Queensland Health Guideline for the investigation and management of suspected foodborne illness outbreaks

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Contents

Preface **5**
Abbreviations **6**
Glossary **8**
Definitions for clinical symptoms **12**
Quick clinical guide to common foodborne pathogens **14**
Summary of outbreak investigation steps **15**
Terms of Reference for OCT/IMT **18**
Checklist of tasks for chair of OCT meeting **19**
1. The investigation and control of an outbreak **20**
1.1 Steps in the investigation of an outbreak 20
1.1.1 Collate and summarise the available information 20
1.1.2 Conduct hypothesis-generating case interviews 20
1.1.3 Develop a line-listing and assess significance of outbreak 21
1.1.4 Outbreak Control Team / Incident Management Team (OCT/IMT) 22
1.1.5 Develop a case definition 22
1.1.6 Undertake further case finding and interviews 23
1.1.7 Clinical, food and environmental sampling 24
1.1.8 Conduct a descriptive analysis of data collected from cases 27
1.1.9 Environmental assessment of a food business 28
1.1.10 Traceback of food products 29
1.1.11 Laboratory testing 30
1.1.12 Review information/evidence: make a decision on further investigation and control 31
1.1.13 Analytic study 32
1.1.14 Implement control measures 33
1.1.15 Declare the outbreak over 33
1.2 Outbreak reports 34
1.3 Post-outbreak review 35
2. Roles and responsibilities **37**
2.1 Public Health Units 37
2.1.1 Outbreak Control Team 39
2.1.2 Outbreak Categorisation 41
2.2 Communicable Diseases Branch 44
2.2.1 OzFoodNet 45
2.3 Forensic and Scientific Services (Public Health laboratories) 46
2.4 Health Protection Branch 46
2.5 Local Government 47
2.6 Other Agencies 48
2.6.1 Department of Agriculture and Fisheries 48
2.6.2 Safe Food Production Queensland 49
3. Communications **50**
3.1 OCT communication 50
3.2 Communication within Queensland Health 50

3.3 Media communication 50
3.3.1 Local outbreaks 51
3.3.2 Statewide/interstate/international issues 51

4. Legislative Framework 52

4.1 Public Health Act 2005 and Public Health Regulation 2018 52
4.2 Food Act 2006 and Food Standards Code 53
4.3 Right to Information Act 2009 56

5. Incident Management Frameworks and Agreements 58

5.1 Health Service Directive QH-HSD-046:2014 - Management of a public health event of state significance 58
5.2 Queensland Health Disaster and Emergency Incident Plan 58
5.3 The Queensland Health Incident Management System Guideline 58
5.4 National OzFoodNet protocol for the epidemiological investigation of multi-jurisdictional outbreaks of foodborne illness 58
5.5 National Food Incident Response Protocol 59

6. References 61

7. Outbreak Investigation Resources 62

8. List of Attachments 64

Attachment 1: Public Health Agency Contact List 65
Attachment 2: OCT Meeting Agenda 66
Attachment 3: Outbreak Control Team Meeting Minutes 67
Attachment 4: Outbreak Investigation Log 69
Attachment 5: Conducting an analytic study 70
Attachment 6: Outbreak Situation Report 73
Attachment 7: Final Internal Outbreak Report 74
Attachment 8: Public Fact Sheet – How to collect a faecal or vomitus specimen 75
Attachment 9: List of agents/toxins able to be examined by the Public Health laboratories (FSS) 76
Attachment 10: Summary of food and environmental laboratory testing 77
Attachment 11: Structured Debrief Tool 78
Attachment 12: Foodborne Pathogens Compendium for Outbreak Investigations 84

Preface

Purpose

The purpose of the Foodborne Illness Outbreak Management Guidelines is to:

- provide operational guidance for public health practitioners for the investigation and management of outbreaks of gastroenteritis and related illness where a foodborne pathogen is suspected or confirmed as the cause, including local, cross boundary and state-wide outbreaks
- define the roles and responsibilities of Queensland Health during outbreak investigations in relation to other agencies such as local government and SFPQ, establishing clear lines of communication and information sharing, and
- provide a practical guide on the steps to be taken during an investigation and identify standard reporting procedures for an outbreak investigation.

Reference tools for use by public health practitioners during outbreak investigations are provided either in the attachments of this document or can be accessed electronically from the foodborne disease webpage (https://www.health.qld.gov.au/clinical-practice/guidelines-procedures/diseases-infection/diseases/foodborne/default.asp).

Scope

These guidelines have been developed to assist public health practitioners in managing both local and cross-boundary suspected foodborne illness outbreaks, particularly in relation to their roles and responsibilities. The role of the OCT/IMT is to coordinate the activities of the agencies involved in the investigation and control of the outbreak, to share information between individuals and groups involved in the investigation, to provide a forum for decision-making and to formally document decisions and outcomes arising from OCT meetings.

Separate guidelines for the investigation and management of multijurisdictional outbreaks that cross state, territory and country borders have been developed by OzFoodNet and the Commonwealth Department of Health. Please refer to Section 5.4 of this document for guidance.

Abbreviations

CCP	Critical control point
CDB	Communicable Diseases Branch
CDNA	Communicable Diseases Network Australia
CHO	Chief Health Officer
DAF	Department of Agriculture and Fisheries
EHO	Environmental Health Officer
EHS	Environmental Health Services
EIA / ELISA	Enzyme Immunoassay / Enzyme Linked Immunosorbent Assay
HHS	Hospital and Health Service
HPB	Health Protection Branch
FBI	Foodborne illness
FSANZ	Food Standards Australia New Zealand
FSS	Forensic and Scientific Services
HPLC-MS	High Performance Liquid Chromatography – Mass Spectrometry
IMT	Incident Management Team
LG	Local Government
MJOI	Multi-jurisdictional Outbreak Investigation
MLVA	Multiple Locus Variable Number Tandem Repeats Analysis
NFIRP	National Food Incident Response Protocol
NOCS	Notifiable Conditions Surveillance System
OCT	Outbreak Control Team
PHMO	Public Health Medical Officer
PHU	Public Health Unit
RT-PCR	Reverse Transcriptase Polymerase Chain Reaction
RTI	Right to Information

SFPQ	Safe Food Production Queensland
SIMT	Statewide Incident Management Team
WGS	Whole Genome Sequencing

Glossary

Aetiological agent	The cause of the illness. May be bacterial, viral, parasitic, chemical or other.
Analytic(al) study	A study designed to test hypotheses by quantifying the association between an exposure (potential risk factors) and an outcome. See 'case control study' and 'cohort study' for examples.
Attack rate	The proportion of a group exposed to a particular factor (e.g. a specific food) who became ill during a given time period.
Case-case comparison study	Case-case study is basically the same as the standard case-control study except that another case population (of ill persons) is used as a comparison group in place of the control group (of well persons). The comparison group can be drawn from cases of another enteric pathogen or from cases of the same pathogen as the outbreak strain but a different subtype or genotype (non-outbreak strains). Measures of association (odds ratios) are limited to differences in exposures between outbreak cases and non-outbreak cases, rather than the population of unaffected individuals.
Case-control study	A study designed to compare the frequency of exposures (e.g. foods eaten) among people with the illness (cases) to the frequency of exposure among those without the illness (controls). Odds ratios are the measures of association derived from case-control studies.
Case definition	A set of criteria that define a case to be included in the analysis or study. This may include a combination of symptoms, laboratory testing and epidemiological information with limitations on time, place, and person. There may be one case definition in an outbreak, or separate case definitions indicating the degree of certainty (e.g. 'confirmed', 'probable', 'possible'). Case definitions may be refined during the course of the investigation.
Cluster	An increase in cases of disease (in excess of expected numbers) that are epidemiologically related in time, place or person but no common exposure, source of infection or mode of transmission has been established.
Cohort study (retrospective)	A study designed to compare exposures (e.g. foods eaten) between those ill and those not ill within a well-defined and contained group, such as attendees at a wedding function or a dinner group at a restaurant. Attack rates and risk ratios are derived from cohort studies.
Confirmed case	A case with a defined set of characteristics as outlined in the case definition. Often refers to laboratory confirmed cases.
Controls/non-ill subjects	Persons who do not meet the case definition who are recruited for comparison with cases (or ill subjects) in epidemiological studies to determine potential risk factors for illness.

Cross-boundary outbreak	See definition in section 2.1.2
Descriptive epidemiology	The aspect of epidemiology concerned with summarising and describing health-related data according to time, place and person characteristics, as opposed to comparative analysis of the data.
Environmental assessment	An in-depth, systematic review of the processes and practices in a food establishment to determine how the environment contributed to the introduction and/or transmission of the aetiological agent that caused illness.
Environmental health investigation	A generic term used to refer to all aspects of the environmental health component of a foodborne illness outbreak response. It encompasses the environmental assessment and/or traceback activities.
Epidemic curve	A graph plotting the distribution of cases by time of onset of initial symptoms. The unit of time depends on the duration of the outbreak and the specific disease.
Epidemiology	The study of the occurrence, distribution and determinants of disease and other health related events in a defined population.
Exposure	An item or event that is a potential risk factor for the disease under study (e.g. food item).
Foodborne illness	Foodborne illness is defined as any illness of an infectious or toxic nature caused by the consumption of food.
Foodborne illness outbreak	A foodborne outbreak is defined as the occurrence of two or more cases of a similar illness after consuming a common food or meal, and analytic epidemiological evidence and/or microbiological evidence implicates the meal or food as the source of illness; or the aetiological agent associated with the outbreak can only result from foodborne transmission (e.g. ciguatera fish poisoning, *Listeria monocytogenes*).
Foodborne intoxication	Illness caused by the ingestion of toxins produced in food by bacteria as a naturally occurring by-product of their metabolic processes during the exponential phase of growth. Intoxication can also result from chemicals, heavy metals and other substances present in food or from naturally occurring toxins found in certain plants and seafoods (e.g. ciguatoxin, saxitoxin).
Foodborne illness – toxin mediated infection	A toxin-mediated infection occurs when a person consumes food containing high concentrations of bacteria which subsequently produce toxins in the intestinal tract (e.g. toxins produced by *Clostridium perfringens*, diarrhoeal strains of *Bacillus cereus*).
Genotype	The genetic makeup which is unique to an individual organism or group of organisms.
Hypothesis	A tentative explanation based on limited evidence which can be tested by further investigation.

Hypothesis generating questionnaire	A questionnaire consisting of demographic, clinical and a broad range of exposure questions that is used to collect information from cases to enable the development of hypotheses on likely risk factors for the disease.
Incubation period	The time interval between infection with the pathogen and onset of first sign or symptoms. The median and range of the incubation period, along with predominant symptoms and signs, will permit a judgement to be made as to whether the cause is more likely to be an intoxication or an infection and assist with selection of appropriate laboratory tests.
Index case	The case with the earliest onset date of illness in the outbreak.
Line list	A list of cases that meet the criteria for inclusion in the outbreak or study. The list is usually presented as a spreadsheet that includes case details, demographic, clinical and epidemiological (risk factor) information.
Local outbreak	See definition in section 2.1.2
Measure of association	A quantification of the strength or magnitude of association between exposure and outcome calculated from an analytic study (e.g. relative risk and odds ratio). An alternative term is ‘estimate of effect’.
Multi-jurisdictional outbreak	An outbreak investigation that involves the use of public health resources from two or more states or territories.
Onset	The date/time when the patient first had symptoms.
Outbreak	Occurrence of cases of the same disease in excess of what would normally be expected in a specified population from a given area, over a particular period of time.
Point source outbreak	An outbreak with a common source where all cases are exposed to the causal agent at the same time or over a relatively short timeframe, and whose onset of symptoms are subsequently clustered around a central peak time/date after the exposure.
Probable case	A case meeting the probable case definition. A probable case usually has less information (e.g. symptoms but no laboratory testing) than a confirmed case.
Surveillance	The continuous collection, collation, analysis and interpretation of health-related data with subsequent reporting to those who need to know.
Suspected FBI outbreak	A suspected foodborne outbreak is defined as the occurrence of two or more cases of a similar illness and descriptive epidemiological evidence implicates a meal or food as the source of illness.

