READING PACK – PART ONE

Amended and abridged from the World Food Safety Guidance for Airline Caterers – 3rd Version (June 2010)

Background and resources

Within the catering business there are industrial standards that can be applied. These are based on scientific understanding of the hazards present.

IFSA and AEA World Food Safety Guideline

Purpose

The World Food Safety Guidelines describe an effective food safety control concept applicable to airline catering establishments worldwide and accepted by international airlines as the basic reference document for airline catering food safety without reservations or additions.

However the World Food Safety Guidelines are superseded by national food legislation whenever requirements of national food legislation exceed or prohibit requirements of the World Food Safety Guidelines.

Introduction

Food safety has long been recognised by the Airline Catering Industry as a matter of paramount importance and this is reflected in its excellent safety record.

HACCP Concept

The Hazard Analysis Critical Control Point (HACCP) concept is a systematic approach to the identification and assessment of food safety hazards and of defining means of their control.

As a management tool, HACCP provides for a structured approach to control identifiable hazards that directly affect safety of food.

The system focuses on prevention at every step of the production process rather than detection of unsafe food products at the end of production. It provides an efficient, right-first-time, approach to food processing, thereby reducing the need for end-product monitoring including microbiological testing. It is a cost effective, powerful system for managing food safety.

Principles of HACCP

Flight Caterers must demonstrate their HACCP system by documenting the relevant system elements according to Codex Alimentarius HACCP Principles, these being:

Principle 1: Conduct a hazard analysis:
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.

Principle 2: Determine the Critical Control Points (CCPs):
A *critical control point* is a step at which control can be applied and is essential to prevent or eliminate a food safety hazard or reduce it to an acceptable level.

Principle 3: Establish critical limit(s):
A *critical limit* is a criterion, which separates acceptability from unacceptability.

Principle 4: Establish a system to monitor control of the CCP:
Monitoring is the act of conducting a planned sequence of observations or measurements of control parameters to assess whether a CCP is under control.

Principle 5: Establish the Corrective Action to be taken when Monitoring indicates that a particular CCP is not under control:
Corrective Action is any action to be taken when the results of *Monitoring* at the CCP indicates a loss of control.

Principle 6: Establish procedure for the Verification to confirm that the HACCP system is working effectively:
Verification is the application of methods, procedures, tests and other evaluations, in addition to monitoring to determine compliance with the HACCP plan.

Principle 7: Establish documentation concerning all procedures and records appropriate to these principles and their application.

Application of HACCP:

The application of HACCP principles consists of the following tasks as identified in the Logic Sequence for Application of HACCP in the Codex Alimentarius.

1. Assemble HACCP Team
The food operation should assure that the appropriate product specific knowledge and expertise is available for the development of an effective HACCP plan.

2. Describe Products
A description of the product groups should be drawn up, plus relevant processes such as handling, packaging, storage and distribution.

3. Identify Intended Use
The intended use should be based on the expected uses of the product by the end user or consumer. In specific cases, vulnerable groups of the population, e.g. institutional feeding, may have to be considered.

4. Construct Flow Diagram
The flow diagram should be constructed by the HACCP team. The flow diagram should cover all steps in the operation. When applying HACCP to a given operation,

consideration should be given to steps preceding and following the specified operation.

5. On-site Confirmation of Flow Diagram

The HACCP team should confirm the processing operation against the flow diagram during all stages and hours of operation and amend the flow diagram where appropriate.

6. Implement the Seven Principles of HACCP

As set out above.

Process Flow Diagram

The diagram should detail the flow of events through the whole process giving a clear and simple description of how the end product(s) is made and handled. An example of Process Flow Diagram for an airline caterer that produces many hundreds of products is shown below **(see Appendix 1)**

Hazard Analysis Table

Following construction of the Process Flow Diagram, the HACCP team should then ensure that all conceivable hazards are identified. Once the hazards are identified for each process step, determination of whether the hazard is significant or not should occur through the evaluation of each hazards severity and likelihood of occurrence. The Decision Tree (Codex 1997 – **see Appendix 2)** can be used to determine whether hazards identified at a particular step may be controlled by a Critical Control Point (CCP) or by a Standard Operating Procedure (SOP).

