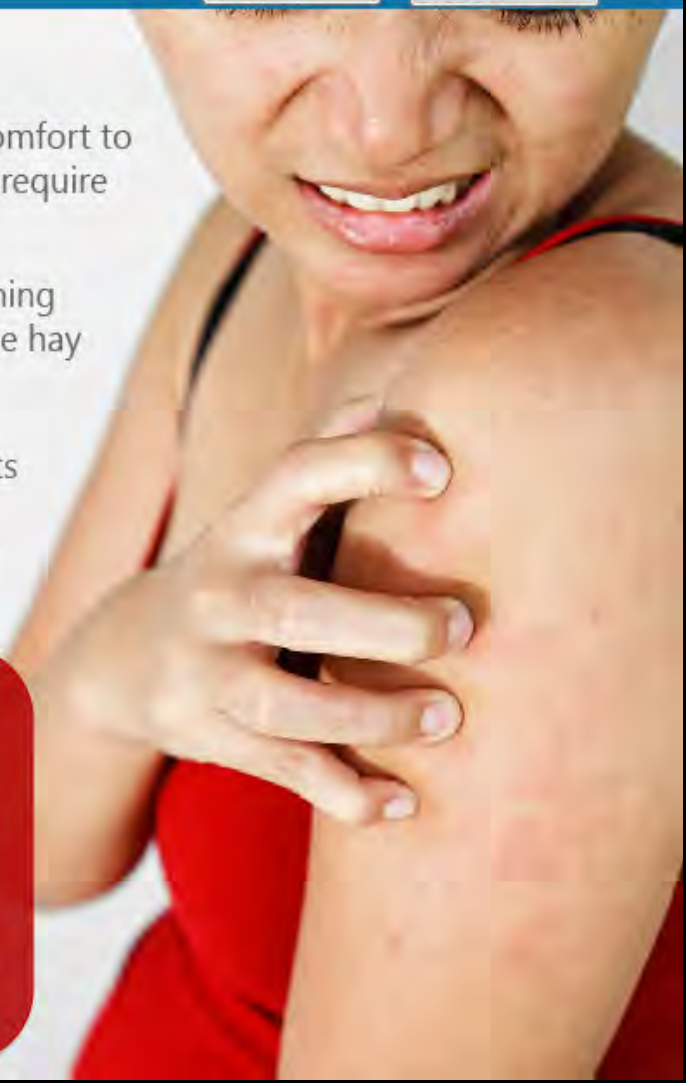
The symptoms of food allergies range from mild discomfort to severe, life-threatening reactions (anaphylaxis), which require immediate medical treatment.

The most frequent symptoms of food allergies are itching and/or swelling of the mouth. Other symptoms include hay fever, asthma, nettle rash, and stomach upset.

The symptoms arise every time the allergic person eats the offending food. However, if they are allergic to a food that is cross-reacting with pollen they may only experience symptoms in the pollen season.

Different kinds of food poisoning can provoke symptoms that are similar to the symptoms experienced in food allergy. Often the reaction is stronger the more poisoned food that the person has eaten.

In order to distinguish between a food allergy and poisoning the person with symptoms needs to see a doctor.



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Allergic Reactions

Allergic reactions to foods may occur within a few minutes after eating the offending food, but rarely symptoms may also develop after hours, making the relationship with ingestion of food less clear.

Symptoms generally disappear within hours but can last for days.

The specific symptoms and severity of an allergic reaction are affected by:

- Type and amount of the allergen consumed
- The form in which the food containing the allergen was eaten
- Intake of alcohol, aspirin and other drugs, such as beta-blockers and ACE inhibitors
- Exercise or stress
- Sensitivity of the allergic person

The symptoms may appear in different parts of the body, including mouth, eyes, nose, lungs, gastrointestinal tract and skin.

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Mouth

The most frequent symptoms of food allergies are itching and/or swelling of the mouth. Oral itching (known as Oral Allergy Syndrome) can be an initial symptom in any kind of food allergy.

However, oral itching is a well known symptom in food allergy induced by cross-reaction with pollen. It can happen with foods like apple, kiwi, hazelnuts, walnuts, celery, carrot, tomato, cherry, and melon.

Most of the allergens involved in pollen related cross-reacting foods will be destroyed in the gastrointestinal tract.

This explains why the symptoms are frequently mild and limited to the mouth. Most of the allergens in the cross-reactive foods will also be destroyed if the food is cooked.

This explains, for example, why many birch pollen allergic people cannot eat raw apples without experiencing symptoms, but stewed apples and apple juice might not be a problem.

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Areas of the Body that can be Affected

Eyes & Nose

The eyes and nose may show hay fever-like symptoms. The eyes may swell, itch, and become red. Sneezing and an itchy and runny (or stuffed) nose may be experienced.

Lungs

Asthmatic symptoms such as wheezing, breathlessness and coughing may arise from the lungs.

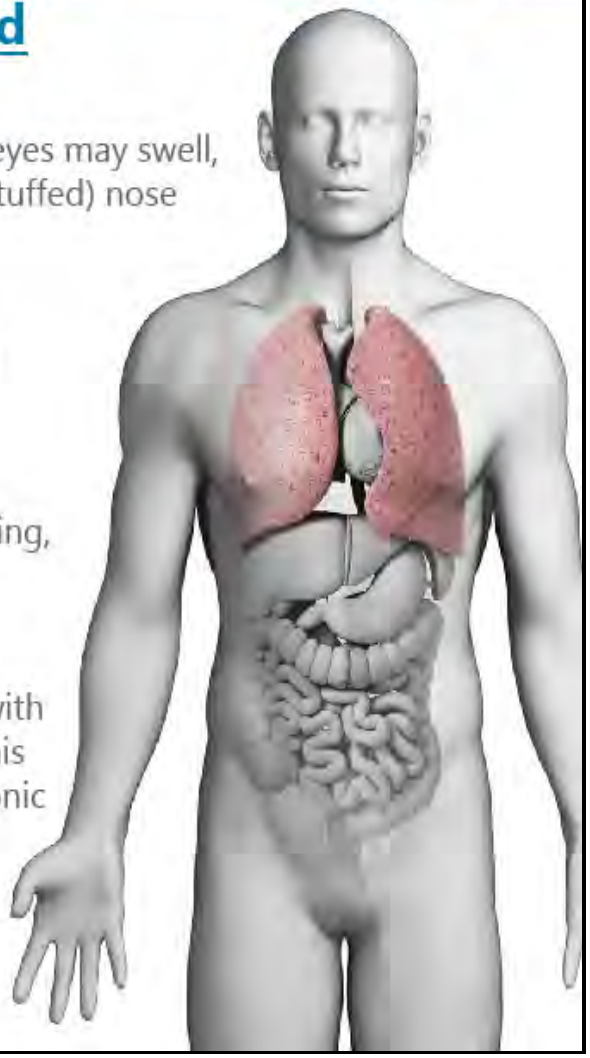
Gastrointestinal Tract

Symptoms from the gastrointestinal tract include pain, bloating, nausea, vomiting, and diarrhoea.

Skin

On the skin acute nettle rash (also called urticaria or hives) with itchy, well-defined white or pale red swellings can appear. This rash is generally short-lived, disappearing within hours. Chronic nettle rash is rarely associated with food allergy.

Longer lasting, chronic skin reactions in the form of atopic dermatitis are associated with food allergy, especially in children.



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Anaphylaxis

Anaphylaxis is an uncommon, acute, potentially life-threatening and sometimes fatal allergic reaction involving the whole body.

The skin itches. The affected person becomes unwell and dizzy, they feel their heart beating, they feel nauseous, and everything may go black.

At the same time they may get nettle rash, hay fever, and suffer an asthma attack. Their blood pressure may drop, and they may faint.

Untreated anaphylaxis can rapidly result in death.

In Europe and the US, peanut and tree nuts are the foods most commonly reported to cause life-threatening reactions. Prompt administration of adrenaline after eating suspected problem foods and transport to an Accident Emergency Department has helped minimise life-threatening episodes.

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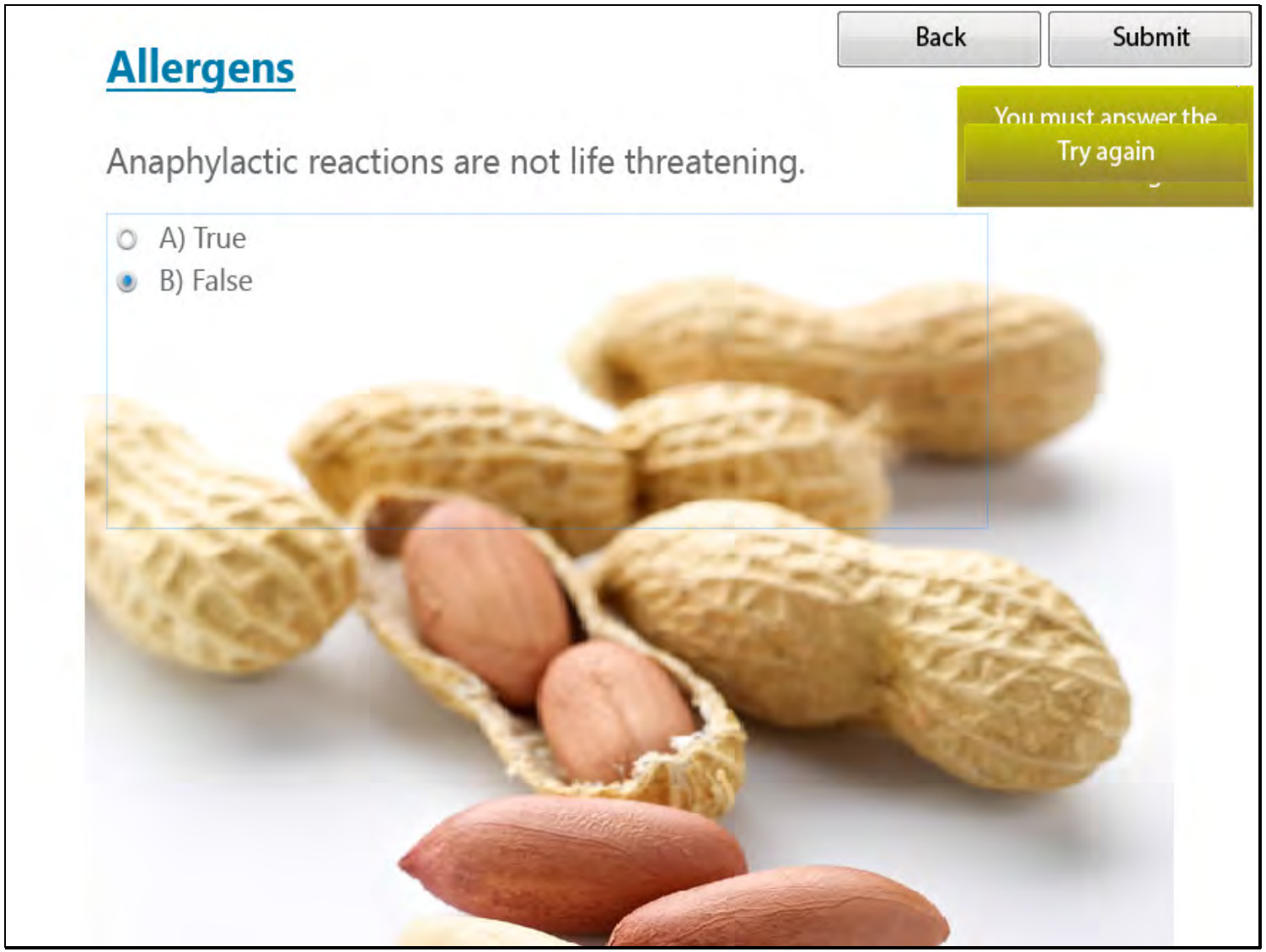

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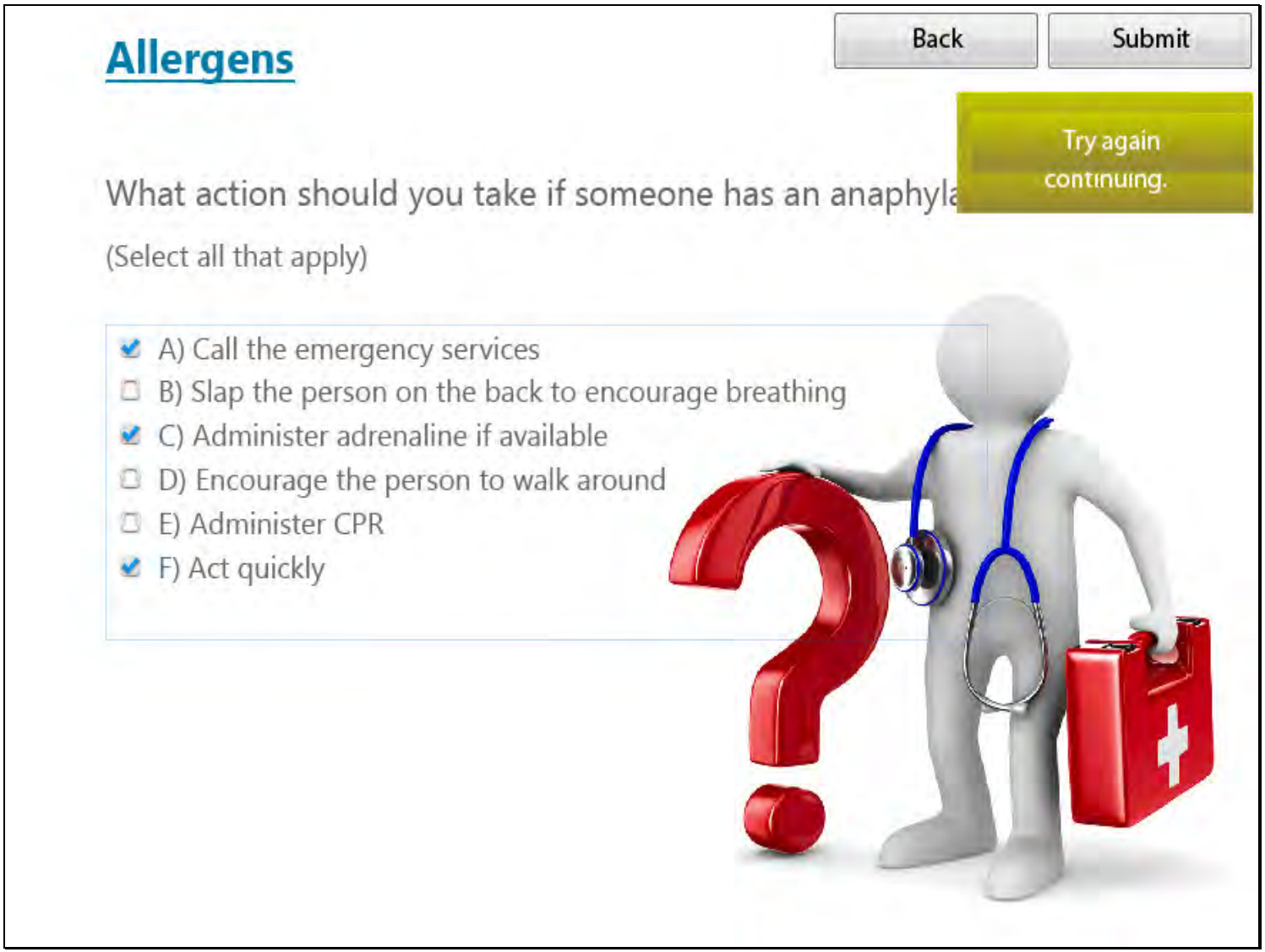

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Food Poisoning

Food poisoning is a common, usually mild, but sometimes deadly illness. Typical symptoms include nausea, vomiting, abdominal cramping, and diarrhoea, that occur suddenly (within 48 hours) after consuming a contaminated food or drink.

Depending on the contaminant, fever, chills, bloody stools, dehydration, and nervous system damage may follow.

These symptoms may affect one person or a group of people who have eaten the same thing (called an outbreak).

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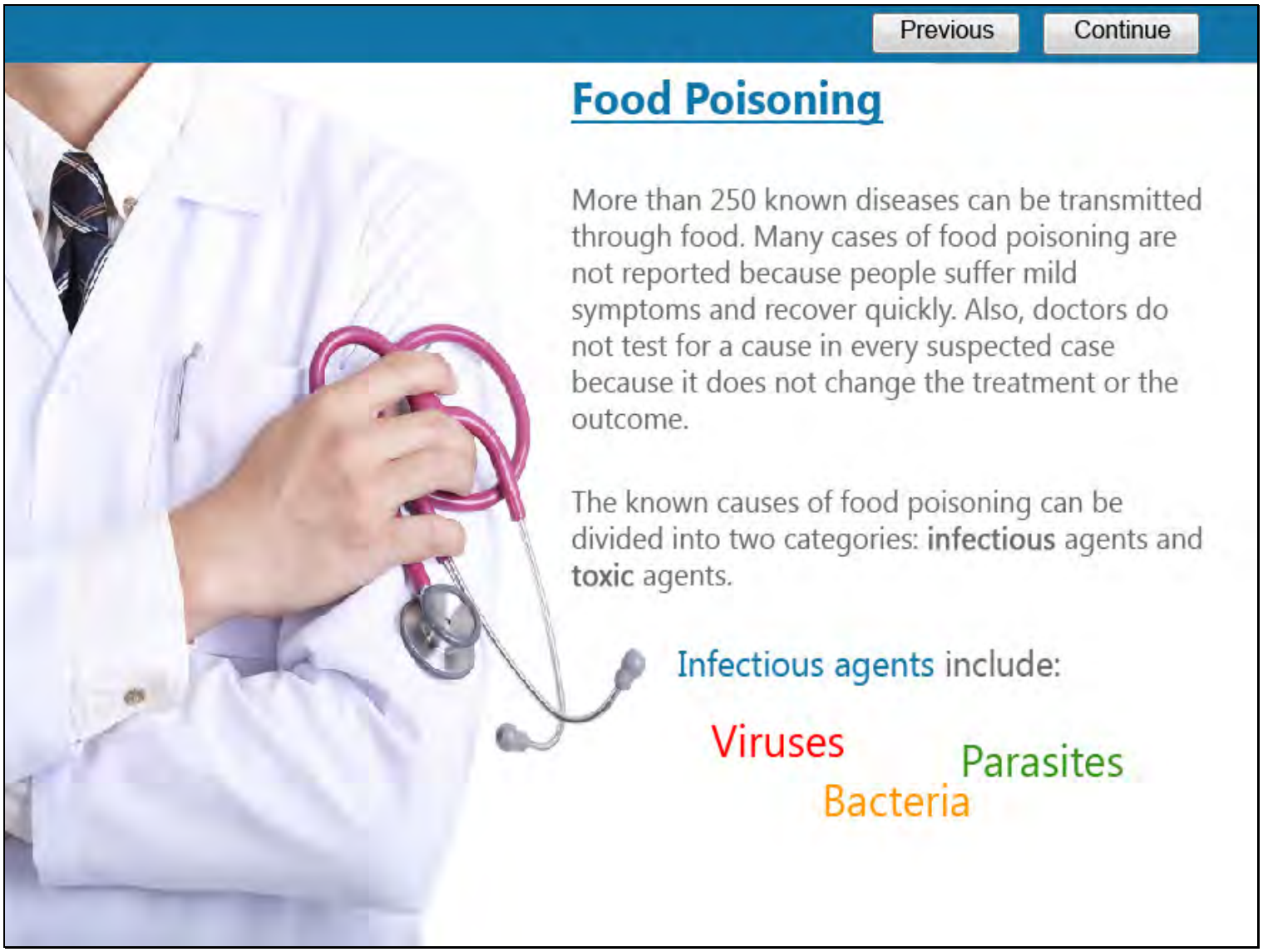

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Food Posioning

Toxic Agents

Toxic agents include poisonous mushrooms, improperly prepared exotic foods (such as barracuda), or pesticides on fruits and vegetables.

Food usually becomes contaminated from poor sanitation or preparation. Food handlers who do not wash their hands after using the bathroom or have infections themselves often cause contamination.

Improperly packaged food stored at the wrong temperature also promotes contamination.

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Food Posioning - Bacteria

Bacteria can cause food poisoning in two different ways:

1. Some bacteria infect the intestines, causing inflammation and difficulty absorbing nutrients and water, leading to diarrhoea.
2. Other bacteria produce chemicals in foods (known as toxins) that are poisonous to the human digestive system. When eaten, these chemicals can lead to nausea and vomiting, kidney failure, and even death.

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Viral Food Poisoning

Norovirus

Noroviruses are a group of viruses that cause a mild illness (often termed "stomach flu") with nausea, vomiting, diarrhoea, headache, abdominal pain, and low-grade fever. These symptoms usually resolve in two to three days.

It is the most common viral cause of adult food poisoning and is transmitted from water, shellfish, and vegetables contaminated by faeces, as well as from person to person.

Outbreaks are more common in densely populated areas such as nursing homes, schools and cruise ships (hence why the virus is also known as the "Cruise Ship Illness").

The term norovirus has been approved as the official name for this group of viruses. Several other names have been used for noroviruses, including Norwalk-like viruses, caliciviruses (because they belong to the virus family Caliciviridae), and small round structured viruses.

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Viral Food Poisoning

Rotavirus

This virus causes moderate to severe illness with vomiting followed by watery diarrhoea and fever.

It is the most common cause of food poisoning in infants and children and is transmitted from person to person by faecal contamination of food and shared play areas.

Hepatitis A

This virus causes mild illness with sudden onset of fever, loss of appetite, and feeling of tiredness followed by jaundice, which is a yellowing of the eyes and skin.

It is transmitted from person to person by faecal contamination of food.

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Water Poisoning

Parasites

Parasites rarely cause food poisoning. When they do, they are usually swallowed in contaminated or untreated water and cause long-lasting but usually mild symptoms.

Giardia (Beaver Fever)

Causes mild illness with watery diarrhoea often lasting one to two weeks. It is transmitted by drinking contaminated water, often from lakes or streams in cooler mountainous climates. The infection can also be spread from person to person by food or other items contaminated with faeces from an infected person.

Cryptosporidium

Causes moderate illness with large amounts of watery diarrhoea lasting two to four days. May become a long-lasting problem in people with poor immune systems (such as people with kidney disease or HIV/AIDS or those on chemotherapy for cancer). It is transmitted by contaminated drinking water.

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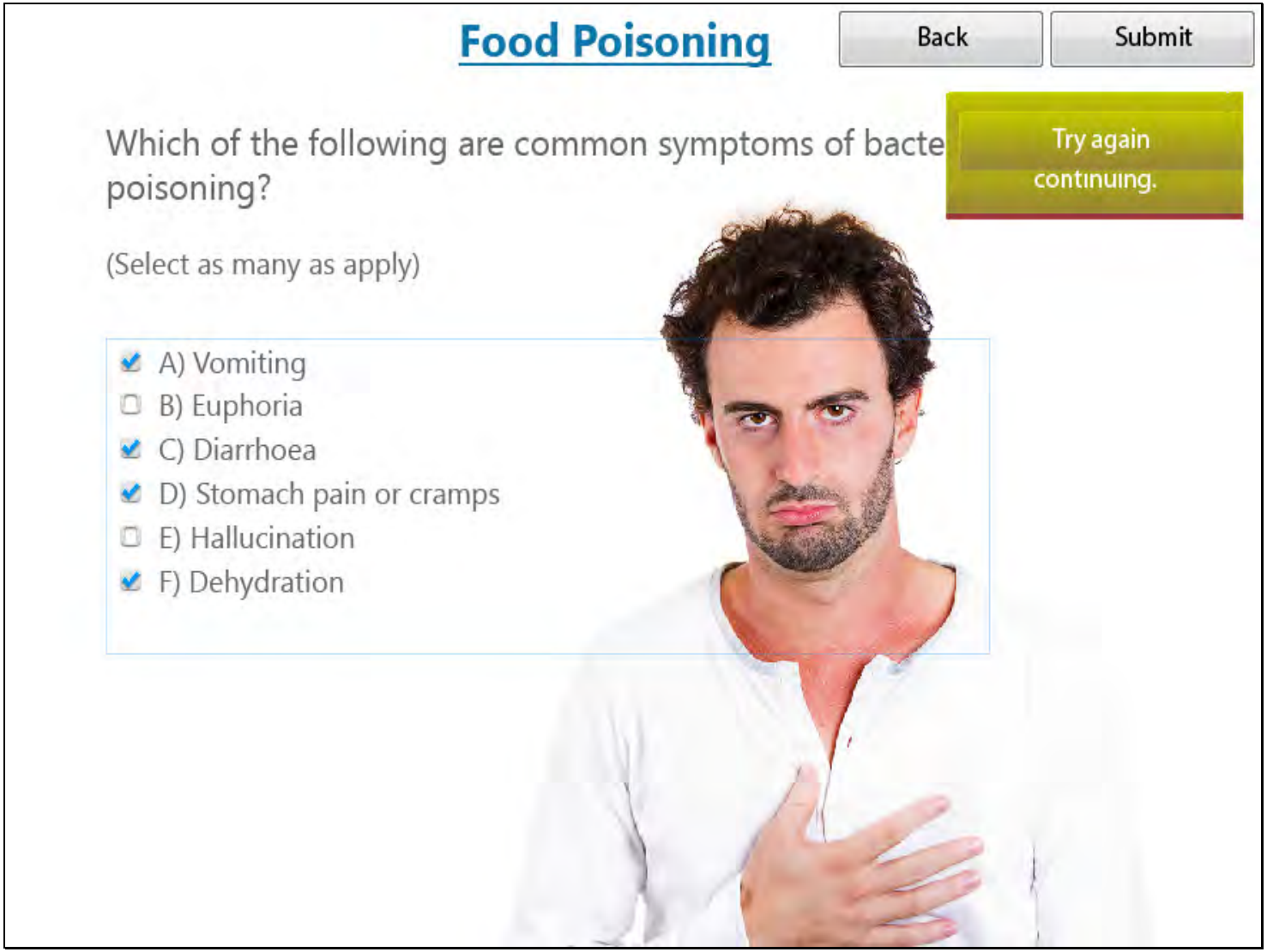

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Toxic Foods

Toxic agents are the least common cause of food poisoning.

Illness is often an isolated episode caused by poor food preparation or selection (such as picking wild mushrooms).

Mushroom Toxins

Illness can range from mild to deadly depending on the type of mushroom eaten.

Symptoms often include nausea, vomiting, and diarrhoea.

Some types of mushrooms produce a nerve toxin, which causes sweating, shaking, hallucinations, and coma.

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Food Posioning - Seafood

Ciguatera Poisoning

This type of food poisoning is caused by eating fish that contain toxins produced by a marine algae called Gambierdiscus toxicus.

It can cause severe illness with numbness of the area around the mouth and lips which can spread to the arms and legs, nausea, vomiting, muscle pain and weakness, headache, dizziness, and rapid heartbeat.

The toxin may cause sensory problems in which hot things feel cold and cold things feel hot. It is transmitted by eating certain large game fish from tropical waters-most specifically barracuda, grouper, snapper, and jacks.

According to the CDC (Centers for Disease Control and Prevention), ciguatera has no cure. Symptoms may disappear in days or weeks, but may persist for years.

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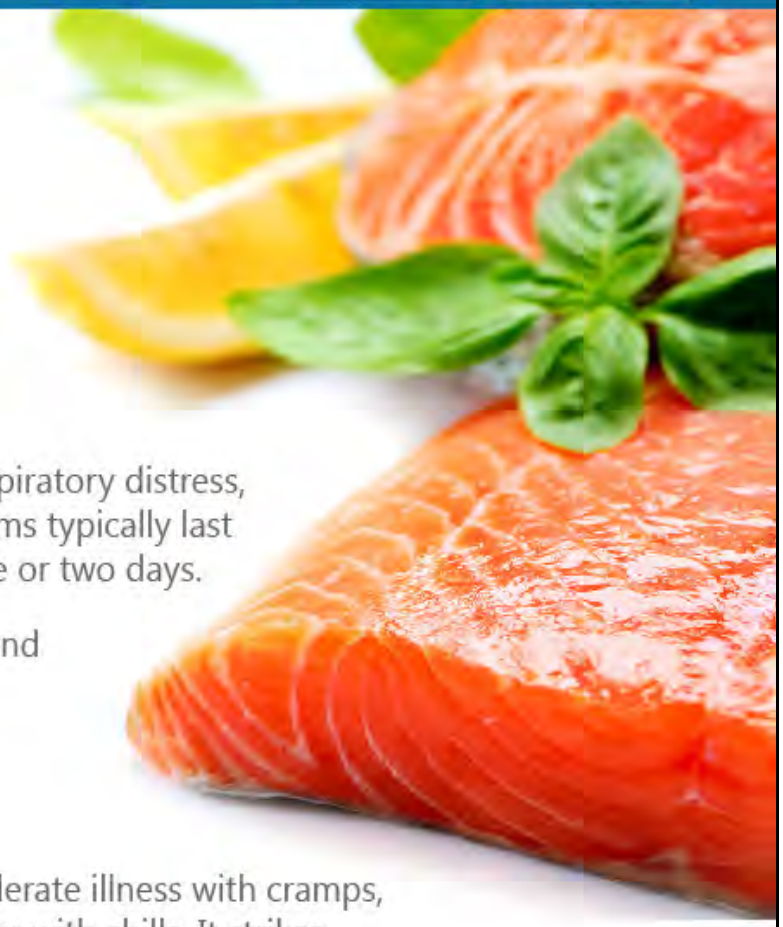
Food Posioning - Seafood



Scombroid

This type of food poisoning causes mild to moderate illness with facial flushing, burning around the mouth and lips, peppery taste sensations, a red rash on the upper body, dizziness, headache, and itchy skin.

Severe symptoms may include blurry vision, respiratory distress, and swelling of the tongue and mouth. Symptoms typically last from four to six hours, and rarely more than one or two days.

It is transmitted in seafood, mostly mahi-mahi and tuna, but can also be in Swiss cheese.

Vibrio Cholerae

This type of food poisoning causes mild to moderate illness with cramps, diarrhoea, headache, nausea, vomiting, and fever with chills. It strikes mostly in the warmer months of the year and is transmitted by infected, undercooked, or raw seafood.

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Food Posioning - Metals

Several metals are toxic, and if ingested in sufficient quantities can give rise to food poisoning.

The symptoms, mainly vomiting and abdominal pain, usually develop within an hour. Diarrhoea may also occur.

Metals may be absorbed by crops growing in contaminated soil, ingested by animals in polluted environments (typically fish or seafood), or food may become contaminated during processing.

Acidic foods, such as fruit, should not be cooked or stored in equipment containing:

- antimony (enamel coatings)
- cadmium (refrigeration apparatus)
- copper (pans)
- lead (ceramics, earthenware and lead crystal)
- zinc (galvanized metals)

Acidic foods may also cause problems if stored in tin-plated iron cans for too long. The acidic foods react with the tin-plate and hydrogen gas is produced. Iron and tin are absorbed by the food which may become unfit for human consumption.

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Posionous Plants

Poisonous plants are rarely the cause of food poisoning in food premises.

Plants responsible for causing acute poisoning include:

- Deadly nightshade
- Death cap mushroom (which may be mistaken for edible mushroom)
- Daffodil bulbs
- Rhubarb leaves
- Potato foliage, flowers, sprouts, peels and green-tinged areas on the potato contain glycoalkaloids, which are toxic to humans

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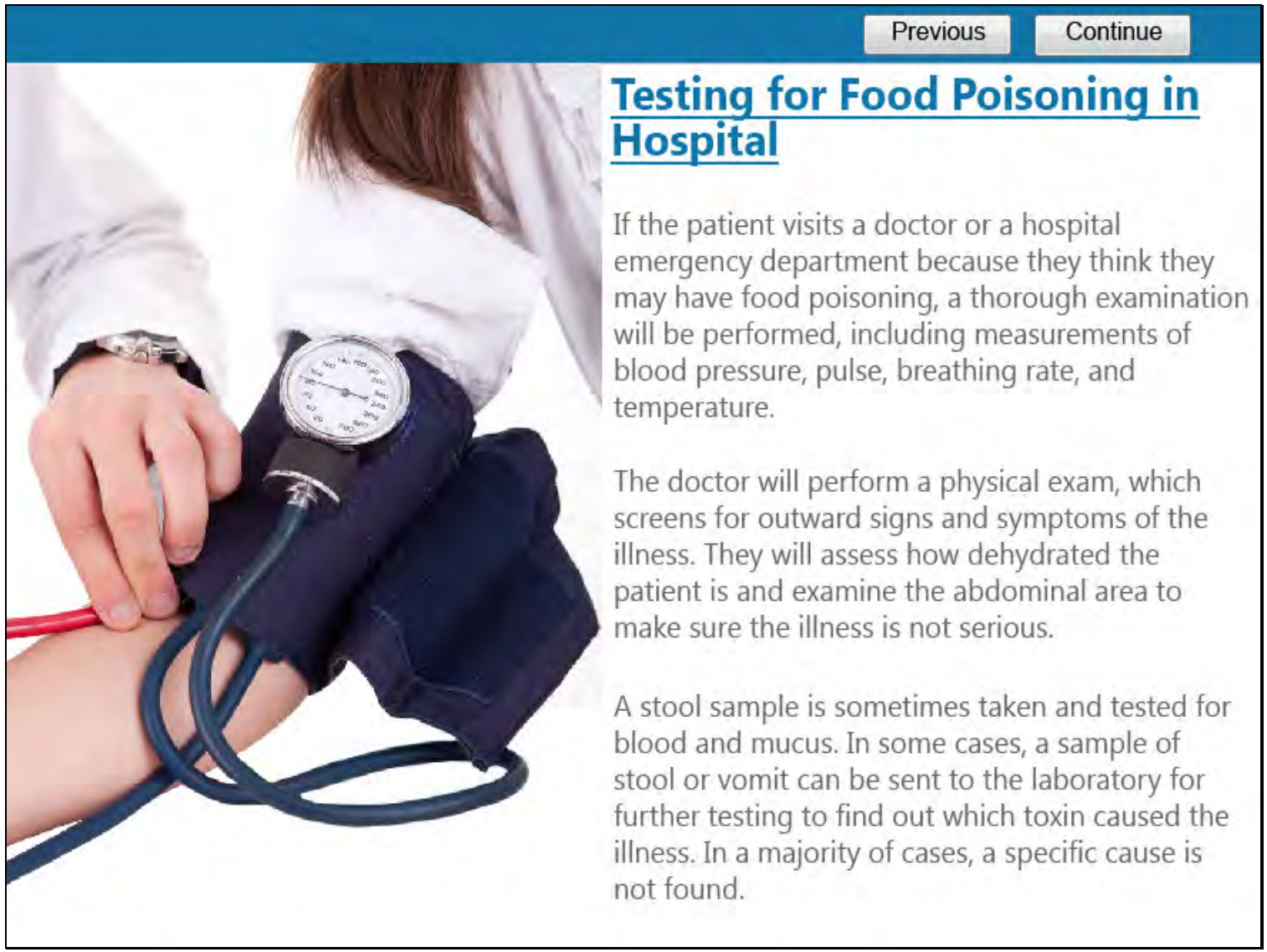

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Testing for Food Posioning in Hospital

A urine sample helps assess how dehydrated the patient is and may indicate possible kidney damage.

Blood tests may be performed to determine the seriousness of the illness.

An x-ray of the abdomen or a CT scan may be taken if the doctor suspects your symptoms may be caused by another illness.

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Self Care at Home

Short episodes of vomiting and small amounts of diarrhoea lasting less than 24 hours can usually be cared for at home.

Do not eat solid food while nauseous or vomiting but drink plenty of fluids.

Small, frequent sips of clear liquids (those you can see through) are the best way to stay hydrated, but avoid alcoholic, caffeinated, or sugary drinks.

Over-the-counter rehydration products made for children such as Pedialyte and Rehydralyte are expensive but good to use if available.

Sports drinks are fine for adults, but only if they are diluted with water. At full strength they contain too much sugar, which can worsen diarrhoea.