Traceback investigation	A traceback investigation is the process used to determine the production and distribution chain of a food vehicle implicated during the investigation of an outbreak. Traceback investigations attempt to clarify the point or place at which the implicated vehicle may have become contaminated. Further investigations are then necessary to identify the practices or conditions that may have caused the problem.
Trace forward investigation	A trace forward investigation is the process of identifying other potentially contaminated products, other than the implicated food vehicle, following identification of the source of contamination in a traceback investigation. For example, the contaminated product may have been an ingredient in the manufacture of other foods.
Vehicle	An inanimate substance (e.g. food) involved in the indirect transmission of an infectious agent that carries the agent from a reservoir/source to a susceptible host. Example 1: an outbreak of *Salmonella* Typhimurium infection due to consumption of tiramisu (vehicle) made on raw eggs (source of infection) – poultry would be the reservoir for this pathogen. Example 2: STEC outbreak due to consumption of undercooked hamburgers (vehicle) made with ground beef (source) – cattle would be the reservoir for this pathogen.
Waterborne outbreak	The occurrence of two or more cases of a similar illness with an established or putative epidemiological or microbiological link to a water source.
Zoonotic outbreak	An outbreak associated with direct or indirect transmission of a pathogen from vertebrate animals to humans.

Definitions for clinical symptoms

Nausea	An urge or inclination to vomit.
Vomiting	'Throwing up'; the forcible expulsion of stomach (upper gastrointestinal) contents through the mouth, resulting from contractions of gut and thoracoabdominal wall musculature. *Vomiting is distinct from regurgitation, where stomach contents backflow into the mouth, and to retching, where a person attempts to vomit but is unable to do so.*
Diarrhoea (acute)	Passage of abnormally liquid or unformed stools, at an increased frequency, with or without discomfort. For the purposes of public health interview, diarrhoea is defined as three or more such motions in any 24 hour period. Acute diarrhoea is considered to be diarrhoea of <2 weeks duration.
Bloody diarrhoea	Three or more loose or liquid stools in any 24 hour period, where visible 'red' blood is observed on one or more occasion. This indicates 'exudative' diarrhoea, a feature of inflammation of the colon. May be accompanied by mucus (glutinous, sticky fluid secreted by mucous glands) in the stool.
Abdominal pain	Pain of any type in the abdomen ('belly'), the largest body cavity which lies between the chest and pelvis. Abdominal pain has multiple causes and each cause is associated with a different pattern of location, frequency, duration, character, radiation and exacerbating factors. In gastroenteritis, pain is often described as 'cramping', meaning involuntary and painful spasms/contractions where pain is generalised over the abdomen.
Fever	An elevated body temperature above normal (36.6 to 37.2°C at ambient room temperature). Also known as pyrexia. For public health questionnaire purposes, fever is defined as measured temperature ≥38.0°C (oral, axillary or tympanic measurement). Subjective symptoms of fever, i.e. 'feverish', may also be classified as fever if the interviewee has not objectively measured his or her temperature. Such symptoms include any of the following - feeling significantly hot/ flushed (independent of ambient air temperature, e.g. 'a hot night'), body sweats at rest, symptoms of chills or shivering.
Chills	Generalised cold sensation associated with shivering/ trembling; induced by the onset of a fever (blood supply moves away from the body's surface). Distinct from 'rigors', which are uncontrollable shivering events lasting >20 mins, with striking pallor (paleness) of face and limbs.
Headache	Pain or ache in the head. Headache has a range of different causes and symptoms vary significantly according to these causes. May be associated with fevers and dehydration due to gastroenteritis. For purposes of public health questionnaire, any mention of subjective head pain may be classified as headache.

Lethargy	Subjective symptom involving abnormal drowsiness, torpor (sluggish inactivity) or apathy. Often associated with malaise, a general feeling of discomfort and uneasiness.

Quick clinical guide to common foodborne pathogens

Pathogen	Incubation period	Nausea / Vomiting	Diarrhoea	Abdominal cramps	Fever	Symptom duration
Staphylococcus aureus	1-7 hours	+++	++	+	-	< 2 days
Bacillus cereus (emetic)	1-6 hours	+++	+	+	-	< 1 day
Bacillus cereus (diarrhoeal syndrome)	8-16 hours	-	+++	++	-	< 2 days
Clostridium perfringens	6-24 hours	-	+++	+++	-	< 2 days
Campylobacter	1-10 days	+	+++ *	++	++	2-10 days
Salmonella	8-72 hours	+	++	++	++	2-7 days
Shigella	12 hours – 6 days	+	+++	++	++	4-7 days
STEC #	1-10 days	-	+++ *	++	-	5-10 days
Yersinia	1-10 days	+	+	+++	+	2-3 days
Vibrio parahaemolyticus	4-48 hours	++	+++	+++	+	1-7 days
Norovirus	12-72 hours	++	+++	++	+	1-3 days
Cryptosporidium	1-12 days	+	+++	+++	-	4-21 days

Key: (-) = usually absent; (+) = mild; (++) = moderate; (+++) = severe; * = often bloody

Shiga toxin-producing *Escherichia coli*

Please refer to the *Foodborne Pathogens Compendium* (Attachment 12) in this guideline for a more comprehensive review of these agents.

Summary of outbreak investigation steps

Initial assessment phase

- Collate and summarise the available information and verify the reported cases have the same diagnosis or if the agent is unknown, have a common epidemiological link.
- Develop case definition and conduct hypothesis-generating interviews with a small number of cases using a standard case questionnaire. The exact number of case interviews needed to generate hypotheses will vary from outbreak to outbreak, but would typically be 4-8 cases.
- Develop detailed line listing (caselist), summarise the data and assess significance of cluster/outbreak.
- If potential common exposure among cases, continue outbreak investigation; if no potential link identified, continue monitoring for further cases and re-assess if needed.
- Utilise established internal public health unit processes to ascertain the need for a formal OCT/IMT structure.
- Develop an outbreak case definition.
- Conduct on-site environmental assessment at implicated food business as required.
- Collect clinical specimens and/or food and environmental samples.
- Implement appropriate control measures according to public health risk.
- Review the information gathered, assess the need for further investigation and identify participating stakeholders, roles and responsibilities.

Main Investigation phase

- Undertake further case finding and interviews.
- Conduct a descriptive analysis of the demographic, clinical and risk factor information collected from cases.
- Review all existing information from investigation.
- Develop hypotheses and consider the need for further epidemiological, microbiological and environmental health investigations, including traceback investigation.
- Collect additional clinical and food/environmental samples as required.
- Conduct an analytic epidemiological study (case-control / cohort) if warranted (and a sound hypothesis has been developed).
- Conduct further characterisation of human & non-human outbreak isolates (e.g. genotyping).
- Ascertain source and spread and implement any further control and prevention measures.

- Ensure accuracy and timeliness of communication to those who need to know (e.g. interim outbreak reports, situation reports).

Stand Down phase

- Identify end of outbreak (usually when case numbers have returned to baseline levels or when two incubation periods have passed since onset of illness of the last case).
- Produce final internal outbreak investigation report and distribute to all OCT/IMT members; complete the OzFoodNet final enteric outbreak summary report form.
- Conduct evaluation of outbreak investigation as required.

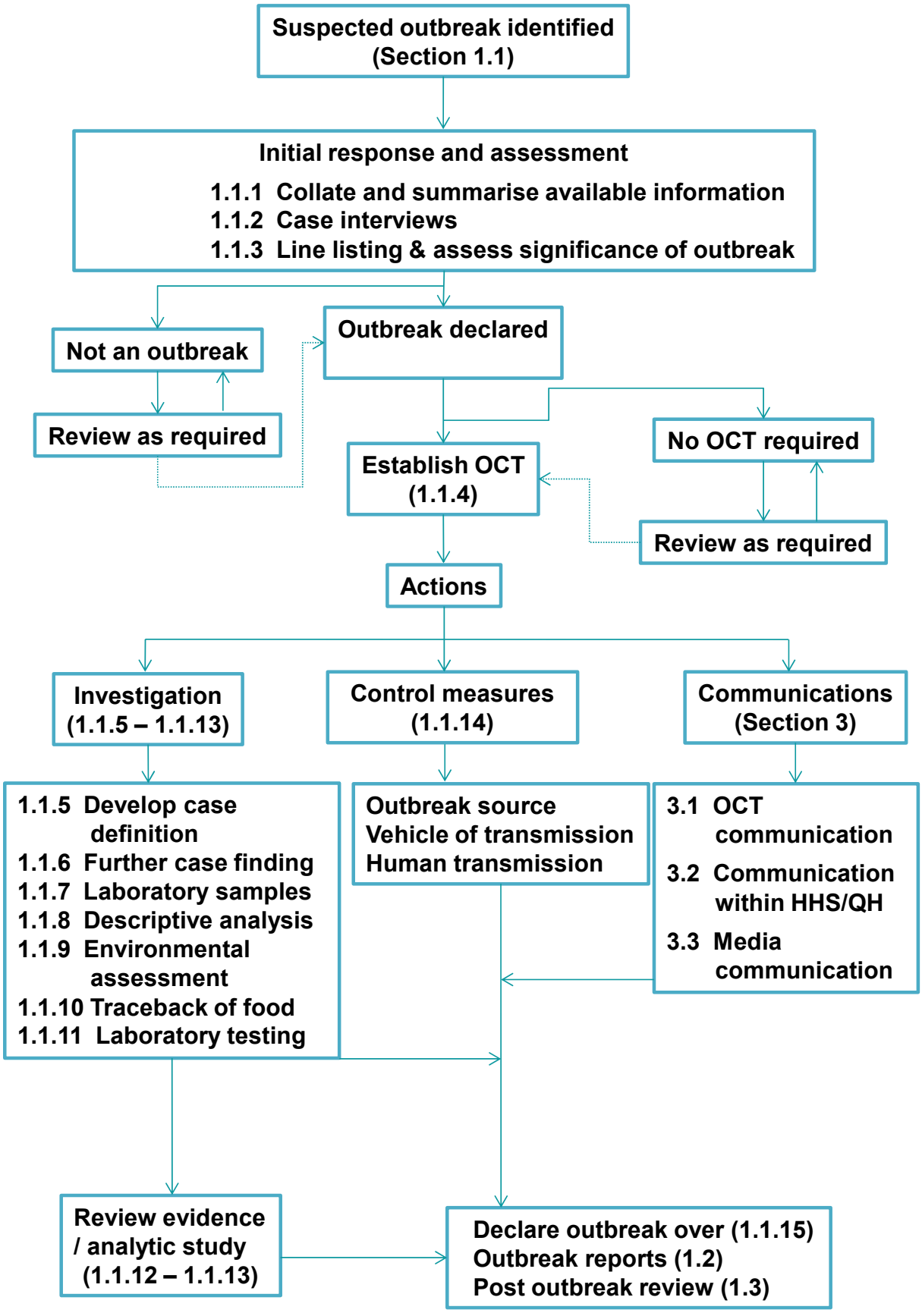

Figure 1. Flowchart for management of a foodborne illness outbreak investigation

* Note: Numbers in Figure 1 align with section numbers in the document

Terms of Reference for OCT/IMT

The terms of reference should be agreed upon at the first outbreak meeting and recorded accordingly. Potential terms of reference include:

- Assess the level of the outbreak (local, cross boundary, state-wide) and the public health risk.
- Determine group membership and which agencies should be represented.
- Assess whether the PHU has sufficient local capacity to undertake the outbreak investigation and response, and arrange for additional resources if required.
- Establish reporting structures and governance.
- Determine frequency of meetings.
- Consider roles and responsibilities of team members.
- Consider how information will be communicated to relevant PHUs, other departments and agencies, and to the media and public.
- Consider whether control measures can be implemented early in the investigation to prevent spread.
- Depending on the nature of the outbreak, consider the legal implications and ensure appropriate documentation and evidence is collected during the investigation.
- Consider potential staff training opportunities during the outbreak investigation.