A CCP is a step, location, practice or procedure at which control can be applied and which is essential to prevent, eliminate or reduce a food safety hazard to an acceptable level.

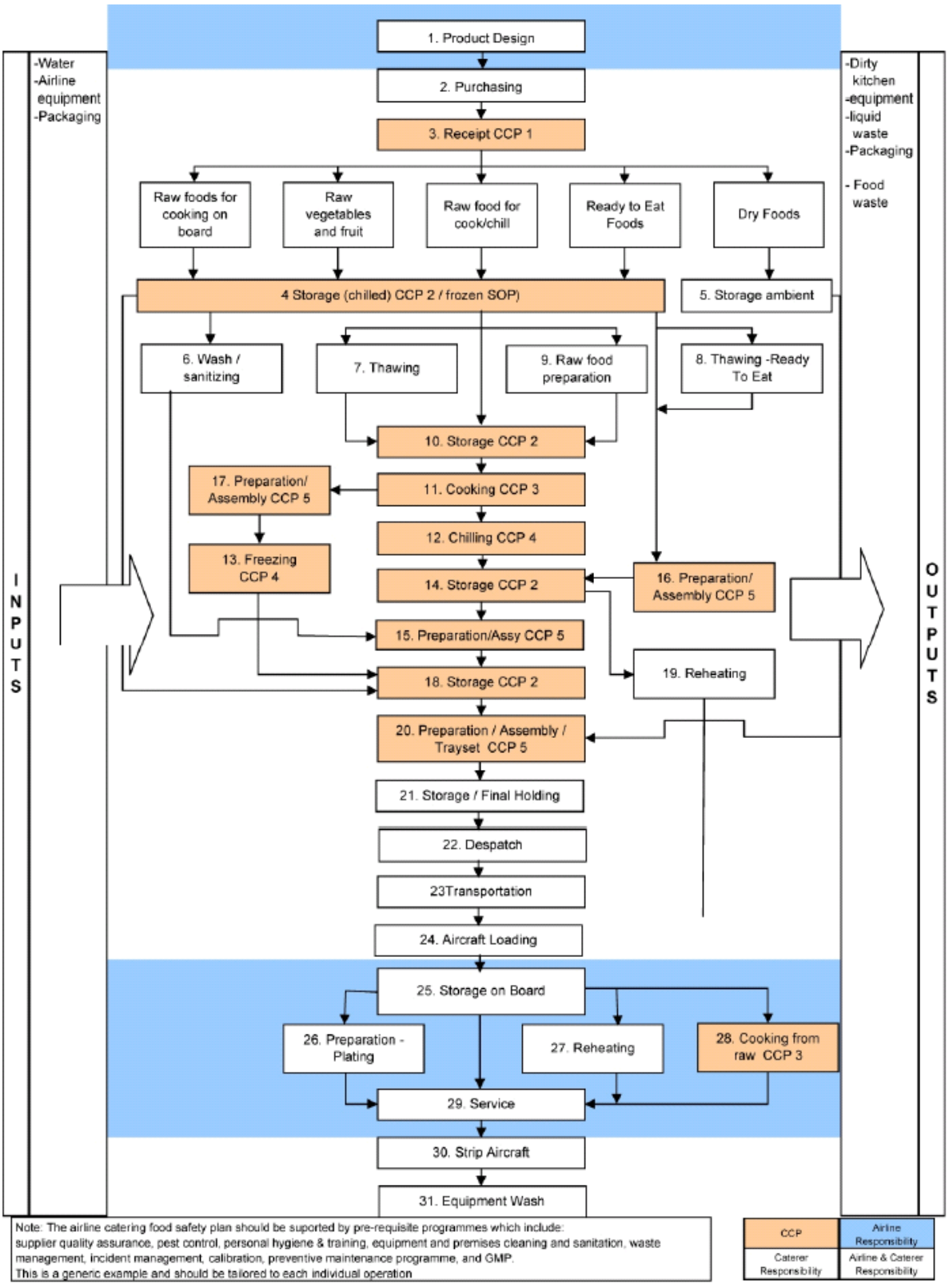
Food Safety Process Table - Critical Control Points

The table below is a HACCP model for the in-flight catering industry. Please note that each individual kitchen should assign a person, or position responsible for monitoring Frequency, Corrective Action and Verification steps.