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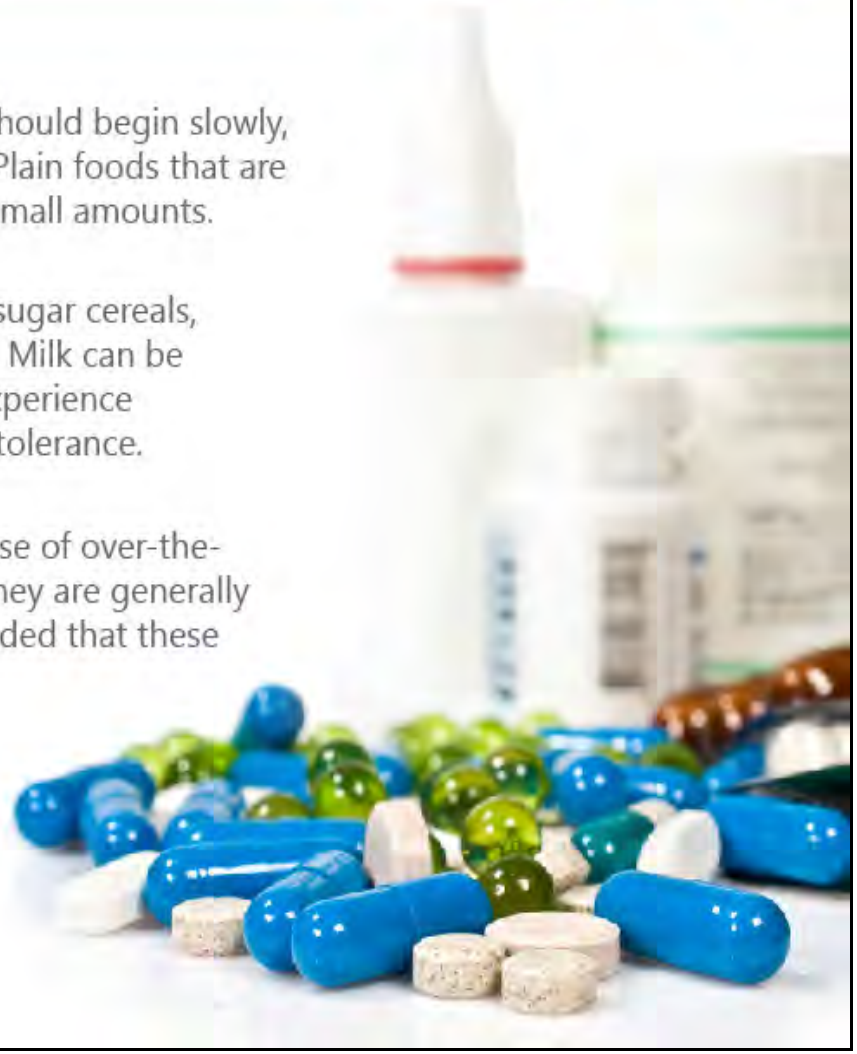
Medical Treatment

After successfully tolerating fluids, eating should begin slowly, when nausea and vomiting have stopped. Plain foods that are easy on the stomach should be started in small amounts.

Consider eating rice, bread, potatoes, low-sugar cereals, lean meats, and chicken (not fried) to start. Milk can be given safely, although some people may experience additional stomach upset due to lactose intolerance.

Most food poisonings do not require the use of over-the-counter medicines to stop diarrhoea, but they are generally safe if used as directed. It is not recommended that these medications be given to children.

If there is a question or concern, you should always check with a doctor.



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Medical Treatment

The main treatment for food poisoning is putting fluids back in the body (rehydration). This can be intravenous (IV) and/or by drinking fluids.

The patient may need to be admitted to the hospital. This depends on the severity of the dehydration, response to therapy, and ability to drink fluids without vomiting. Children, in particular, may need close observation.

Anti-vomiting and diarrhoea medications may be given. The doctor may also treat any fever to make the patient more comfortable.

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Medical Treatment

Antibiotics are rarely needed for food poisoning.

In some cases, antibiotics worsen the condition. Only a few specific causes of food poisoning are improved by using these medications.

The length of illness with traveller's diarrhoea (shigellae) can be decreased with antibiotics, but this specific illness usually runs its course and improves without treatment.

Toxin or chemical poisoning (e.g. poisonous mushrooms or foods contaminated with pesticides) may require aggressive treatment, including pumping the stomach (lavage) or giving medications as antidotes.

These poisonings are very serious and may require intensive care in the hospital.

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Treating Food Poisoning

Back | Submit

What can you do to treat your symptoms if you are suff
from food poisoning?

Try again
continuing.

(Select as many as apply)

- [x] A) Drink lots of fluids, taking small, frequent sips
- [ ] B) Eat lots of food
- [x] C) Use rehydration products
- [ ] D) Don't eat or drink anything if suffering from diarrhoea
- [ ] E) Make sure you have lots of sugar to keep your energy up
- [x] F) Rest

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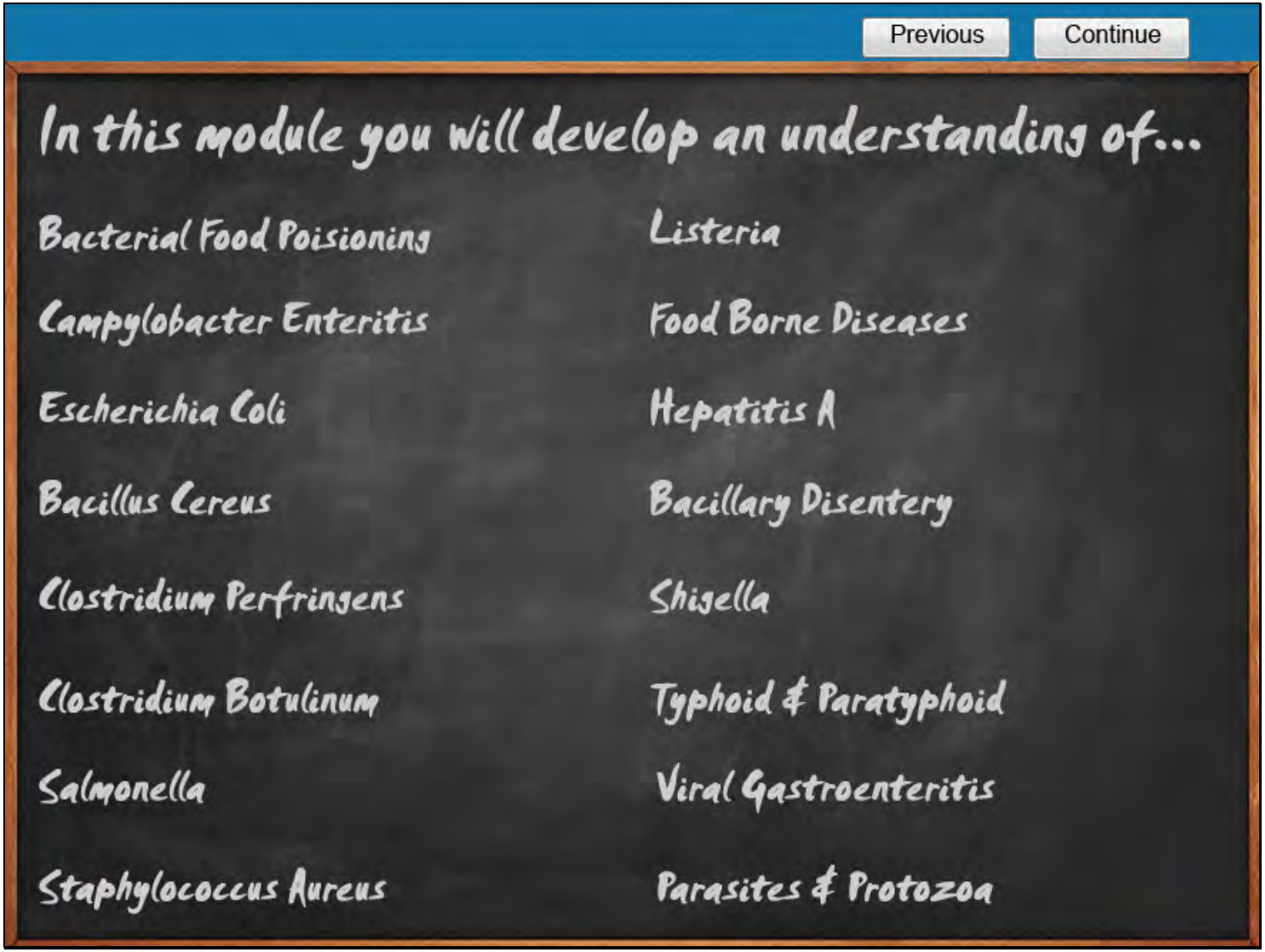

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Bacterial Food Posioning

Bacteria can cause food poisoning in two different ways:

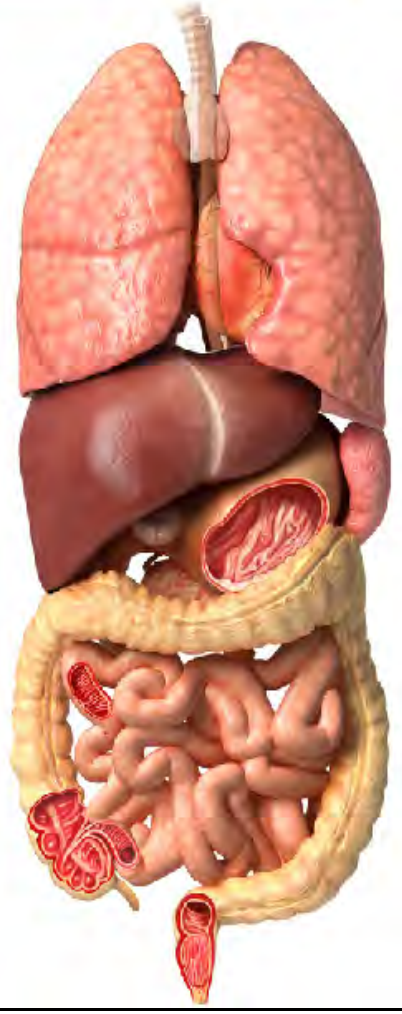
1. Infection

Some bacteria infect the intestines, causing inflammation and difficulty absorbing nutrients and water, leading to diarrhoea.

2. Toxins

Other bacteria produce chemicals in foods, known as toxins, that are poisonous to the human digestive system. When eaten, these chemicals can lead to nausea and vomiting, kidney failure and even death.

The onset time is usually 1 – 36 hours.



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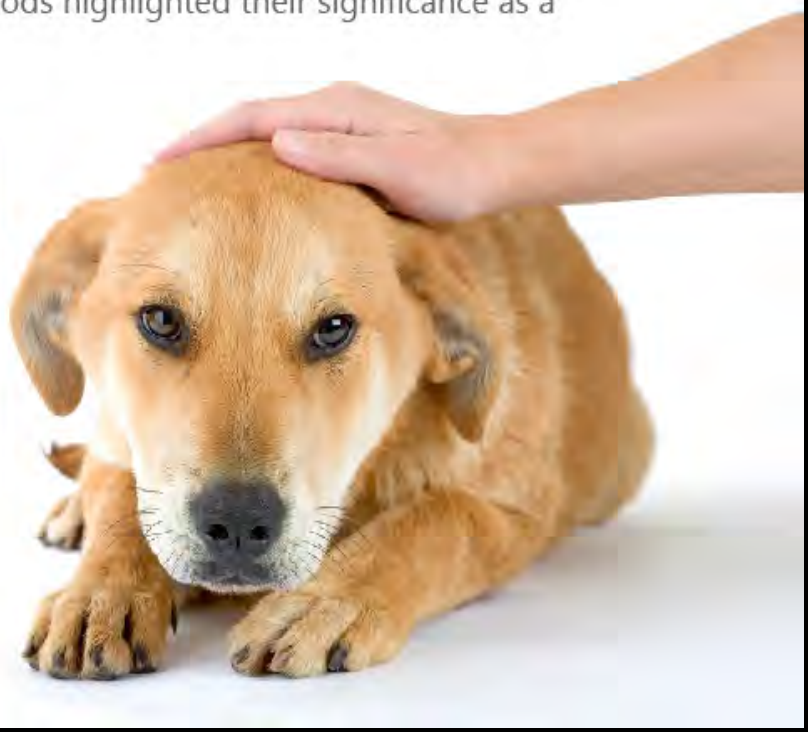
Campylobacter Enteritis

Campylobacter bacteria are now the most common cause of diarrhoea in the UK, with most cases being caused by the type C. jejuni.

Although these organisms were discovered many years ago, it was not until the late 1970s that better laboratory detection methods highlighted their significance as a cause of diarrhoea.

Campylobacter species do not grow in food and illness can be caused if food is contaminated by small numbers of the pathogen. Illness is not necessarily caused by eating contaminated food; it has also been related to drinking water and to contact with animals.



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Campylobacter Enteritis

Sources

These bacteria are found in animals, birds, untreated water and foods such as raw poultry, raw meat and unpasteurised milk.

Birds, especially magpies, have been found to contaminate milk by pecking through caps on bottles left on the doorstep.

Effects

Symptoms include:

- Very severe abdominal pain
- Diarrhoea
- Headaches
- Nausea

People are rarely sick, and this type of food poisoning may be confused with appendicitis because of the severe pain and fever.

Onset: 1 -10 days (usually 2-5 days)
Duration: 1-7 days

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Escherichia Coli

There are several types of E. coli.

Not all are harmful, but certain strains are pathogenic, usually causing symptoms of diarrhoea.

One type, E. coli O157, causes serious illness and even death, particularly in young children and older people. E. coli O157 was the causative agent of the well publicised food poisoning outbreak in Scotland in 1996, in which over 500 cases of illness and 20 deaths occurred.

Sources

E. coli O157 is found in the gut of farm animals and illness is associated with eating undercooked meat and unpasteurised dairy products and by contact with farm animals.

Since low numbers of this bacteria can cause illness, cross contamination from raw to cooked or ready to eat foods is important. It is apparent that illness can be caused by eating cooked meats which have been contaminated by raw meats.

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Bacillus Cereus

Bacillus cereus is a pathogen which can produce spores which survive normal cooking.

Two different types of food poisoning may be caused by Bacillus cereus but the most common in this country is the 'emetic type'. It produces a toxin in the food which appears to occur as the bacteria forms spores. The toxin is not easily destroyed by heat of normal cooking. Food poisoning cases are associated most commonly with rice and pasta dishes which have not been kept at the correct temperatures.

Sources

It is found in cereal products, dust and soil, but is most commonly associated with rice.

Effects

B. cereus bacteria may produce a toxin in the food which causes illness when ingested.

Symptoms: vomiting, stomach cramps and some diarrhoea.
Onset: 1 - 5 hours
Duration: usually no longer than 24 - 36 hours

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Clostridium Perfringens

Clostridium perfringens has been identified as a cause of upset stomachs since the 1890s and was the second most common cause of reported food poisoning in the UK in the 1980s. Outbreaks are often associated with large scale catering where foods are prepared in advance. This type of bacteria is able to form spores which are not destroyed by normal cooking.

Sources

It is found in animal and human faeces, soil, dust, insects and raw meat

Effects

Illness is caused by a toxin which is produced in the body after eating food containing large numbers of active Clostridium perfringens bacteria.

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Clostridium Botulinum

Clostridium botulinum produces a toxin in food which causes a severe illness called botulism, with a high mortality rate.

It occurs rarely in the UK, in the last 75 years there have been only 11 outbreaks of food borne botulism. Cases have often been associated with poorly processed canned foods.

This type of bacteria produces spores which are not killed in normal cooking and are only destroyed at very high temperatures, i.e. above 121°C for 3 minutes.

Sources

The pathogen is found in soil, fish, meat and vegetables.

Effects

Symptoms include, an initial short period of diarrhoea and vomiting followed by double vision, difficulties in swallowing and difficulties in breathing. Severe cases may lead to paralysis.

Onset: 2 hours to 8 days, usually 12 - 36 hours
Duration: may persist for 6 - 8 months

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Salmonella

Although traditionally considered the most common cause of reported cases of food poisoning in the UK, Salmonella is now second to Campylobacter.

There is a range of Salmonella species which cause food poisoning; the most frequently implicated in food poisoning cases in the UK are S. enteritidis and S. typhimurium. Salmonella food poisoning may cause serious illness and can cause fatalities especially in susceptible persons (e.g. older people, babies and those who are already ill).

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Salmonella

Sources

Naturally found in guts of animals, including farm animals and especially poultry, bacteria is transferred to meat during the slaughtering process.

It is also found in or on eggs, in unpasteurised milk, rats, mice, and domestic pets, including terrapins. People may be a source of these pathogens, particularly when suffering from symptoms of Salmonella food poisoning and may continue to excrete them for a long period after recovery.

Effects

Salmonella bacteria cause illness by multiplying within the human body and causing an infection. Symptoms include:

- Fever
- Vomiting
- Abdominal pains
- Diarrhoea

(septicaemia or peritonitis may occasionally develop)

Onset: 6 -72 hours, but usually 12-36 hours
Duration: 1 - 8 days, but can be longer

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Staphylococcus Aureus

Although it has become less common since its peak in the 1950s in the UK it is still the main type of food-poisoning associated with human contamination of food.

The majority of outbreaks are caused by direct contamination of cooked foods by hands which have picked up the bacteria from nose, throat and skin lesions. Staphylococci produce toxins in food which are resistant to heat and are therefore unlikely to be destroyed during the cooking process.

Sources

Staphylococcus is commonly found on humans. It causes skin and wound infections but may be carried naturally on the skin of healthy people and is carried in the nose and throat of almost half the population. The pathogen is sometimes found in unpasteurised milk.

Effects

Staphylococci produce toxins whilst growing in food. When the food is eaten the toxins act on the intestine to cause vomiting.

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Listeria

Listeria monocytogenes has been found to cause illness, and although it has been associated with food, this is not the only way in which the bacteria are transmitted.

Numbers of reported cases are relatively low in the UK. Pregnant women, newborn babies, older people and immunosuppressed persons are most at risk from the illness.

Sources

The pathogen is found in many places in the environment, including cattle, sheep, silage, effluents and sewage. Foods which have been found to contain Listeria include unpasteurised milk products, such as soft cheeses, and meat-based pates. It is able to grow at low temperatures and may even grow very slowly at refrigeration temperatures.

Effects

Symptoms include:

- Fever
- Diarrhoea
- Septicaemia
- Meningitis
- Abortion

Onset: Variable, from 3 -70 days
Duration: Variable

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Food Borne Diseases

Food borne diseases are caused by low-dose pathogens.

They may be considered to differ from food poisoning for the following reasons:

- A relatively small number of organisms are capable of causing the illness
- The food acts purely as a vehicle and the multiplication of the organism within the food is not an important feature of the illness
- Vehicles other than food may transmit the organism via the faecal-oral route
- Person-to-person spread and airborne transmission is more likely, and the incubation period is usually longer

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Hepatitis A

Hepatitis A is a contagious pathogen typically associated with foods such a fruits, vegetables, shellfish, ice and water which can become contaminated from food handlers infected with the virus.

It is a contagious liver disease that results from infection with hepatitis A virus (HAV).

It has the potential to range from a mild illness with limited symptomology to a severe illness lasting several months.

Hepatitis A is usually spread when a person ingests food contaminated by the virus.

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Hepatitis A

Not surprisingly, illnesses associated with Hepatitis A are more likely to occur in countries where Hepatitis A is common, and where there are poor sanitary conditions or poor personal hygiene.

The food and drinks most likely to be contaminated include fruits, vegetables, shellfish, water and ice.

There is no specific treatment for Hepatitis A.

Patients generally suffer from loss of appetite, and the main concern is ensuring that a patient receives adequate nutrition.

Young children infected with Hepatitis A commonly remain asymptomatic.

For adults, the most common symptom, occurring in more than 70 percent of cases, is jaundice.

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Bacillary Dysentery

In the UK, bacillary dysentery is usually caused by the bacterium Shigella sonnei.

It is an acute disease of the intestine characterized by diarrhoea, fever, stomach cramps, nausea, and often vomiting. Stools may contain blood, mucus and pus.

It is an acute disease of the intestine characterized by diarrhoea, fever, stomach cramps, nausea, and often vomiting. Stools may contain blood, mucus and pus.

Fatality is normally less than 1%. The incubation period is usually one to three days, although it varies between one and seven days.

Dysentery is spread through faecal-oral transmission from an infected person or by the consumption of contaminated foods, including water and milk.

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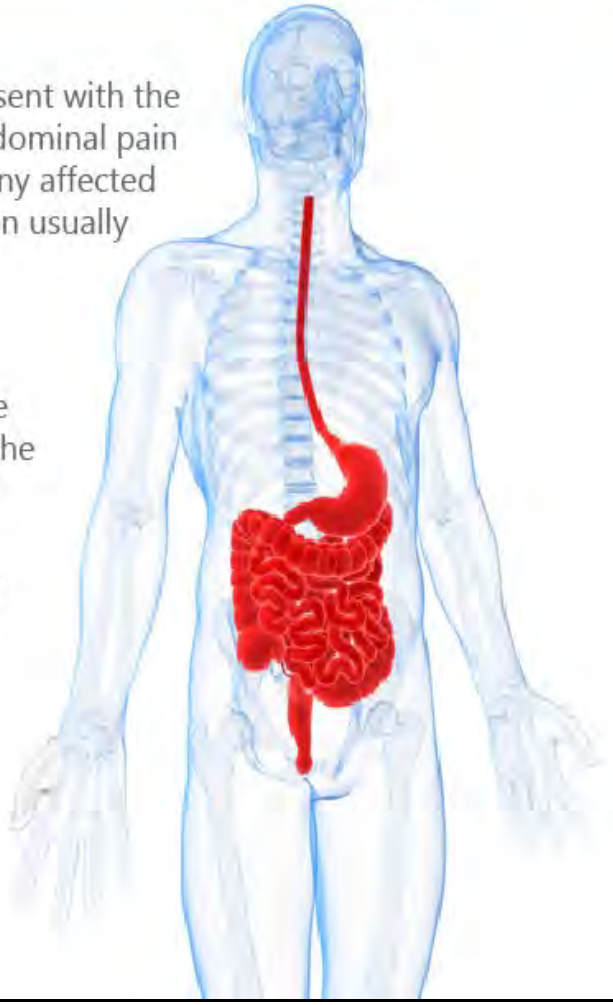
Shigella

In the UK most cases of Shigella infection do not present with the classical symptoms. Most patients have only mild abdominal pain and diarrhoea, often without blood in the faeces. Many affected people probably never visit their GP, and the condition usually settles within a day or two without treatment.

However, more severe forms of infection can occur, particularly when travelling abroad. In these cases the patient may become very ill and dehydrated, and in the absence of medical treatment dysentery can be fatal.

The organism invades the cells lining the large bowel and multiplies there, killing the cell, and this is the cause of the symptoms produced. However, it occasionally invades the bowel beyond the surface lining. S. dysenteriae also produces a toxin similar to that produced by E. coli O157, which causes additional tissue damage, and may lead to haemolytic-uraemic syndrome and kidney failure.



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Shigella

In developed countries, most cases are seen in young children. This is explained by the relatively poor personal hygiene of small children and their attendance at schools and day nurseries where they come into close contact with other children.

The most important complication of bacterial dysentery, is dehydration due to loss of fluid through diarrhoea and vomiting.

The mainstay of treatment is therefore to replace the fluid which has been lost.

In most cases the fluid can be given by mouth but in severely ill patients intravenous replacement may be required.

In developed nations the spread of infection is controlled by emphasising good personal hygiene and the provision of adequate toilet and hand washing facilities.

The use of soap when washing hands is important.

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Typhoid & Paratyphoid

Typhoid fever is an infectious feverish disease with severe symptoms in the digestive system in the second phase of the illness.

Classic typhoid fever is a serious disease.

It can be life threatening, antibiotics are an effective treatment. The disease last several weeks and convalescence take some time.

The disease is transmitted from human to human via food or drinking water, and it is therefore mainly hygiene and sanitary conditions that determine its spread.

It is primarily for this reason that it is no longer so commonly seen in Europe.

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Typhoid & Paratyphoid

There are two phases of classic typhoid fever:

First Phase

The patient's temperature rises gradually to 40°C and their general condition becomes very poor. Symptoms include bouts of sweating, loss of appetite, coughing and headaches, but constipation and skin symptoms may be the clearest symptoms.

Second Phase

In the second to third weeks of the disease, symptoms of intestinal infection are manifested and the fever remains very high and the pulse becomes weak and rapid.

In the third week the constipation is replaced by severe pea-soup-like diarrhoea. The faeces may also contain blood.

It is not until the fourth or fifth week that the fever drops and the general condition slowly improves.

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Viral Gastroenteritis

Viral gastroenteritis is an intestinal infection caused by several different viruses. Highly contagious, viral gastroenteritis causes millions of cases of diarrhoea each year.

Anyone can get viral gastroenteritis and most people recover without any complications.

However, viral gastroenteritis can be serious when people cannot drink enough fluids to replace what is lost through vomiting and diarrhoea. This is especially serious in infants, young children, the elderly, and people with weak immune systems.

Symptoms usually appear within 4 - 48 hours after exposure to the virus and last for 1 - 2 days, though symptoms can last as long as 10 days.

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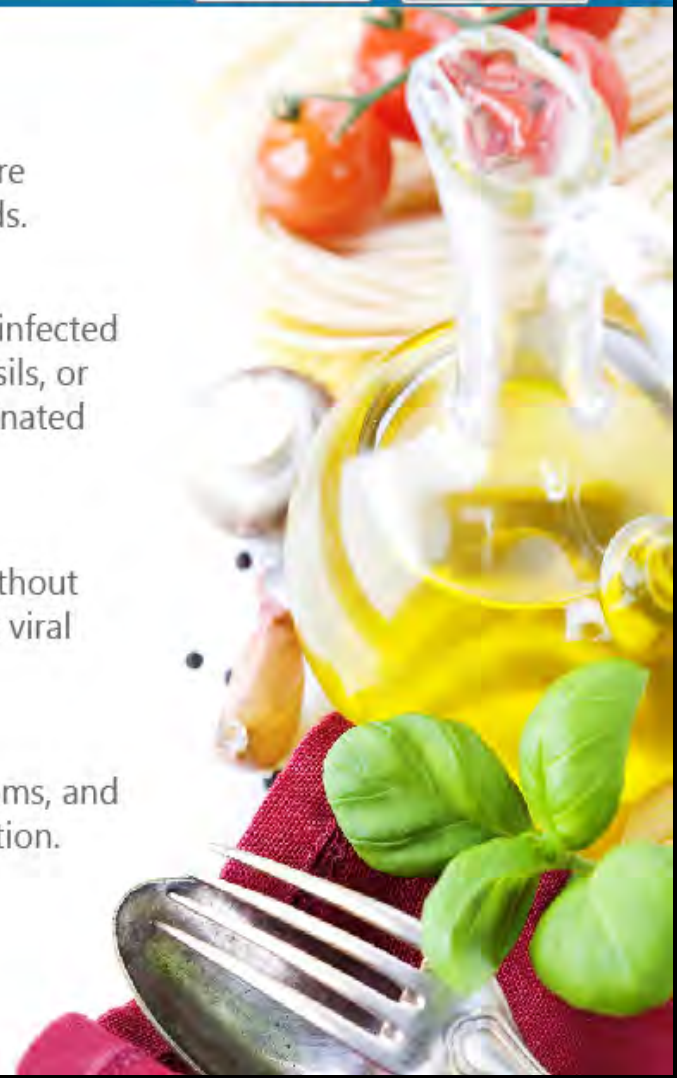
Viral Gastroenteritis

Viral gastroenteritis is highly contagious. The viruses are commonly transmitted by people with unwashed hands.

People can get the viruses through close contact with infected individuals by sharing their food, drink, or eating utensils, or by eating food or drinking beverages that are contaminated with the virus.

Most cases of viral gastroenteritis resolve over time without specific treatment. Antibiotics are not effective against viral infections.

The primary goal of treatment is to reduce the symptoms, and prompt treatment may be needed to prevent dehydration.



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Parasites

Human parasites are organisms that live inside us so that we become their hosts. Since these parasites are unable to produce food for themselves, they depend on us for their survival.

Unfortunately, parasites harm human beings because they consume our food and nutrients, they can destroy our tissues and cells, and they produce toxic waste products that can make people very ill.

Human parasites consist of tiny protozoa and amoebae which can only be seen under a microscope, and parasitic worms and flukes, which are larger.

The small protozoa and amoebae are spread to people by air, water, food, insects, animals, and human contact. Parasitic worms are usually acquired when one ingests contaminated meat.

For the next few minutes we will take a closer look at some of the common parasites that can infect humans.

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Parasites - Worms

Pinworms (enterobius follicularis)

This is one of the most common human parasites.

This worm makes its home in the host's colon, but it lays eggs outside of the host's body. Transmission can occur through unclean hands, clothes, and bed sheets.

Symptoms: Irritation and scratching in the anal area

Hookworms (necator americanus)

This is an intestinal human parasite that begins its life outside of the body, and is generally found in soil or water. We can drink water that contains hookworm larvae, or we can ingest contaminated fruits and vegetables.

The worm attaches itself to the human's intestines, where it drinks blood (this worm actually has teeth!).

Symptoms: weakness, abdominal pain, nausea, diarrhoea, anaemia.

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Parasites - Worms

Tapeworms
(taenia solium, diphyllobothrium latum, and taenia saginata)

Tapeworms are common in dogs and cats but rare in humans.

To become infected with this parasite, one must swallow fleas that are infected with tapeworm larvae. This worm can take up residence in the intestines where it will steal valuable nutrients and expel dangerous waste. The human host infected with this worm may or may not show any symptoms.

Symptoms include: mineral imbalance, bloating, gas, dizziness, hunger pains, "fuzzy" thinking, digestive problems, sensitivity to touch, and allergies.

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Parasites - Worms

Liver Fluke (clonorchis sinensis)

A flat worm that attacks the host's liver by causing inflammation and making holes. It can survive inside a human host for approximately 30 years. Humans acquire this parasite through eating undercooked fish, contaminated vegetables, human faeces used as fertilizer, or by drinking (or swimming) in contaminated water.

Symptoms include:

- An enlarged liver
- Pain in the right side of the body
- Depression
- Oedema
- Vertigo
- Bile stones
- Cancer

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Protozoa

Giardia lamblia

After pinworm, this is one of the most common parasitic infections. Giardia resides in the intestine (or gall bladder) of its host, and is spread by faecal contamination and through water.

Poor sanitation and unsafe sexual practices contribute to the spread of this parasite.

Since it is resistant to chlorination, Giardia can be found in tap water, but it can be found in natural streams as well.

Symptoms include:

- Abdominal pain
- Food sensitivity
- Vitamin deficiency
- Diarrhoea

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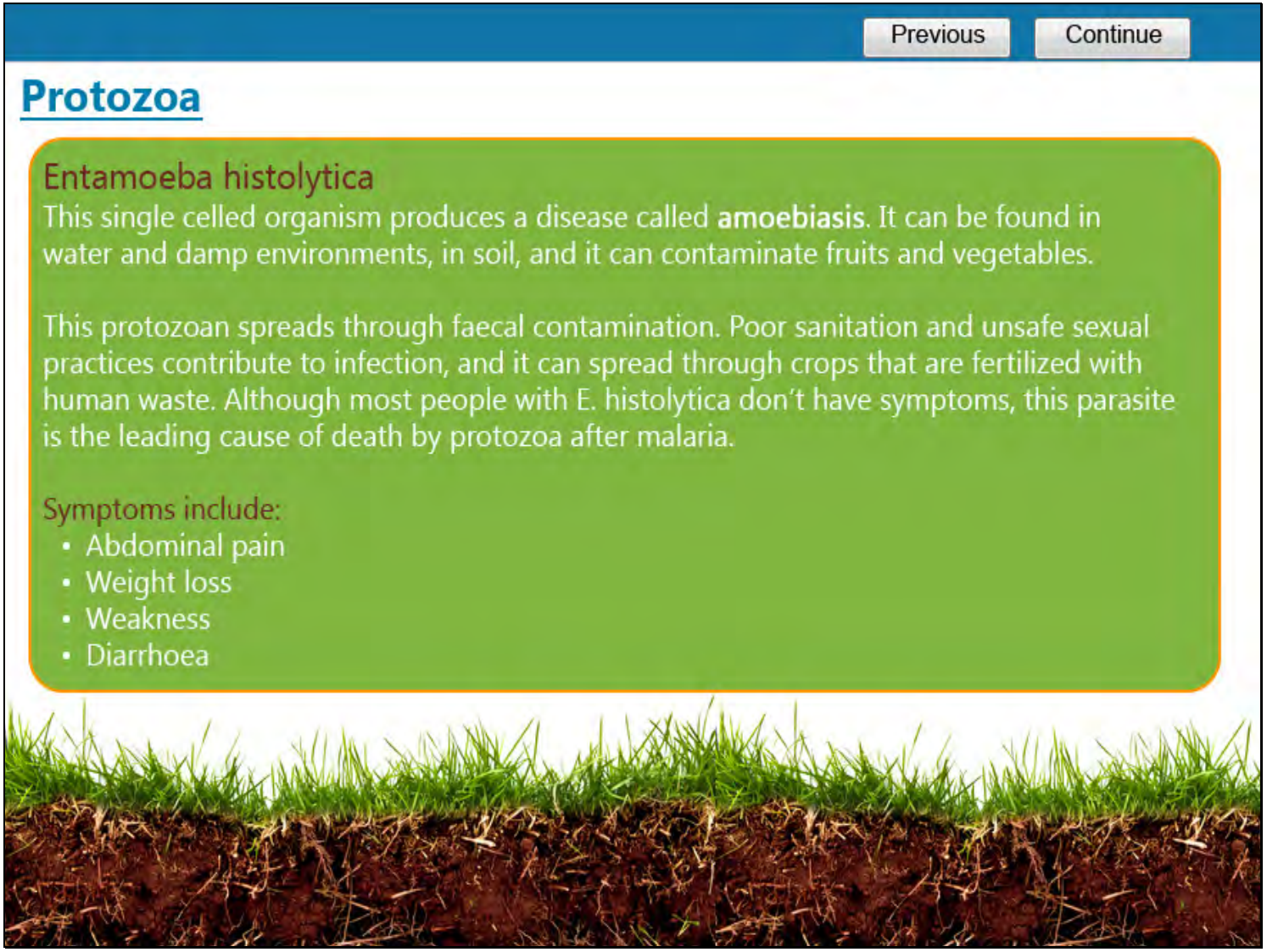

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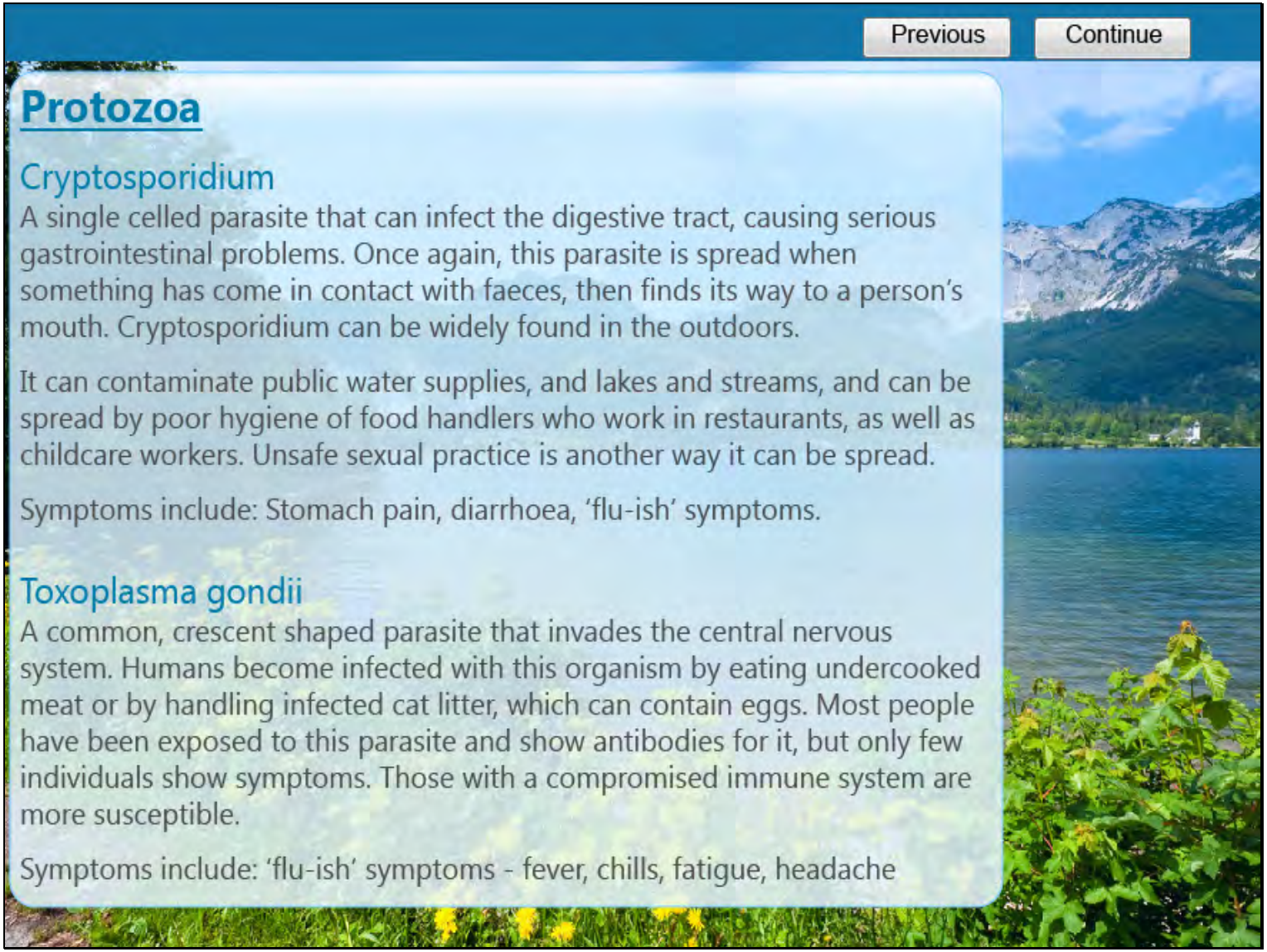

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Diagnosis of Human Parasite Infections

The conventional method of laboratory analysis involves the use of microscopes to analyse stool specimens for human parasites, eggs, or their cysts.