Checklist of tasks for chair of OCT meeting

(i) Initial Meeting

Confirm details

- ☐ Name of outbreak
- ☐ Outbreak number
- ☐ Date commenced
- ☐ Recorder of minutes
- ☐ Meeting No., date, time
- ☐ Attendees (by Agency)
- ☐ Background to this investigation
- ☐ Assess level of outbreak (local, cross boundary, statewide)
- ☐ Assess local capacity to investigate and arrange additional resources if needed
- ☐ Confirm action coordinators (CD, Epi, EH, Lab)
- ☐ Develop a working case definition
- ☐ Appoint media spokesperson if required

Go to New Business →

(iii) Close of Formal Investigation Meeting

- ☐ All epidemiological, microbiological and traceback results finalised
- ☐ Has the source been contained / controlled?
- ☐ Control measures implemented – Review & assess adequacy
- ☐ Agree on final feedback statement if required
- ☐ Internal Outbreak Report - need and coordination
- ☐ OzFoodNet Final Outbreak Summary Report Form (for outbreak register)
- ☐ Scientific publication – communicating important new findings
- ☐ Reflect on OCT function and management
- ☐ Consider need for further evaluation or formal debrief session

(ii) Standard Meetings

Confirm details

- ☐ Recorder of minutes
- ☐ Meeting No., date, time
- ☐ Attendees (by Agency)
- ☐ Summary of investigation to date
- ☐ Working hypothesis

Previous Minutes

- ☐ Amendments
- ☐ Acceptance (Propose, Second)
- ☐ Actions arising
- ☐ Review of events register (Log)

New Business

- ☐ Clinical / epidemiological update
- ☐ Laboratory update
- ☐ Environmental Health - PHU update
- ☐ Environmental Health - LG update
- ☐ OzFoodNet update
- ☐ Other Agencies
- ☐ Review case definition

Action

- ☐ Hypothesis revision
- ☐ Decisions and allocation of tasks
- ☐ Has the source been contained / controlled?
- ☐ Control & prevention measures implemented
- ☐ Communication / updates (SitRpts) to relevant persons/agencies
- ☐ Media
- ☐ Other actions to be undertaken
- ☐ Next meeting

1. The investigation and control of an outbreak

The extent of an outbreak investigation will vary according to factors such as the scale and severity of the outbreak, the risk to the community, the pathogen type, and availability of resources. The flow chart in Figure 1 provides a general overview of the key steps involved in the management of a foodborne illness outbreak investigation. A more detailed description of these actions is provided in this section. Although the steps in the investigation of an outbreak are numbered in order, they can sometimes occur concurrently or be omitted if not required. The roles and responsibilities of participating units or agencies in the investigation of an outbreak are outlined in Section 2 of this guideline.

1.1 Steps in the investigation of an outbreak

1.1.1 Collate and summarise the available information

Following detection or reporting of a suspected outbreak of cases of foodborne illness, it is necessary to gather further information to confirm and describe the extent of the outbreak. Confirmation of the existence of an outbreak requires verifying that the diagnosis is correct (and not due to laboratory error or misreporting) and is common to all cases. In some instances, the diagnosis may take the form of a defined clinical syndrome, rather than a laboratory diagnosis of a specific aetiological agent. Develop an initial working case definition (see 1.1.5)

1.1.2 Conduct hypothesis-generating case interviews

Cases from a cluster or suspected outbreak of foodborne illness need to be investigated with hypothesis-generating case questionnaires. This enables the collection of demographic, clinical and risk factor information to determine if there are any common exposures among cases to suggest a potential outbreak. Case questionnaires for investigation of potential foodborne illness outbreaks are available from: https://www.health.qld.gov.au/clinical-practice/guidelines-procedures/diseases-infection/diseases/foodborne/managing-outbreaks

For outbreaks among defined cohorts such as functions or some other event involving a common meal, a standard catered function/common meal questionnaire that includes a menu option should be used.

If more than one public health unit (PHU) is involved in the investigation, the lead epidemiologist should ensure all interviewers are conversant with and are using the same questionnaire for collecting information, and that procedures for central collation of the data are in place. In some instances, it may be necessary to modify the questionnaire to suit the individual investigation.

Care should be taken to obtain answers for all questions in the questionnaire. For example, when collecting information on the symptoms experienced, please provide a response for all symptoms, not just the 'main symptoms' experienced (Table 1).

Similarly, for consumption of food items, please provide a response for all food items as variables with missing information are excluded from any data analysis. If a question is not asked, then leave response as blank.

Table 1. Example of correct and incorrect methods when filling in a questionnaire

INCORRECT			
	Yes	No	DK/NS
Vomiting	☑	☐	☐
Diarrhoea	☑	☐	☐
Stomach Cramps	☐	☐	☐
Blood in stools	☐	☐	☐
Nausea	☐	☑	☐
Fever	☐	☐	☐
Headache	☐	☐	☐
Fatigue	☐	☐	☐

CORRECT			
	Yes	No	DK/NS
Vomiting	☑	☐	☐
Diarrhoea	☑	☐	☐
Stomach Cramps	☐	☑	☐
Blood in stools	☐	☑	☐
Nausea	☑	☐	☐
Fever	☐	☑	☐
Headache	☐	☐	☑
Fatigue	☑	☐	☐

1.1.3 Develop a line-listing and assess significance of outbreak

Collate and summarise all information collected from initial case interviews, as well as whether they are laboratory-confirmed or not. A line listing of initial cases should be kept for the purpose of recording summarised epidemiological information, and for monitoring and updating ongoing outbreak-associated cases.

A line listing of cases should include the following:

- Case identifiers (case ID, name, date of birth and contact details)
- demographic information (age, gender, indigenous status, place of residence, occupation)
- clinical information (date/time of onset, signs and symptoms, hospitalisation, duration of illness, name and contact details of treating doctor)

- laboratory results (specimen collection date, pathogen, serotype, genotype)
- risk factor information (food history, travel history, environmental exposures)
- social events/functions attended

Assess the significance and level of the outbreak (local, cross boundary, state-wide) and inform those who need to know (e.g. Public Health Physician, Manager Environmental Health). Use established internal communication processes within a PHU, seek external advice where necessary, to determine the need to assemble a formal OCT/IMT.

1.1.4 Outbreak Control Team / Incident Management Team (OCT/IMT)

When considering formation of a formal OCT/IMT to manage the investigation of an outbreak, use Section 2.1.1 as a guide. If no formal OCT is convened, it is likely that some form of public health action will still be required using a coordinated structure involving epidemiology, microbiology and environmental health practitioners. A short-written outbreak report and/or OzFoodNet final enteric outbreak summary report form must still be completed (see section 1.2).

Potential Terms of Reference and a checklist of tasks[1] for the OCT coordinator or other team members to use during the course of an investigation is provided on pages 18 and 19 preceding this section of the guideline.

An outbreak team meeting agenda template is provided in **Attachment 2**.

A template for recording the minutes of OCT meetings is provided in **Attachment 3**.

An outbreak log for recording all activities associated with the outbreak such as delegated tasks and actions taken by team members is provided in **Attachment 4**.

1.1.5 Develop a case definition

It is essential that an outbreak case definition is developed by the OCT early in the investigation and reviewed/updated throughout.

A case definition is a standard set of criteria to be used in the investigation to decide who is a case and who is not.

[1] adapted from MSPHU Outbreak Control Guidelines (October 2017)

A case definition should include well-defined clinical symptoms (+/- laboratory criteria) with restrictions by time, place and person (i.e. the time period when an illness should have occurred must be specified, as well as the location and who is at risk).

The initial case definition may be refined and updated during the course of the investigation. Separate definitions may be developed for confirmed, probable or possible cases.

Examples:

- Any person who attended the Restaurant A between Friday 2nd and Monday 5th January and subsequently developed diarrhoea and/or vomiting and/or stomach cramps.
- A case was defined as any person who attended conference A in Brisbane and developed diarrhoea and at least one of either abdominal cramps, vomiting or fever within 3 days of the event (clinical cases) or had a confirmed culture of *Salmonella* Typhimurium detected in a stool specimen (laboratory confirmed case).
- A case was defined as any person notified in Queensland with a *Salmonella* Typhimurium infection with the MLVA profile 3-17-9-11-524 and a serotype profile 4,12:i:1,2 [Copenhagen variant] between 1 February and 31 March 2014.
- Isolation of *L. monocytogenes* MLST 9 in a person with illness onset since 1 January 2016 and 'highly-likely' to be linked to the outbreak cluster by whole genome sequencing.
- Confirmed case: any case of *Salmonella* Anatum infection with the outbreak genetic sequence AND spent at least part of their exposure period in Australia AND with a specimen collection date on or after 27 December 2015.
- Probable case: any case of *Salmonella* Anatum infection with no overseas travel during their exposure period AND genetic sequence unknown AND specimen collection dates on or after 27 December 2015.

1.1.6 Undertake further case finding and interviews

Attempt to identify additional people who meet the case definition. This allows a more accurate estimate of the magnitude of the outbreak, it reduces the likelihood of bias which may occur by only focusing on cases detected early in the investigation or who identified themselves directly to clinicians or the investigating team, it increases the sample size (thereby providing more statistical power for analytic studies) and increases the opportunity to collect information to identify the source of the outbreak and enable implementation of control measures.

Case finding also enables investigators to refine the case definition as more detailed information is collected. Knowing the extent of the outbreak can also assist in determining the amount of resources to be allocated to the investigation.

Cases can be identified through active or passive case finding strategies.

Examples of active case finding include:

- interviewing symptomatic contacts of known cases
- asking local hospitals or General Practitioners to report patients who meet the case definition
- asking local pathology laboratories to enhance surveillance for cases by increasing the testing of stools for certain enteric pathogens (e.g. STEC testing) or applying additional diagnostic tests
- where applicable, asking workplaces/schools/institutions to report people with gastrointestinal symptoms or absenteeism
- asking foodhandlers if symptomatic
- obtaining guest lists or lists of attendees from functions or social events attended by cases
- using media coverage to advise potential cases to contact public health.

Examples of passive case finding include:

- reviewing notifiable disease reports
- review of medical records

1.1.7 Clinical, food and environmental sampling

Clinical specimens

If required, cases should be encouraged to provide a stool and/or vomitus specimen as early as possible during the investigation. Specimens should preferably be collected from patients who are still symptomatic. If symptoms have resolved within the three previous days, discuss with a Public Health Physician or Public Health Microbiologist whether a specimen is still warranted.

The laboratory can advise on the type and quantity of samples to take, their storage, packing and transport. Information that includes illness onset times, the range and duration of symptoms and food consumption histories from a subset of cases should be submitted to the laboratory (FSS) with the specimens or as soon as is available afterwards, to assist the laboratory in determining the most appropriate tests to perform.

Clinical specimens may have been submitted to private pathology laboratories, in which instance results may be available from these laboratories and retained specimens may be available for further testing at FSS.

Clinical specimens from food workers such as nasal swabs, skin lesion swabs, and stool specimens may identify potential carriers or sources of infection among food handlers. Symptomatic food handlers should be excluded from work as per the appropriate communicable disease guideline.

Please refer to the guidelines for the collection and microbiological examination of faecal and vomitus samples by Environmental Health Officers and PHU staff – http://qis.health.qld.gov.au/DocumentManagement/Default.aspx?DocumentID=23951

A fact sheet for the public on how to collect a faecal or vomitus specimen can be found in **Attachment 8.**

Food samples

Food and environmental samples should be collected as early as possible in the investigation in consultation with the public health microbiology laboratory.

Different procedures may be required for food samples taken with a view to possible prosecution of a food premises.

If food is being sampled because it is suspected of being contaminated, the remainder of the food should be discarded, removed or quarantined.

Analysis of foods for microbial or chemical contamination is time- and resource- intensive. Targeted sampling and analysis of foods should be guided by the epidemiological and/or environmental health investigations. In complex investigations, it may be necessary to be accompanied by a specialist microbiologist to advise on sampling locations and strategies.