Step No	Process Step	Hazard	Control Measures	CCPs	Critical Limits	Monitoring Procedures/ Frequency	Corrective Actions	Verification	Records
3	Goods receipt	Biological: growth of pathogens	Temperature monitoring of potentially hazardous foods upon receipt	CCP1	*Chilled food* 8˚C *Frozen food* Solid with no signs of defrosting	Food temperature monitored from each delivery of potentially hazardous foods. (Physical inspection of frozen products)	If above 8˚C reject product. If frozen product shows signs of defrosting, these should be rejected.	Verify critical limits are being achieved through thermometer/ gauge, calibration, records review, staff interviews, temperature spot checks and that the system is fully operational.	Maintain records of goods receipt on file.
4 14	Storage/ Final handling	Biological: growth of pathogens	Potentially hazardous food to be stored under refrigeration.	CCP2	Critical Limit 8˚C for chilled food or national standards where stricter.	Refrigeration gauges monitored either by continuous recordings or manually daily or at a frequency considered effective.	Where refrigeration temperatures rises above critical limit above 8˚C check food temperature. Where food temperature rises above 8˚C discard food.	Verify critical limits are being achieved through thermometer/ gauge, calibration, records review, staff interviews, temperature spot checks and that the system is fully operational.	Maintain documentation to prove continuous readouts and/or manual temperature records.
11 28	Cooking/ Cooking on Board	Biological: growth of pathogens	*Fully cooked.* Raw foods of animal origin to be cooked to safe core temperatures. *Seared foods.* Raw whole muscle foods to be seared to achieve colour change on all outer surfaces.	CCP3	For minimum cooking temperatures refer to Chapter 7 or apply national standards where stricter.	*Fully cooked*. Temperature probing of products at the end of the cooking process of each batch. *Seared foods.* Physical inspection of total surface of product to ensure all outer surfaces are fully seared.	*Fully cooked*. Continue cooking until temperature requirements are met. *Seared foods.* Continue cooking until outside surfaces are fully seared.	Verify critical limits are being achieved through thermometer/ gauge, calibration, records review, staff interviews, temperature spot checks and that the system is fully operational.	Records of core temperature or physical inspection where appropriate for seared items. Measurement on cooking time to be maintained.

Step No	Process Step	Hazard	Control Measures	CCPs	Critical Limits	Monitoring Procedures/ Frequency	Corrective Actions	Verification	Records
12 13	Chilling/ Freezing: (Rapid Cooling)	Biological: growth of spore forming pathogens	Food must be rapidly chilled after cooking.	CCP4	Product to reduce in core temperate from 60˚C as follows, or national standards where stricter. 60˚C to 10˚C in 4 hours or 60˚C to 5˚C in 6 hours.	Time and core temperature of rapid chilling to be measures at start and finish of process.	Disposal of foodstuff if time and temperature objectives are not achieved	Verify critical limits are being achieved through thermometer/ gauge, calibration, records review, staff interviews, temperature spot checks and that the system is fully operational.	Record time and temperature of product whilst being rapidly cooled. Maintain on file.
15 16 17 20	Handling of ready-to-eat food, e.g. Meal Assembly Portion Tray-setting	Biological Risk of microbial contaminati on from food handlers: Growth of pathogens	Close attention to personal hygiene and routine hand-washing Control of food temperature or time of exposure to ambient temperature during handling is required, unless it can be demonstrated that the food temperature will not exceed 8˚C	CCP5	Hygiene as critical limit Regular supervisory inspection of personal hygiene and practices Temperature as critical limit Ambient temperature above 15˚C, food temperature must not exceed 15°C Time as critical limit Ambient temperature above 15˚C, exposure time must not exceed 45 minutes. Time as critical limit Ambient temperature above 8˚C exposure time must not exceed 90 minutes. Or where ambient temperature is below 8°C no time temperature recording is required.	Hygiene as critical limit As required Temperature as critical limit. Check food temperature at end of process. Time as critical limit Check time at start and end of process.	Hygiene as critical limit As required Temperature as critical limit. If the food exceeds 15°C product must be discarded. Time as critical limit. If the food is exposed for more than 45 minutes must be discarded. If food exposure time exceeds 90 minutes product must be discarded.	Periodic swabbing of hands and hand-contact surfaces for the presence of pathogens Verify critical limits are being achieved through thermometer/ gauge, calibration, records review, staff interviews, temperature spot checks and that the system is fully operational.	Documenting training received, monitoring records and results of swabbing. Maintain records of time or temperature exposure of food in preparation on file.