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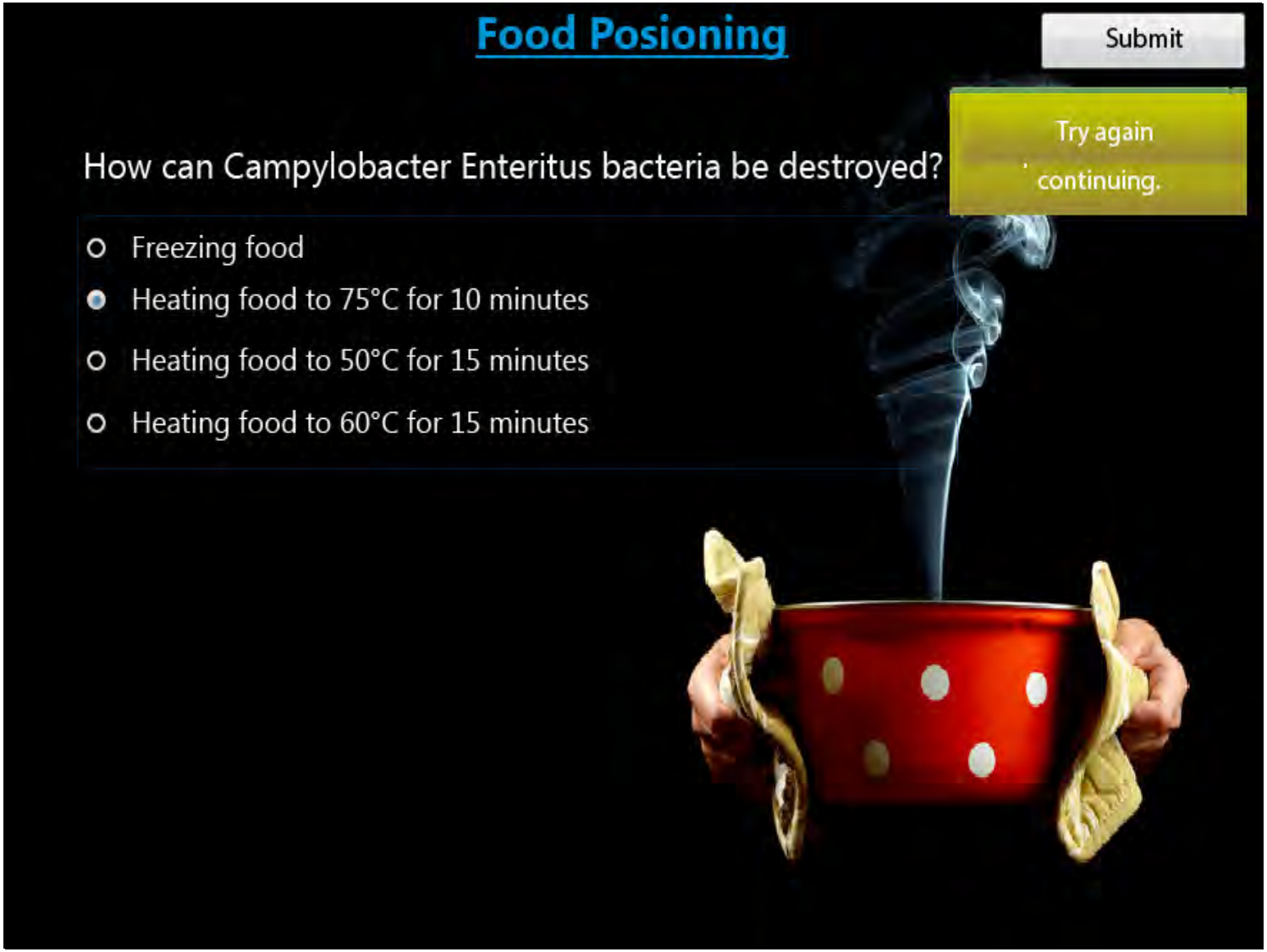

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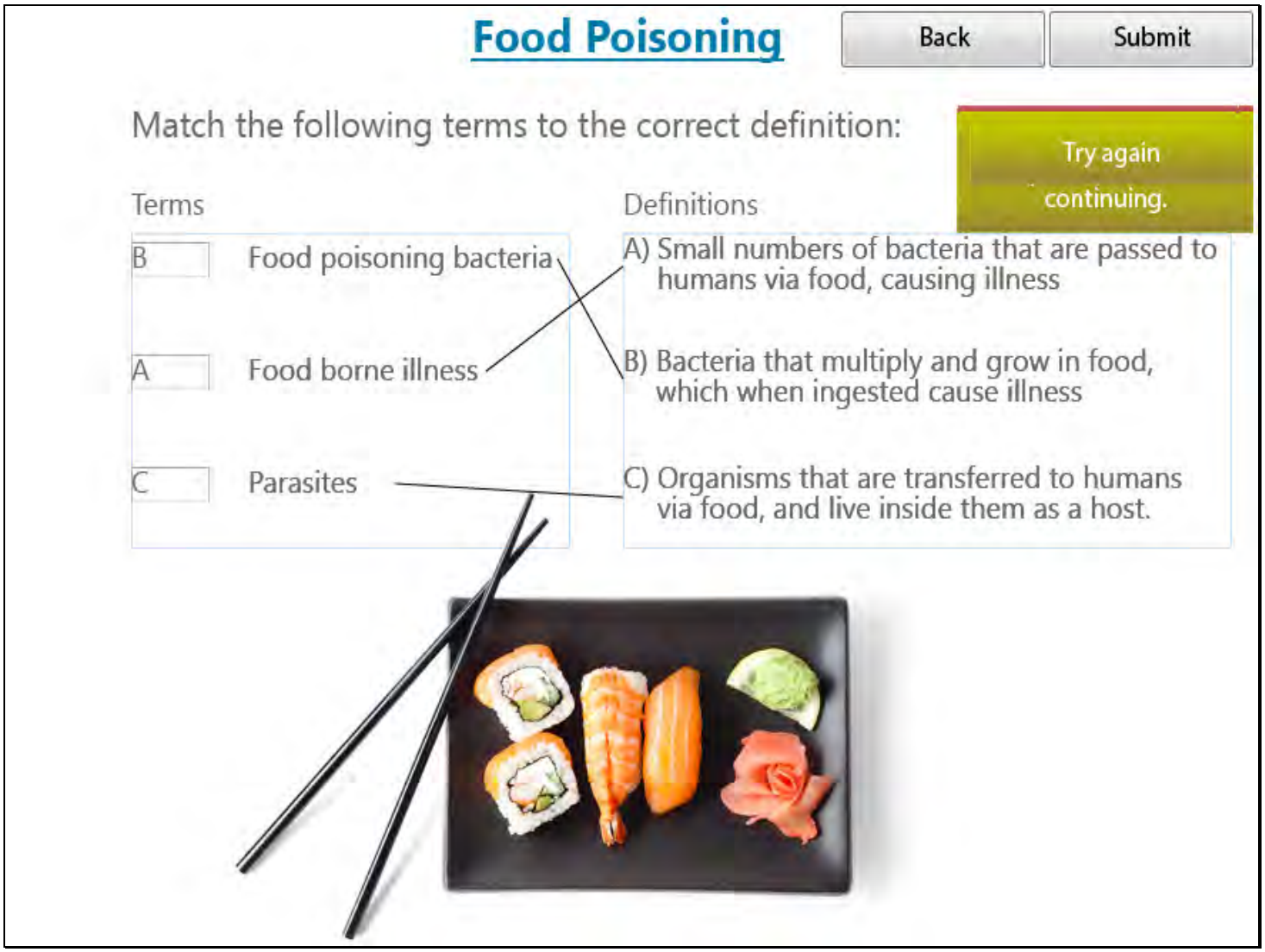

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Food Preservation

Food preservation usually involves preventing the growth of bacteria, fungi, yeasts or any other microorganisms (although some methods work by introducing benign bacteria or fungi to the food), as well as retarding the oxidation of fats that cause rancidity.

Food preservation can also include processes that inhibit visual deterioration (such as the enzymatic browning reaction in apples after they are cut), which can occur during food preparation.

There are many methods of preserving foods, including:

- Drying
- Pasteurisation
- Refrigeration
- Freezing
- Vacuum packing
- Salt
- Sugar
- Smoking
- Pickling
- Artificial food additives
- Canning and bottling
- Jellying
- Irradiation

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Food Preservation

People have attempted to preserve food in order to prevent starvation from the earliest times.

Foods with a low moisture content, such as cereals, are easier to preserve than most moist, high protein foods, such as meat.

There are, however, potential hazards that caterers need to be aware of when considering food preservation techniques.

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Food Preservation Techniques

Food may be preserved in a variety of ways.

This includes the use of:

- Low temperatures
- High temperatures
- Dehydration
- Chemical methods
- Physical methods

These will be covered in the following slides.

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Low Temperature Preservation

This method of preservation relies upon the metabolic reactions of microorganisms such as bacteria.

In other words, the colder it is, the longer it takes for bacteria to multiply.

They eventually become dormant and do not multiply at all, although they may become active again if the temperature rises.

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Refrigeration

Refrigerators should operate at temperatures between 1°C and 8°C.

They are suitable for storing most perishable foods for a short period.

Most of the common pathogenic bacteria cease to multiply or produce toxins at temperatures below 5°C, although some bacteria and moulds do multiply at low temperatures.

Commercial Chilling

Raw meat may be held at temperatures between -1°C and 1°C for longer periods before sale than refrigerated meats.

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Freezing

Freezing relies on two processes to preserve food:

1. The inhibition of enzyme activity in the microorganism
2. The reduction of the available moisture in the food

The process of freezing kills some pathogenic bacteria, but most merely become dormant. Many spores and toxins are unaffected by the process.

Temperatures between -2°C and -5°C kill the greatest number of bacteria.

However, it is important to note that enzymes are very active at -2°C and can spoil food rapidly.

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Freezing

Vegetables should be blanched before freezing to destroy enzymes and reduce the bacterial load (the number of bacteria).

Moulds and yeasts are more likely than bacteria to grow on frozen food as they need less available water and can withstand lower temperatures.

Freezing may be fast or slow.

Commercial freezers can freeze some food to -20°C in 30 minutes. However, a domestic type appliance could take up to 72 hours.

Rapid freezing is better because it prevents the formation of large ice crystals, which can affect the taste, texture and quality of the food after thawing, and reduces the loss of liquid during thawing.

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Freezing

Various methods of freezing exist including:

- Fluidised bed freezing - for example, for peas
- Air blast freezing - the most common method, used for ready meals and chickens
- Plate freezing - for example, for fish fillets
- Immersion (cryogenic) freezing - for example, for raspberries and prawns
- Pello freeze system - for liquids and semi-solids such as spinach, cream, orange juice, pasteurised egg and soup

Frozen food should be handled carefully to prevent contamination, particularly by Staphylococci.

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Frozen Storage

The temperature for a domestic type freezer should be between -18°C and -25°C, but it may be colder on commercial premises.

Some basic points to remember regarding freezer storage are:

- Food must be covered to prevent freezer burn occurring through loss of moisture
- Air does not need to circulate so food can be stored close together
- Display freezers must not be loaded above the load line and temperatures for all freezers must be checked regularly

If you have a freezer breakdown, ask an environmental health officer for advice on the safe use or disposal of the food.

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Thawing Frozen Food

Some food can be cooked straight from the freezer but joints of meat, poultry and other large items must be thawed before cooking.

Always follow the manufacturer's instructions.

If frozen food is not thawed completely, ice crystals remain at the centre.

Although the cooking will melt the ice, the internal temperature may not be hot enough to kill most pathogenic microorganisms.

Therefore, food must be thawed carefully to ensure that there is no bacterial contamination from the thawed liquid.

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Thawing Frozen Food

Things to remember when thawing frozen food are:

- When small refrigerators are used for thawing and storing at the same time, the stored food can easily become contaminated
- If food is thawed at an ambient temperature, bacteria will start to multiply rapidly on the surface of the food while the centre remains frozen or is still thawing
- Ideally, food should be thawed in a cool place or thawing cabinet at a temperature between 10°C and 15°C
- The food should be protected from contamination and should not be able to contaminate anything else
- Once food is thawed, it should either be **cooked immediately,** or it should be refrigerated until it is cooked or consumed
- Special care is needed when thawing frozen poultry

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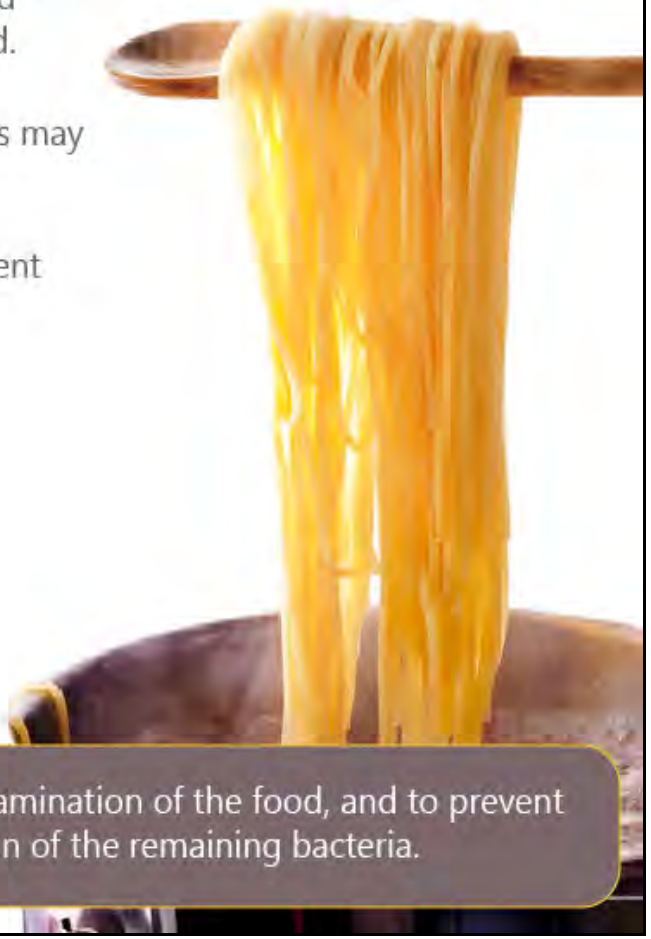
High Temperature Preservation Techniques

High temperatures are used to destroy both spoilage and pathogenic microorganisms, thereby preserving the food.

However, some heat-resistant bacteria, toxins, and spores may survive.

The number of microorganisms that survive heat treatment depends on:

- Initial numbers of microorganisms present
- Type of organisms
- Duration of the heat treatment
- Amount of protein and fat in the food



Precautions should be taken to prevent the recontamination of the food, and to prevent conditions favourable to the multiplication of the remaining bacteria.

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High Temperature Preservation Techniques

Cooking

Cooking helps to preserve food for a short time but its main purpose is to make the food more palatable and safe for immediate consumption or storage out of the danger zone.

Pasteurisation

Pasteurisation is the mildest form of heat treatment, allowing food to be made safe with minimal effect on flavour and nutritional value. Examples of its application include milk, eggs, large cans of ham, wine and canned fruit.

Pasteurisation destroys pathogens and large numbers of spoilage organisms. However, spores and toxins may survive, so pasteurised foods should be refrigerated to prevent spoilage.

Milk is usually pasteurised by heating to 72°C for 15 seconds then cooling rapidly to a refrigeration temperature.

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High Temperature Preservation Techniques

Sterilisation

Sterilisation destroys all microorganisms, giving an extended product life. However, true sterilisation is difficult to achieve, so a form of treatment referred to as commercial sterilisation is often used.

This process kills all organisms that are likely to cause food poisoning or spoilage, but it also changes the flavour and texture of food and reduces the nutritional value, including the loss of vitamins.

Commercial sterilisation is achieved by heating food to a temperature above 100°C usually by steam under pressure. For example, milk is heated at a temperature of 100°C for 30 minutes, followed by a two stage cooling process.

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High Temperature Preservation Techniques

Ultra Heat Treatment (UHT)

This technique was developed to give a long shelf life to food without substantially changing its texture or flavour.

Milk is heated to 132°C for one second before being filled aseptically into sterile packaging.

Canning

In this form of heat treatment food is placed in a can which is sealed then treated so that all particles of food reach a temperature of 121°C for at least three minutes.

If a large can of dense food is being treated, the process could involve heating for 45 minutes. This is called a 'botulinum cook' because the process kills the heat resistant bacterium Clostridium botulinum.

Other combinations of time and temperature can be used to achieve the same effect, and all canned foods have long shelf lives, which are limited only by the slow chemical and physical changes that may take place in the food.

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High Temperature Preservation Techniques

Dehydration

Dehydration preserves food by reducing the amount of water available to bacteria, yeasts and moulds.

The availability of water is expressed as water activity (aw).

Most bacteria need water activity of at least 0.95 and very few can exist at 0.6.

Dried food usually contains less than 25% moisture with aw of less than 0.6, making it difficult for many types of microorganisms to survive. However, yeasts and moulds can normally grow at a lower aw than bacteria.

Additionally, some bacteria, such as Clostridium perfringens, survive dehydration by forming spores which become active when food is reconstituted.

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High Temperature Preservation Techniques

Dehydration can be achieved by either sun drying or artificial drying.

Sun Drying

This method involves laying foods out in the sun to dry on mesh or cloth covered frames. Commonly used for drying fruit (apples, currants, figs, tomatoes etc.), vegetables, meat and fish.

Artificial drying

This method is normally quicker and more effective than sun drying, so it is used for most packaged convenience foods.

Artificial drying methods include:

- Hot air (e.g. tunnel drying, fluidised bed drying and roller spray drying) - hot air drying denatures the protein in the food, significantly affecting texture and flavour
- Warm air (e.g. accelerated freeze drying) - accelerated freeze drying affects food cells less, so the product may be reconstituted with little change in flavour and appearance

Vegetables need to be blanched before dehydration to stop enzyme activity during storage.

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Chemical Preservation Techniques

Different chemicals can be used to preserve foods, two of the most common ones are salt and sugar.

Salt

Salt has been used as a preservative for centuries. It is used in curing, brining and pickling, to preserve food and enhance its flavour.

The preservative effect of salt is partly due to osmosis. In simple terms, the salt absorbs the water, making it unavailable to bacteria or moulds.

Some bacteria can grow in salt, while others survive but cannot multiply.

Staphylococci will grow in relatively high salt concentrations (of 20%) and are often associated with food poisoning from semi-preserved salted meats.

Salmonellae will grow in an 8% concentration.

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Chemical Preservation Techniques

Sugar

Sugar, which is used to preserve condensed milk, some cakes, candied fruit, jam and some other conserves, **acts in a similar way to salt**.

However, the concentration of sugar needs to be approximately **six times higher** to achieve the same effect.

Moulds and yeasts can survive stronger sugar concentrations than most bacteria because they do not need as much moisture.

Problems of mould growth can occur when the sugar content of jam is reduced and other preservatives are removed.

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Dry Storage

Dry food stores need to be dry, cool, of adequate size and vermin proof. All food should be covered, wrapped or containerised to reduce risk of contamination.

Adequate lighting is necessary to aid cleaning and the detection of pests.

There must be an effective ventilation system because temperature fluctuations can lead to condensation which may cause contamination. Mechanical systems are more efficient than opening and closing windows.

A cleaning schedule should be followed and food should be stored off the floor on shelving, mobile bins or pallets.

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Storage & Temperature Control - Key Points

- Food must be stored in appropriate conditions - for example, in a clean, dry, pest free area at the appropriate temperature
- Frozen food should be kept at below -18°C
- Refrigerated food should be kept at between 1°C and 8°C
- Hot food must be kept at 63°C or above
- Food must be used or sold before its use by date
- A best before date indicates when the food is at its best
- Thorough stock rotation procedures minimise waste, spoilage and the likelihood of infestation
- Correct storage conditions and temperatures help to maintain the safety and optimum quality of food throughout its shelf life

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Cooked Hot Food

If cooked food is not required for immediate consumption, it must be, kept at a temperature of 63°C or above or cooled rapidly and put in a refrigerator.

If cooked food is cooled, it should ideally reach a temperature of 8°C or below in less than 90 minutes.

Food cools more rapidly if cool air can circulate around it, and blast chillers can reduce food temperatures from 70°C to 3°C in less than 90 minutes.

To enable this temperature change to occur, joints of raw meat should be portioned to weigh less than 2.5kg (about 5lb), and hot liquids should be drained and cooled in shallow pans.

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Food Contamination

Bacterial contamination can happen if the preservation process is not carried out correctly or if a container, such as a can or a wrapper around vacuum packed food, is damaged

Cross-contamination is likely if the preservation process is not carefully controlled.

Chemical contamination may occur if an incorrect quantity of preservative, mould inhibitor or colouring is added, or if containers are cleaned with excessive amounts of cleaning chemical or not rinsed thoroughly.

Physical contamination can occur if containers are unclean or if raw food is not cleaned and checked adequately before being processed.

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Refrigerated Storage

Refrigeration only delays food spoilage by bacteria and moulds, and does not prevent it entirely.

Most common food poisoning organisms cannot multiply or produce toxins at temperatures below 5°C.

However, certain pathogens, such as Listeria and Clostridium botulinum, do grow at temperatures below 5°C.

Domestic refrigerators are not usually suitable for commercial usage because they do not stay cold enough when the doors are opened frequently.

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Refrigerated Storage

The hygienic and efficient use of refrigerated storage units depends upon correct positioning, maintenance, cleaning, loading, and defrosting and the prevention of contamination.

Raw and high risk food must be kept apart and ideally separate refrigerators should be used. If this in not possible, raw food must be stored below cooked food.

All food should be adequately covered to protect it from contamination and prevent it from drying out, absorbing odours or causing contamination.

Acidic food should not be refrigerated in opened cans because the acid can attack the internal surface of the can.

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Siting Refrigerators

Refrigerators should be:

- Easy to access for storing and retrieving food and for cleaning the surrounding area and the refrigerant coils
- Positioned in a well ventilated area away from the direct rays of the sun or from any heat source
- Be maintained in a good condition and serviced regularly - door seals should be checked regularly to ensure that they do not perish and become difficult to clean
- Cleaned on all internal surfaces using a suitable sanitiser, which must then be dried thoroughly - any spills should be cleared up immediately

Large refrigerator motors should be installed outside the building or outside the food area as they generate heat and dust.

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Loading Refrigerators

Efficiency

Efficiency is impaired if food is placed in front of the cooling unit.

Air Circulation

Refrigerators must not be overloaded as good air circulation is necessary to keep a constant temperature.

Cooling

Hot food should be cooled rapidly before storing. If the food is still warm when it is refrigerated, the temperature inside the refrigerator may rise, increasing the possibility of bacterial multiplication.

Cross Contamination

Condensation may form and drip onto other food with the risk of causing cross-contamination.

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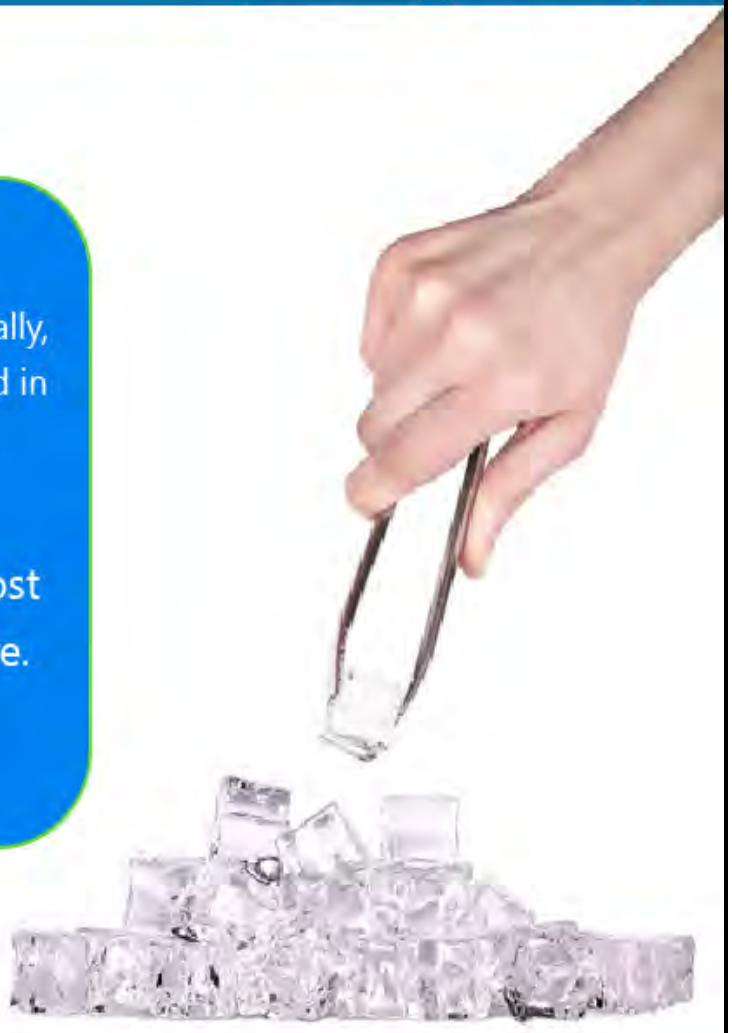
Defrosting Refrigerators

If refrigerated units do not defrost automatically, defrosting should be carried out regularly and in accordance with manufacturer's instructions.

When ice builds up, it increases the cost of maintaining the correct temperature.



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Guidelines for Handling Frozen Poultry

Poultry must be segregated from high risk food to prevent contamination.

Thaw completely, either in a thawing cabinet or a cool room between 10°C and 15°C. If these methods are not practicable, it is better to thaw poultry in cold running water than to use a small multi-use refrigerator or a warm room.

The bird is completely thawed when the body is pliable, legs are flexible, body cavity is free from ice crystals, and the core temperature, or temperature in the thickest part, is above 0°C.

Once thawed, keep poultry in a refrigerator and cook within 24 hours. Remove the giblets and cook any stuffing separately.

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Guidelines for Cooking Frozen Poultry

Cook poultry thoroughly.

When the juices run clear and the temperature probe indicates that the core temperature, or the temperature in the thickest part of the flesh, has reached 75°C, the poultry is thoroughly cooked.

Avoid handling the cooked poultry if possible.

All equipment and surfaces must be properly cleaned and disinfected before being used for other high risk foods.

Ideally there should be separate surfaces and equipment for raw and cooked foods.

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Guidelines for Handling Canned Foods

- Canned foods should be stored in dry, cool, well ventilated conditions
- All cans should be examined on delivery, and any unsatisfactory deliveries should not be accepted
- Once stored, they should be checked regularly and the principles of stock rotation should be followed
- Canned food should be rejected if the can is blown, dented, rusty, holed or showing signs of seam damage, or if the contents are the wrong texture or have an unusual smell or colour
- Once cans are opened, transfer the contents to plastic or stainless steel containers, cover and refrigerate
- Do not put part open cans into the fridge, the can metal can oxidise and cause food poisoning.

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Storage & Legislation

Cooked food which is to be eaten, used or stored cold, must be cooled as rapidly as possible.

The Food Labelling Regulations 1996 deal with date marks, and, except for a number of exempted products, food must be labelled with an appropriate Use By or Best Before date.

There is a general requirement that raw foods, ingredients, and intermediate and finished products must not be kept at a temperature that would lead to a risk to health.

Apart from some specified exemptions, food which is likely to support the multiplication of pathogenic microorganisms or the formation of toxins must be stored at or below 80°C (England, Wales and Northern Ireland) or under refrigeration (Scotland).

If such food is to be kept hot, it must be held at 63°C or above.

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Personal Hygiene

Food handlers must always observe the highest possible standards of personal hygiene.

This ensures that food does not become contaminated by pathogenic organisms, physical contaminants or chemical contaminants.

High standards of personal hygiene play an important part in creating a good public image while protecting food and helping to ensure legal compliance.

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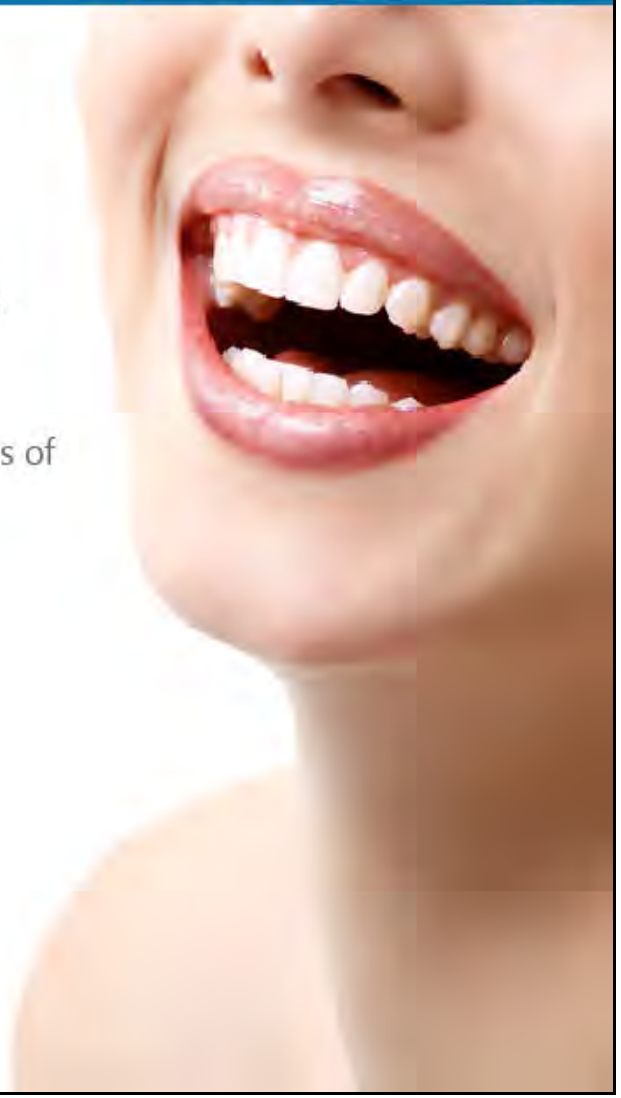
Potential Hazards

There are numerous risks to food hygiene, these include:

- Bacterial contamination - particularly Staphylococcus aureus, which is commonly from septic cuts, hands, hair, nose or mouth
- Cross contamination - involving bacteria, including types of Salmonella and Campylobacter from unwashed hands
- Carriers
- Physical contamination - including jewellery, hair or fingernails
- Chemical contamination - including from perfume, scented soaps or aftershaves



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Cuts, Boils & Skin Infections

Staff with septic cuts or boils should be excluded from food handling areas as they are likely to be carrying Staphylococcus aureus. **Uninfected** cuts should be covered by a clean, easy-to-detect, waterproof dressing.

All dressings must be waterproof to prevent blood and bacteria from contaminating food and to prevent bacteria, especially from raw food, from infecting the cut and making it septic.

Dressings should also be highly visible. They are often blue or green so that they may be seen and recovered if dropped in food. Some companies that screen food with a metal detector provide staff with dressings containing a thin metal strip.

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Cuts, Boils & Skin Infections

Lost dressings must be reported immediately.

Staff must have access to adequate first aid facilities, including detectable waterproof dressings.

Skin conditions such as dermatitis, eczema and psoriasis may increase the possibility of food contamination.

People with these conditions may need to be excluded from food handling duties until medical clearance is given to resume such work.

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Hair

Staphylococcus aureus and other pathogenic microorganisms may be found in hair.

To protect food from contamination by loose hairs or dandruff, food handlers should wash their hair regularly and keep it completely enclosed by a suitable head covering (which may include a hair net and hat) while working in a food area.

Food handlers must not be allowed to comb their hair or adjust hats when they are wearing protective clothing or are in food areas.

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Clothing

Special overclothing, including hats, is worn to safeguard food from contamination.

Although the clothing may protect the personal clothing of staff, this is incidental to the main purpose - **The protection of food.**

Everyone working in a food handling area must wear clean clothing, and, where appropriate, must wear protective clothing.

Protective clothing may include:

- Overalls
- Disposable or washable aprons
- Boots
- Rubber, chainmail or disposable gloves
- Hats
- Hair nets

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Clothing

Overalls or overclothing should cover the food handlers' own clothes and should be:

- Clean
- Washable or disposable
- Light coloured
- Without external pockets

Food handlers must wear suitable clothing to safeguard food from contamination. Protective clothing may also be necessary.

Any buttons must be securely attached. However, hygiene specialists prefer clothing with press studs or strips of quick-release fastening material because there is less risk that they will fall off into food and cause physical contamination.

Overclothing such as aprons, hats, etc. must not be worn outside the food premises, or when travelling to and from work.

Outdoor clothing must not be brought into food rooms, but should be left in a locker or cloakroom provided for the purpose.

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Hand Hygiene

About 15% of adults carry Staphylococcus aureus on their skin.

Food handlers must wash their hands regularly throughout the working day to reduce the number of bacteria on their skin and to prevent cross contamination. In particular, they must wash their hands:

- Before entering a food room
- Between handling raw and high risk food
- After a break
- After going to the toilet
- After handling waste food or refuse
- After eating, smoking, blowing their nose, touching any other body part

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Hand Washing

Correct hand washing is a very important step in the prevention of food poisoning, therefore it is very important to not just swill your hands, wash them using hot water, soap and take your time to do it thoroughly.

Never wash your hands in the food sink, always use a wash hand basin.

Wash Your Hands Frequently

Frequent hand washing is vital to remove the dirt and germs that collect on hands during your normal work routines. There are also other activities and times when you must always wash your hands.

Anti bacterial gel or foam cannot be used as an alternative to hand washing.

Dry Your Hands Properly

Drying is just as important as thorough washing. Never dry your hands on a tea towel that is used to dry equipment, and use disposable paper towels if you can.

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Steps in Thorough Hand Washing

Step 1

Turn water on at a comfortable temperature and wet hands and wrists.

Step 2

Apply a generous amount of anti bacterial hand soap.

Step 3

Generate a good amount of lather and wash well for 15 seconds, ensuring that you clean between fingers, nail beds, under finger nails and the back of hands and wrists.

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Steps in Thorough Hand Washing

Step 4

Rinse well under running water, keeping hands from touching the tap and prevent spilling.

Step 5

Hold your hands so that the water flows from the wrists to the finger tips.

Step 6

Dry hands with a clean paper towel.

Step 7

Use the towel to turn off the taps so your hands stay clean.

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Care of Your Hands

Keep your fingernails short so that they are easier to clean.

Do not wear nail varnish at work.

Not only can it chip off and physically contaminate the food, but also, dirt and bacteria can collect around and underneath the broken nail varnish on your nails.

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Jewellery, Perfume & Aftershave

Food handlers should not wear any jewellery because it harbours dirt and bacteria and could cause physical contamination if jewellery or gemstones fall into food. There is also a risk of entrapment if food handlers wear jewellery while operating machinery.

Some companies allow staff to wear one-piece sleeper earrings and a plain wedding ring.

Specific arrangements may be also be necessary for jewellery worn for religious or cultural reasons.

Scented personal hygiene and grooming products
Soap, perfume, aftershave and deodorants may taint food if they are strongly scented.

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Mouth, Nose & Throat

About 40% of adults carry Staphylococcus aureus in their nose and throat.

If food handlers eat sweets or food while they are working, they are likely to transfer the bacteria from their mouths to their fingers, then to food or utensils therefore eating should be prohibited in food rooms.