If an implicated food has not been identified at the time of sampling, a range of foods can be sampled and stored between 0°C and 5°C for subsequent testing if required. Do not freeze foods unless already frozen. Please refer to the *Guidelines for the collection of food samples by Environmental Health Officers for microbiological examination (V 4.0)* - http://qis.health.qld.gov.au/DocumentManagement/Default.aspx?DocumentID=24101

Food samples may be unpackaged or packaged and sourced from catering establishments, manufacturing premises or retail, depending upon the outbreak. Foods that may be suitable for collection and analysis include:

- Ingredients used in preparation of implicated foods
- Leftover foods from a suspect meal

- Foods from a menu that have been implicated epidemiologically
- Foods implicated epidemiologically collected further up the food chain during the traceback investigation
- Foods known to be associated with the pathogen in question
- Foods that may have favoured survival or growth of the organism.

If a packaged food item is suspected of being involved in an outbreak, it is particularly important to collect unopened packages of that same food, ideally from the same batch or lot. If no foods are left over from a suspect meal, samples of items that were prepared subsequently but in a similar manner may be collected instead, though findings from these tests should be interpreted with caution. In consultation with the public health microbiology reference laboratory and other members of the OCT, sampling of raw foods should also be considered should a food vehicle not be identified from the epidemiological investigation. This may enable identification of the source of infection and mode of introduction of the pathogen into the kitchen. Genotyping of clinical and non-human strains cultured from raw or cooked foods by whole genome sequencing or some other molecular test may be indicated to provide the required evidence linking infection to a food or source.

Environmental samples

The purpose of collecting environmental samples is to obtain evidence for the presence of the outbreak strain in the kitchen/preparation/manufacturing environment, particularly when food samples have tested negative, and to evaluate the extent of contamination that may have led to the outbreak. Examples include swabs of food preparation surfaces, equipment (e.g. slicing machines, blenders), containers, cutting boards, utensils and other surfaces such as refrigerators, door handles, drains, etc. Environmental samples may also include tea towels, sponges and untreated water. It is recommended that a microbiologist is consulted before environmental sampling is undertaken or samples are submitted as it may be difficult to interpret results and a specialised sampling methodology may be required. Environmental swabs need to be tested reasonably quickly, usually within 24 hrs of collection.

Attachment 9 lists the range of potential foodborne and waterborne pathogens that can be tested by the Public Health laboratories (FSS). A template for summarising the results from laboratory testing of food and environmental samples is provided in **Attachment 10**.

Attachment 12 (Foodborne Pathogens Compendium for Outbreak Investigations) provides information on the appropriate collection and transport of clinical specimens and

non-human (food and environmental) samples for a range of different enteric pathogens. The compendium also provides information on the usual clinical presentation, known high risk foods, and laboratory criteria for confirmation of an outbreak for each of the pathogens.

1.1.8 Conduct a descriptive analysis of data collected from cases

The lead PHU is responsible for data analysis and reporting.

The data collected from the questionnaires should be entered into a database or spreadsheet and a descriptive analysis of the cases completed. This descriptive analysis may assist with establishing a hypothesis about a potential food vehicle or source of infection and guide further investigation.

The analysis should aim to characterise the cases in terms of time, place, demographic details and shared exposures that may be potential risk factors for illness, as well as describing the clinical characteristics of the cases and the laboratory findings.

The descriptive epidemiology should be updated constantly during the course of the investigation.

A descriptive analysis of the data should include the following:

- number of persons at risk of illness (if a defined cohort)
- case definition and number of persons meeting case definition
- number of laboratory-confirmed cases (+/- probable, +/- possible cases)
- age, sex and geographical distribution of cases
- onset dates, epidemic curve (+/- epidemic map)
- clinical data (e.g. signs, symptoms, median incubation period, median duration of illness, % hospitalised, % seen by doctor, number of deaths)
- description and frequency of common exposures among cases (foods eaten, water exposure, animal contact, travel, eating venues / place of purchase, and social events)
- food-specific attack rates among all persons (ill and non-ill persons) for cohort investigations.

As more information is gathered and hypotheses are developed, the outbreak investigation questionnaire may need to be updated and previous cases may need to be re-interviewed to capture the new information.

Regular epidemiological updates in the form of a brief descriptive report should be provided to members at each OCT meeting. Epidemiological information is usually

described by a case definition, person, time and place characteristics, clinical information and laboratory findings. An epidemic curve, food consumption or other exposure frequencies and/or univariate and multivariable analysis results may also be included as the investigation progresses.

Cross-boundary outbreaks and those of statewide significance usually require central collation and analysis of information by the lead agency. Situation Reports (**Attachment 6**) that summarise epidemiological, environmental health, traceback and laboratory information throughout the course of the investigation may be warranted. The lead agency will determine the frequency and distribution of situation updates. The nature and level of detail provided should be commensurate with the size, severity, consequences and planned enforcement/regulatory actions.

1.1.9 Environmental assessment of a food business

If a food business appears to be associated with the outbreak, an environmental assessment of the business should be undertaken after an initial OCT meeting. This should include liaising with other regulatory partners/agencies such as local government or Safe Food Production Queensland at the earliest opportunity. An environmental assessment of a food business is different to a routine regulatory inspection. An environmental assessment attempts to identify the contributing factors and/or environmental precursors that contributed to the introduction or transmission of the agent that caused illness. Contributing factors can be divided into three categories:

- Contamination
- Survival
- Proliferation/amplification

Contamination factors refer to how an aetiologic agent was introduced into or onto the food vehicle. Examples of contamination factors include a contaminated ingredient or bare-hand contact by a food handler/worker/preparer suspected to be infectious.

Survival factors refer to processes or steps that would have eliminated or reduced an aetiologic agent if conducted properly. Examples of survival factors include insufficient time and/or temperature during cooking/heat processing or insufficient time and/or temperature during reheating.

Proliferation/amplification factors identify how an aetiologic agent was able to increase in numbers and/or produce toxic products before the food was ingested. Examples of

proliferation/amplification factors include improper cold or hot holding of foods or inadequate processing, such as acidification, water activity, or fermentation.

(See http://www.foodstandards.gov.au/foodsafety/standards/Pages/2-hour-4-hour-rule.aspx)

Guidance for environmental investigations at retail / food service businesses for egg-associated outbreaks is provided at: http://foodregulation.gov.au/internet/fr/publishing.nsf/Content/publication-Through-Chain-Investigation-Guidelines-for-Egg-Associated-Outbreaks

Further information on the growth and survival of pathogenic microorganisms in foods can be found in Appendix 1 of the Compendium of Microbiological Criteria for Food: http://www.foodstandards.gov.au/publications/Documents/Compedium%20of%20Microbiological%20Criteria/Compendium%20of%20Microbiological%20Criteria.pdf

Recommendations may be implemented during the environmental assessment in order to stop the outbreak and prevent further spread of the agent, and/or they may be used in the development of longer term strategies to reduce the likelihood of future outbreaks.

Officers undertaking environmental assessments should be encouraged to complete the online learning program on environmental assessments from the Centers for Disease Control and Prevention.
https://www.cdc.gov/nceh/ehs/elearn/eats/index.html

Further information on environmental assessments can also be found at:
https://www.fda.gov/Food/RecallsOutbreaksEmergencies/Outbreaks/ucm235425.htm

1.1.10 Traceback of food products

Dispersed community outbreaks may require traceback of food products. Such a situation may arise when contamination of the food product occurs prior to the point of food preparation, such as during the production or transport processes. Tracebacks of implicated food items are usually based on epidemiological and/or microbiological evidence.

The purpose of conducting such tracebacks is to determine the source and distribution of the implicated food product and identify potential sites of contamination up the food chain (e.g. farm, primary processing plant, imported food). Rapid traceback will enable prompt testing and food recall action if needed. Involvement of the appropriate agencies (e.g. SFPQ/DAF) can assist with the collection of information, sampling of foods and environmental sampling and testing.

Information to be collected includes:

- exact name of food including any varieties and pack sizes (weight/volume)
- premises and code/lot number (batch number)
- date markings, e.g. expiry date / use by date / best before date
- date received
- names and addresses of manufacturer, packer, sponsor, importer, wholesalers, distributors and retailers as needed.

Copies of invoices should be obtained where appropriate (not just verbal evidence). The validity of traceback evidence strongly depends on the receipt of proper documentation.

After tracing back and identifying the source of the contamination, product or ingredient associated with the foodborne illness, all other potentially contaminated products should be identified (traced forward). For example, the product may have been used as an ingredient in the manufacture of other foods. In this instance, it may be useful to test these other foods for the pathogen of concern. Trace forward is necessary to enable all contaminated products to be recalled and/or investigated as a source of the illness.

Food Safety Standards and Regulation (Health Protection Branch) should be consulted at an early stage if a food recall may be required.

In complex, large or severe outbreaks very detailed knowledge of each step of the food logistics, processing and preparation pathways will be necessary to identify potential sources, reservoirs or ‘amplifying’ steps between ‘paddock’ and ‘plate’.

1.1.11 Laboratory testing

It is important that the Public Health laboratory (FSS) is consulted early in the investigation to provide appropriate advice during the investigation. A microbiologist will be a key member of the OCT/IMT.

The role of the laboratory is to:

- advise on the appropriate clinical specimens to be requested from the cases and any persons thought to have been at risk
- advise on the type and quantity of food and environmental samples to be taken
- advise on specimen transport and storage for specific pathogens.
- perform the appropriate microbiological tests on clinical, food and environmental samples
- advise on further sampling if required

- conduct subtyping of pathogens (e.g. serotyping, genotyping)

1.1.12 Review information/evidence: make a decision on further investigation and control

Information collected from the descriptive epidemiology, in combination with the environmental health investigation and laboratory results, should be reviewed to determine whether the investigation can cease or whether further investigation is warranted.

Further investigations would likely be required for the following scenarios:

- if there is insufficient information to implement control measures or prevent further outbreaks occurring due to the same source
- outbreak is still ongoing
- no strong hypothesis developed
- aetiological agent unknown
- source and mode of transmission unknown
- new or unusual aetiological agent
- high public/media interest

If there is insufficient evidence from the descriptive investigation to strongly support a hypothesis regarding the likely food vehicle or source of infection, then more exhaustive interview methods may need to be employed. These include:

- applying an extended trawling questionnaire incorporating a wider range of foods to newly notified cases, or
- applying an extended trawling questionnaire to a subset of previously interviewed cases, or
- designating a single public health officer to conduct interviews consisting of incisive open-ended questions with a subset of cases.

Following on from the descriptive study, stronger epidemiological evidence and testing of hypotheses can be attained through an analytic epidemiological study if required. This type of evidence may also be useful to further guide the environmental health and/or laboratory investigation.

1.1.13 Analytic study

The essential feature of an analytic study is the use of a comparison group that enables calculation of quantitative statistical associations between various exposures (potential risk factors) and illness. Analytic studies are often resource intensive but may enable the investigating team to provide convincing evidence of the responsible food vehicle and /or source of infection for the outbreak. This type of epidemiological evidence may support and justify the implementation of public health interventions or be used as supporting evidence for litigation purposes.

Two types of studies that use a comparison group are common in outbreak investigations, the case control study and the retrospective cohort study. The PHU epidemiologist (local outbreaks) or an OzFoodNet epidemiologist (local, cross-boundary or state-wide outbreaks) should be consulted for input into the design and implementation of these studies. A brief plan or protocol for conducting the analytic study should be prepared and approved by the investigation team prior to commencing.

The study design is usually dictated by the nature of the outbreak. Timeliness is an important criterion in planning a study; a rapid result is essential if the information is to give maximum benefit. Delayed investigations may be useful for assessing the impact of long term outbreak prevention policies but are not appropriate for the timely management of the outbreak. It may be appropriate to conduct an analytic study using only a small number of cases and controls. This can always be expanded if required.

If the analytic epidemiology shows no significant associations between exposure(s) and illness, it may be necessary to consider other hypotheses regarding potential food vehicles or modes of transmission. Sometimes a more specific control group is needed to test a hypothesis and a second case-control study will be required. However, there is probably little point in conducting a second case-control study unless there is a sound hypothesis to test.