Appendix 1 – Process Flow Diagram

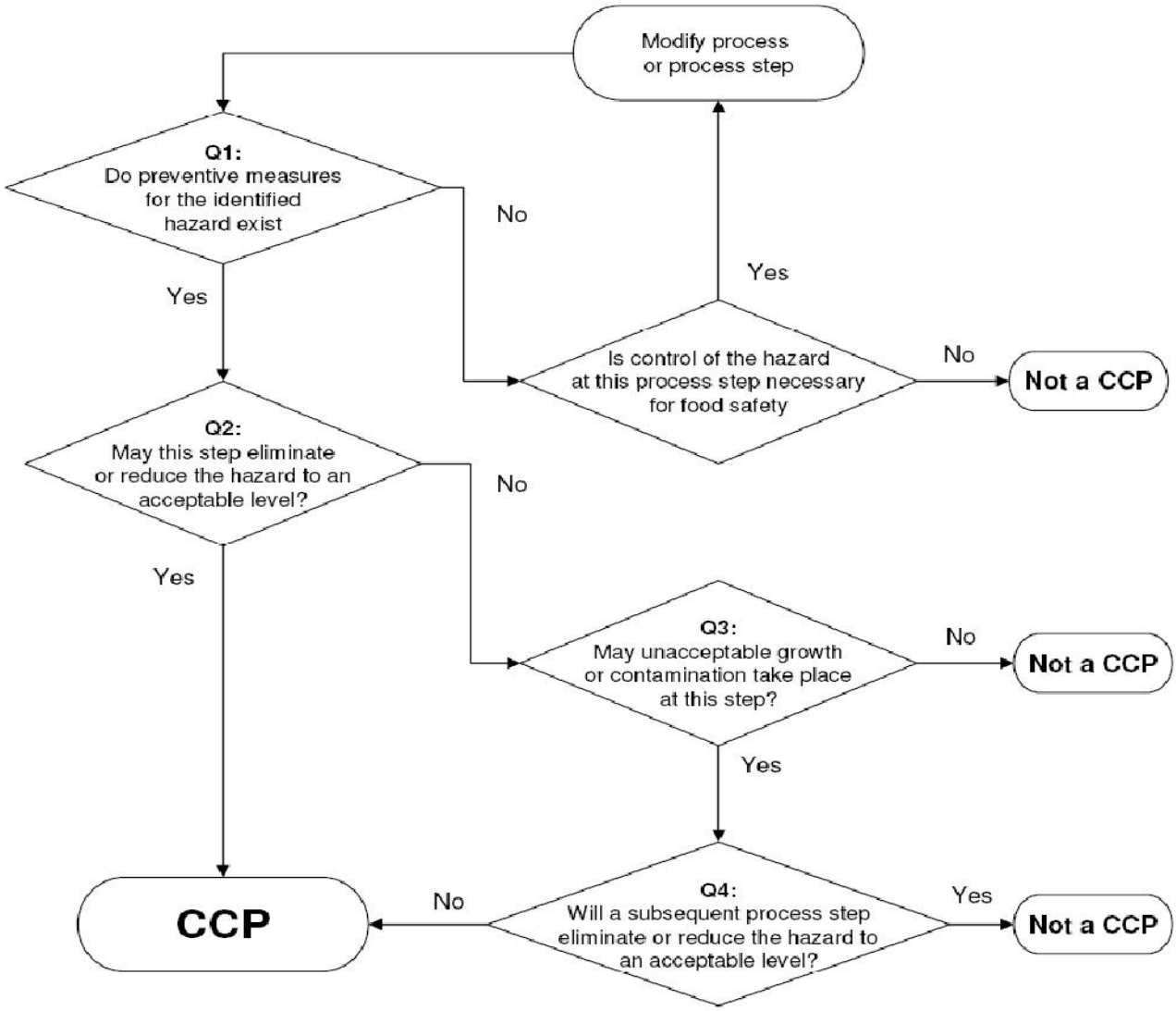


Appendix 2

Example of Decision Tree to Identify CCPs

For the Airline Catering Industry

(answer questions in sequence)



Decision Tree adapted from FAO (Food and Agriculture Organization of the United Nations)

READING PACK – PART TWO

Abridged from the 'MANAGEMENT OF OUTBREAKS OF FOODBORNE ILLNESS IN ENGLAND AND WALES' - Food Standards Agency (May 2008)

Management arrangements

2.4. Local authorities and port health authorities play a key role in managing outbreaks of food-borne illness. The Food Safety Act (1990) and the Food Hygiene Regulations (2006), or their equivalent in devolved administrations, place responsibilities and powers of control with local authorities. The investigation of outbreaks of food-borne disease is carried out by Environmental Health Professionals (EHPs) and others employed by the local authority. Local authorities have powers to assist both investigation and control of outbreaks, including powers of entry, sampling powers and powers to exclude food handlers, seize and detain food and close premises.

2.11. The HPA's Centre for Infections (HPA CfI) is responsible for the collection and collation of data on outbreaks of communicable disease including food-borne illness and is involved in its prevention and control at a national level in England. The National Public Health Service (NPHS) provides the same services in Wales. Where appropriate, HPA CfI or NPHS can provide experts to assist in local outbreak investigations or, in the case of outbreaks with a national distribution, its experts may themselves design and carry out outbreak investigations.

2.13. The Food Standards Agency (FSA) is a UK-wide, non-ministerial Government department, established under the Food Standards Act 1999 with responsibility for the protection of public health in relation to food. This guidance is issued under section 20 of the Act, which confers powers to issue guidance upon the FSA.

4. Identification of outbreaks