When checking the taste of food, food handlers must use a clean spoon. If a second or subsequent taste test is necessary, clean spoons must be used each time to prevent contamination of the food.

Coughing and sneezing may spread Staphylococcus aureus bacteria by airborne droplets. Anyone with a bad cold or sore throat should not handle open food.

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Personal Hygiene - Key Points

- High standards of personal hygiene help to protect food from physical and bacterial contamination
- Every food handler has an individual responsibility for high standards of personal hygiene
- Bad habits while working with food - such as smoking, eating, wearing jewellery or nail varnish or having uncovered skin injuries or infections may cause physical or bacterial contamination of the food
- Overclothing including protective clothing and hats should be clean, washable or disposable, without external pockets and light coloured
- The personal hygiene habits of staff should be monitored to ensure that standards are maintained
- Confirmed and suspected cases of food poisoning and foodborne disease should be excluded from food handling duties

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Personal Hygiene Management

Examples of Supervisory Management

Supervisors can do a range of things to ensure good personal hygiene practices from staff. Some examples are:

- Setting a good personal example
- Helping to establish and communicate policy and procedures on a range of issues such as jewellery, exclusion from work and clothing for food handlers
- Monitoring personal hygiene and habits of staff, including:
  - Visual checks for jewellery, loose hair, incorrectly worn clothing, thoroughness of hand washing
  - Arranging swab testing of hands
  - Recording the results of laboratory tests on faecal samples following infection

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Personal Hygiene Management

Examples of Supervisory Management (Continued)

- Explaining hygiene policies to new staff during interviews or during induction training
- Arranging for instruction and training at induction and basic levels, on a day-to-day basis and as refresher training
- Emphasising issues such as hand washing, bad habits, reporting sickness, jewellery, clothing policies and individual responsibility
- Implementing policies and procedures for personal hygiene

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Personal Hygiene Management

Examples of Supervisory Management (Continued)

- Ensuring the provision of necessary and appropriate resources, such as hand washing facilities, the cleaning and storage of overclothing and the supply of waterproof plasters
- Motivating staff to maintain standards by a variety of appropriate approaches, such as refresher training, staff meetings, check lists, posters and disciplinary action
- Monitoring a range of records and practices, including health questionnaires of potential new employees, the records of swabbing and faecal samples, and staff behaviour.

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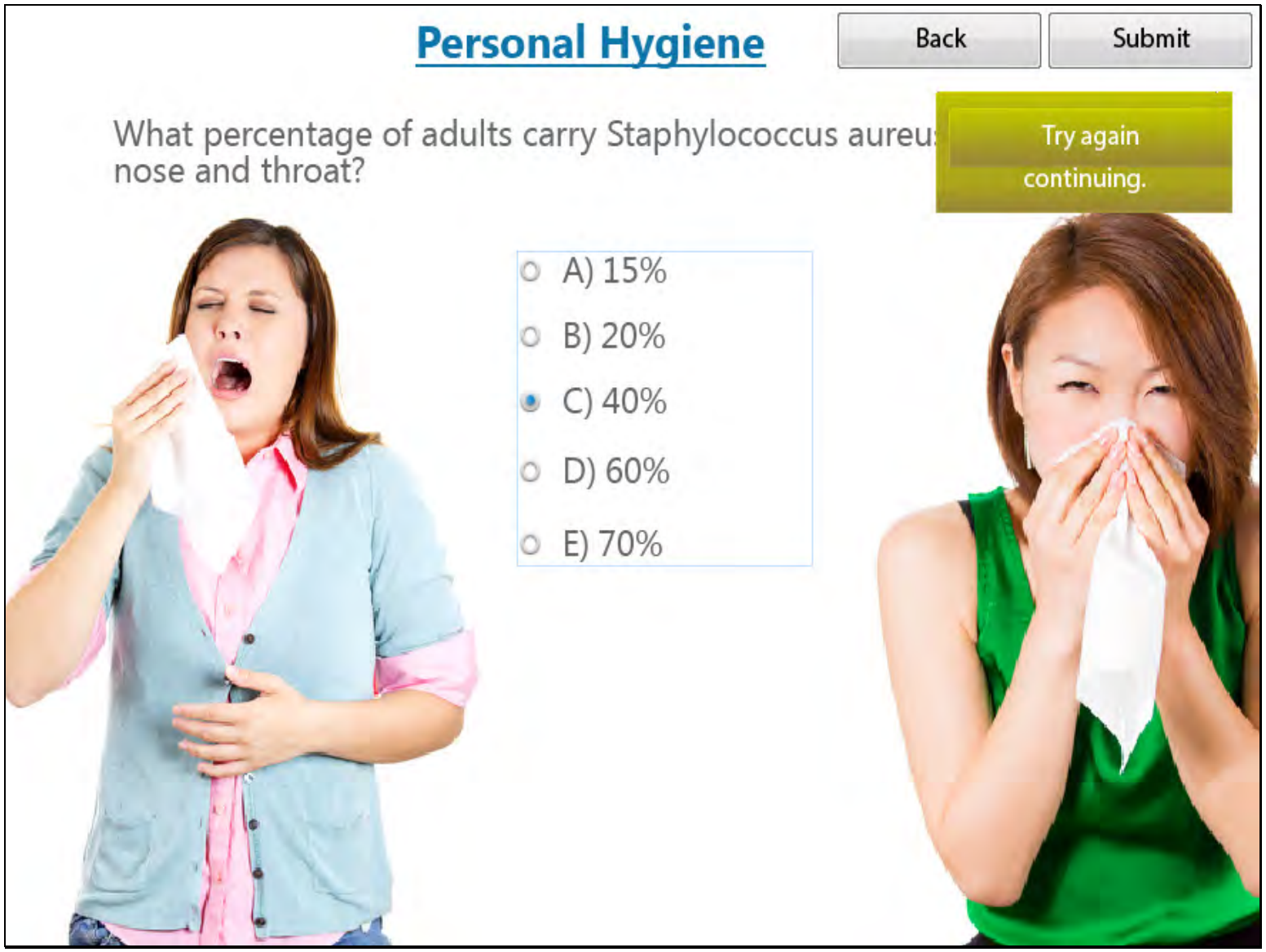

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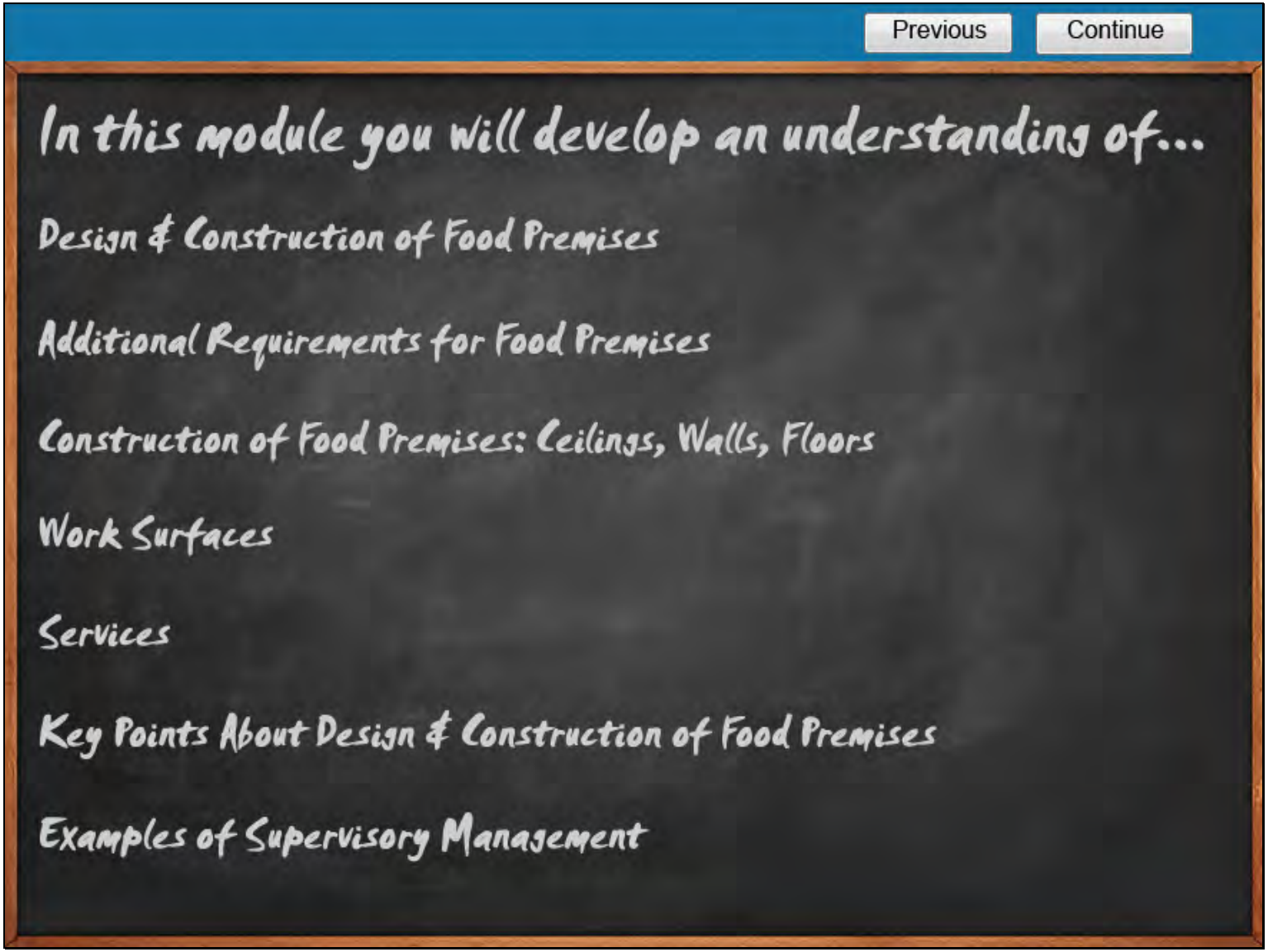

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Design & Construction of Food Premises

The law across the UK requires food premises to meet certain standards. Whilst the laws do vary slightly from place to place, the following applies to all:

The layout, design and construction of premises must:

- Allow for adequate cleaning
- Protect food from cross contamination
- Protect against the accumulation of dirt and contact with toxic materials
- Protect against condensation, mould and the shedding of particles into food

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Additional Requirements

In rooms where foodstuffs are processed, treated or prepared, the regulations lay down additional requirements. These include:

- Supplies of potable water
- Sanitary facilities (lavatories must not lead directly into food rooms)
- Storage for food at suitable temperatures
- Drainage, lighting and ventilation
- Hand washing facilities and, where necessary, separate provision for washing food
- Changing facilities for staff where necessary
- Floor surfaces and walls must be maintained in sound condition and be easy to clean and disinfect if necessary
- Materials should be impervious, washable and non-toxic
- Floors must allow adequate surface drainage
- Walls should be smooth to an appropriate height

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Additional Requirements

- Ceilings must be designed, constructed and finished to prevent the accumulation of dirt, reduce condensation and mould growth and prevent the shedding of particles
- Windows and other openings must be constructed to prevent the accumulation of dirt and, where necessary, be fixed closed during food production. In some cases, fly screens may be appropriate
- Doors should be easy to clean and made of smooth, non-absorbent material
- Surfaces, including equipment surfaces, must be maintained in sound condition, be easy to clean and, where necessary, to disinfect. They should be of smooth, non-toxic, washable materials
- There must be adequate facilities to wash and disinfect work tools and equipment

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Additional Requirements

- Moveable and/or temporary premises (including market stalls, marquees, domestic premises used for the preparation of food for sale, and vending machines) must be positioned, designed and constructed so that they can be kept clean and maintained in good repair and condition to avoid the risk of food contamination and harbourage of pests
- Where necessary, personal hygiene equipment and food washing facilities must be provided
- Food authorities can decide which materials are suitable for the construction of food premises and food equipment
- Articles, fittings and equipment which come into contact with food must be kept in good condition, be made of suitable materials and be kept clean and disinfected if necessary to minimise any risk of contamination; they must be installed in a way that allows for adequate cleaning of the surrounding area
- Waste must not accumulate in food rooms and must be deposited in closed containers which are easy to clean
- Refuse stores must be designed and managed in ways that allow them to be kept clean, that prevent access by pests and contamination of food, drinking water, premises or equipment

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Construction of Food Premises

Ceilings

Ceilings may be solid or suspended, but must be made from materials that are smooth, impervious, easy to clean, light coloured, not easily damaged by condensation and capable of supporting ventilation grills and pipework.

Suitable surfaces include plasterboard with taped joints, skimmed plaster and corrugated sheeting, provided that they are all treated so they may be cleaned easily.

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Construction of Food Premises

Walls

Smooth, impervious, non-flaking, light coloured and capable of being thoroughly cleansed - these are the key requirements for walls.

The surface should resist spills, chemicals, grease, heat and impact.

Pipework which passes through walls must be adequately sealed and any brackets must be easy to clean.

Suitable surfaces include glazed tiles, plastic sheeting, resin bonded fibreglass, stainless steel sheeting or splash backs behind sinks and worktops.

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Construction of Food Premises

Floors

When selecting a floor covering, the following should be considered:

- The volume and nature of the traffic e.g. fork lift trucks, foot traffic, pallets
- Whether the area is wet or dry
- How the area will be cleaned e.g. by steam
- What resistance will be necessary against chemicals e.g. acid, grease, salts
- Safety issues e.g. non-slip surfaces
- The type of sub-floor e.g. solid types are most suitable for tiled surfaces
- Adequate drainage facilities
- Coving to wall surfaces
- Suitable surfaces include epoxy resin, ceramic or quarry tiles, welded anti-slip and vinyl sheet

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Work Surfaces

Any work surface in a food room must be smooth, impervious, free from cracks and easy to clean.

Preparation surfaces should be at the correct height and provide a firm base on which to work.

If materials other than stainless steel are used (such as plastic laminate), care should be taken to seal all gaps between sheets of the material which could harbour food scraps.

The material must be able to withstand repeated cleaning without premature deterioration, pitting or corrosion.

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Services

Gas

Flexible connections (installed by a registered contractor) are recommended so that it is easy to clean around the supply pipes without the risk of damage.

Electricity

There should be an adequate number of power points.

Controls should be fixed clear of equipment to prevent them becoming dirty or wet during cleaning, and electrical wiring should be protected by waterproof conduit. Isolators and all switches should be flush fitted.

Water

There must be a good supply of potable water from the rising main.

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Services

Drainage

There must be sufficient drainage in good order and good repair. It must be laid to an adequate fall, and flowing from clean and high risk to dirty or raw. All gulleys must have traps, and grease traps may be necessary. Internal inspection holes should be double sealed.

Ventilation

The system should flow from clean to dirty areas. It must prevent excessive heat, condensation, dust and steam, and remove odours and contaminated air.

When planning a ventilation system, expert advice should be sought to ensure that food rooms will have the recommended number of air changes.

Good ventilation provides reasonable working conditions, reduces humidity and temperatures which encourage bacterial multiplication, and helps to reduce grease and the staining of ceilings, so reducing the need for frequent redecoration.

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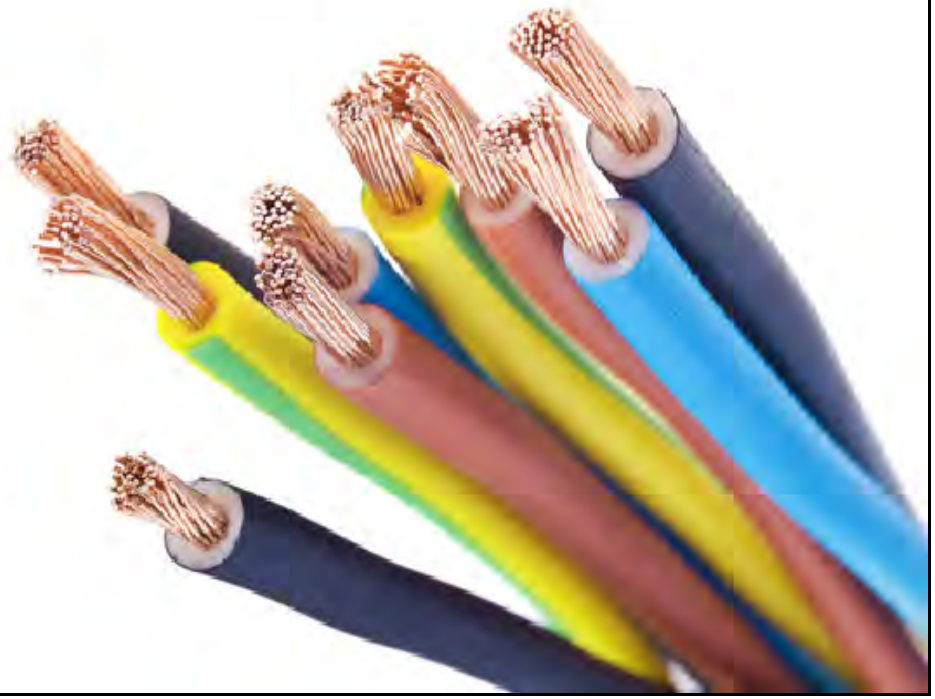
Design & Construction of Food Premises - Key Points

- The design, construction and maintenance of food premises are important aspects of the management of food safety
- Services, such as water and electricity, must be provided and be safe to use
- Walls, floors, ceilings and surfaces must be made from impervious materials and must be easy to clean and maintained in good condition
- Food equipment must also be impervious, non-absorbent, taint-resistant and easy to clean



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Design & Construction of Food Premises

Examples of supervisory management:

- Set a good example
- Help to set standards and create procedures, such as cleaning policies, maintenance standards, equipment condition standards, purchasing policies and design briefs for new building work
- Communicate standards and procedures to staff
- Train staff to clean and maintain both equipment and premises, and to report any damage
- Take appropriate cleaning and pest control measures
- Ensure the provision of resources such as time, materials, cleaning equipment, maintenance budgets, servicing and 24-hour call-out contracts for equipment, and pest control contracts

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Design & Construction of Food Premises

Examples of supervisory management:

- Monitor a range of records and practices, such as checklists for the condition of premises, equipment checklist for the cleaning and swabbing of surfaces and records for pest contractors' work and equipment faults
- Implement procedures
- Motivate staff to maintain standards through a variety of approaches, such as refresher training, staff meetings, check lists, posters, disciplinary action etc.
- Check (audit) and review the system
- Take any necessary corrective action

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Design & Construction of Food Premises

Back Submit

Regulation (EC) No.852/2004 - Annex II - (General Hygiene Requirements) food premises to meet certain standards - for instance, the premises must clean and maintained in good repair and condition.

Try again continuing.

Choose the right word or phrase to complete each of the following statements:

The layout, design and construction of premises must...

Column 1		Column 2
B	Allow for adequate _____	A) accumulation of dirt and contact with toxic substances
E	Protect food from _____	B) cleaning
A	Protect against _____	C) food
C	Protect against the shedding of particles into _____	D) condensation and mould
D	Protect against _____	E) cross contamination

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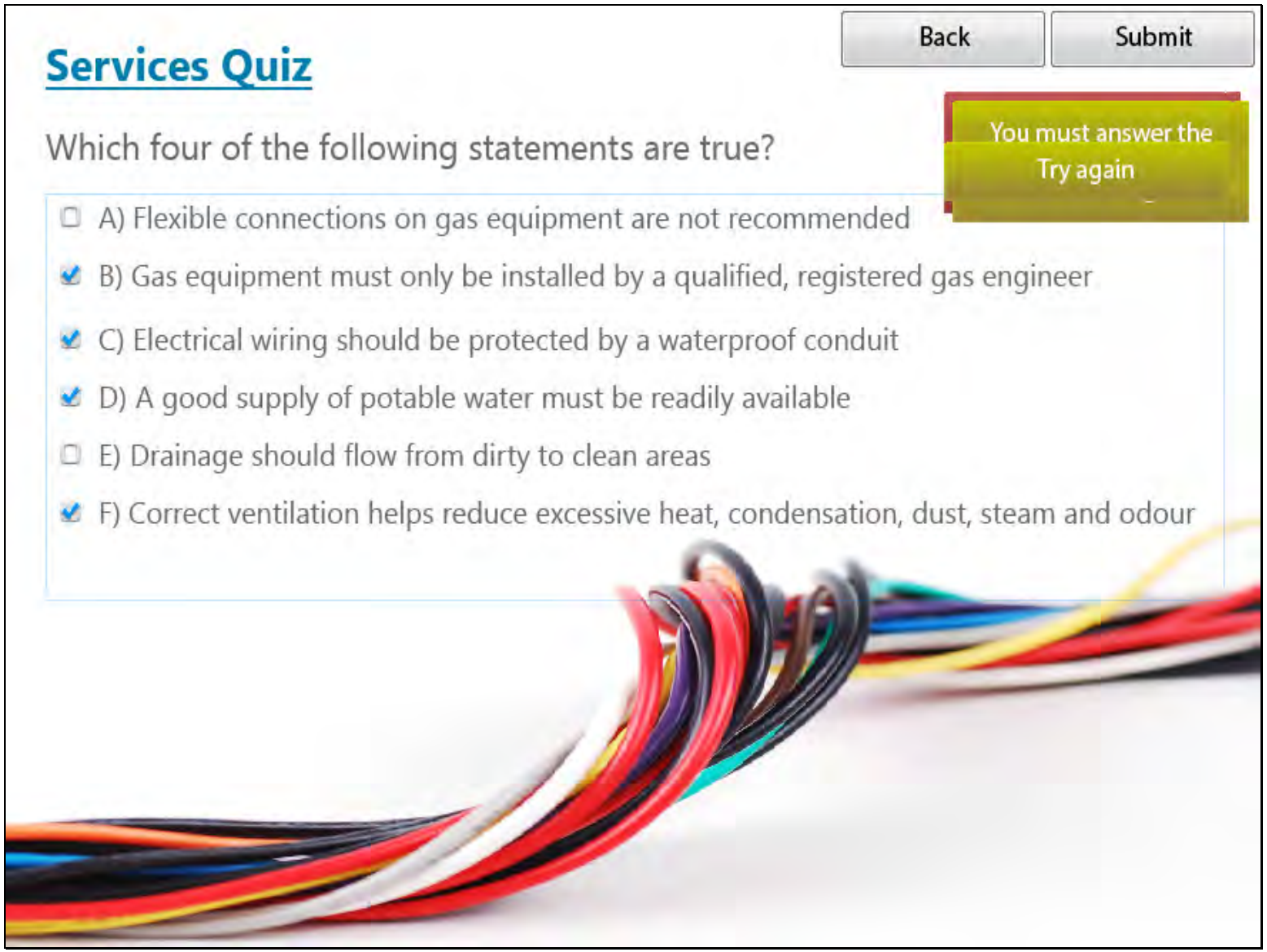

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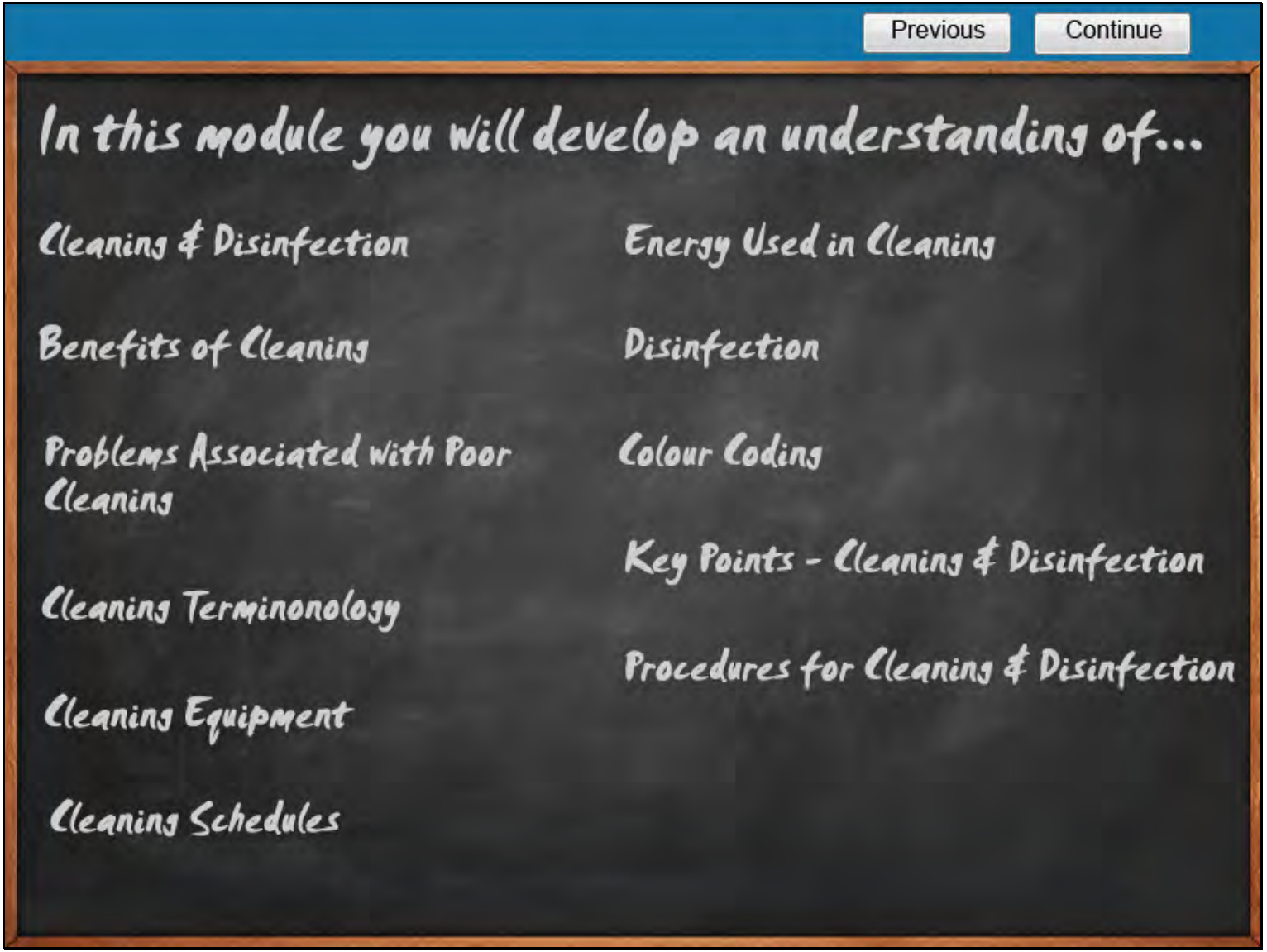

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Cleaning & Disinfection

Cleaning can be defined as the application of energy to remove dirt grease and other soiling.

It is essential to food safety as well as being a legal requirement for a food business.

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Cleaning & Disinfection

Bacterial contamination - when contaminated cleaning cloths are used, or when cleaning is inadequate.

Physical contamination - from brushes and cleaning cloths, or from inadequate cleaning of equipment and surfaces which may leave grease, burnt food and other food debris that could contaminate the next batch of food to be prepared.

Chemical contamination - from incorrect use of chemicals, inadequate rinsing, inappropriate use of chemicals which are not safe for food areas, unsuitable storage of cleaning chemicals close to food or decanting and storage of chemicals in food containers.

The Need for Cleaning

It is a legal requirement to keep premises, equipment, utensils and materials clean to help to ensure the safety of food. Effective cleaning can also have an important impact upon a business's reputation and profitability.

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Benefits of Cleaning

- Reducing the risk of food spoilage or food poisoning
- Removing materials and food that could provide harbourage and nourishment for pests
- Aiding the prompt discovery of pest infestation
- Preventing the physical contamination of food
- Ensuring that the working environment is pleasant, safe and attractive - in turn promoting economical and effective working methods
- Reducing the risk of accidents to customers, staff and others affected by the work
- Promoting a favourable image to customers
- Ensuring working efficiency by reducing damage to equipment and services and reducing maintenance costs

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Problems Associated With Poor Cleaning

- The loss of product quality with a reduced shelf life, leading to:
  - Customer complaints
  - Loss of reputation
  - Food poisoning and foodborne disease
  - Loss of sales
  - Legal proceedings
- Wasted food and the need to remake food
- Contaminated food, including tainted food
- Corrosion and premature replacement of equipment
- Production breakdowns (for example, the incorrect use of cleaning chemicals could damage machinery)
- Deterioration of floor surfaces and drainage systems
- Non-compliance with the law (legislation states that food premises must be kept clean and maintained in good repair)

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Cleaning Terminology

Bactericide - a substance that destroys bacteria.

Cleaning - the removal of soil, food residue, dirt, grease and other objectionable matter.

Detergent - a chemical, or mixture of chemicals, which helps to remove grease and food particles so that surfaces are prepared for disinfection.

Disinfectant - a chemical, or heat in the form of water or steam, used for disinfection.

Disinfection - the reduction of microorganisms to a level that will not lead to harmful contamination or to the rapid spoilage of food. The term usually refers to the treatment of surfaces or premises but may also be applied to aspects of personal hygiene, such as disinfection of the skin.

Sanitiser - a chemical used for cleaning and disinfecting surfaces and equipment.

Sterilisatlon - a process that destroys all microorganisms.

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Cleaning Equipment

There are many types of cleaning equipment and cleaning systems including:

- Clean In Place (CIP) for certain types of equipment, such as beer lines in a pub
- Sinks and tanks
- Hand aids, such as cloths, brushes, mops and buckets
- Mechanical aids, such as vacuum cleaners, steam cleaners, dishwashers and low pressure jet washers, which may be used in combination with a foam for cleaning walls and other surfaces in high risk areas

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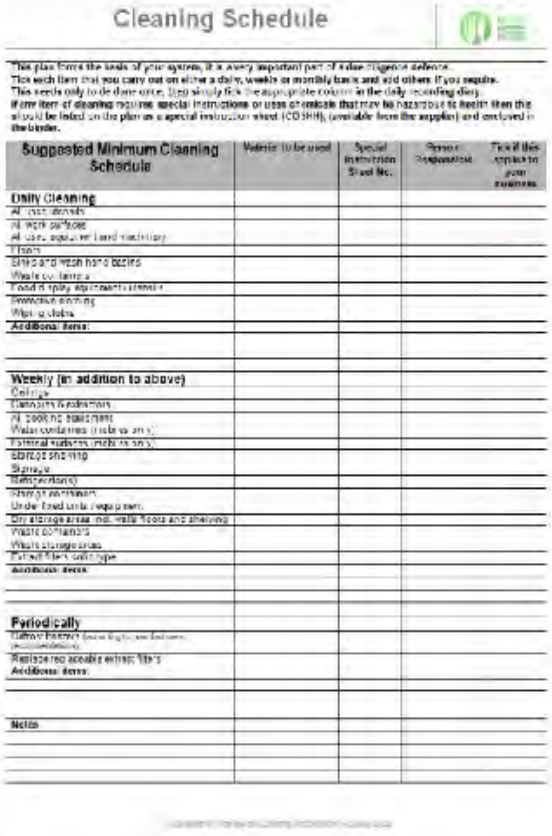
Cleaning Schedules

Cleaning schedules help to communicate standards and to ensure that cleaning is carried out and managed effectively.

Cleaning schedules should include:

- Items and surfaces to be cleaned
- Name of the employee or job title of the person who must carry out the cleaning task
- When the cleaning must be done
- Method of cleaning and the standard to be achieved
- Time required for the task
- Chemicals, materials and equipment needed
- Safety precautions to be taken and the protective clothing and equipment to be worn, such as goggles and gloves
- Signature of the person who carried out the task
- Signature confirming that the work has been checked

There must be a monitoring and inspection system to ensure that the cleaning schedule is followed and that standards are maintained. Checking may include the use of rapid bacterial tests or swabbing.


Cleaning Schedule

Suggested Minimum Cleaning Schedule				
Daily Cleaning				
Additional items:				
Weekly (in addition to above)				
Additional items:				
Periodically				
Additional items:				
Notes				

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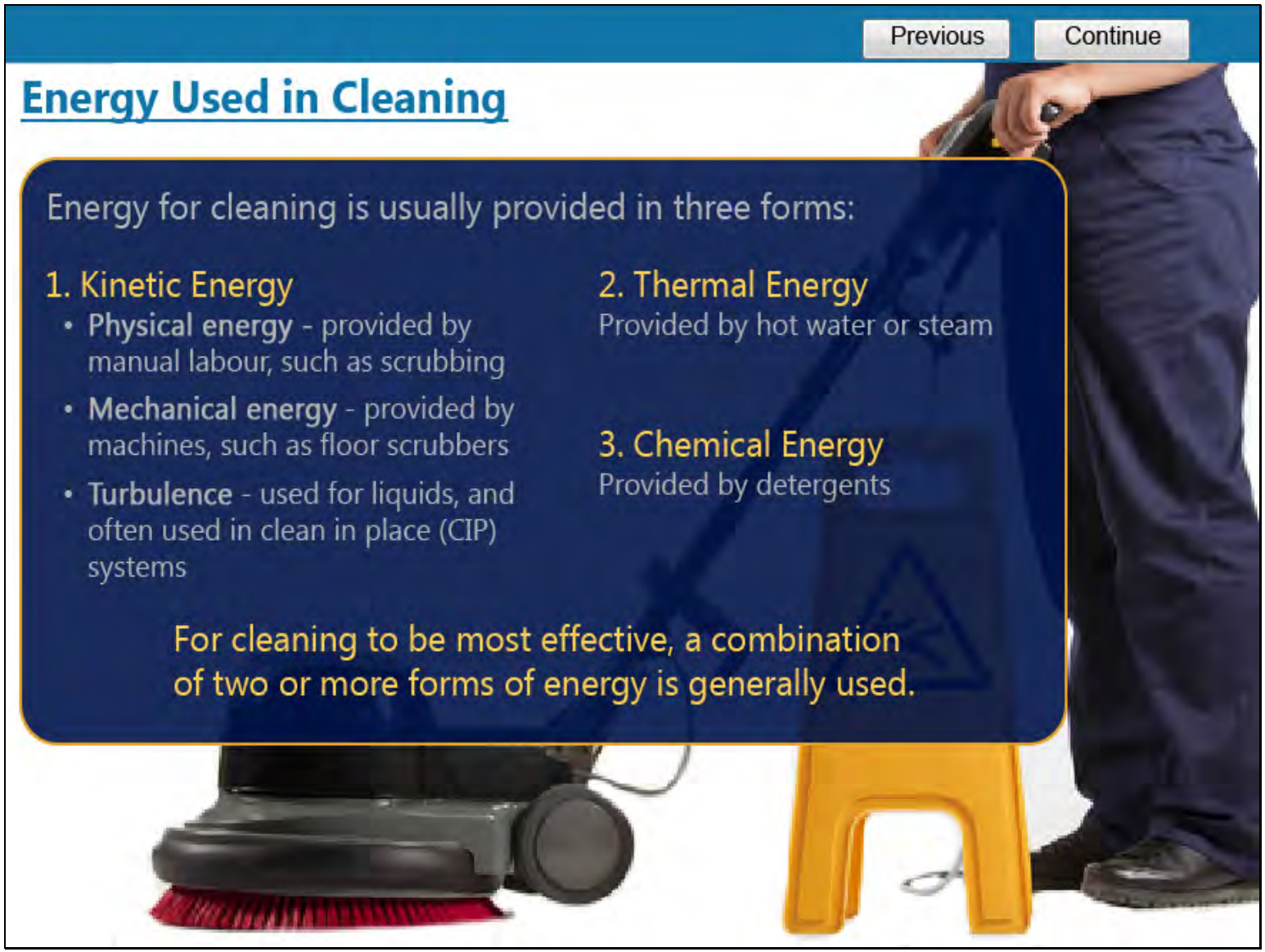

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Disinfection

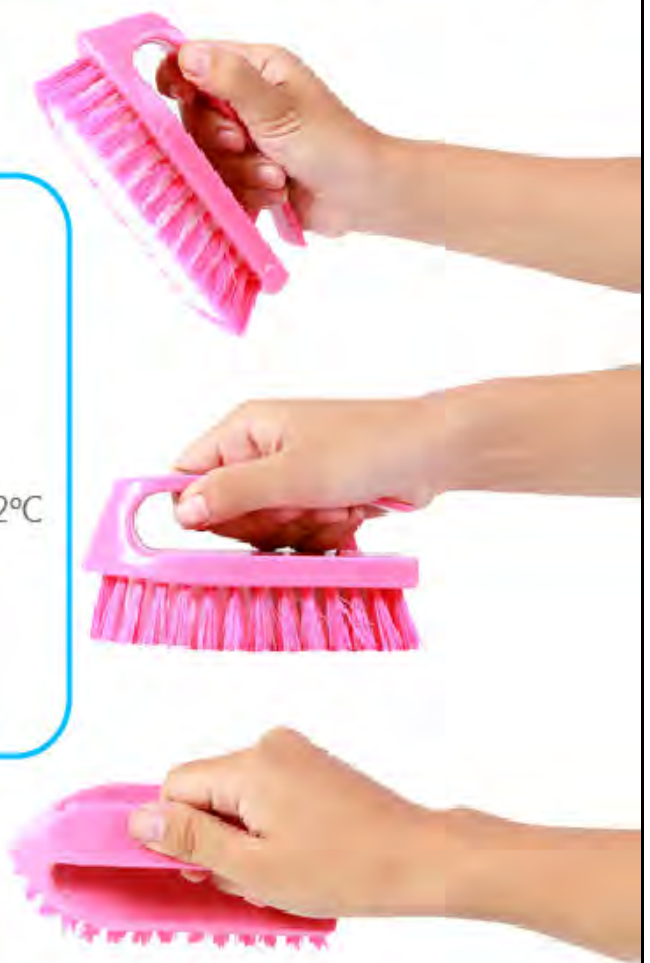
The process of disinfection reduces pathogenic bacteria (but not spores or toxins) to levels that are neither harmful to human health nor to the quality of food.