It should be remembered that an analytic study can only provide evidence of a statistical association between illness and consumption of a suspect food. In order for the association to be considered causal, other criteria must be considered. These include an assessment of non-causal explanations for the association such as random error, systematic error (selection / information bias) and confounding, and subsequently, supporting criteria for a causal association such as strength of the association, evidence of a dose-response effect, and biological plausibility.

Further information on the conduct of analytic studies can be found in **Attachment 5**.

1.1.14 Implement control measures

In most instances, the primary goal of outbreak investigation is control and prevention. Potential control measures should be considered during all stages of the investigation and, when there is sufficient evidence, should be implemented as soon as possible. Control measures can be implemented through three main areas:

1. the outbreak source
2. the vehicle of transmission
3. human transmission.

Examples of control measures at the source:

- education of food workers
- closure of food premises
- prohibiting sale or use of food
- product recall
- modification of processes/procedures in preparation of food
- exclusion or restriction of activities of food workers.

Examples of control measures aimed at the vehicle of transmission:

- removal or recall of contaminated product
- modified handling or cooking instructions.

Examples of control measures aimed at preventing human infection and disease:

- exclusion of cases from school or work (see Attachment 10)
- advice on personal hygiene
- food safety education of food workers
- issuing public health alerts (e.g. ‘boil water’ notices)
- administration of vaccine or chemoprophylaxis (e.g. hepatitis A outbreak).

Continued monitoring of both the control measures themselves, and for new cases of illness associated with the outbreak, is essential to ensure the measures are effective.

1.1.15 Declare the outbreak over

The point at which an outbreak can be declared over depends very much on

- the nature of the outbreak
- the pathogen involved

- the source of infection
- the control measures implemented

The OCT decides when an outbreak is over and when a statement can be made that there is no longer an unacceptable risk to public health. As a general guide where there is uncertainty about the previous four dot points, a minimum of two incubation periods without any new cases should occur before the outbreak is declared over. In some circumstances, background (sporadic) cases of infection of the same strain or genotype from a different source to the outbreak will continue to occur in the community. Enhanced surveillance for other cases among the potentially exposed population may need to occur for a short period of time after the outbreak has closed to ensure they are sporadic and not from the same source as the outbreak.

1.2 Outbreak reports

After the outbreak has been declared over, details of the investigation should be fully documented in the form of a **final outbreak report**. The outbreak report should be drafted as soon as possible, preferably within 2-4 weeks of declaring the outbreak over and then distributed to all members of the OCT. A copy of the report should also be forwarded to OzFoodNet. The level of detail required for this report will vary according to the complexity of the incident under investigation. The report may be used in legal proceedings and as such should be objective, accurate, clear and timely. Also consider the legal obligations concerning the release of information to parties outside the investigation team and only provide relevant feedback, conclusions and advice around the outcomes of the investigation if requested.

A template for the final internal outbreak report is included in **Attachment 7**. However, this format may be modified or simplified depending on the complexity of the outbreak.

In addition, an **OzFoodNet final enteric outbreak summary report form** should be completed and sent to OzFoodNet within two weeks of the outbreak being declared over to enable entry of summary information into the Queensland Health Gastrointestinal Outbreak Register (co-ordinated by OzFoodNet, Communicable Diseases Branch). An excel version of the OzFoodNet outbreak register summary report form is available from the foodborne diseases webpage (https://www.health.qld.gov.au/clinical-practice/guidelines-procedures/diseases-infection/diseases/foodborne/managing-outbreaks). Confidentiality is essential in any investigation and all information should be

treated as such. The *Right to Information Act 2009* may apply to these reports (see Section 4.3).

1.3 Post-outbreak review

Depending on the magnitude and complexity of the outbreak, a post-outbreak review in the form of either an informal debrief or formal structured evaluation should be considered. This will provide the opportunity to review the overall process, identify strengths and weaknesses in the investigation and develop some practical recommendations to improve the management of similar investigations in the future. For structured debriefs, core members of the OCT and representatives of other participating agencies who assisted in the investigation should be invited to attend. The debrief can be chaired by the outbreak coordinator or another person appointed by the outbreak coordinator (e.g. an external facilitator who was not directly involved in the investigation).

The main objectives of a debrief are to:

- Provide an overall summary of the clinical, epidemiological, laboratory, environmental health and traceback investigations as appropriate
- Evaluate the investigation processes and timelines
- Assess the effectiveness of public health and food safety actions, including any impediments to controlling public health risks
- Evaluate communication and collaboration between units and agencies
- Identify any resource, organisational or training needs for improving outbreak response
- Make recommendations for changes to policy or standards
- Assess the usefulness and identify improvements to the Queensland Health Guideline for investigation and management of suspected foodborne illness outbreaks

Attachment 11 provides a structured debrief tool to assist the facilitator in focussing on the major issues for discussion and for documenting a list of action items generated from the debrief. Participants are sent an outbreak summary report and the list of debrief trigger questions (prompts) several days preceding the debrief. Participants complete and return the trigger questions to the facilitator prior to the debrief. The facilitator will collate the responses from each of the participants and produce a final list of the most frequently reported issues for discussion at the debrief.

The debrief should begin with a brief presentation describing the outbreak investigation and results. This is then followed by a discussion and brainstorming session on the most

important issues raised by the OCT participants. A list of action items and timelines are produced, with outcomes and recommendations recorded in a succinct post debrief report.

Participants in any evaluation should be mindful that the inputs and outcomes of the process may become publicly available through RTI or other disclosure processes.

2. Roles and responsibilities

The Queensland Health agencies involved in the investigation of foodborne/waterborne illness outbreaks include PHUs, the Communicable Diseases Branch (CDB), OzFoodNet, Public Health laboratories (Forensic and Scientific Services), and Food Safety Standards and Regulation within the Health Protection Branch (HPB). The role of each unit is described in the following sections. Contact details for public health agencies in Queensland are provided in **Attachment 1**.

The role of local government and other agencies including Safe Food Production Queensland in the investigation of foodborne illness outbreaks is stipulated in Sections 2.5 and 2.6.

Cooperation and prompt exchange of information between PHUs and CDB (including OzFoodNet), the Public Health laboratories, Food Safety Standards and Regulation and other agencies is crucial when investigations are commenced and control measures are being implemented.

2.1 Public Health Units

PHUs have lead agency role in the investigation and management of local and cross-boundary foodborne, waterborne and other enteric illness outbreaks within their communities. Local PHU protocols can be used in conjunction with the Queensland Health Guideline for the investigation and management of suspected foodborne illness outbreaks (this document).

Outbreaks in Queensland Health facilities are managed differently from those in the community. Information for management of outbreaks in Queensland Health facilities can be found in the document "Guidelines for the management of outbreaks of communicable diseases in health facilities".

The PHUs are responsible for:

- declaring an outbreak following appropriate consultation
- informing OzFoodNet (preferably by email) when initiating an investigation into any suspected foodborne or waterborne outbreak (local or cross-boundary)

- notifying the Executive Director CDB and Medical Director Communicable Diseases and Infection Management of any foodborne or waterborne outbreak investigations that may be of public concern or attract media interest
- convening an outbreak control team if required
- appointing an outbreak coordinator
- liaising with local government and other agencies as required
- liaising with OzFoodNet as necessary
- informing and liaising with Food Safety Standards and Regulation (HPB) when there may be a need to recall food, invoke emergency orders under the *Food Act 2006*, or apply the National Food Incident Response Protocol (NFIRP) to aid in the management of the outbreak
- Informing Food Safety Standards and Regulation when the investigation requires notification of an implicated food product that comes from a business accredited by SFPQ (e.g. egg farm, poultry farm, oyster farm)
- completing an OzFoodNet final enteric outbreak summary report form (for the Queensland Health Gastrointestinal Outbreak Register) Available from: (https://www.health.qld.gov.au/clinical-practice/guidelines-procedures/diseases-infection/diseases/foodborne/managing-outbreaks/default.asp)
- Completing an internal outbreak investigation report for outbreaks of significance (**Attachment 7**)
- forwarding a copy of the internal outbreak investigation report to OzFoodNet for outbreaks of significance, particularly those in which an analytic study was incorporated into the investigation.

The PHU epidemiologists would normally coordinate the epidemiological component of local and cross-boundary outbreak investigations. However, OzFoodNet epidemiologists can provide resources and assistance with the investigation if required.

For outbreaks that cross PHU boundaries there will need to be close liaison with the relevant PHUs and a decision made as to who will lead the investigation (please refer to Section 2.1.2).

When there is a suspected or confirmed outbreak of state-wide significance, the Executive Director CDB should be consulted about convening a State-wide Incident Management Team (SIMT).

Often small clusters of potential foodborne illness are investigated without the need to convene a formal OCT. It is recommended that each Public Health Unit (PHU) develop a process to assist in making this decision.

It is important though that such clusters are recorded as outbreaks should they meet the definition and the appropriate summary reports are completed for audit and surveillance purposes including a copy for OzFoodNet.

PHUs should notify OzFoodNet when investigating any local enteric pathogen clusters including the outcome of their investigations. This will ensure timely communication to other PHUs who may be investigating similar clusters in their area.

2.1.1 Outbreak Control Team

The OCT is a multi-disciplinary group of people who work together to investigate the outbreak. The core team is responsible for planning and coordinating the investigation. Outside the core team are individuals who may be called upon, as required, to act as advisors/consultants about specific aspects of an investigation.

The requirement to assemble a formal OCT will depend on factors such as:

- the potential public health risk
- the size and distribution of the outbreak
- the epidemiology / pathogenicity of the agent
- public concern
- media interest

The coordinator of the OCT will be the Director (or delegate) of the relevant PHU. Outbreak control teams can range in size and complexity from a small group of individuals convened to manage a small local outbreak, to a more formal, broader group of individuals assembled to manage more complex and/or larger outbreaks. Irrespective, the principles for investigating, controlling and reporting on these outbreaks remain much the same.

Outbreak control teams may include the following members as appropriate:

- PHU Public Health Physician/s
- PHU Director
- PHU Manager Environmental Health
- PHU Public Health Nurse/s, Clinical Nurses in Public Health

- PHU Epidemiologist/s
- PHU Environmental Health Officers
- OzFoodNet Epidemiologist/s
- Local Government Environmental Health Officer/s
- Public Health Microbiologists
- Communications / Public Affairs Officer
- Executive Director CDB and/or Medical Director, Communicable Diseases and Infection Management, CDB
- Manager Epidemiology, CDB or other CDB epidemiologist/s
- Principal Environmental Health Officer, CDB
- Director, Food Safety Standards and Regulation (or delegate)
- Public Health Registrars
- Post-graduate Epidemiology / Environmental Health students
- Administrative support
- Safe Food Production Queensland (SFPQ) / DAF officers.
- Representatives from other agencies as deemed necessary

During an outbreak the OCT should meet frequently; for larger outbreaks this could be daily. A member of the OCT or an administrative officer should be designated at each meeting to record the minutes.

Appointing an OCT spokesperson for media liaison should also be arranged early in the investigation.

It is recommended that a central outbreak investigation log be kept of all events and activities associated with the outbreak investigation including delegated tasks and actions taken by team members (**Attachment 4**).

Terms of reference for the outbreak investigation should be agreed at the first OCT meeting (page 18).

An early discussion regarding potential enforcement action should be commenced between the PHU and LG or other regulatory partner as soon as possible. In any event, investigating agencies should be mindful of gathering sufficient evidence to support possible future regulatory action.

2.1.2 Outbreak Categorisation

Outbreak investigations can be categorised into four levels according to the following definitions:

i. Local outbreaks

An outbreak or foodborne illness investigation is considered to be 'local' if:

- all or the majority of cases seemingly reside or are staying within the one PHU area, and
- the apparent source of the outbreak is located within that same PHU area, and
- the outbreak can be appropriately managed within local resources.

In situations where interviews are required of cases who live outside of the PHU area, the investigating PHU should inform the relevant PHU and organise the interviews of these cases, either by the lead PHU or the PHU where the cases reside.

It is recognised however that on occasion, an interview may commence with cases before the PHU of residence is known. In this situation, the interview may be completed. The Director (or delegate) of the interviewing PHU should notify the Director (or delegate) of the cases' PHU immediately and provide a copy of the completed questionnaire(s).