4.1. Outbreaks may be identified in a number of ways and it is crucial to establish without delay whether or not the incident is real or anomalous. An outbreak of food-borne illness is defined as either two or more linked cases of the same disease, or when the observed numbers of cases unaccountably exceeds the expected number.

4.2. Clearly we have to be sure that the cases in question are as a result of the same disease. A case definition is necessary to achieve this and such a definition needs to be carefully considered. Cases may come to light because of clinical symptoms reported to a health professional, microbiological analysis of specimens, or from specific complaints from the general public about a perceived incident. In considering a suitable case definition it must be remembered that, for some diseases symptomless excretion is commonplace (e.g. *E.coli* O157) and that such excretion is not a normal finding. Whether or not symptomless excretors are included in the case definition is a matter of choice but it is worth remembering that these individuals may be able to contribute to the epidemiological picture and they are themselves a source of ongoing infection by person to person spread.

5. The investigation and control of an outbreak

Overview

5.1. Whilst the approach to the investigation and control of an outbreak is likely to vary dependent on the circumstances, the following 'aide memoire' is designed to assist in systematically addressing the issues (as they relate to the Preliminary Phase). It is not intended to imply that each action must automatically follow the one preceding it, or that all steps are needed on every occasion. In practice some steps will be carried out simultaneously whilst others, for example communication and collation of data, will be required throughout the whole process. Effective investigation and control will require good partnership working to bring together different areas of expertise. It is expected that the steps outlined below will involve input from the experts in relevant fields e.g. CCDC, environmental health staff, HPA/CDSC Wales epidemiologists, microbiologists and virologists.