Disinfection may be carried out using:

Heat - Preferably moist heat, at a temperature above 82°C

Steam

Chemicals - Either separately or in combination



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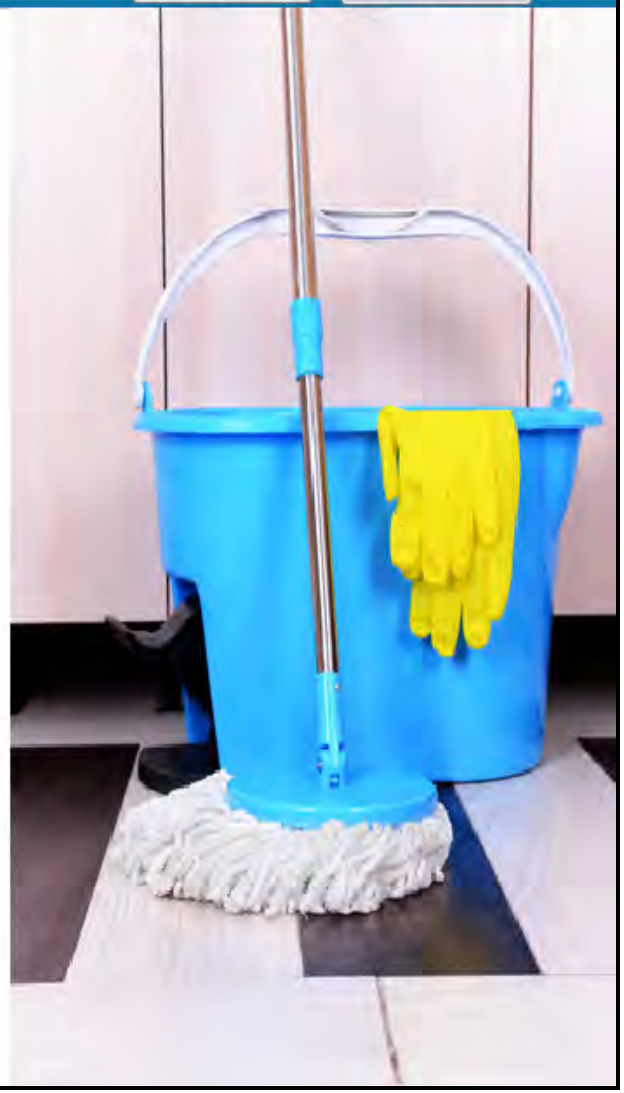
What To Disinfect

Surfaces where the levels of microorganisms present may have an adverse effect on the quality or safety of food should be disinfected regularly.

Such surfaces include:

- Hand contact surfaces - such as tap and door handles (including refrigerator and oven doors), light switches, telephones, toilet seats and nail brushes
- Food workers' hands - disinfection may be achieved by the use of bactericidal soap or alcohol based disinfectants or both
- Cleaning materials and equipment - such as mops, cleaning cloths, scrapers and brushes



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Guidelines for Disinfection

- Disinfection needs to be carried out carefully to ensure that it is successful and safe, and does not introduce any food safety hazards
- Ensure that chemicals used in food areas are food safe
- Read the manufacturer's instructions and make sure that you understand them before using the disinfectant
- Always follow the manufacturer's instructions
- Make up the solution to its specified strength, using measured amounts of chemicals and water
- Never mix different chemicals

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Guidelines for Disinfection

- Rinse away all traces of detergent from clean surfaces before attempting to disinfect them, otherwise the disinfectant will not be able to work properly
- Use a fresh solution of disinfectant every time you carry out a cleaning task and do not be tempted to top up an existing solution
- Do not soak mops or cloths in disinfectant solutions for long periods, such as overnight, because the solution weakens and may allow bacteria to grow
- Always leave disinfectants on a surface for the contact time recommended by the manufacturer
- Rinse thoroughly, unless the manufacturer's instructions state that rinsing is unnecessary

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Colour Coding

Colour coding can be used to identify clearly which equipment should be used in certain areas, thereby reducing the risk of cross-contamination.

Different colours can be used for equipment for sanitary areas and for high and low risk storage, production or preparation areas.

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Procedures for Cleaning & Disinfection

The process of cleaning and disinfection involves six basic stages:

1. Pre-clean: removal of loose soil by wiping, scraping, rinsing or soaking
2. Main clean: loosening the remaining soil by the use of detergents and manual labour
3. Intermediate rinse: removal of soil and chemicals
4. Disinfection: reduction of the remaining bacteria to a safe level
5. Final rinse: removal of the disinfectant
6. Drying: either natural (for example, air drying) or physical (for example, using disposable paper towels or a clean dry cloth)

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Procedures for Cleaning & Disinfection

If the soiling is light, the pre-clean may be combined with the main clean.

Disinfection may not be necessary on all surfaces. When disinfectants are used, disinfection may be incorporated in the main clean using a chemical sanitiser.

This creates a four stage process:

1. Pre-clean
2. Main clean and disinfection
3. Rinse
4. Dry

Some types of equipment need to be completely or partly dismantled to allow satisfactory cleaning. Electrical safety must be checked before machines are cleaned.

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Cleaning & Disinfection - Key Points

- Cleaning is the removal of soil and disinfection is the reduction of microorganisms to an acceptably safe level
- A sanitiser is a chemical used for cleaning and disinfecting in the same process
- There are six stages of cleaning: pre-wash, main wash, rinse, disinfect, rinse and dry
- Cleaning schedules are a written communication of standards of cleaning
- Cleaning involves methods which are proactive, such as cleaning schedules, and reactive, such as clean-as-you-go tasks
- Cleaning safeguards food, reduces waste, promotes a good image and complies with the law
- Supervisors assist in creating cleaning schedules and in monitoring cleaning standards, taking corrective action as necessary

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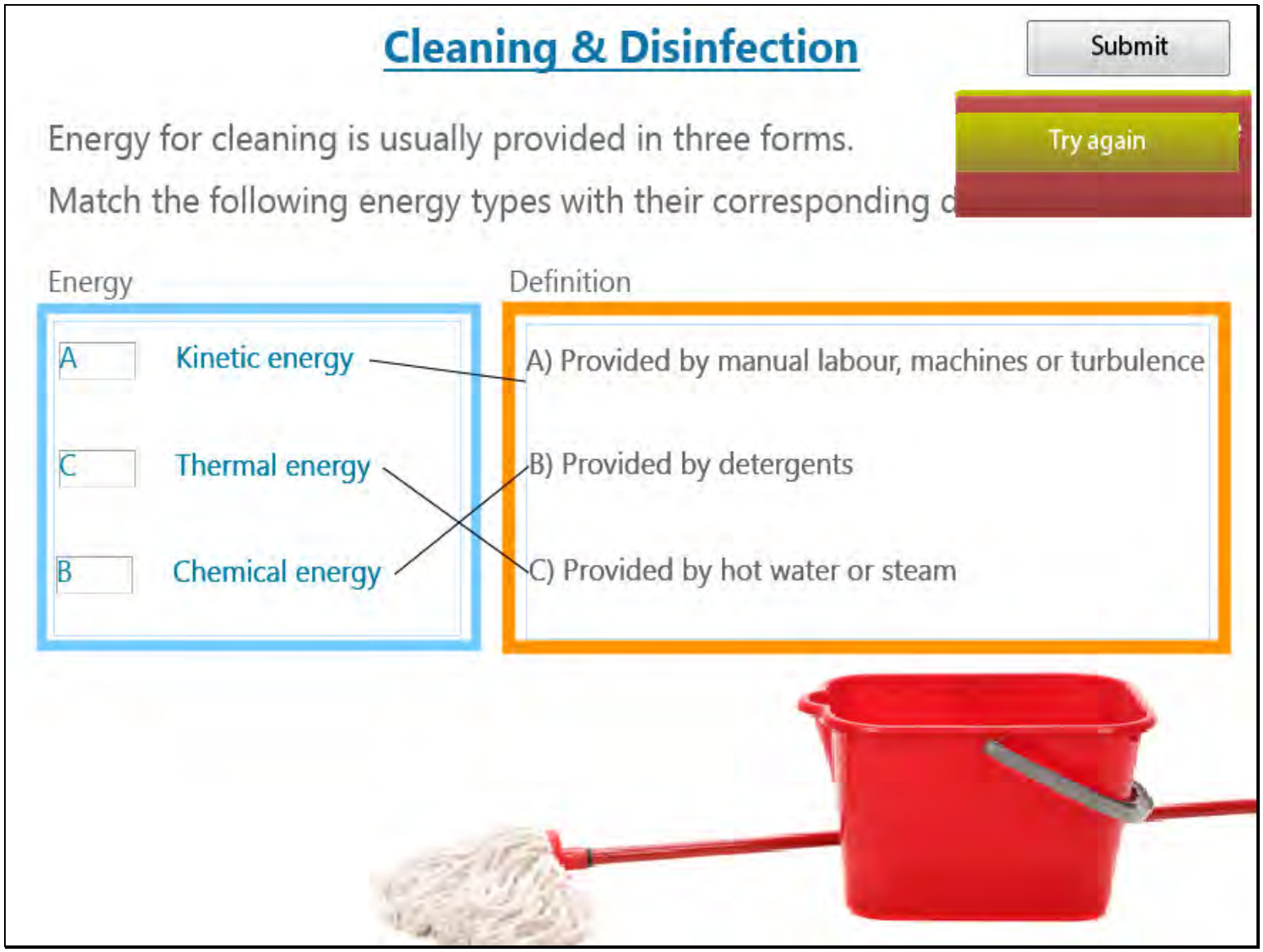

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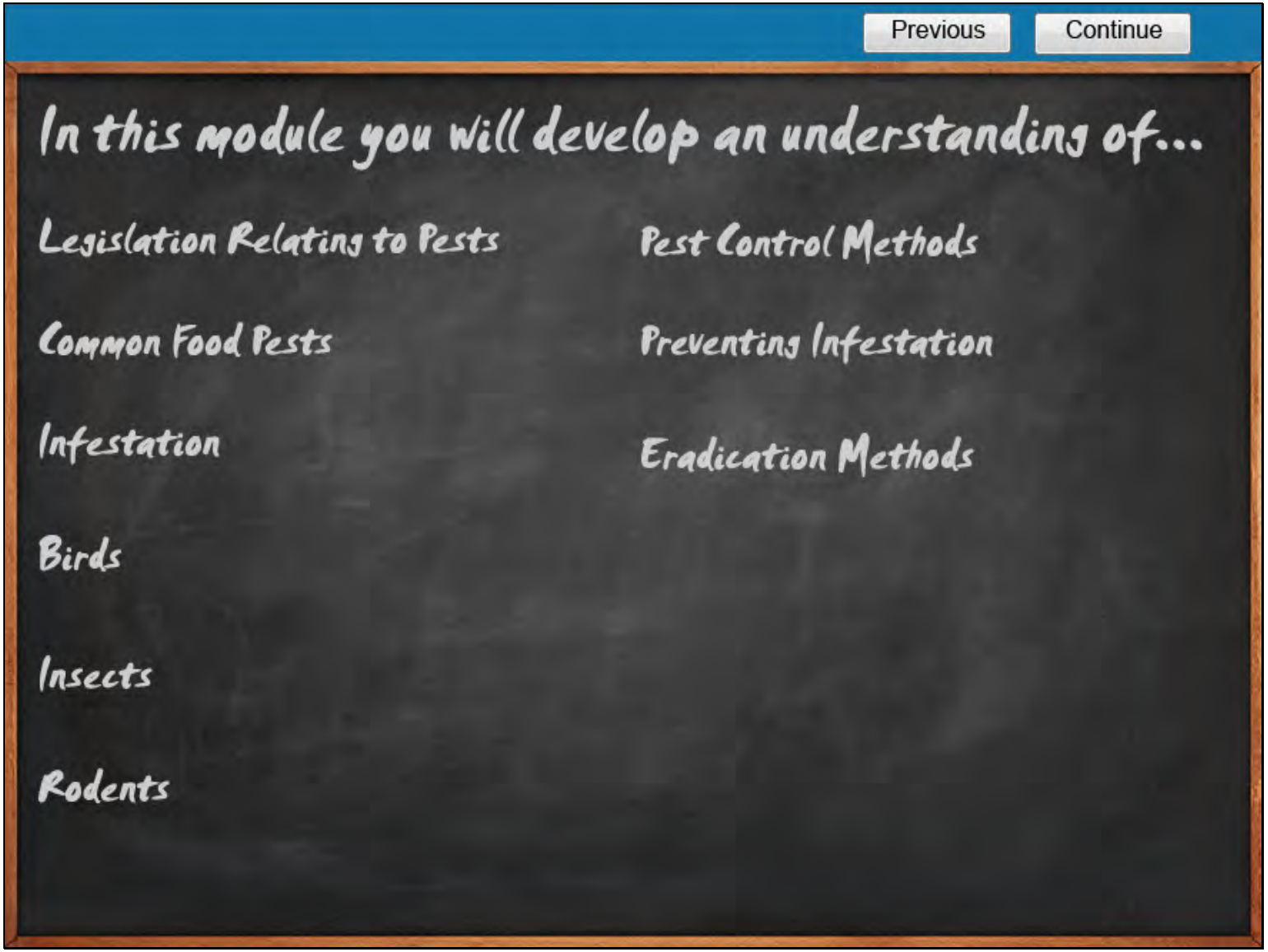

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Legislation Relating to Pests

The Prevention of Damage by Pests Act 1949 requires all local authorities and occupiers or owners of land to take steps to ensure that the district is kept free from rats and mice.

Infestation by insects or mites must be reported to DEFRA by the land owner.

It is an offence under the Food Safety Act 1990 to sell unfit or contaminated foods - and pests compromise food safety.

Food premises with a serious pest infestation may be shut down under closure procedures.

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Food Pests

Food pests cause thousands of pounds of damage every year to food premises and business reputations, while infestations are a major reason for enforcement action and prosecution. However, every food organisation can take steps to prevent an infestation.

Methods of control include environmental, physical and chemical measures.

Potential Hazards from Pests and Pest Control:

- **Bacterial Contamination** from bacteria on pests and excreted by them
- **Cross-Contamination** from bacteria left by pests on food contact surfaces
- **Physical Contamination** from pests' bodies, eggs, hair, droppings etc.
- **Chemical Contamination** from careless use of insecticides and rodenticides, or from residual insecticides

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Common Food Pests

A food pest is any living creature capable of contaminating food directly or indirectly.

Common pests in food businesses include:

Birds
Such as sparrows and pigeons

Insects
Such as flies, cockroaches, psocids (booklice), ants and stored product insects

Rodents
Such as rats and mice

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Common Pests

Food pests must be controlled because:

- It is a legal requirement
- They carry disease
- They cause food wastage
- They cause customer complaints
- They damage buildings and fittings

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Infestation

If you discover a pest infestation, you must take immediate action to deal with it.

The steps you take will depend upon your job responsibilities and training, but may include:

- Closing the premises
- Finding the cause of the infestation and ensuring it won't recur
- Ensuring that contaminated food is removed and destroyed
- Arranging for the premises to be cleaned thoroughly
- Ensuring that food is removed before chemical sprays are used
- Checking that surfaces and equipment are cleaned after treatment and before being re-used so food does not become tainted
- Organising the treatment, and any necessary repeated treatment of the premises by competent pest control operatives
- Inspecting the premises for maintenance defects and ensuring that effective repairs are carried out promptly

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Infestation

The manager or owner of a food business must ensure that any contracted pest control companies are competent and that the managers or owners are kept informed of any surveys and action taken.

A written record should be made about each visit and should be kept by the food business.

Using contractors does not remove or reduce a company's legal responsibility if pests contaminate food.

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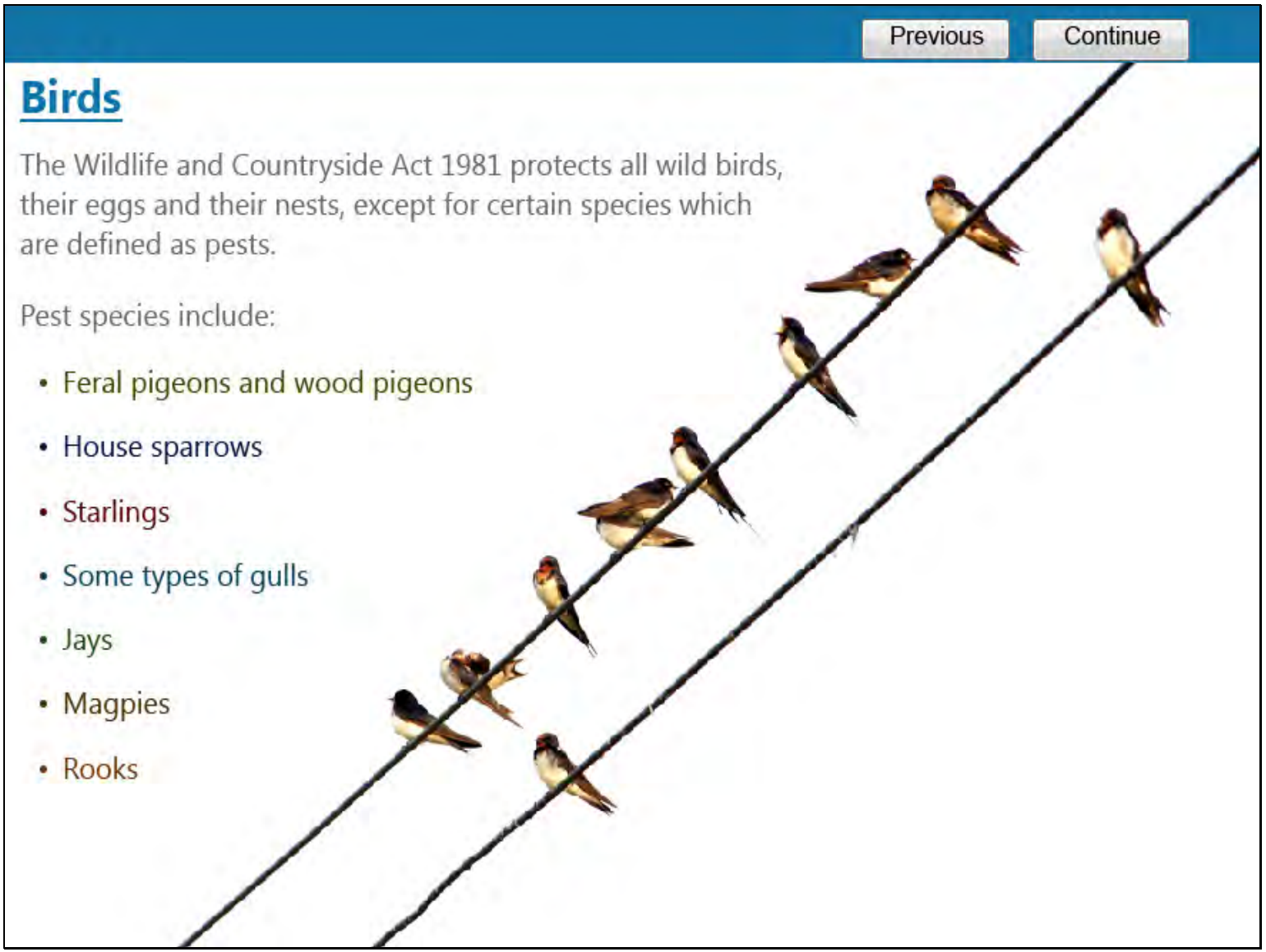

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Birds

Controlling pest birds will help prevent:

- Contamination of food or equipment by droppings, feathers and nesting materials which carry insects and mites
- Transmission of food poisoning microorganisms, such as Salmonella
- Blocked gutters which may result in flooding, and expensive repairs and maintenance
- Defacement of buildings (bird droppings contain an acid which attacks stone and paint)
- Roosting on fire escapes and similar structures, causing a safety hazard
- Non-compliance with legal requirements

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Birds

Environmental control of birds

Thick, inert gels and sprung wires discourage birds from perching and roosting on buildings by making them feel insecure.

Bird scaring devices include loud bangs, flashing lights and distress calls, but birds tend to ignore them after a while.

Physical control of Birds

Baited traps with non-return doors may be used for pigeons. Air rifles may be used, but food must be protected from metal pellet contamination.

Subject to a licence from the Ministry of Agriculture, Fisheries and Food (MAFF), mist netting may be fixed in the flight paths of birds, provided trapped protected species are released and pest species are killed by humane methods.

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Insects

Insects including flies, cockroaches and stored product pests, such as beetles, weevils, psocids and mites need to be controlled.

The main reasons insect infestations must be controlled are:

- It is a legal requirement
- Insects can attack and destroy large quantities of food
- They can contaminate food by their bodies, droppings, webs and eggs
- Many insects and cockroaches carry food poisoning bacteria

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Insects

Flying insects (for example, houseflies, bluebottles, fruit flies etc.) can infect food by:

- Regurgitating partly digested food and enzymes as they eat
- Physically contaminating food with their bodies, eggs etc.
- Continually defecating
- Carrying bacteria, such as Salmonella

Cockroaches can carry various pathogens including Staphylococci and Salmonellae.

They may also contaminate food with their moult debris, dead bodies and faecal pellets.

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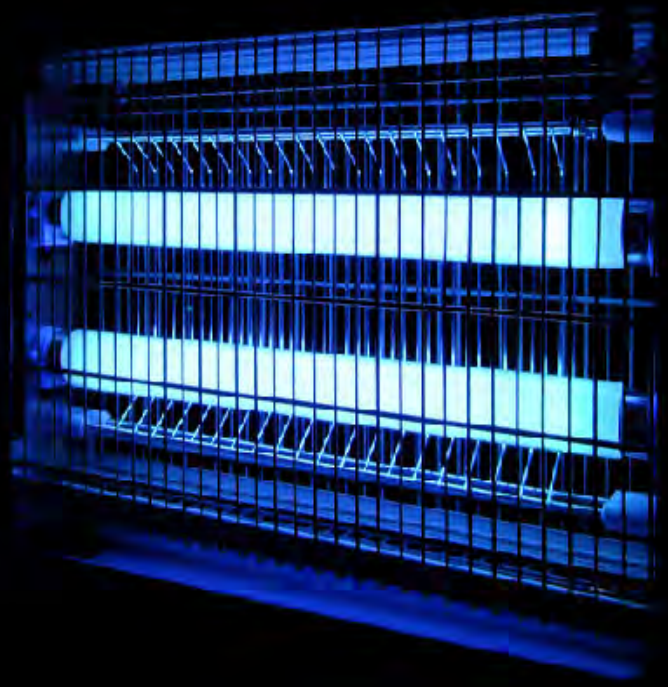
Physical Control of Insects

Sticky boards may be used to check for insect infestation. Sticky fly paper, without chemicals, can be used in areas where the public are not admitted.

Electrocuting fly killers may be used to kill flying pests which are attracted to a charged grid by ultraviolet light. Care must be taken when positioning electrocutors, to ensure that dead flies cannot fall or be blown into food.



Electrocutors are most effective when placed away from windows and fluorescent light and properly maintained. They should not be used where there are high concentrations of flour, sugar, dust or custard powder because of the risk of explosion.

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Chemical Control of Insects

Insecticides may be used as a spray or contact dust, in a gel or included in bait.

Thermal vaporisers, dichlorvos strips or residual insecticides must not be used in food rooms, because the substances they emit may contaminate food, as may the bodies of the dead insects.

Residual insecticides may be used in food rooms if all food and equipment is removed or covered. However, thorough cleaning must take place before the room is used for food again.

Fumigation may be necessary if stored product insects are found.

Insecticidal lacquer bands may be used on walls and around doors, and insect growth regulators and pheromones to attract insects may be used for long-term control.

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Rodents

Rats and mice should be controlled because:

- They can spread disease caused by food poisoning bacteria (such as Salmonella) that is carried on and in their bodies
- Food may become contaminated by rodent urine and droppings, which can lead to Weil's disease (leptospirosis) and other illness
- Rodents can be carriers of parasites, including the cysts of Trichinella spiralis, a worm that lives in rats' intestines - this parasite particularly affects raw pork and may survive when the meat is not cooked thoroughly
- Rat bites pose a health risk to humans

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Guidelines for the Prevention of Pest Infestation

- Remove unused equipment, vegetation and other harbourage areas from the site
- Move and regularly check unused equipment and packaging
- Keep all food in rodent proof containers and always replace lids
- Check all raw materials (including packaging, equipment and food) on arrival and before they are stored
- Ensure that outside areas are tidy and not overgrown with vegetation

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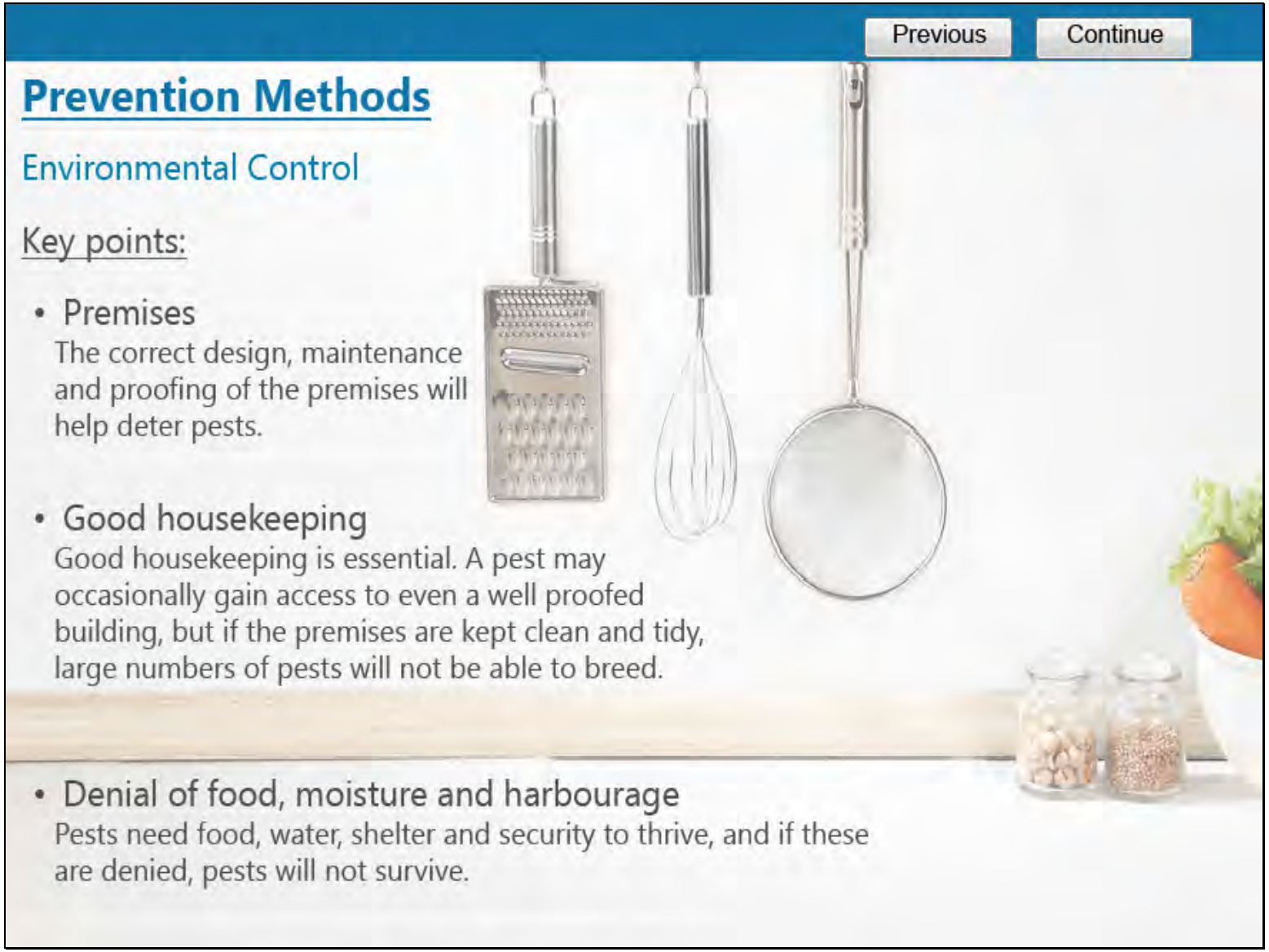

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Prevention Methods

- Correct storage of food and packaging
  Pay special attention to staff changing rooms, locker rooms, dining areas, lift shafts, food stores and waste areas. All spills of food and liquid should be cleared up immediately.

- Waste disposal
  Waste should be removed and disposed of in a hygienic manner. Bins must have well fitting lids and be of an adequate size.

- Water
  Removing sources of water will aid control. This includes things such as dripping taps, leaking roofs and damaged gutters.

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Prevention Methods

Denial of access includes ensuring that:

- Doors are well fitting and are kept closed unless in use
- Windows have insect screens and air bricks have a wire mesh behind them
- The building is well maintained so that no holes are left, for instance, around pipes
- False ceilings, ducting and boxed-in pipework have internal access points
- Cavities in internal walls have been avoided
- Cupboards, equipment and preparation tables can be moved for cleaning and inspection

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Eradication Methods

If pests gain access to food premises, they must be destroyed by physical or chemical methods.

When physical methods are used, the pest is caught and removed so the risk of food contamination is eliminated. However, if the infestation is large, physical control may be too slow and ineffective, so chemical methods are used.

When chemicals are used, pests may not die immediately and they may contaminate food if precautions are not taken. The use of chemicals must be carefully controlled to prevent chemical contamination of food.

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Physical Control

Methods of Physical Control include:

- Traps
- Sticky boards
- Electrocuting fly killers
- Thick inert gels (to deal with birds)
- Sprung wire systems (to deal with birds)
- Bird scaring devices
- Sticky flypapers
- Shooting
- Mist netting
- Tracking powder

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Chemical Control

Methods of Chemical Control include:

Rodenticides

These can be either acute (when a single bait is used, for instance, in sewers) or chronic (multiple baits used in food premises over a period of time).

Insecticides

Some sprays may be used for cockroach control, providing that all food is protected from contamination. Although dichlorvos strips are unsafe for use in food rooms, some residual insecticides may be suitable.

Narcotising Drugs

This type of chemical control is most commonly used for birds.

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Methods of Pests Control - Summary

Pests need to be controlled to prevent the introduction and spread of bacteria, disease and physical hazards.

Pests may be controlled by a variety of methods:

Environmental

Physical

Chemical

Environmental methods are usually used to prevent pest infestation, while physical and chemical methods are usually used to treat infestations.

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Pest Control

Examples of supervisory management:

- Help set standards for stock control, cleaning, good housekeeping, waste control, building repair and maintenance and creating procedures for preventing and eliminating infestation
- Control of pest contractors and surveys of the premises
- Communicating standards and procedures to staff
- Creating and maintaining checklists for maintenance, cleaning schedules, stock delivery, stock rotation and surveys of the premises, signs of pests, reporting procedures, good housekeeping, stock control, cleaning, waste control
- Training staff to identify and report signs of pest infestation, and to use stock rotation, good housekeeping and effective pest prevention methods

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Pest Control

Examples of supervisory management:

- Ensuring the provision of resources such as cleaning and proofing materials and checklists
- Supervising pest control contracts, the regular inspections for signs of pests, the checking of deliveries and physical and environmental controls, such as fly screens and electrocutors
- Monitoring a range of records and practices, such as contractor's pest book and surveys for infestation
- Using a variety of approaches, such as refresher training, staff meetings, check lists, posters and even disciplinary action, to motivate staff to maintain standards
- Checking, auditing and reviewing the system
- Taking any necessary corrective action

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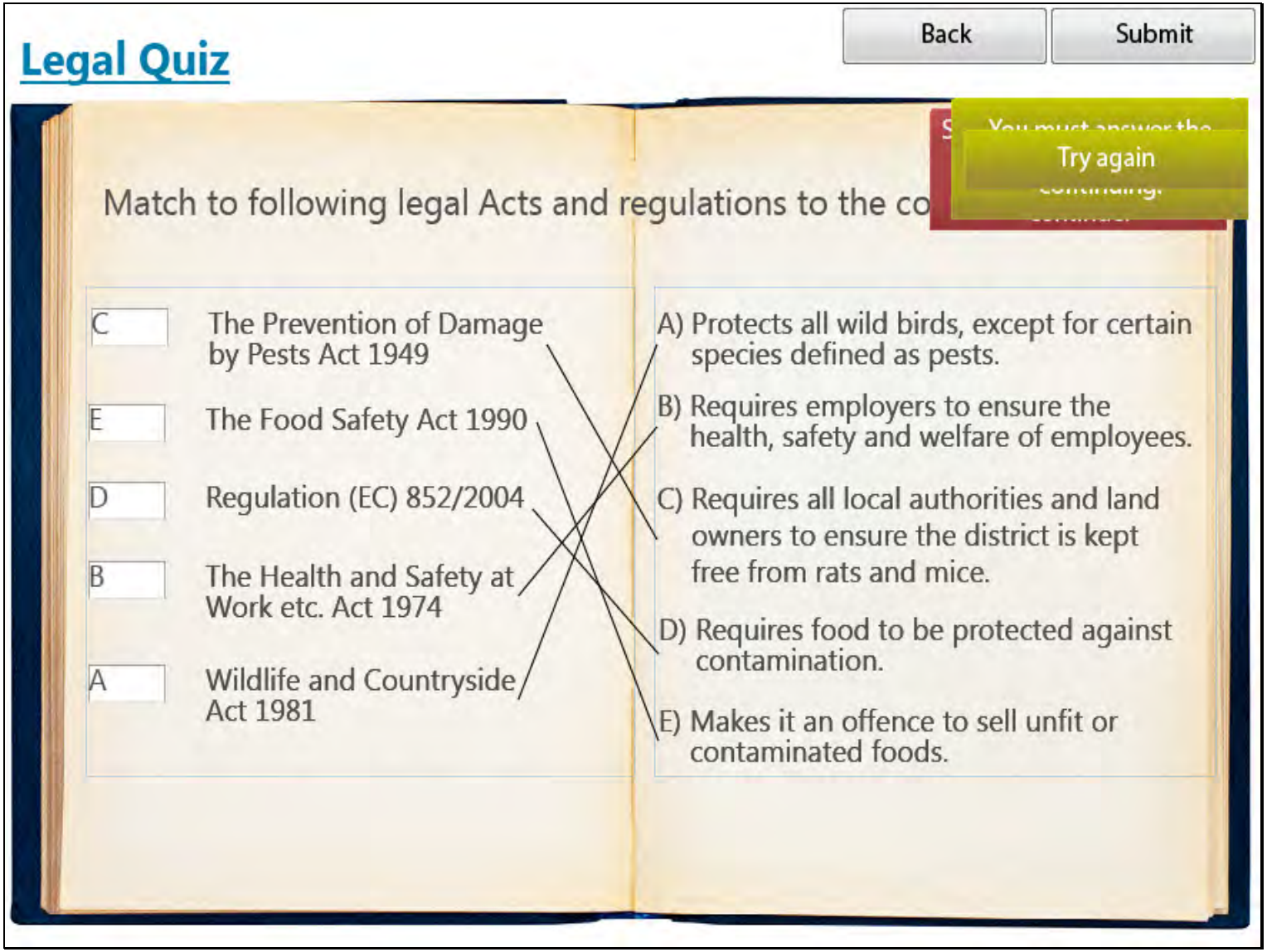

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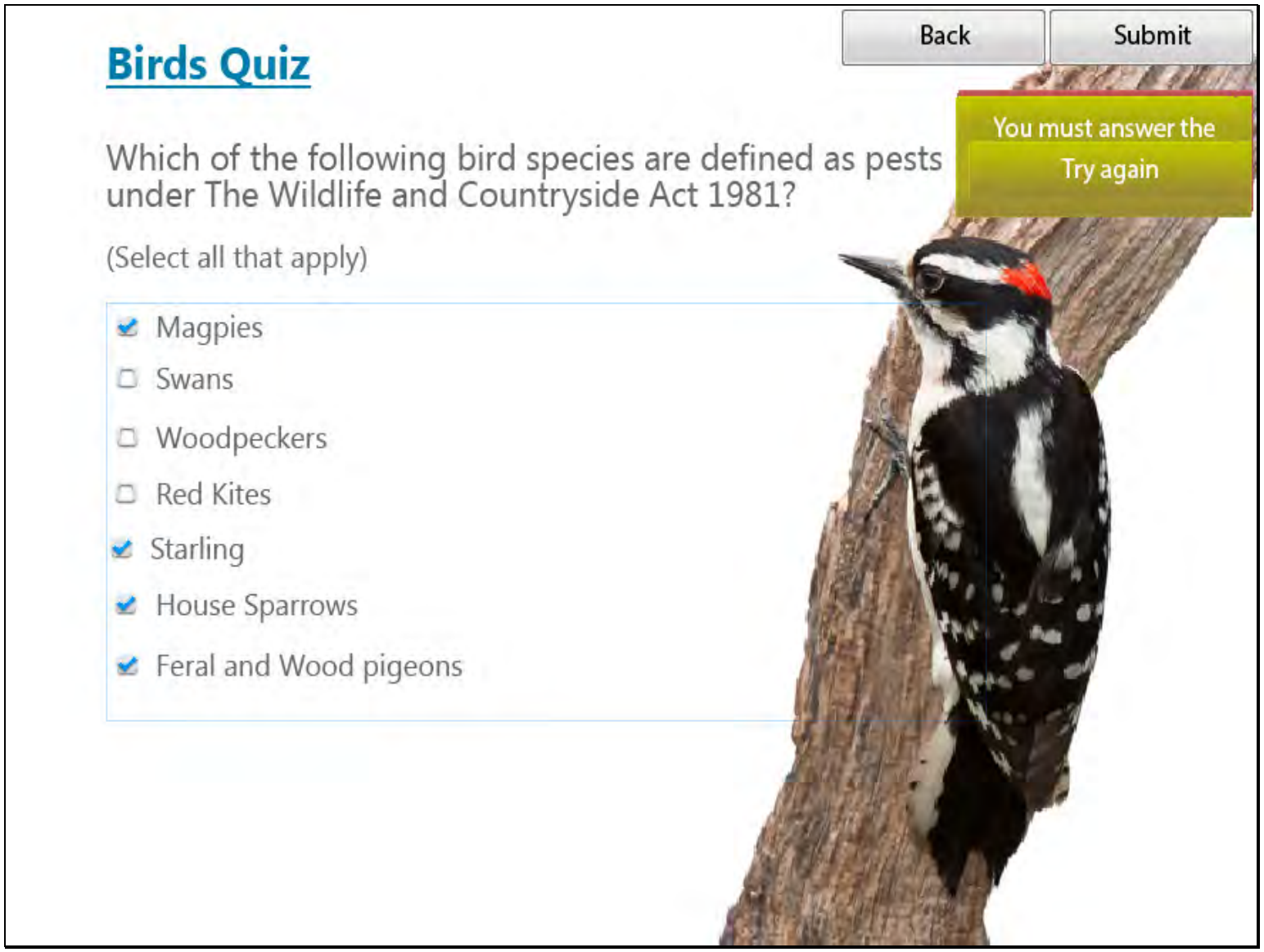

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Pest Prevention Quiz

Back Submit

Which of the following are key elements of pest prevent

Try again

(Select all that apply)

- [x] A) Correct design of premises
- [x] B) Regular cleaning and maintenance of premises and equipment
- [ ] C) Large, open bins for waste
- [x] D) Fix and maintain any leaking taps or water sources
- [x] E) Store food in closed containers, off of the ground
- [x] F) Make sure doors and windows have adequate seals and screening
- [ ] G) Remove waste from food preparation areas only at the end of the day

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Food Safety Management & HACCP

In the European Union, food business operators have a legal responsibility to implement a food safety management system based on the principles of HACCP (Hazard Analysis Critical Control Points).