In the event the PHU lacks capacity to properly investigate the outbreak, assistance may be sought from CDB (e.g. OzFoodNet) or adjacent PHUs if resources permit.

Where interviews are required of cases who live in another state or territory, the investigating PHU should contact CDB (OzFoodNet) who will subsequently contact and make arrangements to have these cases interviewed by the jurisdiction where the case resides or preferably, obtain approval for the Queensland PHU to investigate. If the Queensland PHU interviews a case from outside the state, the PHU should forward a copy of the completed CRF to CDB/OzFoodNet who will pass the information on to the health department of the relevant jurisdiction.

ii. Cross-boundary outbreaks

An outbreak or foodborne illness investigation is considered to be 'cross-boundary' when the outbreak does not meet the definition for a state-wide outbreak, and:

- the majority of cases seemingly reside across two or more PHU areas, and/or
- the exposure (e.g. distribution of a contaminated food product) has seemingly occurred across two or more PHU areas.

When outbreak investigations cross more than one PHU boundary, the OCT coordinator should be the Director (or delegate) attached to the PHU in whose jurisdiction the food was prepared or function held.

The OCT coordinator may also need to appoint outbreak sub-coordinators for each of the major disciplines involved in the outbreak investigation (e.g. epidemiologist; environmental health officer; laboratory scientist, public health nurse).

The role of each coordinator will be to collate and summarise the latest investigation results from the participating PHUs and present the results at each OCT meeting.

In line with the Queensland Health Incident Management System Guideline, the OCT coordinator may wish to adopt the same IMT structure as that used for state-wide outbreaks (Figure 2), for the investigation of local or cross boundary foodborne outbreaks.

Transition to a new lead agency

During the course of an investigation, the information collected may show that the distribution of outbreak cases has changed and/or the food business related to the outbreak lies within a different PHU area. This may indicate a need to change the lead agency.

Transitioning to another PHU

- A phone call or teleconference should occur between the two PHUs to conduct a handover of the investigation.
- An email should follow from the new lead PHU outlining the agreed actions.
- Documentation collected to date should be transferred to the new lead PHU.

Transitioning to CDB

- CDB and the lead PHU Director (or delegate) should discuss by phone the need for changeover of the investigation from PHU to state coordination.
- Agreed actions should be circulated by email following the discussion.
- Documentation collected to date should be transferred to CDB prior to the next OCT meeting.
- A follow up teleconference including previous OCT members should be organised by CDB to inform them of the new lead arrangements.

iii. Statewide outbreaks

An outbreak or foodborne illness investigation is considered to be ‘state-wide’ when:

- the investigation identifies a community-wide outbreak involving cases from multiple PHU areas that is likely to be associated with a food product distributed widely across the state (or nationally), or
- the outbreak investigation is declared by the Chief Health Officer and Deputy Director-General Prevention Division to be a public health event of state significance.

Upon declaration of a public health event of state significance, the investigation will be coordinated centrally through an incident management team (IMT) under the Incident Management System Guideline framework (http://qheps.health.qld.gov.au/emu/docs/3-qh-incident-mgt-system-guideline.pdf).

The Chief Health Officer and Deputy Director-General of the Prevention Division has accountability for the response to public health events of state significance. For foodborne outbreaks, the Executive Director CDB may be delegated responsibility for coordination and management of the statewide incident response on behalf of the CHO.

The Health Incident Controller (HIC) for a state-wide foodborne outbreak investigation should be the Executive Director CDB (or delegate), and is responsible for appointing the IMT (Figure 2).

The size and structure of the IMT will be dependent on the scale of the outbreak, however should include (at a minimum) the following functions:

- Planning and Intelligence
- Operations and Logistics
- Media and Communications
- Administration

The Planning & Intelligence function includes the collation and analysis of epidemiological, microbiological and environmental health information and its dissemination as intelligence to support decision making and planning.

The Operations and Logistic function involves the tasking and application of human and physical resources to enable achievement of incident objectives.

The Planning, Intelligence, Operations and Logistics functions may be assigned separately to various IMT officers, or an IMT officer may take on multiple roles depending on the location, size and complexity of the outbreak. Incident management structures, for either a HHS or the Department, must be flexible and scalable in order to adjust to these factors.

Media and Communication functions include monitoring traditional media and social media sources and developing key messaging for media presentation and releases.

The Administration function includes logging and tasking all IMT correspondence relating to the investigation.

Supporting staff from the Communicable Diseases and Infection Management Team within CDB and the Food Safety Standards and Regulation team may also be called upon to support an IMT.

The Director (or delegate) of each PHU involved in the investigation takes on the role of Site Commander in a public health event of state significance. Site Commanders are responsible for managing the response for their PHU and liaising with the IMT.

The Health Service Directive which outlines the management of a public health event of state significance is available at https://www.health.qld.gov.au/directives/docs/hsd/qh-hsd-046.pdf.

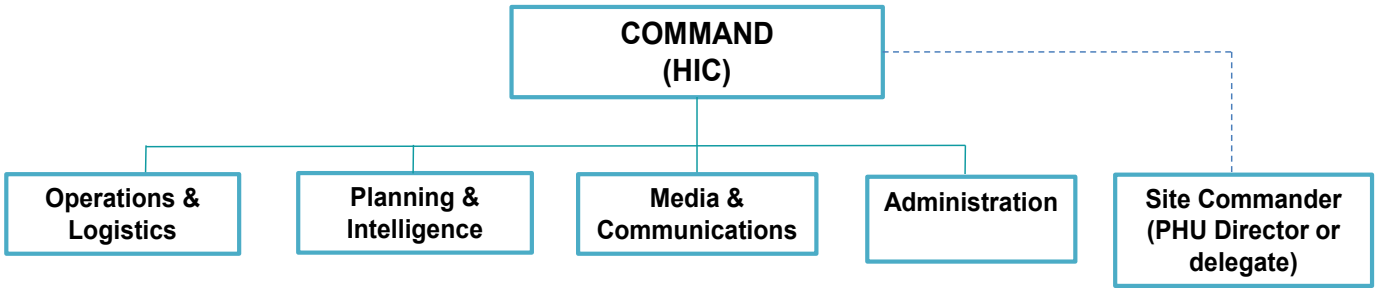

Figure 2. Incident management team structure for state-wide outbreak investigation

iv. Cross-border, national and international outbreaks

Please refer to section 5.4 in this document.

2.2 Communicable Diseases Branch

The role of CDB includes to:

- establish and coordinate the state-wide IMT
- participate as a member of local or cross boundary OCT/IMTs when appropriate
- review foodborne pathogen guidelines and fact sheets
- provide advice, particularly when there is a perceived need to act outside the guidelines
- communicate with other State and Territory Health Departments and CDNA if indicated

- collate and disseminate information to Food Safety Standards and Regulation (HPB), other relevant areas of the Department of Health, and to other relevant agencies.

2.2.1 OzFoodNet

The role of OzFoodNet includes:

- State-wide surveillance of foodborne, waterborne and other gastrointestinal illness, and the timely reporting/alerting of disease clusters and outbreaks to the Executive Director/Medical Director CDB and PHUs
- notification and provision of timely epidemiological information to the Executive Director CDB (through the Medical Director, CDIM) and PHUs on any cluster investigations conducted by OzFoodNet that are potential outbreaks
- coordination of the epidemiological component of state-wide outbreak investigations
- provision of timely written epidemiological outbreak situation reports of those investigations coordinated by OzFoodNet
- provision of epidemiological assistance, foodborne illness outbreak investigation resources and professional advice to PHUs if requested
- inform the national OzFoodNet Coordinating Epidemiologist and other state and territory OzFoodNet sites of significant foodborne illness clusters or outbreak investigations conducted locally or across the state
- communication and participation with other states/territories in the event of a multi-jurisdictional or nationwide foodborne illness outbreak
- collation of enteric outbreak summary reports
- provision of annual foodborne disease surveillance reports in Queensland and publish on the foodborne disease webpage
- regular review of foodborne illness outbreak management guidelines and protocols
- monitor the occurrence of foodborne outbreaks in other states and territories which may impact on Queensland and communicate this information to PHUs and Executive Director/Medical Director CDB
- assist in the coordination and running of foodborne disease outbreak training programs for Queensland Health staff involved in foodborne illness outbreak investigation

2.3 Forensic and Scientific Services (Public Health laboratories)

The role of the public health microbiology laboratory during an outbreak investigation includes the following components:

- coordination with PHUs and/or diagnostic pathology laboratories for transport of samples
- examination of clinical specimens, potentially contaminated foods and environmental swabs for foodborne pathogens
- further characterisation of suspected or confirmed outbreak isolates using both phenotypic and genotypic typing methods (e.g. whole genome sequencing)
- provision of technical advice in relation to specimen collection, transport and storage, pathogen characteristics, and available tests
- participation as a member of the OCT/IMT
- transport of the samples to the other public health laboratories for further characterisation

Queensland Health Public Health laboratories (FSS) have the capacity to examine samples (both clinical and environmental/food) for a range of bacterial agents, viruses, parasites and toxins as listed at **Attachment 9**.

Specimens/samples collected during foodborne illness investigations should be submitted to FSS where possible or alternatively to local diagnostic pathology laboratories in the first instance.

Clinical information from a subset of cases that includes type of symptoms, onset times and duration of illness, and food consumption histories should be submitted to FSS with the samples or as soon as practicable afterwards to assist the laboratory in determining the most appropriate tests to perform.

2.4 Health Protection Branch

Food Safety Standards and Regulation will act as the lead section within the HPB (Prevention Division) on policy and regulatory matters. Its role is to:

- be lead agency on food safety legislation under the *Food Act 2006* (refer to Section 4) and provide advice to PHUs, local government and other stakeholders

- coordinate any state-wide compliance and enforcement issues related to the outbreak investigation
- assist and coordinate food recalls in Queensland and liaise with Food Standards Australia New Zealand (FSANZ) regarding food recalls
- Liaise with SFPQ when the investigation implicates a food product that comes from a primary produce source
- provide support to CDB and PHUs during foodborne outbreak investigations (i.e. liaison with interstate counterparts, state food officers and FSANZ on legislative issues)
- participate as a member of the state-wide IMT
- coordinate state-wide surveillance of food safety
- liaise with other States/Territories concerning food safety policy and regulatory issues and national coordination of any necessary action related to food safety and standards
- facilitate the use of emergency powers by the Chief Executive of Queensland Health under the *Food Act 2006*.
- Assist in the provision of training programs for Queensland Health staff involved in foodborne illness outbreak investigation

2.5 Local Government

Local governments should inform the relevant PHU of any connected reports or complaints from the public or food businesses regarding foodborne illness.

In a foodborne illness outbreak, environmental health officers (EHOs) employed by local government should collaborate with Queensland Health officers to investigate outbreaks related to food businesses in their area. This may include:

- inspection or audit of a food business
- enforcement of the Food Safety Standards
- implementation of control measures
- collection of samples

A log of all actions taken by local government should be maintained by those taking such action. Relevant information should be passed to the PHU when appropriate or requested.

To enable a timely response by the PHU when an outbreak occurs in an area remote from a PHU office, local government EHOs may be requested to take responsibility for the various aspects of the foodborne illness investigation. The PHU retains the coordinating role in any outbreak.

Under the *Food Act 2006*, local government has legislative responsibility for administering and enforcing the Food Safety Standards. Local government EHOs may take enforcement action including commencing legal proceedings, independent of any outbreak investigation, against people who commit offences under the *Food Act*.

2.6 Other Agencies

2.6.1 Department of Agriculture and Fisheries

The Department of Agriculture and Fisheries (DAF) is responsible for primary production and processing. This includes:

- industry development and trade
- food safety policy for primary production and processing
- administering prevention and control measures for animal and plant diseases
- administering control measures over the appropriate use of agricultural and veterinary chemicals that may affect food safety or impact on production and trade.

DAF oversees the *Food Production (Safety) Act 2000* and Safe Food Production Queensland (SFPQ) is the statutory authority established under the Act.