Aide Memoire

Preliminary Phase

Collate and assess the available information and consider whether or not the cases exhibit common symptoms and appear to share common exposure factors e.g. consumption of a particular food, attendance at a specific event, visit to a particular premises, direct or indirect contact with animals (on a particular public amenity premises for example) etc.

Establish a tentative diagnosis

Agree case definition

Collect relevant specimens

Conduct in-depth interviews with initial cases to establish any common factors

Conduct on-site investigations at implicated premises

Form preliminary hypothesis

Consider the likelihood of a continuing public health risk

Initiate immediate control measures proportionate to the public health risk

Identify the need to convene a formal Outbreak Control Team and the activation of the outbreak control plan

In the case of significant outbreaks [] inform the HPA CfI / CDSC Wales and the FSA Incidents Branch

Review the information gathered, assess the need for further investigation and identify the roles and responsibilities of the relevant partners.

5.3. The general principles of an investigation will apply to microbiological, acute chemical or radiological food-borne incidents, although in chemical incidents person to person spread is unlikely to be an issue. The majority of outbreaks are microbiological, but, because it is not always clear at the beginning of an investigation whether the incident is microbiological, chemical or radiological in nature, it is important that at an early stage appropriate clinical samples from the cases are submitted to the laboratory.

5.4. Many outbreaks are already over by the time they are discovered. If it becomes clear that there is no continuing public health risk a decision will have to be made, in the light of available resources and priorities, as to whether or not a full investigation is justified. Without further enquiry, it is likely to be impossible to come to firm conclusions about the source of the contamination and the vehicle or mode of spread. For example, just because a number of affected people ate fish it cannot be concluded that contaminated fish was responsible for the outbreak, no matter how biologically plausible; enquiry among unaffected people may reveal that they ate fish also. The discovery of a breakdown in food hygiene may be suggestive, but further evidence of cause and effect will be required to design effective control measures, as well as to advance scientific knowledge and for national surveillance purposes.

Preliminary hypotheses

5.20. Assessment of the initial information from the laboratory, the interviews with patients and the inspection of the premises may make it possible to form a preliminary hypothesis as to the cause and mode of spread. This may enable appropriate control measures to be instituted at this point.

5.21. At the end of the preliminary phase, a decision will be needed about whether or not to continue the investigation to establish the cause of infection. It may be apparent at this stage that there is no further public health risk and in such circumstances the value of a further investigation will need to be assessed. It is important that the OCT (or investigators, if no formal OCT has been convened) reach an agreement in the light of priorities and the availability of resources. If further action is agreed, the additional steps listed in paragraph 5.1 should be considered.

Descriptive epidemiology

5.33. Most outbreaks of food-borne disease warrant a descriptive study, because this can assist in identifying ways of preventing similar outbreaks in the future. The objective should be to provide a detailed description of the outbreak, its onset, size and progress (the epidemic curve), and the categorisation of cases by various characteristics, such as age and gender. Associations of place and time should also be sought. If formal, legally enforceable, control measures are required, harder evidence from laboratory investigations and an analytical epidemiological study may also be needed.

5.34. Those at risk during the outbreak should be identified and data from as many cases as possible obtained through interviews. There is also an urgent need to identify affected persons, such as food handlers, who pose a risk of further spread.

Appendix I

Features of food-borne illness

Bacillus cereus food poisoning – emetic and diarrhoeal type.

Gram positive, aerobic facultative anaerobic, motile rod, producing heat-resistant spores and one or more toxins including a heat labile enterotoxin (formed in the gut) and a heat resistant emetic toxin.. Organism has a temperature growth range of 10-50^{o}C (optimum: 28-35^{o}C). Some psychrotrophic forms show slow growth at 4–9^{o}C.