HACCP was developed in the 1960s by the Pillsbury Company, Natik and NASA to guarantee the safety of food intended for astronauts.

The problem faced was how to guarantee 100% safe food for the astronauts to consume. It was recognised that food poisoning in space could cause untold medical complications. These complications would require medical intervention, which would not be available.

HACCP has become a requirement for food trade between countries across the globe and in 2006 the European Union made HACCP-based systems a legal requirement in all food businesses.

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Why is this Approach Better?

Traditionally, food businesses would check that the food they had produced was safe by testing some of it after it had all been produced – 'end-product testing'.

This approach has its limitations, as it is possible for some unsafe food to pass through undetected. In the case of some high risk products (e.g. cream), by the time the test results were received, the unsafe food would have already been consumed.

The HACCP approach is favourable, as it shifts the emphasis of control from end-product testing and inspection, to identifying food safety hazards and risks and eliminating them prior to, or during production.

HACCP systems prioritize controls, meaning that resources are concentrated on the points critical to food safety; for example, cooking, cooling and storage of high risk food.

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Advantages of HACCP

There are many advantages of managing food safety using the HACCP system.

Advantages include:

- HACCP is proactive - remedial action is taken before serious problems occur
- It's cost-effective - resources are targeted to where they are most needed
- HACCP complies with legal requirements
- Risk of food poisoning and food complaints is reduced (brand protection)
- Demonstrates management commitment to food safety - part of a hygiene culture
- It is useful to demonstrate due diligence

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HACCP Terminology

Control Measures: Actions or activities required to prevent or eliminate a food safety hazard or reduce it to an acceptable level.

Corrective Action: The action to be taken when results of monitoring at a critical control point indicate loss of control, i.e. a critical limit is breached.

Critical Control Point: A step in the process where control can be applied and is essential to prevent or eliminate a food safety hazard or reduce it to an acceptable level.

Critical Limit: A monitored criterion which separates the acceptable from the unacceptable.

Decision Tree: A sequence of questions to determine if a step in the process is a critical control point.

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HACCP Terminology

Deviation: Failure to meet a critical limit.

Flow Diagram: A systematic representation of the sequence of steps or operations involved with a particular food item or process, usually from receipt of raw materials to consumer.

Food Safety Management System: The policies, procedures, practices, controls and documentation that ensure the food sold by a food business is safe to eat and free from contaminants.

HACCP (Hazard Analysis Critical Control Points): A food safety management system which identifies, evaluates and controls hazards which are significant for food safety.

HACCP Team: A group of people with appropriate expertise who develop and implement a HACCP system.

Hazard: A biological, chemical or physical agent in, or condition of food, with the potential to cause harm to the consumer.

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HACCP Terminology

Hazard Analysis (Codex Alimentarius): The process of collecting and evaluating information on hazards, and conditions leading to their presence, to decide which are significant for food safety and therefore should be addressed in the HACCP plan.

Monitoring: The planned observations or measurements of control parameters to confirm that the process is under control, and that critical limits are not exceeded.

Prerequisite Programmes: The good hygiene practices that a food business must have in place before implementing HACCP, to enable the HACCP plan to concentrate on the most significant hazards.

Risk: The likelihood of a hazard occurring in food.

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HACCP Terminology

Target Level: A control criterion that is more stringent than the critical limit, and which can be used to reduce the risk of a deviation.

Tolerance: The specified degree of latitude for a control measure, which, if exceeded, requires immediate corrective action.

Validation: Obtaining evidence that elements of the HACCP plan are effective, especially the critical control points and critical limits.

Verification: The application of methods, procedures, tests and other evaluations, in addition to monitoring, to determine compliance with the HACCP plan (includes prerequisite programmes).

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Prerequisite Programmes (PRPs) for HACCP

HACCP is not the only system in a food business to manage food safety.

There are many general procedures common to most businesses, designed to control general food safety hazards found in the food production environment.

These procedures are commonly referred to as prerequisite programmes (PRPs).

In the first place, premises must be safely designed and constructed and have the necessary facilities and equipment to produce safe food.

Management must be committed to the introduction of HACCP, and ensure the provision of adequate resources and suitable facilities.

Also, prior to the implementation of an effective HACCP system, a business must be operating in accordance with good hygiene practice, or in the case of factories, good manufacturing practice, and comply with all relevant food safety legislation.

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Prerequisite Programmes (PRPs) for HACCP

Other PRPs for HACCP include:

- Approved suppliers
- Well designed, constructed and maintained premises and equipment
- Accurately calibrated equipment
- Product flow (should flow from the delivery of raw ingredients to the production of finished products, without risk of cross-contamination)
- Water and ice used in food production must be potable
- Staff must be trained commensurate with their work activities (they should have high standards of personal hygiene, especially in relation to handwashing)
- A health and exclusion policy should exist to screen new employees and ensure that food handlers with diarrhoea and/or vomiting do not handle food until they are symptom-free for at least 48 hours, and that when they return to work, they can be relied on to thoroughly wash their hands after using the toilet

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Prerequisite Programmes (PRPs) for HACCP

Other PRPs for HACCP include:

- Effective planned cleaning and disinfection, and the use of cleaning schedules for monitoring purposes
- Thorough washing and disinfecting of all ready-to-eat fruit and salad vegetables
- Effective waste management
- Integrated pest management
- Effective waste management
- Stock rotation
- Labelling, traceability and recall procedures
- Good hygiene practices prevent some microbiological contaminants and the majority of physical and chemical contaminants that could occur in catering and retailing operations

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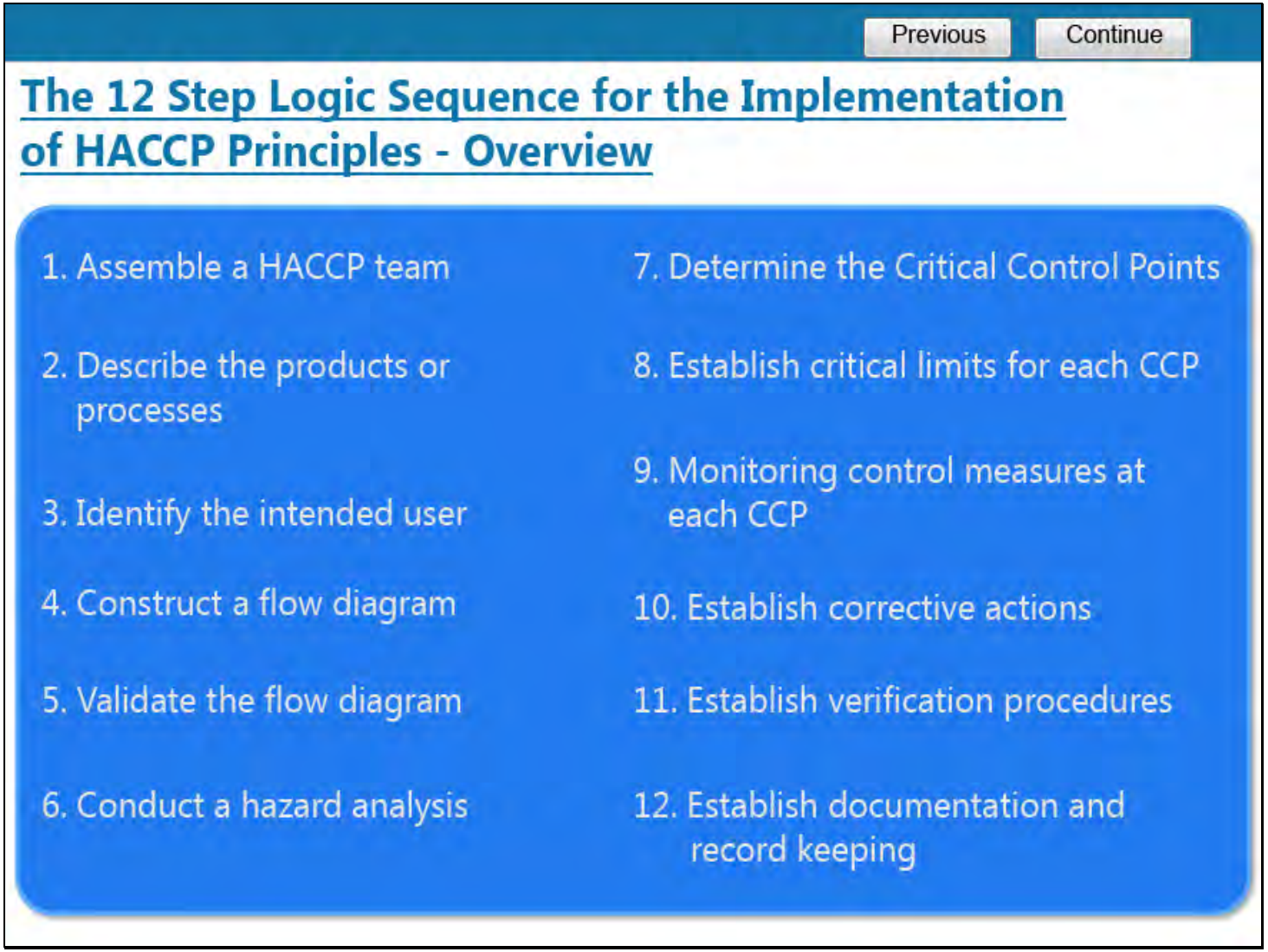

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The 12 Step Logic Sequence for the Implementation of HACCP Principles

1) Assemble and train the HACCP team

The HACCP team must be proportionate to the size, risk and complexity of the business. The team must be aware of the hazards and controls associated with the production of food. In small businesses, one person may be the sole team member, although external consultants may also assist.

2) Describe the products or processes

A detailed description of each product will be required in manufacturing. However, in catering or retailing it is more likely that the processes will be used as a basis for the flow diagrams. For example, perishable raw food which is cooked and served hot, or high-risk food which is served cold.

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The 12 Step Logic Sequence for the Implementation of HACCP Principles

3) Identify intended user

This is especially important for vulnerable groups such as babies, the elderly, pregnant women, ill people, those who suffer allergic reactions and those with immune deficiency.

4) Construct a flow diagram

A flow diagram is a systematic representation of the sequence of steps involved with a particular food item or process, usually from purchase of raw materials to the consumer.

5) Validate the flow diagram

This involves ensuring that your theoretical flow diagram accurately reflects what happens in practice.

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The 12 Step Logic Sequence for the Implementation of HACCP Principles

6) Conduct a hazard analysis (Codex Principle 1)

Hazard analysis involves:

- Identifying the hazards that may affect the process - What could go wrong?
- Identifying the steps at which the hazards are likely to occur (critical steps)
- Deciding which hazards are significant - i.e. hazards whose elimination or reduction to acceptable levels is essential to the production of safe food
- Determining the measures necessary to control the hazards - measures to prevent things going wrong

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Hazards

Food safety hazards are biological, chemical or physical contaminants with the potential to cause harm to the person who consumes the contaminated food.

The most common biological hazards are microbiological.

Biological hazards that may cause food borne illness include bacteria or their toxins, viruses, moulds and parasites.

They involve:

- The contamination of ready-to-eat food by sufficient numbers of pathogens to cause illness
- The multiplication of microorganisms
- The survival of microorganisms, for example, as a result of undercooking

Poor temperature control or prolonged time at ambient temperature could result in any food poisoning bacteria multiplying to large numbers.

Failure to cook thoroughly could result in the survival of some food poisoning bacteria.

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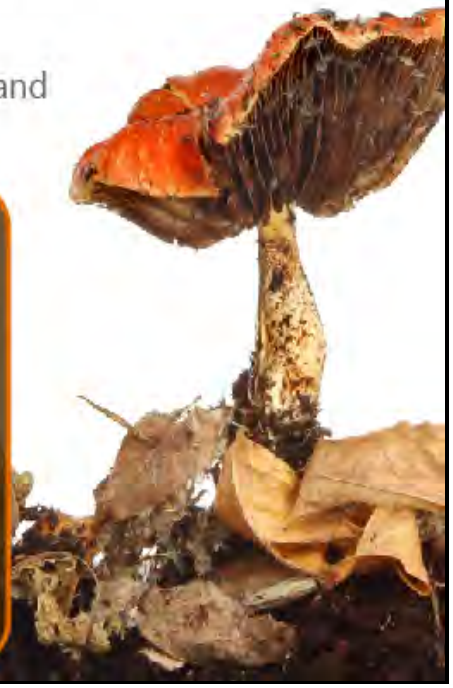
Hazards

Chemical hazards include poisonous foods such as toadstools, pesticides, cleaning chemicals and excess additives that can poison people. Allergenic hazards are often dealt with as chemical hazards.

Physical hazards (foreign bodies) include glass, sharp metal objects and stones that may result in cuts to the mouth, broken teeth, choking and internal injury. Burning is also a physical hazard.

Physical or chemical hazards could occur at any stage in the process and it is unlikely that their removal will be guaranteed at a later stage.



Control Measures

Control measures are the actions required to prevent or eliminate a food safety hazard or reduce it to an acceptable level, for example, cooking food to kill bacteria or keeping food cold in a refrigerator to stop the multiplication of bacteria.

Control measures for physical contaminants include the use of metal detectors and filters and strict rules about the storage and use of chemicals.

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The 12 Step Logic Sequence for the Implementation of HACCP Principles

7) Determine the Critical Control Points (CCPs) (Codex Principle 2)

These are steps in the process where control measures must be used to prevent food poisoning, injury or harm to the customer.

CCPs are identified by using judgement and expertise.

Cooking, processing, cooling and cold or hot storage of high-risk foods are usually CCPs.

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The 12 Step Logic Sequence for the Implementation of HACCP Principles

8. Establish critical limits for each CCP (Codex Principle 3)

Critical limits are values which are set for control measures to ensure the food is safe. For example, cooking food to a core temperature of 75°C, hot holding of food above 63°C or refrigerating food below 8°C.

Critical limits should be unambiguous and measurable.

If a critical limit is breached (for example, if refrigerated food is above 8°C for more than 4 hours), the food should be thrown away.

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Critical Limits for CCPs

To avoid throwing food away and to allow remedial action to be taken before a critical limit is breached, it is best to set a target level - for example, store food below 5°C or cook food to 78°C.

Then, if the target level is breached (for example, the food in the refrigerator is 7°C), the thermostat can be turned down to reduce the temperature before the critical limit is breached.

Critical limits include time, temperature, size, weight, appearance and colour.

Objective and measurable parameters are preferable.

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The 12 Step Logic Sequence for the Implementation of HACCP Principles

9. Monitoring (checking) control measures at each CCP (Codex Principle 4)

Monitoring is essential to confirm that the process is under control and critical limits are not exceeded.

Monitoring also ensures:

- Expected standards are being achieved
- A due diligence defence will be assisted
- Complaints are minimised
- Commitment and motivation of staff are improved

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Monitoring Control Measures at Each CCP

Monitoring methods include:

- Physical assessment
- Observation
- Supervision
- Measuring temperatures, time, weight etc.
- Checking records
- Competency

Monitoring systems should state:

- WHAT the critical limits and target levels are
- HOW the monitoring should be undertaken
- WHERE the monitoring should be undertaken
- WHEN the monitoring should be undertaken
- WHO is responsible for monitoring

The frequency of monitoring must be cost-effective and sufficient to ensure that the hazards are controlled.

Critical limits may dictate frequency to avoid wasting food, for example, if the critical limit for refrigerated food is 8°C for 4 hours, then the temperature should be measured at least every four hours.

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Physical Assessment of Food

The appearance, smell, texture, taste and other physical characteristics of food are valuable for obtaining a rapid assessment of food standards (quality, taint and spoilage).

However, food contaminated by pathogenic bacteria may appear in all respects fit to eat and suspect food should not be tasted.

Specific indicators include:

- Smell
  - Good food should smell fresh, pleasant and natural
  - Unusual, stale, musty or rancid smells should invite suspicions
  - Chemical smells may indicate chemical contamination
  - Ammonia smells in some fish are an early sign of decomposition
- Taste
  - Unusual bitterness or sweetness, a soapy taste or any untypical flavour may indicate food is unfit

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Physical Assessment of Food

Sound

Many packed foods, especially canned goods, emit a characteristic sound on being tapped or shaken.

Any such food or pack emitting an untypical sound is suspect.

Texture

Unusual softness, hardness, brittleness or change in texture may be indicative of unfitness.

Meat, fish and certain other products, such as cheese, should display a springy texture. Light pressure from a finger that causes an indentation to remain can be significant.

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Bacteriological Monitoring

Bacteriological monitoring can be used to assist the verification of HACCP, but is also commonly used in manufacturing premises to:

- Build up a profile of product quality
- Indicate trends in product quality
- Ascertain whether handling techniques are satisfactory
- Indicate product safety and the absence of specific organisms or pathogens
- Determine effectiveness of cleaning and disinfection
- Determine effectiveness of processing
- Confirm that legal standards or customer's specifications are being met

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Monitoring Food Handlers

Monitoring of food handlers by supervisors is essential to identify failures in personal hygiene or hygiene practices and to identify training needs.

Monitoring can involve observation, for example:

- Ensuring staff wash their hands properly when entering the food room
- Ensuring protective clothing is clean
- Ensuring protective clothing is worn correctly

More formal monitoring can involve bacteriological swabbing of fingers, competency testing and annual medical checks by medical staff to reinforce rules relating to illness.

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The 12 Step Logic Sequence for the Implementation of HACCP Principles

10. Establish corrective actions (Codex Principle 5)

Corrective action is the action taken when a critical limit is breached. It involves two distinct parts:

1. Dealing with the affected product (for example, destroying the product or reducing the shelf life)
2. Bringing the process back under control

For example, corrective action would be necessary if food in a refrigerator was at too high a temperature. The action taken may be to turn the thermostat down and to destroy the food if it had been above 8°C for more than 4 hours.

Or, in the event of a metal nut being found in food, sales of any suspect food should be stopped immediately. A full investigation would be required to ascertain if there was a possible source for the nut in the kitchen. If not, the supplier must be notified.

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Establishing Corrective Actions

Staff should be asked to be particularly vigilant for any problems.

For example:

If a used blue plaster is found in the mixing bowl, the contents of the bowl should be discarded. The person responsible, if on-site, should be traced so that an additional larger plaster can be provided. Staff should be reminded of the need to ensure plasters don't become detached and that finger cots may be needed.

Or, if a food handler uses a bowl for mixing a high risk food after it has been used for mixing raw egg, they should be instructed on the risks and advised of the consequences if it is done again.

The high risk food should be discarded and the bowl cleaned and disinfected.

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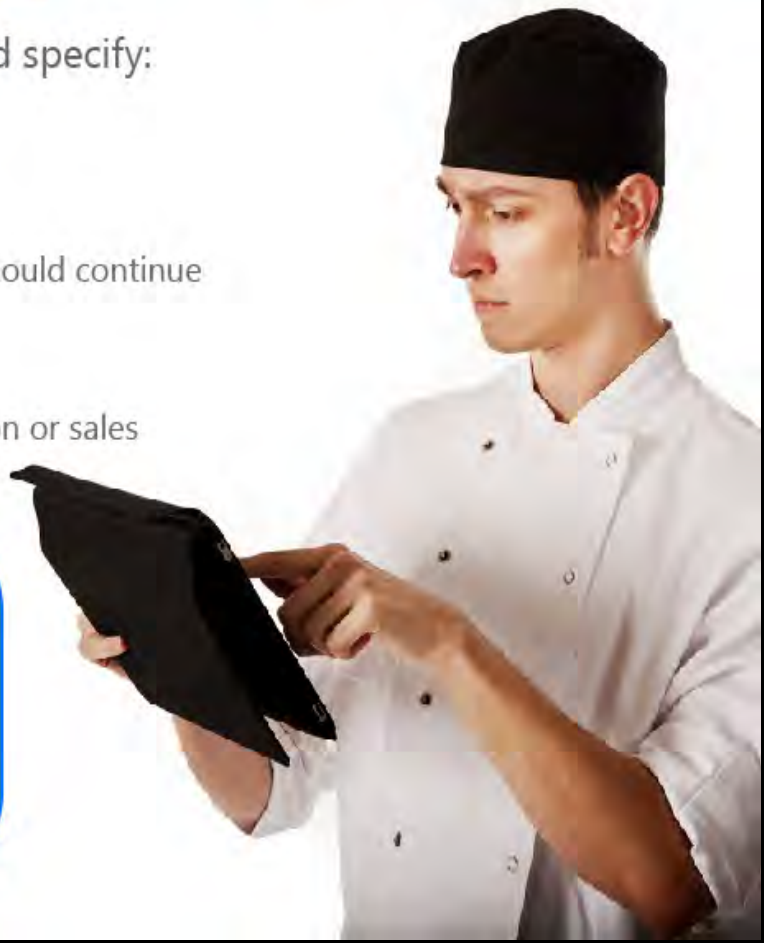
Establishing Corrective Actions

Procedures for corrective action should specify:

- The action to be taken
- Who should take the action
- Who should be notified
- Whether or not production and/or sales should continue
- Whether products should be recalled
- How the product should be dealt with
- Who can authorize the restart of production or sales

Manufacturers, wholesalers and retailers should ensure that all products are clearly labelled and traceable in the event of a recall being necessary.



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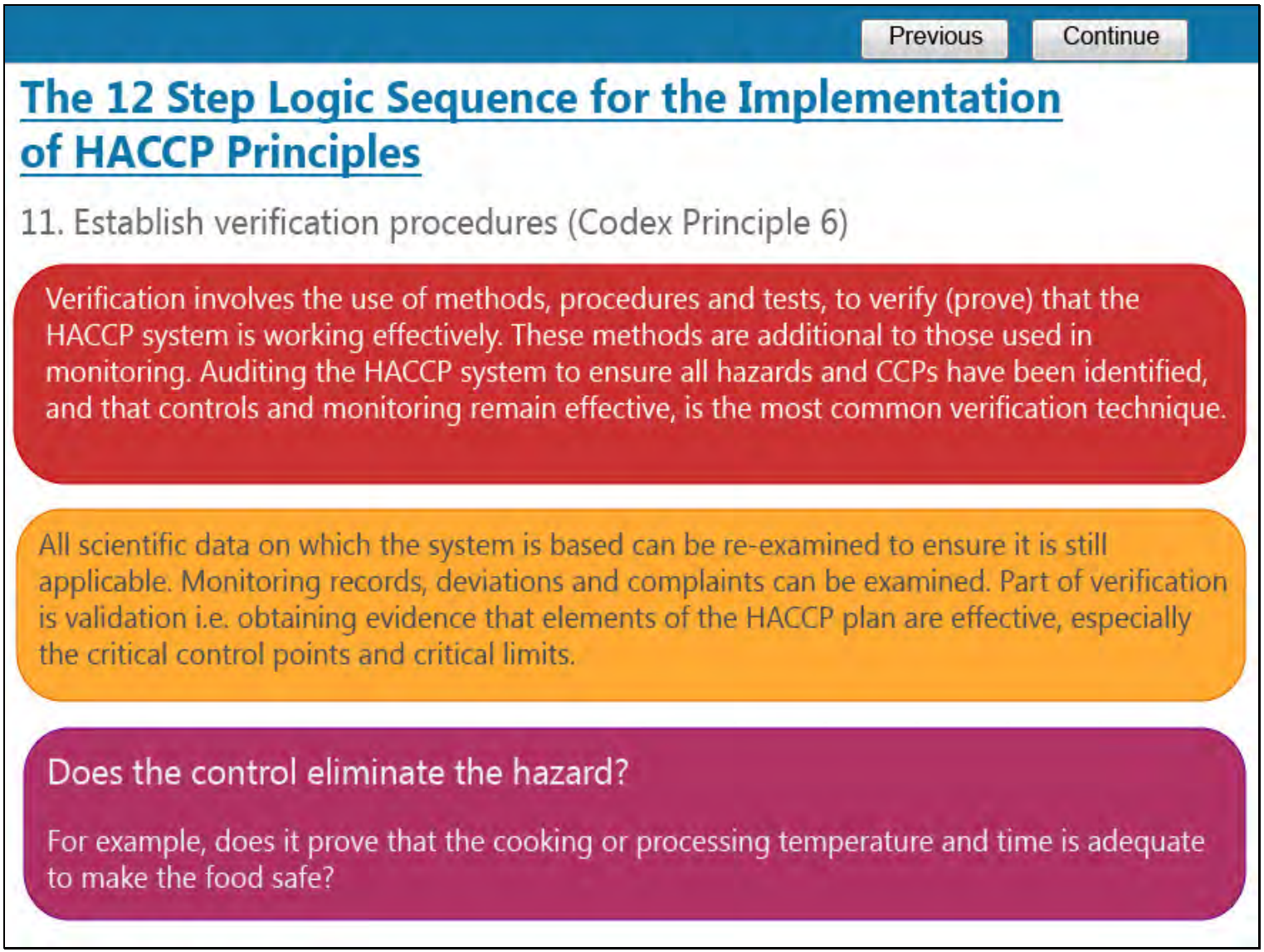

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Establishing Verification Procedures

The HACCP plan should be reviewed periodically, particularly if:

- A justified complaint is received
- Illness occurs
- Raw materials change (e.g. fresh chicken instead of frozen)
- The recipe changes (e.g. salt is removed)
- Equipment changes (e.g. a blast chiller is introduced)
- Packaging or distribution changes (e.g. refrigerated transport is utilised)

Persons involved in verification may include:

- External consultants
- Persons responsible for the HACCP system
- Staff involved with controls and monitoring
- Supervisors and managers
- Enforcement officers

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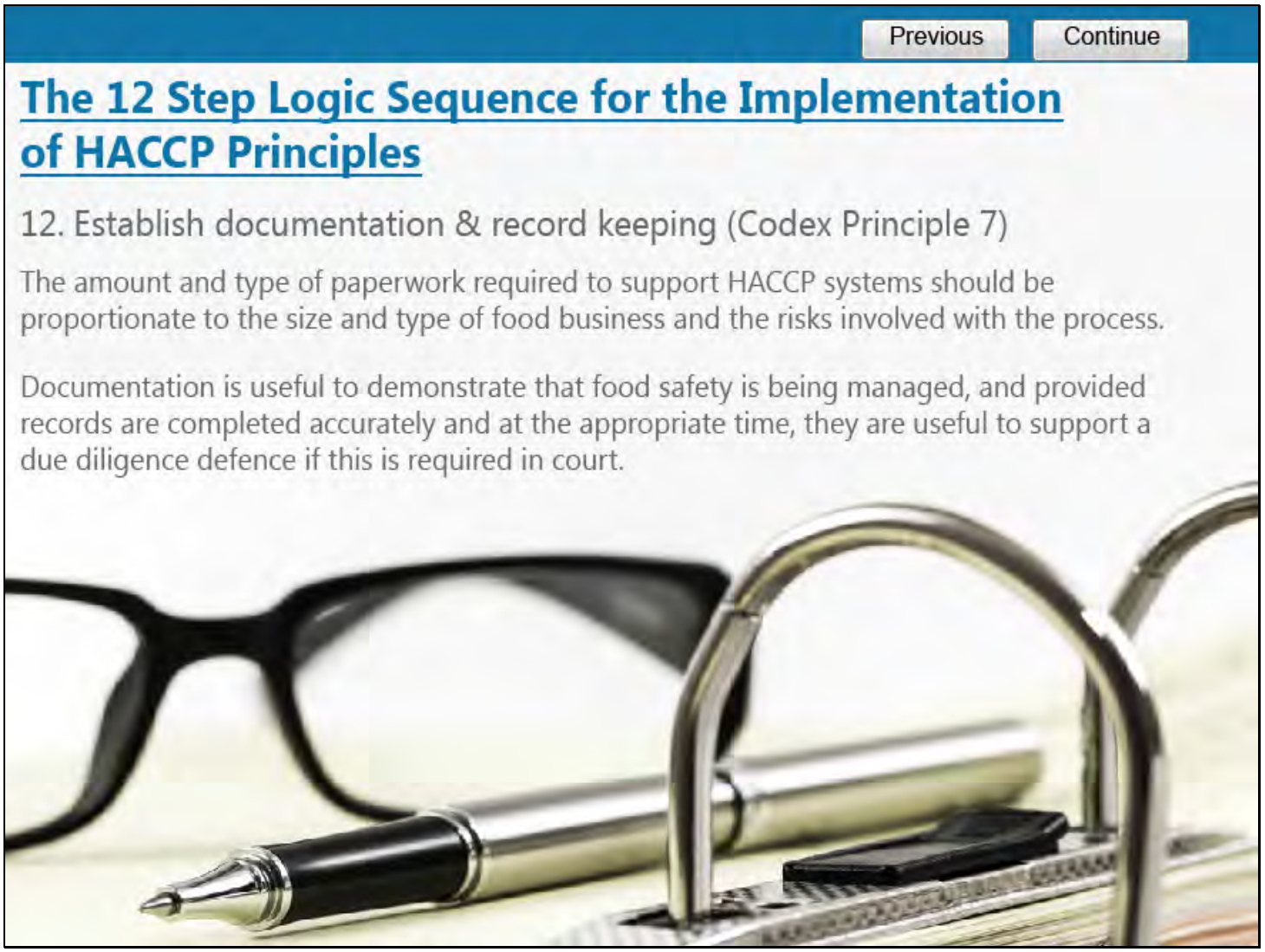

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HACCP Documentation

The documentation to support the HACCP study may include:

- The HACCP plan
- A floor plan
- The prerequisite programmes
- Audit reports
- The approved supplier list
- Monitoring records such as:
  - Deliveries
  - Training records
  - Refrigerator and freezer temperatures
  - Cleaning schedules
  - Stock rotation
  - Pest control
  - Exclusion records

All monitoring records should be signed and dated.

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HACCP Documentation

The HACCP plan may include:

- Details of the HACCP team
- Scope and terms of reference
- Product or process description
- Flow diagrams
- Hazard analysis and CCP determination
- Consumers
- Critical limits, targets, deviations and corrective actions
- Validation, verification and review procedures

Some of this documentation may be itemised on the HACCP control chart.

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Safer Food, Better Business (SFBB)

SFBB is a food safety management system developed by the Food Standards Agency (England).

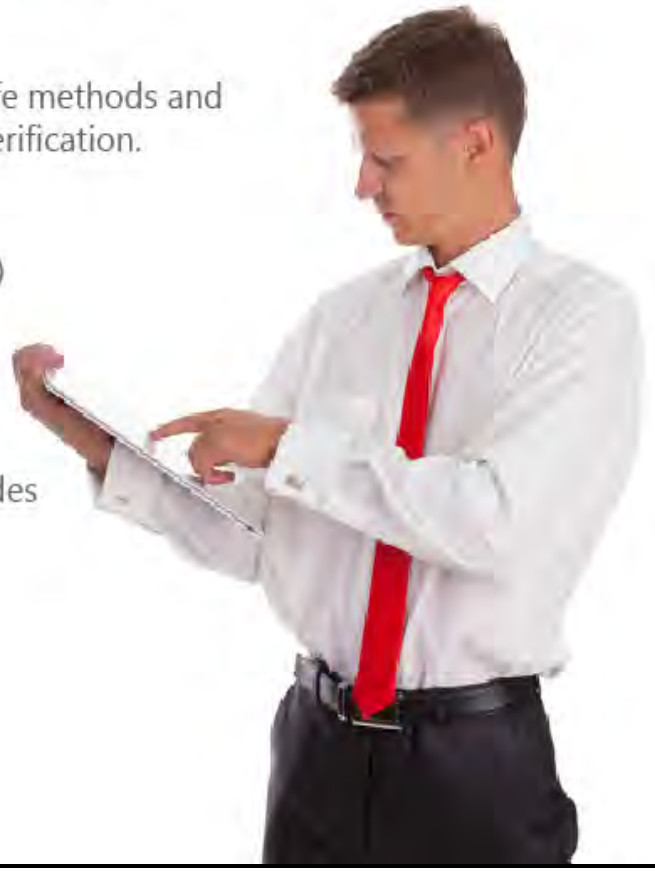
It is divided into two parts. The first part provides safe methods and the second part is concerned with monitoring and verification.

The safe methods relate to:

- Cross contamination (including personal hygiene)
- Cleaning (including handwashing)
- Chilling
- Cooking

There is also a section on management, which provides guidance on:

- Opening and closing checks
- Proving methods are safe
- Safe method completion record
- Training and supervision
- Stock control
- Selecting suppliers and contractors



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Safer Food, Better Business (SFBB)

SFBB 1. Safe Methods

Opening checks include:

- Checking fridges and equipment
- Staff fitness
- Cleanliness of surfaces
- Adequate cleaning materials are provided

Closing checks include:

- No food is left out
- Out of date food is discarded
- All dirty cloths are replaced
- All waste removed

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CookSafe Food Safety Assurance System

CookSafe is a food safety management system developed by the Food Standards Agency (Scotland).