In relation to foodborne illness outbreaks, DAF's role is to:

- collaborate on and undertake 'on farm' investigations and associated laboratory investigations as appropriate, e.g. to identify a livestock species, product, crop or a particular property that is indicated as a potential source of the foodborne pathogen or agent
- contribute to press releases/reports to ensure that relevant and accurate information is provided relating to an outbreak, the potential source/sources implicated (such as livestock and 'on farm' situations) and evidence relating to the outbreak
- develop preventive measures when a production practice is identified as the cause of a foodborne illness outbreak.
- Report to the Minister for Agricultural Industry Development and Fisheries Queensland on matters relevant to the outbreak

2.6.2 Safe Food Production Queensland

In line with the food safety responsibilities of the Agriculture and Fisheries portfolio, the *Food Production (Safety) Act 2000* provides for the food safety of primary produce. SFPQ has been established under the *Food Production (Safety) Act 2000* as a statutory authority.

SFPQ has responsibility for food safety where food safety schemes are in place, currently for meat, dairy, eggs, seafood and certain horticultural produce. SFPQ has powers over accreditation of food businesses and auditing of food safety programs and food safety offences.

SFPQ will assist CDB, Food Safety Standards and Regulation (HPB) or PHUs, as required, in the investigation of foodborne illness outbreaks involving primary production and processing where it has jurisdiction.

SFPQ has a responsibility to inform the relevant PHU of any connected reports or complaints from the public or food businesses regarding foodborne illness.

SFPQs role includes:

- keeping the Minister for Agricultural Industry Development and Fisheries informed on matters relevant to the outbreak
- collaborating and undertaking joint investigations with PHUs on primary production and processing (where a food safety scheme applies) suspected of contributing to the foodborne illness outbreak
- contributing to the content of press releases/reports relating to the primary production and processing suspected of contributing to the outbreak to ensure appropriate relevant and accurate information is provided
- conducting audits/inspections to ensure actions have been taken to correct problems contributing to the outbreak and prevent them from re-occurring.

3. Communications

3.1 OCT communication

Good communication between all members of the OCT is essential. Regular meetings should be held (and minuted) throughout the course of the outbreak. Decisions made regarding further actions and who is responsible for such should be noted.

Each individual should keep comprehensive notes of their actions, observations, information received, etc. This is necessary for legal purposes as well as to enable completion of an investigation report. Information about people involved in foodborne illness investigations is confidential and should only be discussed with those involved in the investigation.

It may be necessary to coordinate media messages with the Local Government, SFPQ or DAF to ensure accurate and timely advice is relayed to all parties involved in the outbreak. It is important to maintain this relationship and liaise with all organisations throughout the outbreak.

3.2 Communication within Queensland Health

The Executive Director CDB is responsible for informing senior management in Queensland Health of significant foodborne illness outbreaks. The size and type of outbreak will determine who needs to be informed. In most cases, situation reports and updates can be simultaneously emailed by the Executive Director CDB (or delegate) to the Chief Health Officer, the Executive Director HPB, the Senior Departmental Liaison Officer and the Director Media Unit. Ministerial briefings will be provided where indicated as deemed by Executive Director CDB or HPB.

3.3 Media communication

Effective media communication is important to ensure appropriate, consistent and non-conflicting public health messages are communicated. The following guidelines apply:

- At the first OCT meeting, arrangements for communicating with the media should be discussed and agreed
- Local or departmental media representatives may participate in the OCT
- The OCT should nominate a single spokesperson if required

- No other member of the OCT will release information to the media without the agreement of the OCT coordinator and media representative
- Media statements should be prepared on behalf of the OCT by a small key group
- The OCT will endeavour to keep the public and/or media as fully informed as possible without prejudicing the investigation and without compromising any statutory responsibilities or legal requirements.

3.3.1 Local outbreaks

The HHS media unit should be contacted by the OCT coordinator and briefed on the situation. The media unit will advise on the appropriate course of action regarding media communications, and coordinate any necessary media statements and approvals before comment is released to the media.

All media enquiries (including after hours) should be directed to the Media Unit.

Any significant or contentious issues that are likely to be the focus of significant media interest or that may be raised in Parliament require the preparation of a Ministerial briefing note(s).

3.3.2 Statewide/interstate/international issues

The Executive Director CDB will advise the Department of Health Media Unit as soon as possible of the situation. The media unit will advise on the appropriate course of action on media communications and coordinate any media statements and approvals before comment is released to the media.

In matters of major significance, the media unit may negotiate special approval processes to ensure timely communication with mass media outlets.

Media enquiries (including after hours) should be directed to the media unit.

4. Legislative Framework

4.1 *Public Health Act 2005 and Public Health Regulation 2018*

Under the *Public Health Act 2005* and *Public Health Regulation 2018*, medical practitioners and hospital medical superintendents/chief executive officers are required to notify foodborne or waterborne illness in two or more associated cases and foodborne or waterborne illness in a food handler. Directors of pathology laboratories are required to notify laboratory confirmed cases of scheduled notifiable conditions including conditions which may be foodborne or waterborne such as salmonellosis, campylobacteriosis, shigellosis, Shiga toxin producing *Escherichia coli* (STEC) infection, typhoid, cholera and paratyphoid, along with requests for certain conditions including foodborne botulism. The Act provides for the collection of contact information regarding notifiable conditions by a contact tracing officer. Sections of the legislation relevant to investigations of foodborne illness include:

Sections 70-73: A doctor or a person in charge of a hospital must notify the Chief Executive if a person has or had a clinical or provisional diagnosis of a notifiable condition.

A director of a pathology laboratory must notify the Chief Executive if a pathological examination of a specimen of human origin indicates that a person has or had a pathological diagnosis notifiable condition or if they receive a request for a pathological examination of a human specimen for a pathology request notifiable condition (as specified in Schedule 1 Notifiable conditions of the *Public Health Regulation 2018*).

Sections 89, 99-102: A contact tracing officer is authorised to obtain information about how a person was exposed to a notifiable condition or how a person exposed others to a notifiable condition. Where a contact tracing officer reasonably suspects that a person may have contracted a notifiable condition while receiving goods from a business e.g. by dining at a restaurant, they are authorised to obtain information from the owner/person in charge of the business, including contact details of all people who have received goods from that business. The contact tracing officer may ask the owner/person in charge for evidence to support the correctness of the information and can warn them it is an offence to fail to provide the information within a reasonable time period. Failure to provide business contact information is dealt with in Section 102.

4.2 *Food Act 2006* and Food Standards Code

Food Act 2006 and related legislation

The *Food Act 2006* (the Act) is the primary food safety legislation in Queensland and applies to all Queensland food businesses.

The purposes of the Act is to:

- ensure food for sale is safe and suitable for human consumption
- to prevent misleading conduct in relation to the sale of food
- to apply the Australia New Zealand Food Standards Code.

The Act manages legislative requirements of the preparation, handling and sale of food in Queensland. It also sets out offences for non-compliance against the Act and provides for prosecutions and penalties for such offences.

Section 39 of the Food Act requires that food businesses and persons must comply with the Australia New Zealand Food Standards Code (the Code). However all Queensland food businesses, regardless of whether they are required to have a food business licence, are required to comply with the Act and the Code.

Legislative requirements of the Act are a joint responsibility of Queensland Health and Local Government.

There are other pieces of food safety legislation in Queensland that address food safety at a different level of the food supply chain:

- *Food Regulation 2016* (the Regulation)—prescribes details in relation to a food business, mobile premises, prescribed contaminants in food and fees for approval as an auditor.
- *Food Production (Safety) Act 2000*—regulates the production of primary produce for which a food safety scheme applies, as detailed in the *Food Production (Safety) Regulation 2014*. Currently, the following schemes are included:
    - egg and egg products
    - dairy produce
    - meat and meat products (including pet meat and rendered products)
    - seafood.
- *Food Production (Safety) Regulation 2014*—is subordinate legislation to the *Food Production (Safety) Act 2000*.

Australia New Zealand Food Standards Code

The Australia New Zealand Food Standards Code (see Section 5.6 of this document) is a national standard that is adopted by all Australian States and Territories (and New Zealand). It sets out national standards for the safe and hygienic production of food, labelling and composition of food, and the primary production and processing of certain agricultural commodities.

Chapter 4 of the Food Standards Code legislative requirements under the *Food Production (Safety) Act 2000* in Queensland are the responsibility of Safe Food Production Queensland.

Section 98 of the *Food Act 2006* requires particular licensees to have an accredited food safety program, and provides for the accreditation and auditing of food safety programs including corresponding auditing requirements.

In the event of an emergency the *Food Act 2006* provides under section 216 for emergency powers. The chief executive may make an order under this section of the ACT if the chief executive has reasonable grounds to believe that the making of the order is necessary to prevent or reduce the possibility of a serious danger to public health or to mitigate the adverse consequences of a serious risk to public health.

The *Food Act 2006* includes a requirement under section 270 for notice of isolation of prescribed contaminant to orally notify the chief executive about the isolation immediately (i.e. by telephone) and then provide the chief executive with notice about the isolation via the approved form within 24 hours after isolating the contaminant or being notified that the contaminant has been isolated.

Section 271B of the *Food Act 2006* requires reporting suspected intentional contamination of food. This is done by notifying 13HEALTH (telephone: 13 432 584) when a reasonable suspicion has been formed that food at, or sold from premises has been intentionally contaminated.

A list of Prescribed contaminants the can be found in the *Food Regulation 2016*

Food safety standards

The food safety standards are part of the Code and apply across Australia.
The objective of the food safety standards is to ensure that only safe and suitable food is sold in Australia. They outline the obligations of food businesses in relation to:

PART 3.2 Food Safety Requirements

- Standard 3.2.1 Food safety programs

- Standard 3.2.2 Food safety practices and general requirements
- Standard 3.2.3 Food premises and equipment

PART 3.3 Standard 3.3.1 Food safety programs for food service to vulnerable persons

Roles and Responsibilities

Local government

Local governments are responsible for:

- licensing of food businesses (both making and selling of food)
- mobile food premises
- complaints about food safety and hygiene matters in food premises
- food safety programs (except those in Queensland Government facilities).

Local governments can suspend or cancel food business licenses or apply for a restriction which may involve a food business having to terminate operation.

The department and local governments can issue improvement notices and infringement notices, for certain offences under the *Food Act 2006*. Offences may lead to being prosecuted in a magistrate's court.

Public Health Units

Public Health Units are responsible for:

- food composition and labelling issues (including undeclared food allergens)
- responding to enquiries about food legislation
- complaints about suspected foodborne illness, contamination of food and food recalls

All food businesses in Queensland are required to notify 13HEALTH (telephone: 13 432 584) when a reasonable suspicion has been formed that food at, or sold from, their premises has been intentionally contaminated.

Safe Food Production Queensland

Safe Food Production Queensland regulates under the *Food Production (Safety) Act 2000* the primary production and processing of meat, eggs, dairy, seafood and certain horticulture in Queensland.

Safe Food Production Queensland's role is to ensure that:

- Queensland's food production systems meet national food safety standards

- Businesses along the food supply chain know and understand their responsibilities
- Potential threats to the integrity of food supply are identified and dealt with decisively
- Consumers maintain their confidence in the food produced in Queensland

Safe Food Production Queensland has a range of powers under the *Food Production (Safety) Act 2000* that include:

- developing food safety arrangements
- accrediting primary production and processing businesses
- establishing auditing systems
- registering approved auditors
- conducting investigations into food safety offences

Safe Food Production Queensland also maintains an Accreditation Register, which may be searched to identify businesses currently accredited with SFPQ in the Meat, Dairy, Egg and Seafood industries.

4.3 Right to Information Act 2009

The *Right to Information Act 2009* (RTI) and the *Information Privacy Act 2009* (IP) provide a right of access to government information unless, on balance, it is contrary to the public interest to release the information. The RTI and IP Acts apply to Queensland Ministers, Queensland government departments, local councils and most semi-government agencies and statutory authorities. They do not apply to documents held by the Commonwealth government or by other State governments (such documents are subject to the FOI legislation of those other jurisdictions). The Act applies to all documents held in relation to a particular investigation.