Symptoms of acute nausea, vomiting and stomach cramps (emetic type) and diarrhoea (diarrhoeal type) arise after ingestion of large numbers of bacteria or pre-formed toxin. The incubation period is 1-5 hours (emetic type) and 6-8 hours (diarrhoeal type) and the duration of illness is around 24 hours. Exclusion is inappropriate.

Foods commonly associated include cereal products, rice, pasta and spices.

Campylobacter spp. enteritis

Gram negative, microaerophilic, non–sporing curved motile rod, which is thermotolerant, with optimum growth in the range 42–45^{o}C. It has a high infectivity with as few as 100 organisms capable of causing illness.

Although infection has been associated with a range of foods including poultry, meat, dairy products and shellfish, it can be spread by cross-contamination, environmental (recreational water) and animal contact. However, person-to-person spread is uncommon even though protracted excretion occurs occasionally.

The incubation period is 1-10 days (usually 3 – 5 days) before the onset of abdominal pain, diarrhoea (possibly bloody), headache and fever, lasting 2 – 7 days with the possibility of serious complications. Exclusion extends to 48 hours after clinical recovery.

Clostridium perfringens

Gram positive, strict anaerobic, spore-forming rod, the spores of which can survive normal cooking temperatures. Multiplication occurs if temperature control is inadequate, given that the organism has a growth range of 15-50^{o}C (optimum: 43-45^{o}C). Ingestion of large numbers of vegetative cells (10^{5}+) results in enterotoxin production in the small intestine and after an incubation period of 6-24 hours (usually 10-12 hours) symptoms of acute abdominal pain and diarrhoea (vomiting is uncommon) develop and may last for 24 hours. Exclusion is not appropriate.

Foods commonly associated include: stews, rolled roasts and pies, where the source is ultimately a foodstuff contaminated with animal faeces or soil. Outbreaks arise when contaminated bulk cooked meat dishes are left at ambient temperature during cooling and storage.

Salmonella spp. (excluding S.typhi and S.paratyphi)

Gram negative, aerobic, facultative anaerobic rod that is mesophilic, but can grow at temperatures down to 6–8^{o}C, though readily killed by heating (70^{o} for 2 minutes)

Normally large numbers of bacteria required to produce a case, though certain foods, e.g. chocolate, protect the organism from gastric acid and the infective dose is lower. It is also lower in vulnerable groups such as the young and the elderly. Symptoms include malaise, diarrhoea, fever, vomiting and abdominal pain. Septicaemia, peritonitis and meningitis are rare occurrences.

Disease has been associated with a wide range of foods, most notably poultry, eggs, unpasteurised milk, meat and infected food handlers. Domesticated and wild animal species can carry the infection and excrete the organism intermittently or during clinical episodes. Risk factors include cross- contamination / poor food handling, inadequate cooking and infected food handlers.

The incubation period is 6-72 hours (usually 12-36 hours) and symptoms may persist for 2 days to three weeks. Exclusion is not indicated.

Stapylococcus aureus food poisoning

Gram positive, facultative anaerobic, coccal bacterium producing a heat-resistant enterotoxin, comprising three different exotoxins. Symptoms of intoxication (abdominal cramps, nausea and vomiting) follow an incubation period of 1-6 hours (typically, 2-4 hours) during which the bacterium (that may have contaminated food from skin lesions, nostrils, or fingers) elaborate a pre-formed toxin.

Foodstuffs associated with cases are ham and processed meats (bacterium can survive high salt concentrations), egg products and cream cakes which are then stored at room temperature.

Viral gastro-enteritis e.g. norovirus ('Norwalk virus')

The major cause of diarrhoea and vomiting in the UK and brought about by a range of virus agents, the commonest being norovirus, the cause of the so-called 'winter vomiting disease'. Illness is characterised by nausea, headache, fever, malaise, diarrhoea (often watery) and vomiting (sometimes 'projectile') with onset generally 24-48 hours after exposure to virus which can be transmitted in raw and under-cooked food, contact with stools or faecally-contaminated hand-contact surfaces and inhalation/ingestion of particles through vomitus. Disease is highly infectious, though generally self-limiting with the duration limited to 12-60 hours.