It is divided into 5 sections:

1. The first section provides key definitions and details of how HACCP works.

2. This is followed by advice on constructing a flow diagram specific to your operation and based on the template provided.

3. The third section provides generic HACCP charts for most process steps from purchase to service.

4. Charts will need to be completed relevant to the process steps of your specific business and this requires using the fourth section of the manual, the house rules.

5. The final section of CookSafe provides guidance on recording and includes photocopiable monitoring forms, for example, temperature monitoring records and cleaning schedules.

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NCASS Due Diligence System

The NCASS Due Diligence System goes beyond food safety and includes health and safety documentation.

Unlike SFBB and Cooksafe the NCASS system is customised to the business and is included with NCASS membership. It is divided into 10 sections:

1. Food safety risk assessment
2. Cleaning
3. Complaints procedures and forms
4. Training requirements and registers
5. Pest control and registers
6. Accident & sickness register and forms
7. Vehicle & driver records
8. Health & safety policy
9. Fire risk assessment
10. Code of practice

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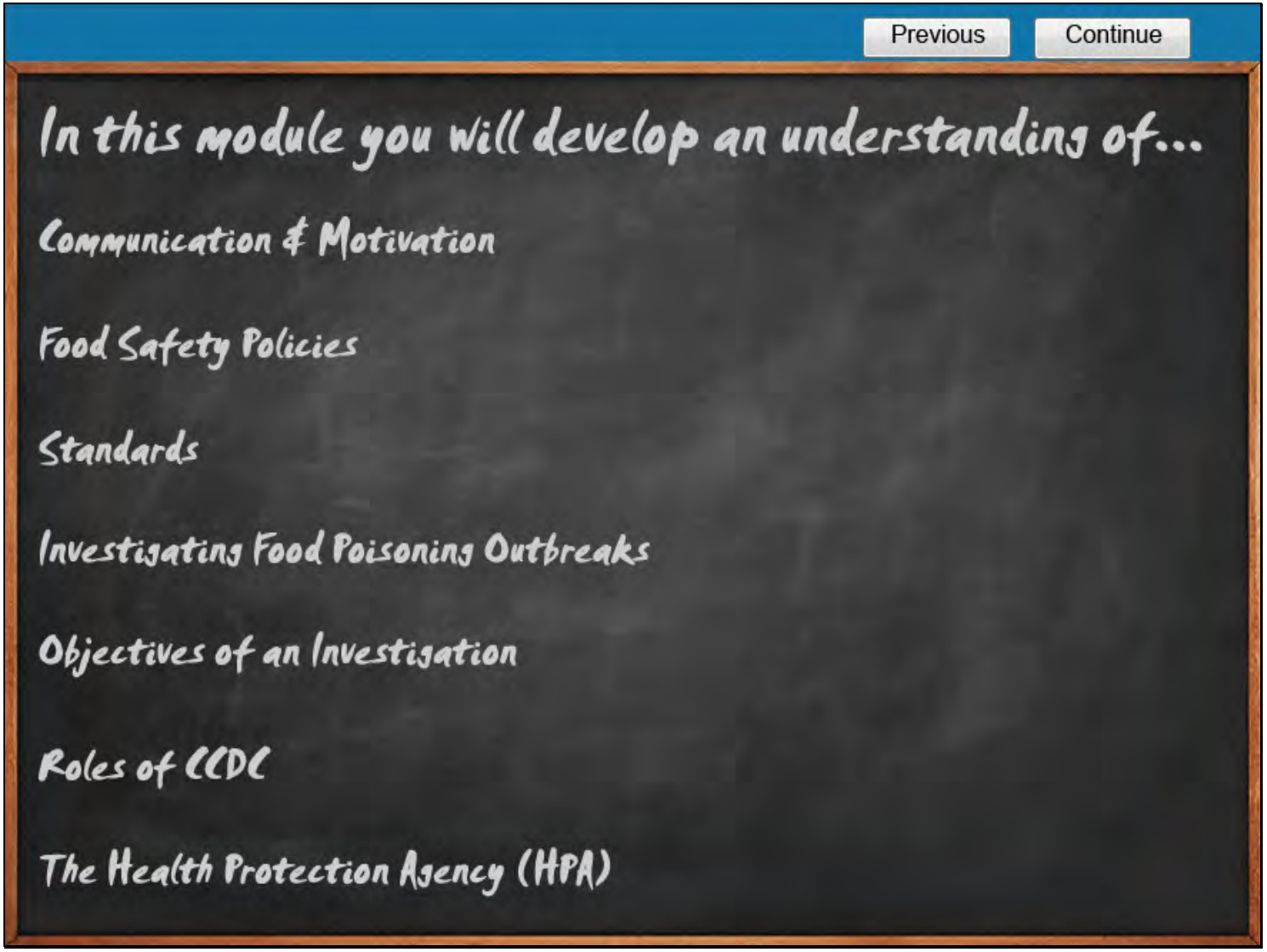


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Communication & Motivation
An essential role of supervisors is to communicate standards, company hygiene rules and legal responsibilities to staff.
This starts with induction training, but is a continuous process to keep staff up to date and reinforce food hygiene practice.

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Communication & Motivation

There are several techniques that can be used to make staff aware of the requisite standards:

- Effective verbal or written instruction
- Demonstrating good practice and testing
- Placing new employees with an experienced 'buddy'
- Using training courses, DVDs, videos, e-learning, coaching cards or distance learning
- Using an external consultant or environmental health practitioner or officer
- Team briefings or memoranda, either individually or on notice boards
- Posters and notices
- Issuing a booklet of hygiene rules to all new staff
- Leading by example

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Food Safety Policies

Once staff are aware of the required standards they must be motivated to implement them continuously.

Motivation starts by explaining the importance of hygiene standards, not only for the business, but for the individual. Nobody wants to be responsible for causing a food poisoning outbreak, especially if this results in them **losing their job.**

The importance of good hygiene practice can be demonstrated by supervisors and managers leading by example, by correcting staff who do things wrong and by rewarding staff who do things right.

This can be in the form of praise or even 'hygiene employee of the month'. Staff who continuously demonstrate bad hygiene practices should never be promoted and may be disciplined or even dismissed.

Observation and monitoring of good hygiene practices reinforces their importance as does routine questioning and competency testing.

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Food Safety Policies

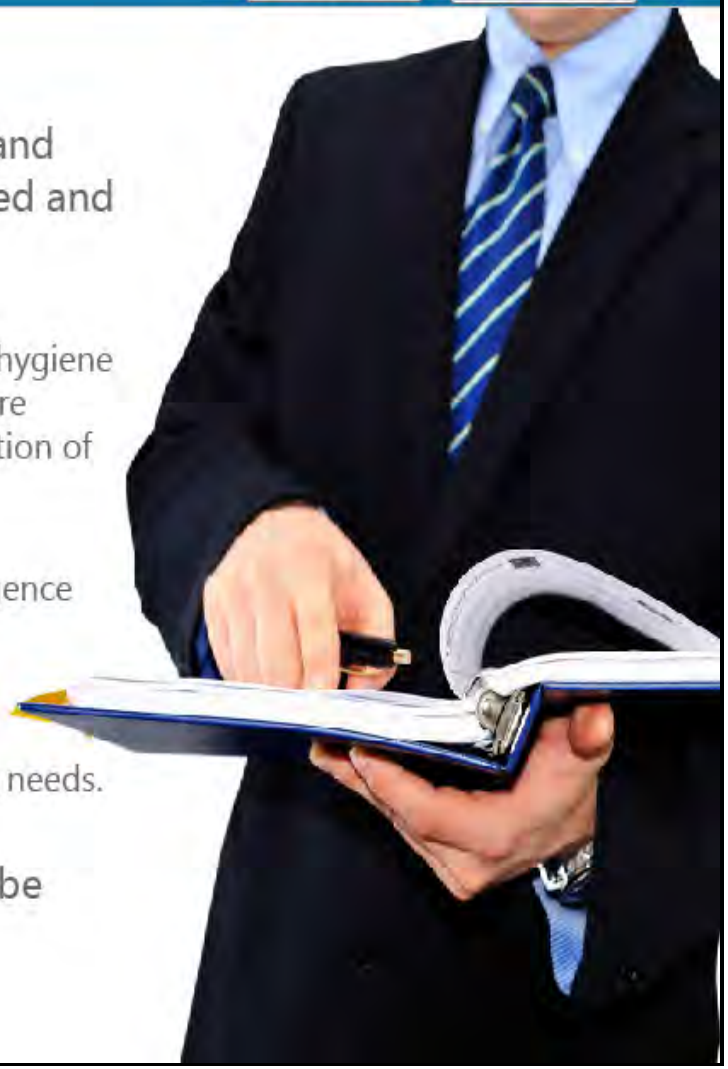
When a company has determined its aim and objectives, the standards can be determined and incorporated into a **food safety policy.**

The food safety policy can be used to attain good hygiene practices or good manufacturing practices which are essential prerequisites to the effective implementation of HACCP based systems.

This document is very useful to support a due diligence defence and demonstrate legal compliance.

It is also an effective way of communicating the required standards to staff and identifying training needs.

To remain effective, the document should be reviewed regularly.



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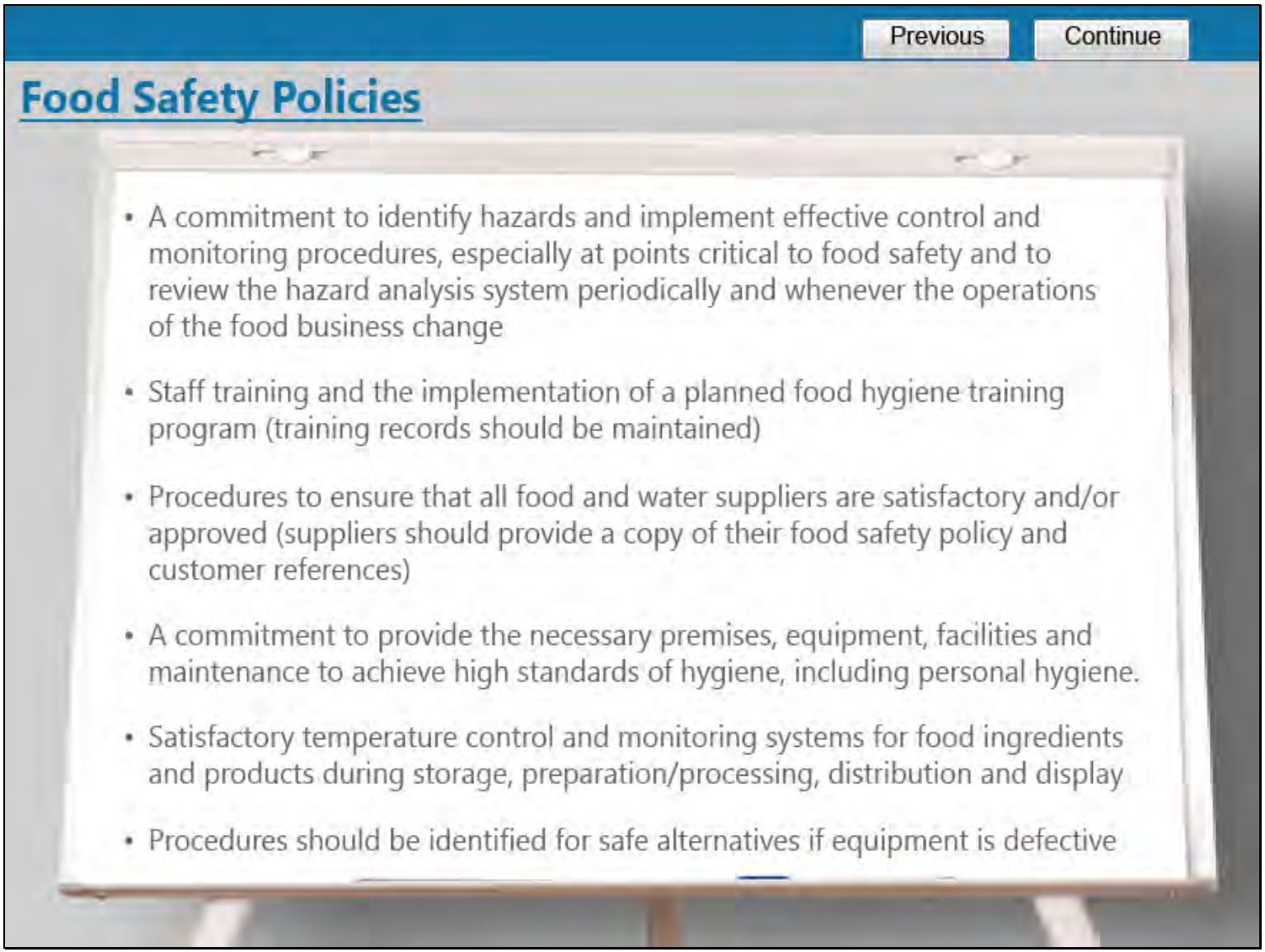
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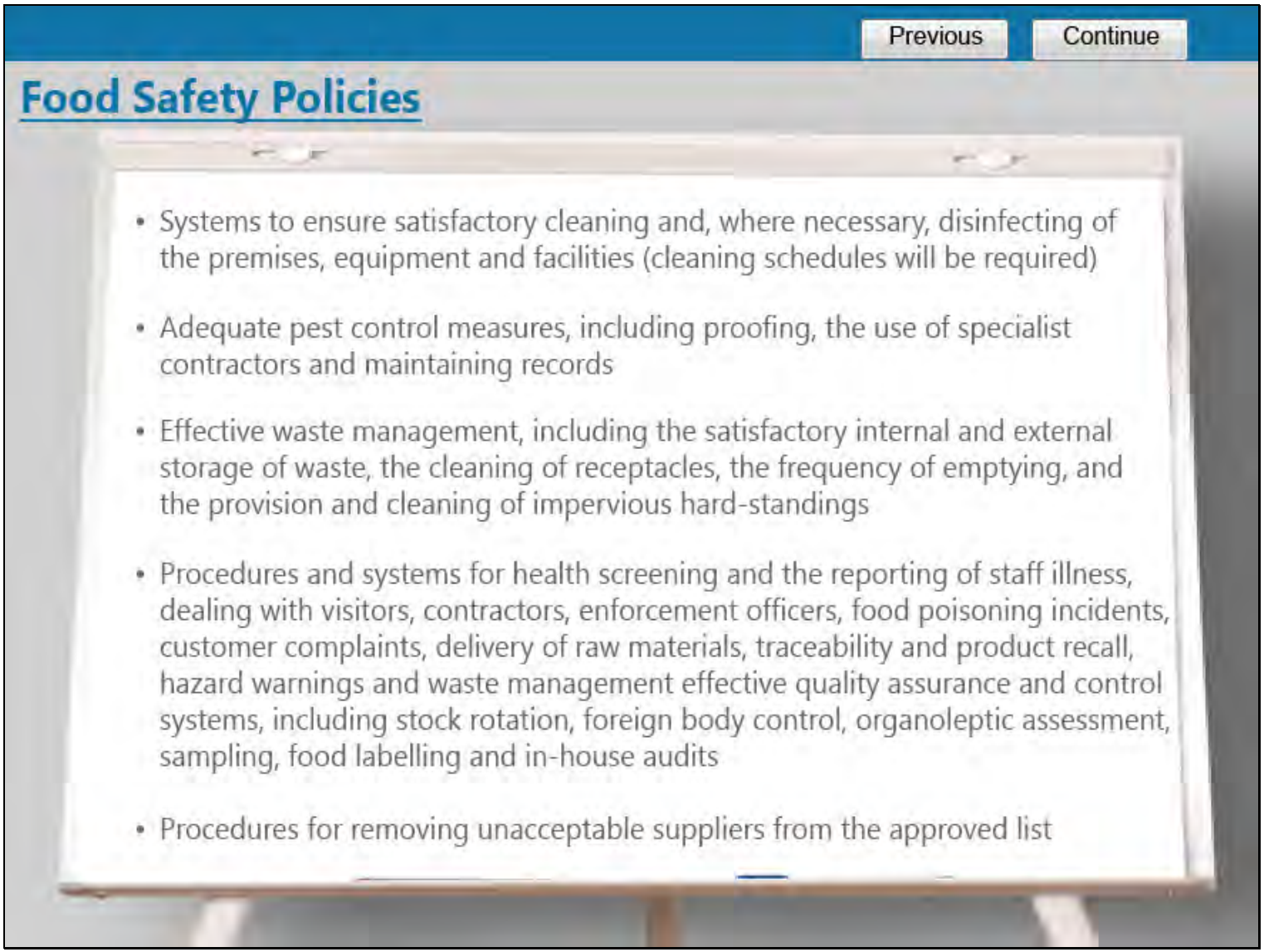
Food Safety Policies
• A commitment to identify hazards and implement effective control and monitoring procedures, especially at points critical to food safety and to review the hazard analysis system periodically and whenever the operations of the food business change
• Staff training and the implementation of a planned food hygiene training program (training records should be maintained)
• Procedures to ensure that all food and water suppliers are satisfactory and/or approved (suppliers should provide a copy of their food safety policy and customer references)
• A commitment to provide the necessary premises, equipment, facilities and maintenance to achieve high standards of hygiene, including personal hygiene.
• Satisfactory temperature control and monitoring systems for food ingredients and products during storage, preparation/processing, distribution and display
• Procedures should be identified for safe alternatives if equipment is defective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Food Safety Policies
• Systems to ensure satisfactory cleaning and, where necessary, disinfecting of the premises, equipment and facilities (cleaning schedules will be required)
• Adequate pest control measures, including proofing, the use of specialist contractors and maintaining records
• Effective waste management, including the satisfactory internal and external storage of waste, the cleaning of receptacles, the frequency of emptying, and the provision and cleaning of impervious hard-standings
• Procedures and systems for health screening and the reporting of staff illness, dealing with visitors, contractors, enforcement officers, food poisoning incidents, customer complaints, delivery of raw materials, traceability and product recall, hazard warnings and waste management effective quality assurance and control systems, including stock rotation, foreign body control, organoleptic assessment, sampling, food labelling and in-house audits
• Procedures for removing unacceptable suppliers from the approved list

Previous Continue

Standards

Standards are necessary to ensure consistency and to provide a reference point to determine when a target has been achieved or a task, such as cleaning, has been completed satisfactorily.

The term 'standard' may be used in several different ways:

- Voluntary standards (for example, hygiene or cleanliness), may be arbitrary levels
- Legal standards, such as storage temperatures for food
- International standards such as HACCP and ISO 9000

Standards may be set by an individual, a company, customers, governments, trade associations and independent standards authorities.

Premises with high standards develop a good reputation, which attracts new customers, with the minimum number of complaints.

Previous Continue

Standards

Food safety standards set above the minimum legal level will ensure compliance with legislation, codes of practice and industry guides, as well as the production of safe, wholesome food of acceptable quality and shelf life.

Standards are also essential to facilitate control, monitoring and auditing to assess compliance. The best way to check standards is to implement a systematic monitoring program.

Specifications are documented standards which describe the safety and quality characteristics of the raw materials and the products obtained from suppliers.

Specifications ensure uniformity and may include minimum standards for weight, size, colour, pH, aw, absence or maximum numbers of microorganisms, processing requirements, delivery details, including temperature, absence of physical and chemical contaminants, packaging and labelling. They may also detail the action that will be taken (usually rejection) if the specification is not adhered to.

Previous Continue

Investigating Food Poisoning Outbreaks

The effective investigation of food poisoning outbreaks is essential to limit the spread of infection and to provide information for:

- The food industry on unsafe products and practices
- Improving the effectiveness of inspections by enforcement officers
- Use when formulating new legislation

A general outbreak involves two or more persons from different households, while a household outbreak involves two or more persons in the same household, but not connected to another case or outbreak.

In the event of a serious or large outbreak, an outbreak control team is usually established. A food poisoning outbreak control team consists of several experts, including a consultant in public health, a medical consultant, a microbiologist and an environmental health practitioner.

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Objectives of an Investigation

Investigations have a number of objectives, the main one being, to contain the spread of illness and prevent further outbreaks.

Other investigation objectives include:

- Identifying the outbreak location (place where food vehicle was prepared or served)
- Identifying the causative agent involved (e.g. pathogen, virus type, chemical, toxin etc.)
- Tracing cases and carriers, especially food handlers
- Tracing the source of the causative agent
- Determining the main faults that contributed to the outbreak (e.g. food left at ambient temperatures for several hours)
- Making recommendations to prevent recurrence
- Providing data for use in surveillance

Previous Continue

Role of the EHP & EHO

In addition to their involvement with the outbreak control team, the environmental health practitioner or officer uses their skills in tracing cases and persons at risk, organizing the collection of specimens and interviewing people involved to obtain information to assist with achieving the above objectives.

When the outbreak location has been identified, the investigating officer will undertake a comprehensive investigation and inspection of the operation to ascertain the faults in the food preparation and the management failures that resulted in the faults.

If the evidence suggests the sale of unfit food and the absence of a due dilligence defence, the officer may also collect evidence for use in legal proceedings.

The officer will need to secure the assistance of the manager and/or supervisor to assist in the investigation.

In the event of a very recent outbreak, the officer will request the suspension of cleaning and disinfection, and perhaps, the termination of food production or even the closure of the food premises.

Previous Continue

Role of the EHP & EHO

The officer will require details of:

- Customers, especially other food poisoning cases
- All food production staff and their functions
- Records, especially staff sickness, including staff with septic cuts or boils
- All relevant food production details

The officer may require samples of food or packaging remains. Swabs of surfaces and equipment may be taken, and staff will be interviewed and asked to provide faecal specimens.

Having identified cases, the causative agent, the outbreak location, and the cause of the outbreak (by interviews and site investigation), the officer will attempt to trace the source, i.e. what brought the causative agent into the food premises or where the agent first entered the food chain (for example, the cow on the farm, or the source of the poisonous chemical).

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The Role of the Supervisor

If a supervisor suspects the business may have been responsible for a food poisoning outbreak, they should advise the manager.

The manager will probably require any further food sales to be suspended, if the outbreak is very recent, until the allegation has been investigated.

Any staff with boils or septic cuts or who have recently suffered from diarrhoea or vomiting, even if they are now symptom-free, should be sent to the doctor and not resume food-handling duties until medical clearance has been obtained.

Checks should be made to ensure that no other similar complaints have been received. Supervisors may be able to obtain invaluable information on the history of the suspect foods from delivery to service. In the case of retail or manufacturing, recall procedures for suspect food may need implementing.

Previous Continue

The Role of the Supervisor

Supervisors will be able to assist in the provision of necessary information for the environmental health practitioner or officer.

Records provided by management may be slightly out of date because of last minute changes, and the supervisor will need to check the accuracy, especially in the following areas:

- Menus
- Supplier lists
- Delivery records
- Staff work and sickness records
- HACCP
- Methods of preparation

Previous Continue

The Role of the Supervisor

Other records that will be required include:

- Temperature control (cooking and storage)
- Training
- Pest control
- Cleaning schedules
- Complaint records, audit records
- Details of customers
- Supplier audits

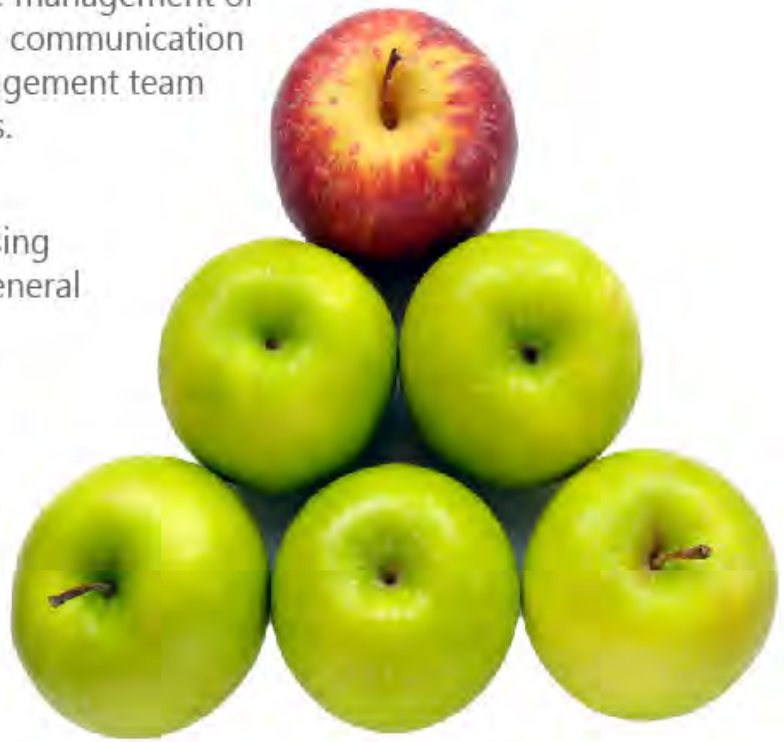
Supervisors will also be given the task of ensuring the premises are thoroughly cleaned and disinfected once the officer is satisfied that they are capable of producing safe food.

In addition any recommendations from the officer on preventing future outbreaks will need to be implemented.

Previous Continue

Supervisors Role in Food Safety - Key Points

- Food businesses need to have standards and specifications with appropriate monitoring procedures to ensure that the food they produce is safe.
- The supervisor has an important role in the management of food hygiene within the business including communication with staff and senior members of the management team and the monitoring of workplace standards.
- Food and equipment may be monitored using physical assessments, visual inspections, general observation, checklists, bacteriological monitoring, quality assurance and HACCP.
- Supervisors should ensure that all records are thorough, accurate and up to date, and will assist in the provision of necessary information to an EHO or EHP.



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Role of the Consultant in Communicable Disease Control

Consultants in communicable disease control, or CCDC's, are public health doctors employed by the health authorities and who work for local authorities.

They are responsible for controlling public health diseases, including food poisoning, and usually chair the outbreak control team.

In addition to their medical skills, CCDC's often provide the epidemiological expertise and give advice on controlling infection and treatment required.

CCDC's rarely get involved in enforcement matters or the inspection of premises.


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The Health Protection Agency (HPA) & Health Protection Scotland (HPS)
The HPA is a national organization for England and Wales, created on 1st April 2003, to protect people's health by minimizing risks from infectious diseases, poisons, chemicals and biological and radiation hazards.
The HPA incorporates several organizations including, the Public Health Laboratory Service, the Communicable Disease Surveillance Centre, the Central Public Health Laboratory and NHS public health staff responsible for infectious disease control.
Health Protection Scotland (HPS) is the equivalent organization responsible for Scotland.

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The HPA & HPS

The HPA & HPS are responsible for:

- Advising the Government on public health matters
- Delivering services to protect public health
- Providing impartial advice and information to professionals and the public
- Providing rapid response to health protection emergencies
- Improving knowledge of health protection through research, development, education and training

The HPA provides surveillance and assists in the control of food borne illness.

It provides expertise and its laboratories are involved with testing food samples, water samples and faecal specimens.

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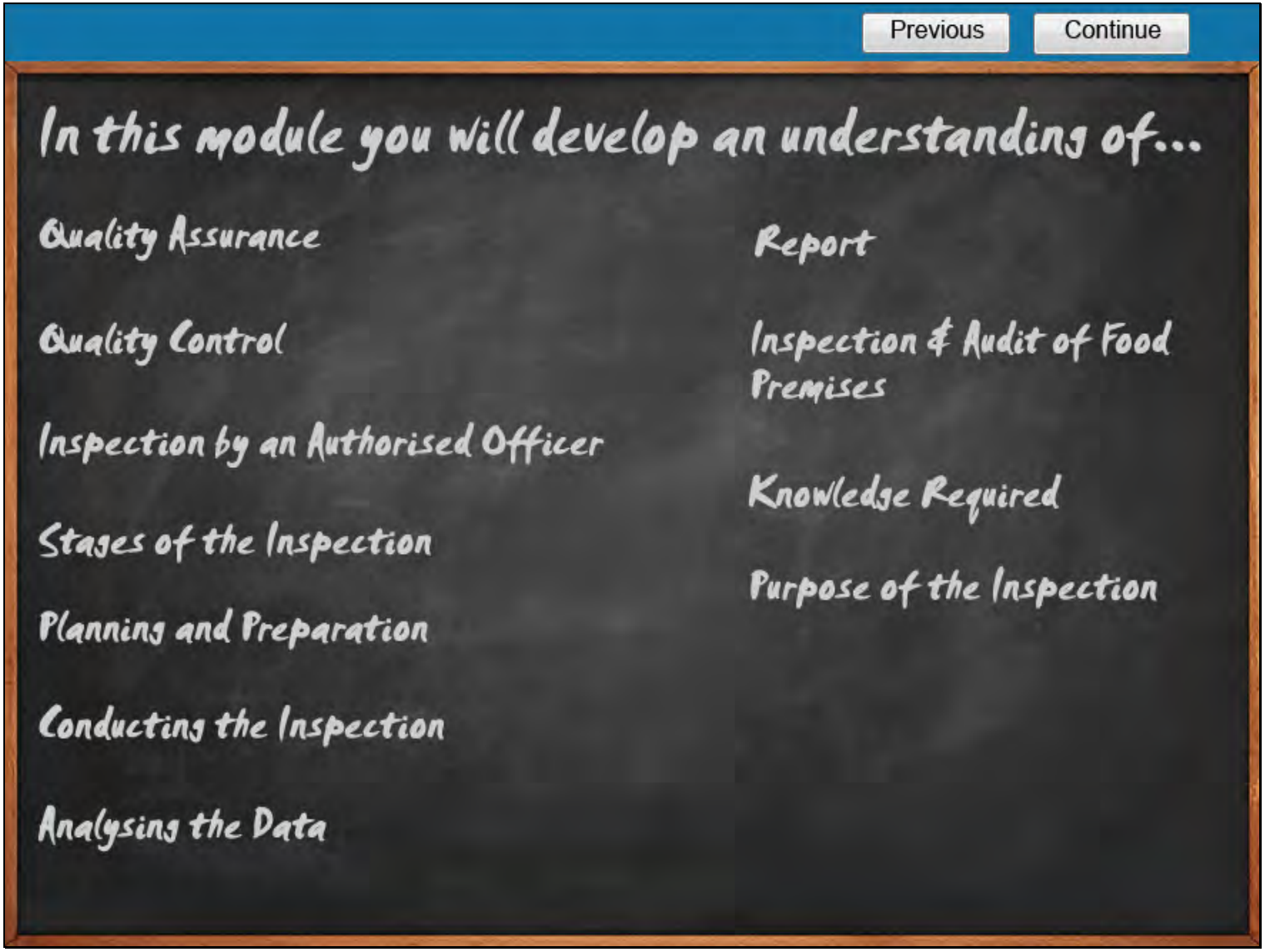

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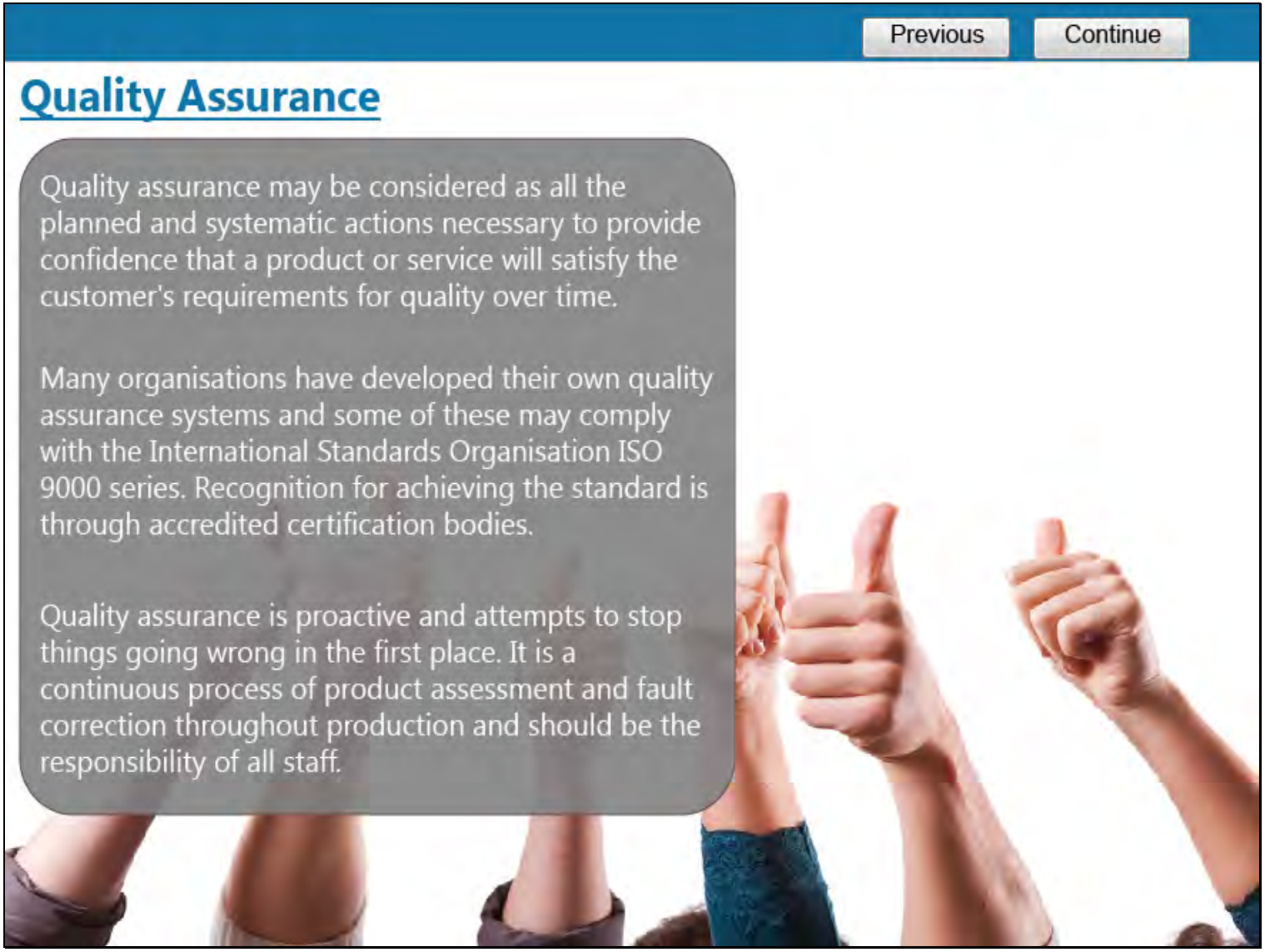

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Quality Assurance

The effective implementation of quality assurance requires:

- The specification (what is to be done)
- Documented instruction (how it is to be done)
- The recording system (to confirm it has been done)
- A monitoring system (to confirm recording and corrective actions are satisfactory)

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Quality Assurance

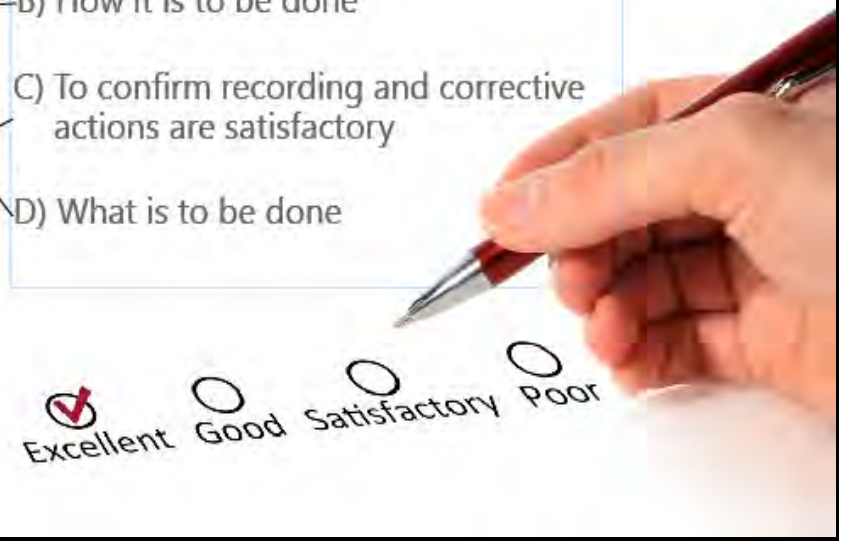
Submit

Quality assurance is proactive and attempts to stop things going wrong in
a continuous process of product assessment and fault correction throughc
should be the responsibility of all staff.

You must answer the
Try again

Match the feature of effective implementation of quality assurance with its explanation.

D	The specification	A) To confirm it has been done
B	Documented instruction	B) How it is to be done
A	The recording system	C) To confirm recording and corrective actions are satisfactory
C	A monitoring system	D) What is to be done



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Inspection by an Authorised Officer

At the conclusion of the inspection, it is advisable to keep a record of any work that must be completed immediately, and also any follow-up action the officer intends to take.

Priorities and timescales for completing any remedial work should be noted.

The manager may wish to use inspections by the environmental health practitioner or officer to improve hygiene standards.

Staff should be advised why the officer is inspecting the premises. They should reinforce the good hygiene practices required by staff, for example, wear clean protective clothing and wash their hands on entering the food room.

The officer could be asked to speak to individual members of staff to emphasise the importance of hygiene, address all the staff or undertake a training session.

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Stages in the Inspection

1) Planning and preparation

When the objectives of the inspection have been decided, the scope and depth can be determined. The inspection may consider microbiological, chemical and physical hazards and it may be a full or part inspection or very specific.

The equipment required will include a probe thermometer, torch, protective clothing, sample bags, a scraper and an A4 pad and clipboard.

The inspector may need additional knowledge and training to develop inspection skills, including interviewing, simulation (reconstruction), measurement, analysing and report writing.

Prior to undertaking the inspection, it is useful to have records of previous inspections, specifications, hazards, risks, relevant legislation, industry guides and codes of practice.

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Stages in the Inspection

2) Conducting the inspection

The timing of the inspection will be dictated by the objective.

If undertaking a comprehensive inspection, it is necessary to examine each step in the production of food from the receipt of deliveries to the serving of customers.

The hazards (contamination, multiplication and survival) controls, monitoring and corrective action at each stage (critical control point) should be considered.

Observations should be carried out as inconspicuously as possible and the inspection should be methodical.

A typical routine involves starting at a defined point, such as the wash hand basin, within a room, the progressive examination of all relevant items around the perimeter and then the same ordered examination of central fittings, installation or equipment.

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Stages in the Inspection

2) Conducting the inspection

Every aspect of the subject under examination should be covered.

It may not be enough to look at a piece of equipment; it may need to be dismantled and/or moved from its position.

Cupboards and refrigerators may need to be wholly or partially emptied and surfaces may need to be scraped or tapped to assess soundness.

In this respect, full use should be made of the senses - sight, smell, hearing and touch.

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Stages in the Inspection

3) Analysing the Data

All of the raw data collected during the inspection will need careful analysis to provide meaningful information which can be presented in the report. For example:

- Several cleaning defects in differing rooms may indicate inappropriate cleaning schedules
- If staff are wearing dirty protective clothing this may result from poor communication and/or poor supervision or training
- Several empty paper towel or soap dispensers may demonstrate ineffective monitoring as well as poor management commitment to achieving high standards of personal hygiene
- Food hygiene certificates may be hung on the wall, but the staff may not be competent to undertake their activities and to produce safe food

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Stages in the Inspection

4) Report

The Report of the inspection should be more than just a list of faults. Good practice and achievements should be complimented.

Faults should be grouped together, for example, personal hygiene or cleaning.

The remedial work should be prioritised, for example:

- An unsafe process should be dealt with at the time of the inspection
- Some cleaning problems may need to be rectified within a day
- Some decoration, structural items or replacement equipment may be dealt with in one to three months

Recommendations and legal requirements should be clearly distinguished, and any solutions proposed should be cost-effective and practical.

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Inspection & Audit of Food Premises

An inspection of a food premises or operation will only be effective if the person undertaking the inspection has a clear understanding of the reason for inspection, and also has the relevant technical knowledge, skills and experience.

The inspection must be planned and sufficient time must be allowed to achieve the objective.

After the inspection, the data collected will need to be analysed to determine the action to be taken to rectify any defects. A comprehensive report should be written and problems must be followed up to ensure compliance.

An **inspection** involves careful observation and examination, whereas an **audit** may be considered as comparing what you actually do with what you say you do. **The two processes will usually overlap.**

Supervisors should prepare for audits by collecting all relevant records.

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Knowledge Required

The inspector must have a thorough understanding of:

- All technical aspects of the operation (for example, catering practice, cook-chill, or canning)
- The legal requirements and relevant codes of practice or industry guides
- The main causes of food poisoning and complaints associated with the type of operation
- All relevant aspects of HACCP
- The industry norm, i.e. standards expected for similar premises

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Purpose of the Inspection

There are many different reasons for inspecting a premises, including:

- To ensure that the premises or operation is capable of producing safe food
- To assess the effectiveness of HACCP, especially in relation to critical control points (verification)
- To ensure policies and procedures are being adhered to and standards are being achieved
- To identify the training needs of staff
- To provide advice
- To demonstrate management commitment to food safety
- To respond to a complaint
- To revisit

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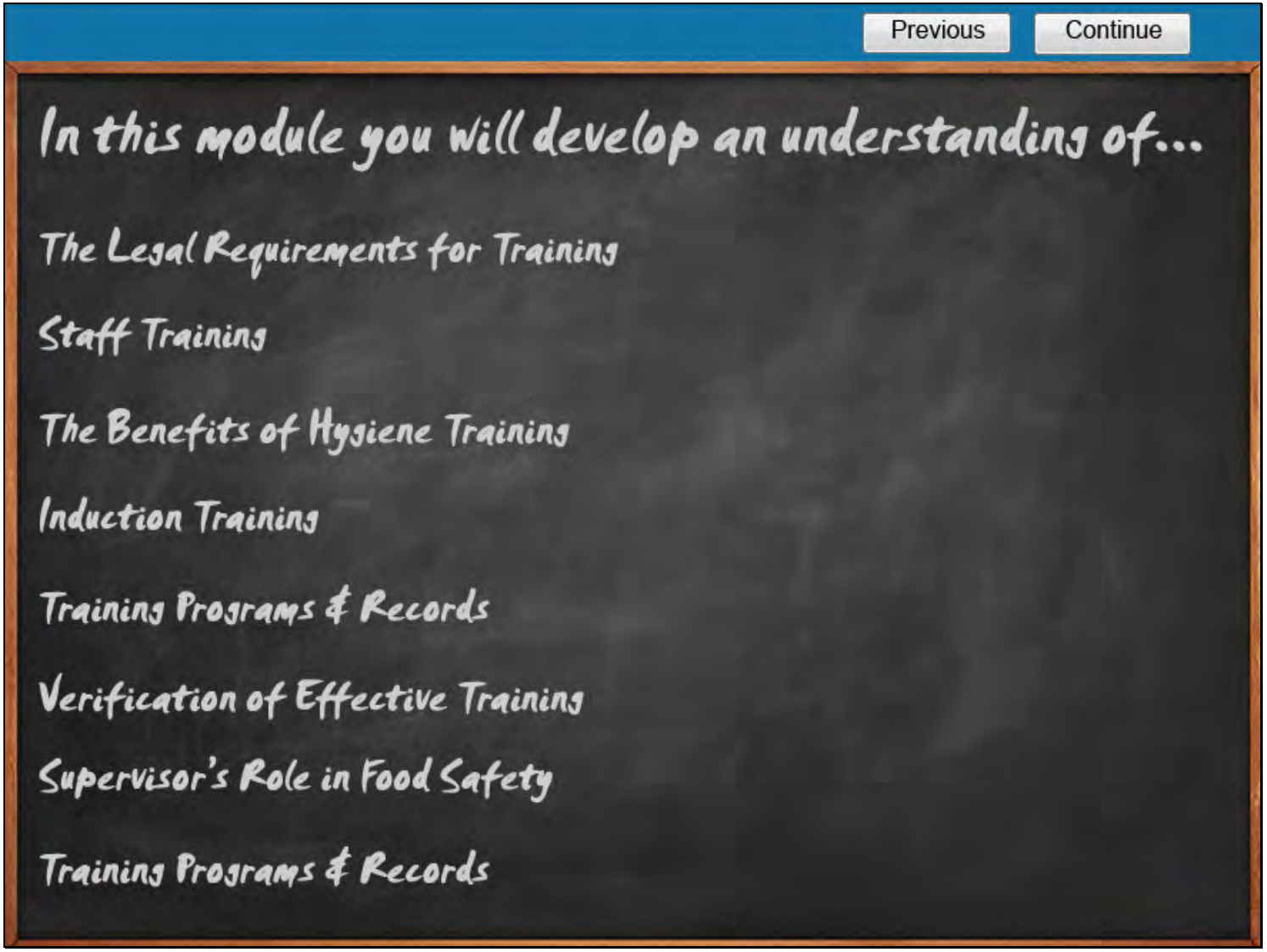

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The Legal Requirement for Training

Food business operators must ensure that:

- Food handlers are supervised and instructed or trained in food hygiene matters commensurate with their work activity - in other words, they are trained to carry out their specific job safely and to ensure the production of safe food
- Those responsible for the development and maintenance of the food safety management system based on the HACCP principles, or for the operation of the relevant guides, have received adequate training in the application of the HACCP principles

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The Legal Requirement for Training

It is recommended that:

- All food handlers receive written or verbal instruction in the essentials of food hygiene before they start work, and additional hygiene awareness instruction (introduction to food hygiene in Scotland) within four weeks of starting work
- Food handlers who prepare open high risk foods or have a supervisory role receive Level 2 training within three months of starting work
- Supervisors undertake Level 3 or Level 4 training, and depending on their actual duties, supervisors and managers should also undertake relevant HACCP training

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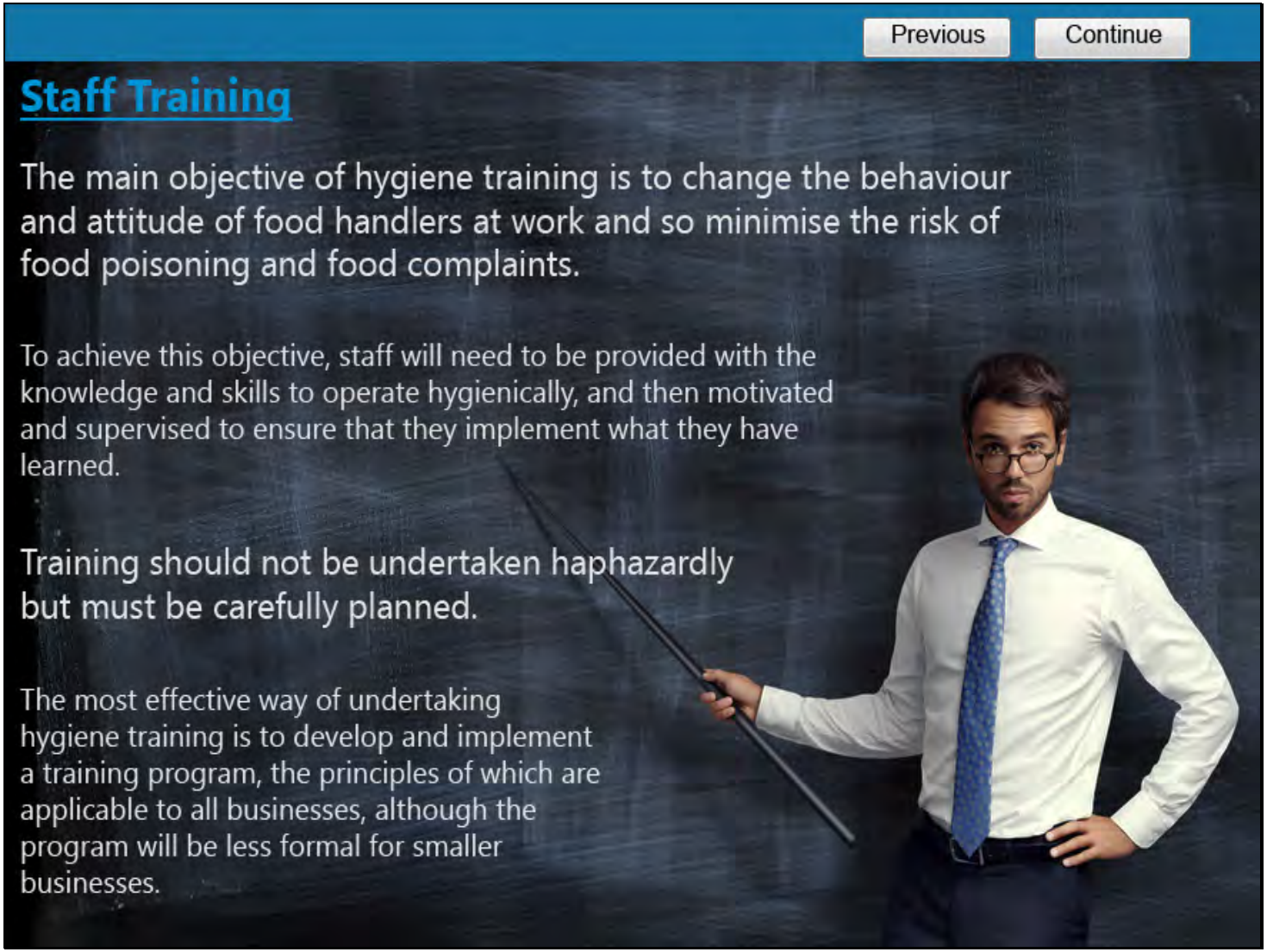

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The Benefits of Hygiene Training

Training contributes significantly to the profitability of a food business by:

- Assisting the production of safe food and reducing risk of food poisoning
- Safeguarding the quality of the product and reducing food wastage
- Reducing complaints
- Generating a pride in appearance and practices, increasing job satisfaction and probably reducing staff turnover
- Contributing to increased productivity
- Ensuring that all the correct procedures are followed, including cleaning
- Complying with any legal provisions or the requirements of industry guides or codes of practice (providing a due diligence defence)
- Promoting a good company image which should result in increased business
- Improving the supervisory skills of managers

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Induction Training

Induction training of all food handlers is particularly important.

In addition to some of the previously mentioned benefits, it will:

- Ensure new staff are aware of the company hygiene rules
- Comply with specific requirements of the industry guides and legislation
- Demonstrate the importance the business places on food hygiene, thereby contributing to the right culture
- Reduce the need for close supervision
- Reduce the amount of waste food

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Training Programs & Records

It is good practice for food businesses to have a training program which identifies the training needs of each food handler.

Records of training should include:

- Induction (hygiene essentials)
- Hygiene awareness
- Foundation or Elementary (Level 2)
- Intermediate (Level 3) or Advanced (Level 4)
- Any specific courses attended (e.g. HACCP, refresher training etc.)

These records should be completed for each food handler, to assist compliance with the legal requirements and to assist in establishing a due diligence defence.

It must always be remembered that the law requires competency for food handlers to produce safe food, not an aging certificate on the wall.

Records are also useful to provide evidence that staff have received appropriate training, to identify training needs and plan a training program.

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Verification of Effective Training

Training can be considered successful when food handlers implement the highest standards of food hygiene at all times, even when there is no supervisor present.

Verification therefore involves ensuring staff have the knowledge and implement this knowledge.

Verification also includes observing staff and auditing their activities, for example, that the refrigerator is correctly loaded and that all necessary records are satisfactorily completed.

Staff could be asked to complete written or verbal tests, but more importantly they should be given competency tests. Staff must, for example, be able to demonstrate how to wash their hands correctly or use a probe thermometer safely.

Accurately completed training records should be available.

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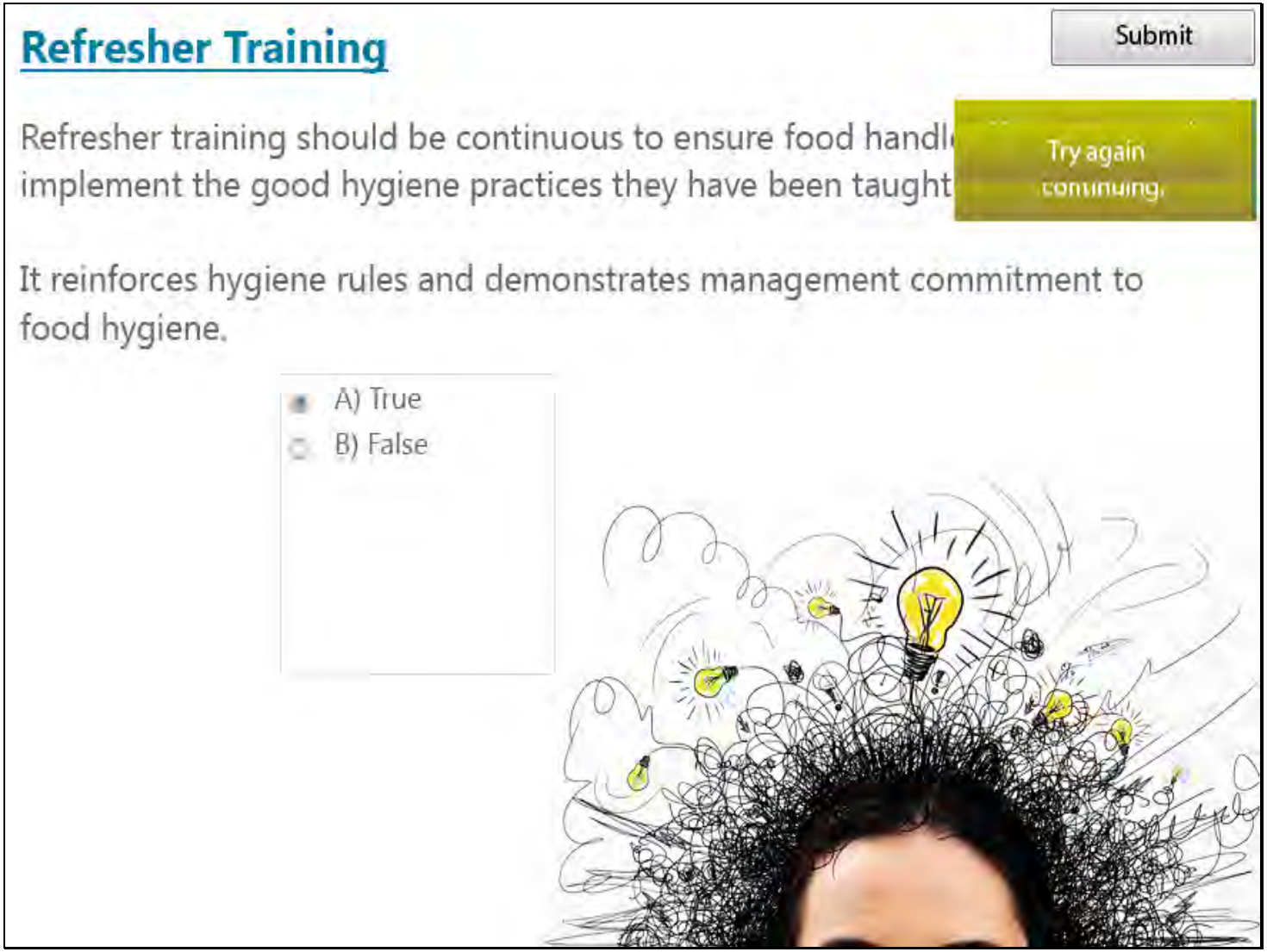

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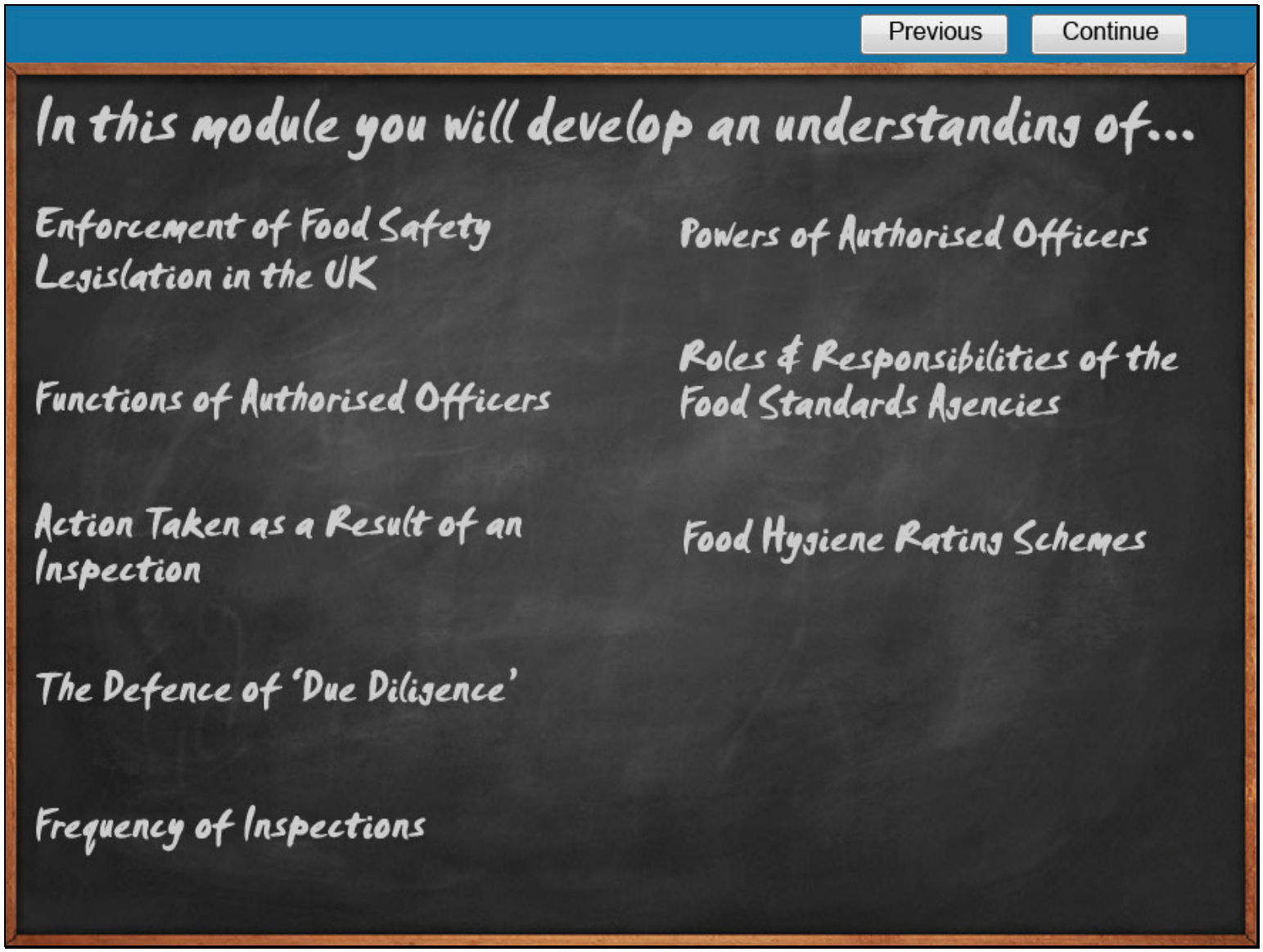

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Authorised Officers

Authorised officers undertake these functions when:

- Conducting routine visits and inspections of food premises
- Investigating food poisoning outbreaks and incidents
- Investigating food complaints
- Lecturing on hygiene courses and seminars and giving related talks
- Using the media - for example, press releases, committee reports and hazard warnings
- Dealing with planning and license applications
- Developing partnerships with business decision making bases in the local authority area

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Action Taken as a Result of an Inspection

During an inspection, an EHP or EHO may identify contraventions of food hygiene legislation and/or poor or unsafe food handling practices.

Several options exist to remedy the contraventions, and detailed guidance is found in the Food Law Code of Practice as to the most appropriate action.

The options available and potential outcomes for all food hygiene inspections include both **formal** and **informal** actions.

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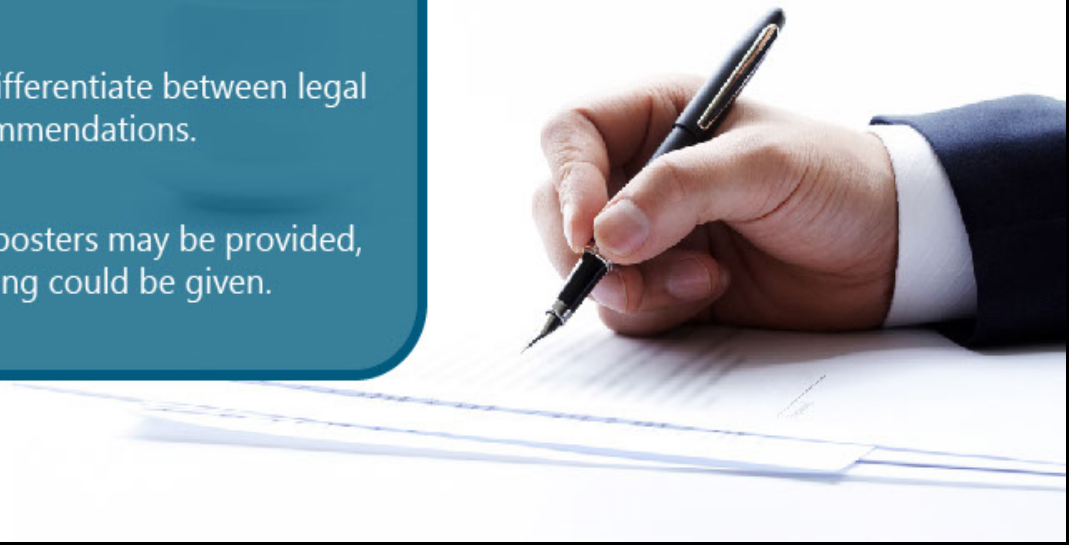
Action Taken as a Result of an Inspection

Informal Action

Informal action may be in the form of verbal or written advice and warnings. This action will be taken where the EHP or EHO is confident the work will be carried out.

Letters should clearly differentiate between legal requirements and recommendations.

Information leaflets or posters may be provided, and instruction or training could be given.



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Action Taken as a Result of an Inspection

Formal Action

A **hygiene improvement notice**, will be issued for contraventions of food hygiene legislation, allowing not less than 14 days to comply (for example, a cracked wash hand basin or premises and equipment in disrepair).

NOTE: This type of notice would not be used for cleaning issues or anything that needs to be completed in less than 14 days.

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Action Taken as a Result of an Inspection

Formal Action

Where food does not comply with food safety requirements, it may result in the **detention or seizure of unsafe food**.

Examples include:

- Food which is unfit
- Food responsible for causing food poisoning
- Food contaminated with rat droppings

The food would be taken to a magistrate who has the power to condemn the food, and the food business operator would probably be prosecuted.

Alternatively the unfit food could be voluntarily surrendered to the authorised officer.

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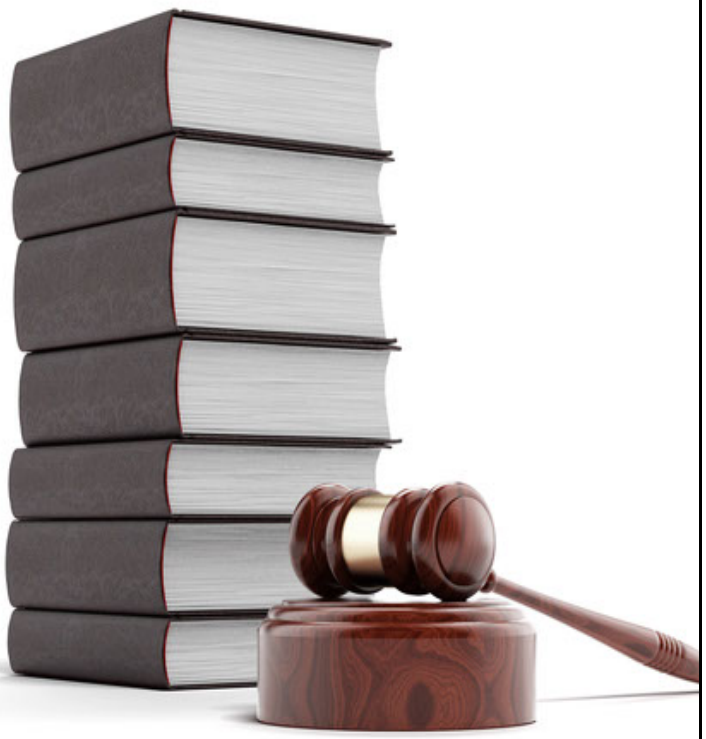
Action Taken as a Result of an Inspection

Formal Action

A **hygiene emergency prohibition notice**, is issued where there is an imminent risk of injury to health, requiring closure of the premises, prohibition of processes or prohibition of equipment use (a court will issue a prohibition order if the proprietor is convicted and there is a risk of injury to health).



For example:

- A serious pest infestation
- Sewage or flooding because of a drainage problem
- No water
- Responsible for a food poisoning outbreak
- Too many ill staff
- No electricity

(NOTE: These are also instances when a food business should voluntarily cease to trade)

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Action Taken as a Result of an Inspection

Formal Action

A **formal caution** will be issued where an offence exists but it is not considered in the public interest to prosecute through the courts. However, where it is considered in the public interest, a business will be **prosecuted**.

In order to take a successful prosecution, appropriate evidence will be required.

Evidence can include:

- the notes taken at the time of inspection
- photographs
- witness statements and seized records
- documents
- equipment
- food

The results of the laboratory tests regarding, for example, the seized food or swabs of work surfaces, could also be used as evidence.

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The Defence of Due Dilligence

Legislation creates a number of offences known as 'strict liability'.

It does not matter that the accused did not intend to break the law, the mere fact that there is clear evidence that a statute has been contravened is sufficient for a conviction.

This regime of strict liability was perceived as causing injustice if a person was held to have committed an offence for which he had no responsibility, or because of an accident or some cause completely beyond his control.

To create a balance of fairness, the defence of 'due diligence' was included. The legislation specifically states that it is a defence to prove that all reasonable precautions were taken and all due diligence was exercised to avoid the offence.

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The Defence of Due Dilligence

Through legal precedent, various principles have been confirmed as necessary if a defence is to succeed. Some positive steps will always be required.

Taking reasonable precautions involves the setting up of a system of control having regard to the nature of the risks involved.

Due diligence involves securing the proper operation of that system.

Where there is a reasonable precaution then it should be taken. Written records are not a legal requirement, however, satisfactory records may be useful to assist a due diligence defence.

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Frequency of Inspections

Effective inspection programs recognise that the frequency of inspection will vary according to the type of food business, the nature of the food, the degree of handling and the size of the business.

The frequency of visits is determined by the hazards associated with the business, including the current level of compliance with food safety legislation, the confidence of the enforcement officer in management, the history of compliance, and the control systems in place.

Essentially, those premises posing a potentially higher risk should be inspected more frequently than those premises with a lower risk.

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Powers of Authorised Officers

Officers have the right to enter a food premises at any reasonable time, without notice. This includes any time there is activity at the business, even if it is not open to the public.

Food hygiene inspections have two main purposes:

1. To **identify risks** arising from the food business's activities and determine the effectiveness of the business's own assessment of hazards and controls

2. To **identify contraventions** of food legislation and seek to have them corrected

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Powers of Authorised Officers

Before carrying out a food hygiene inspection, EHPs or EHOs will take account of a number of issues.

These will include:

- Reviewing the history of the premises - including information on operations and systems, previous complaints and responses to earlier inspection outcomes
- Equipment availability - for example, calibrated temperature recording equipment
- Appropriate protective clothing
- Assessing the need for additional expertise - for example, food examiners

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The Role of the Food Standards Agencies

Local authorities should bear in mind that schemes are generally based on food hygiene and safety procedures and confidence in management elements of the Code of Practice. Broadly, these have been set out as follows:

- Scoring systems should be open, transparent and simple to understand, and accurately reflect the standards of compliance within the business
- Clear explanation of scoring schemes and associated bandings should be provided to members of the public
- Every effort should be made to ensure scoring within a particular scheme is as consistent as possible

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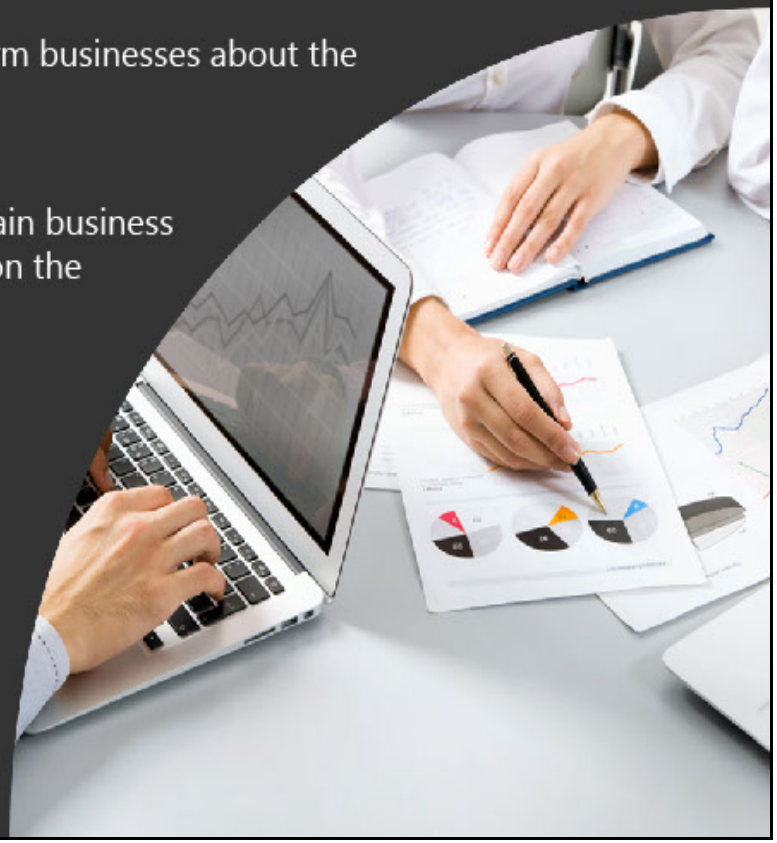
The Role of the Food Standards Agencies

(Continued)

- A mechanism should be put in place to inform businesses about the relevant complaints procedures
- Local authorities should actively seek to obtain business cooperation in displaying score certificates on the premises
- There should be an ongoing commitment to keep the public informed about the general outcomes of the scheme



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The Role of the Food Standards Agencies

The core values of the Agencies are to:

- Put the consumer first
- Be open and accessible
- Be an independent voice

The functions of the Agencies are to:

- Provide advice and information to the public and to the government on food safety from farm to fork, nutrition and diet
- Protect consumers through effective enforcement and monitoring
- Support consumer choice through promoting accurate and meaningful labelling

The Food Standards Agency is led by a board and accounts to Parliament through Health Ministers. The headquarters are based in London. Scottish, Welsh and Northern Irish Executives of the Agency are responsible for implementing policies on food issues specific to each country within the Agency's framework.

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Responsibilities of the Food Standards Agencies

The Agency has responsibility for:

- Food safety, contaminants, nutrition, additives and labelling
- Animal feed and veterinary public health
- The performance of Local Authority enforcement
- The Meat Hygiene Service
- Research

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Food Hygiene Rating Schemes

It is very important that all food businesses obey the law and supply food that is safe to eat.

Consumers in certain areas can already see how well a food business in their area complies with food hygiene regulations through the various schemes throughout the UK which are run by their local authority.

The primary purpose of these schemes is to empower consumers so that they make more informed choices about the places from which they purchase food.

Local authority enforcement officers are responsible for inspecting food businesses to ensure that they meet the legal requirements on food hygiene.

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Food Hygiene Rating Schemes

Under the schemes, each food outlet is given a score that reflects the inspection findings.

The food safety officer will check how well the business is meeting the law by looking at:

- How hygienically the food is handled – how it is prepared, cooked, reheated, cooled and stored
- The condition of the structure of the buildings – the cleanliness, layout, lighting, ventilation and other facilities
- How the business manages and records what it does to ensure food is safe

At the end of the inspection, the business is given one of the six ratings (0 - 5). The top rating of 5 means that the business was found to have 'very good' hygiene standards.

Any business should be able to reach this top rating.

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Food Hygiene Rating Schemes

Scores are displayed on the Food Standards Agency website (www.food.gov.uk), where consumers can see scores for all businesses in the local area.

Experience with these schemes suggests that as well as providing information to consumers, they can encourage businesses to raise their hygiene standards.

If a food business thinks their given score is unfair they can appeal against it. A reinspection can be applied for within 14 days of receiving notification of their food hygiene rating. Alternatively, a revisit can be requested, but there is a waiting time of at least 3 months before another inspection can be done.

The Food Hygiene Rating Scheme differs slightly in Scotland, but all information and ratings, as well as links to specific websites for Scotland, Wales and Northern Ireland, can be viewed through the main Food Standards Agency website.