The applicant does not have to give a reason for wanting access to documents. If the application is refused, the RTI/IP decision-maker will provide a written explanation of the reasons, and details of the applicant's review rights. Documents/information covered by the RTI and IP Acts includes files, reports, letters and memorandums including drafts and handwritten notes as well as computer printouts, maps, plans, photographs, tape recordings, films or videotapes and other means of storing information. If an applicant is not satisfied with the original decision, internal review decision appeal processes exist.

Further information can be accessed at:

Legal services

Right to Information request

5. Incident Management Frameworks and Agreements

There are a number of directives and guidelines that outline decision making frameworks to assist in the management of responses to food incidents that occur either at the HHS level or state-wide and multi-state and territory investigations.

5.1 Health Service Directive QH-HSD-046:2014 - Management of a public health event of state significance

This Health Service Directive applies to all HHSs and outlines the public health classification system that defines the levels and management of a public health event including those of state significance. The HHS is required to notify the Chief Health Officer and Deputy Director-General, Prevention Division when consideration of a public health event of state significance is required. This directive is available at https://www.health.qld.gov.au/__data/assets/pdf_file/0019/150760/qh-hsd-046.pdf.

5.2 Queensland Health Disaster and Emergency Incident Plan

The Queensland Health Disaster and Emergency Incident Plan may be used to aid in the management of a significant foodborne illness outbreak event. However, this framework is to be used to complement, and not replace, this document.

5.3 The Queensland Health Incident Management System Guideline

The Queensland Health Incident Management System Guideline aims to support the Queensland Health Disaster and Emergency Incident Plan by clearly defining the incident management system and its procedures for a Queensland Health response to a disaster or emergency incident.

5.4 National OzFoodNet protocol for the epidemiological investigation of multi-jurisdictional outbreaks of foodborne illness

The *Guidelines for the epidemiological investigation of multi-jurisdictional outbreaks that are potentially foodborne* were developed by OzFoodNet and endorsed by CDNA http://www.health.gov.au/internet/main/publishing.nsf/Content/BA8ABBB4031EF7B6CA25801A002

03B3C/$File/guide-epi-invest-multi-jurisdictional.pdf. The purpose of the guidelines is to provide clear guidance to members of OzFoodNet on coordinating and managing the epidemiological investigation of multi-jurisdictional outbreaks in Australia that are potentially linked to contaminated food sources in a timely, appropriate, consistent and coordinated manner. This protocol does not override existing responsibilities of individual agencies or jurisdictions; rather it provides a framework to guide principal partners in responding to potential multi-jurisdictional outbreaks. When a multi-jurisdictional outbreak investigation (MJOI) is activated:

- CDB becomes the lead agency in Queensland.
- The OzFoodNet Epidemiologist(s) represent Queensland at OzFoodNet MJOI meetings.
- The Executive Director, CDB (or their nominated delegate) is the representative on CDNA MJOI meetings.
- OzFoodNet will notify PHUs and HPB (Food Safety Standards and Regulation) by email that an MJOI has been activated, within 1 day of activation.
- OzFoodNet will provide situation updates at designated times to all PHUs in Queensland.

5.5 National Food Incident Response Protocol

FSANZ developed the National Food Incident Response Protocol (NFIRP) under the auspices of the Food Regulation Standing Committee's Implementation Sub-committee (ISFR)[2]. The NFIRP provides a framework to coordinate the response of Australian government regulatory agencies responsible for food safety and food issues in the event of a national food incident.

A food incident is defined as "any situation within the food supply chain where there is a risk, potential risk or perceived risk of illness or confirmed illness associated with the consumption of a food or foods."

[2] The Food Regulation Standing Committee's Implementation Sub-Committee for Food Regulation (ISFR) comprises representatives from the Australian government and each State and Territory jurisdiction and New Zealand and includes representation from the Australian Quarantine and Inspection Service, Food Standards Australia New Zealand and Australian local government. ISFR members are responsible for food safety and food issues and include the government agencies in each jurisdiction with statutory responsibility for food safety. http://foodregulation.gov.au/internet/fr/publishing.nsf/Content/ISFR

Where a food incident is associated with cases of human illness, the NFIRP will be used to co-ordinate the response of food regulatory agencies under the broader management of the human illness outbreak and will work in conjunction with state and/or national foodborne illness outbreak management protocols/guidelines.

6. References

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Public Health England, 2014. *Communicable Disease Outbreak Management, Operational guidance*. Public Health England, London, UK. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/343723/12_8_2014_CD_Outbreak_Guidance_REandCT_2__2_.pdf

CIFOR. *Guidelines for Foodborne Disease Outbreak Response (2nd edition)*. https://www.cdc.gov/ncezid/dfwed/food-safety-office/cifor.html

World Health Organization. 2008. *Foodborne Disease Outbreaks: Guidelines for investigation and control*. http://apps.who.int/iris/bitstream/10665/43771/1/9789241547222_eng.pdf

7. Outbreak Investigation Resources

Communicable Disease Control Guidance - *http://disease-control.health.qld.gov.au/*

National Food Incident Response Protocol – *http://foodregulation.gov.au/internet/fr/publishing.nsf/Content/incident-response*

Guidelines for the collection & microbiological examination of food samples by Environmental Health Officers (V 4.0) - http://qis.health.qld.gov.au/DocumentManagement/Default.aspx?DocumentID=24101

Guidelines for the collection & microbiological examination of food samples by Environmental Health Officers - http://qis.health.qld.gov.au/DocumentManagement/Default.aspx?DocumentID=23951

Through-chain investigation guidelines for egg associated outbreaks http://foodregulation.gov.au/internet/fr/publishing.nsf/Content/publication-Through-Chain-Investigation-Guidelines-for-Egg-Associated-Outbreaks

Guidelines for the public health management of gastroenteritis outbreaks due to norovirus or suspected viral agents in Australia – *http://disease-control.health.qld.gov.au/Condition/758/norovirus*

Queensland guideline for the management of outbreaks of communicable disease in health facilities – *https://www.health.qld.gov.au/publications/clinical-practice/guidelines-procedures/diseases-infection/governance/management-outbreaks.pdf*

List of all Notifiable Conditions and Notifiable Conditions Report Form - *https://www.health.qld.gov.au/clinical-practice/guidelines-procedures/diseases-infection/notifiable-conditions/list*

Contact tracing (*Public Health Act 2005*) – http://qheps.health.qld.gov.au/ehpom/documents/contactracpha_pr.pdf

Queensland Health Foodborne Diseases webpage – https://www.health.qld.gov.au/clinical-practice/guidelines-procedures/diseases-infection/diseases/foodborne

Questionnaires & Summary Reports for outbreak investigations – https://www.health.qld.gov.au/clinical-practice/guidelines-procedures/diseases-infection/diseases/foodborne/managing-outbreaks

Bad Bug Book – Handbook of Foodborne Pathogenic Microorganisms and Natural Toxins
https://www.fda.gov/downloads/Food/FoodborneIllnessContaminants/UCM297627.pdf

Environmental Assessment of Foodborne Illness Outbreaks e-learning
https://www.cdc.gov/nceh/ehs/elearn/eats/index.html

Environmental Assessment of Foodborne Illness Outbreaks
https://www.fda.gov/Food/RecallsOutbreaksEmergencies/Outbreaks/ucm235425.htm

8. List of Attachments

Attachment No.	Title	Page No.
1	**Public Health Agency Contact List**	64
2	**OCT Meeting Agenda template**	65
3	**OCT Meeting Minutes template**	66
4	**Outbreak Investigation Log**	68
5	**Conducting an analytic study**	69
6	**Outbreak Situation Report template**	72
7	**Final Internal Outbreak Report template**	73
8	**Public Fact Sheet – how to collect a faecal or vomitus specimen**	74
9	**List of agents/toxins able to be examined by Public Health laboratories (FSS)**	75
10	**Summary of food and environmental laboratory testing**	76
11	**Structured debrief tool**	77
12	**Foodborne Pathogens Compendium for outbreak investigations**	83

Attachment 1: Public Health Agency Contact List

			Phone	Fax
Office of the CHO & DDG Protection Division	Communicable Diseases Branch	Executive Director	(07) 3328 9728	(07) 3328 9782
		Medical Director Communicable Diseases and Infection Management	(07) 3328 9725	(07) 3328 9782
	OzFoodNet	Epidemiologist Consultant	(07) 3328 9733	(07) 3328 9740
		Senior Epidemiologist	(07) 3328 9738	(07) 3328 9740
	Health Protection Branch	Executive Director	(07) 3328 9266	
		Director Food Safety Standards and Regulation	(07) 3328 9323	(07) 3328 9354
	Media unit		(07) 3708 5380	
Public Health Units	Metro North		(07) 3624 1111	(07) 3624 1159
	Metro South		(07) 3176 4000	(07) 3176 4045
	West Moreton (Ipswich)		(07) 3818 4700	(07) 3818 4701
	Gold Coast		(07) 5667 3200	(07) 5667 3280
	Sunshine Coast		1300 017 190	(07) 5470 6641
	Darling Downs (Toowoomba)		(07) 4699 8240	(07) 4699 8477
	Wide Bay (Hervey Bay)		(07) 4184 1800	(07) 4184 1809
	Wide Bay (Bundaberg)		(07) 4303 7500	(07) 4303 7599
	Central Queensland (Rockhampton)		(07) 4920 6989	(07) 4920 6865
	Mackay		(07) 4885 5800	(07) 4885 5819
	Townsville		(07) 4433 6900	(07) 4433 6901
	Tropical Public Health Services Cairns		(07) 4226 5555	(07) 4226 3095
Queensland Health Forensic and Scientific Services	Public Health Microbiology	Clinical Microbiologist	(07) 3096 2681	
		Chief Scientist	(07) 3096 2828	(07) 3096 2973
		Senior Scientist (molecular typing)	(07) 3096 2826	(07) 3096 2973
		Scientist (*Salmonella* typing)	(07) 3096 2831	(07) 3096 2973
		Scientist (Foods)	(07) 30962823	(07) 3096 2973
		Senior Scientist (water)	(07) 3096 2822	(07) 3096 2973
	Public Health Virology	Chief Scientist	(07) 3096 2899	(07) 3096 2878
		Senior Scientist (Enterics)	(07) 3096 2888	(07) 3096 2878
	Chemistry	Supervisor - Organic Chemistry	(07) 3096 2847	(07) 3096 2839
		Supervisor - Inorganic Chemistry	(07) 3096 2811	(07) 3096 2813
		Supervisor - Food Chemistry	(07) 3096 2842	(07) 3096 2839

Attachment 2: OCT Meeting Agenda

OCT Meeting Agenda			
Outbreak name			
Meeting number		Investigation start date	
Date		Time	
Chair			
Attendees			
Apologies			

	Topics	Person responsible
1	**Introduction and reminder of confidentiality**	Chair
2	**Roll call and apologies**	Chair
3	**Incident summary to date**	Chair
4	**Minutes and action items from last meeting**	Chair
5	***Outbreak updates*** • Epidemiology • Laboratory (clinical and non-clinical samples) • Environmental Health • Other agencies (e.g. Safe Food / DAF / Council)	Epi Coordinator Lab Coordinator EH Coordinator Agency Rep
6	***Management of outbreak*** a) Investigation – next steps • Epidemiology • Laboratory • Environmental Health (PHU) • Environmental Health (LG) • Review case definition b) Control and prevention measures c) Communications • media releases to public • information for general practitioners, hospitals, path labs • media interviews d) Update for Executive Director (CDB) / Director-General / Minister's office (as appropriate) e) Arrangements for enquiries from the public	All
7	Review action items arising from this meeting	Chair
8	Other business	Chair
9	Date and time of next meeting	Chair

Attachment 3: Outbreak Control Team Meeting Minutes

OCT meeting minutes			
Outbreak name			
Outbreak No.		**Date investigation commenced**	
Key roles and responsibilities	Chair: Epi coordinator: Lab coordinator: EH coordinator: Minutes:		
Summary of investigation to date	Date of update		
	No. of cases		
	No. laboratory confirmed		
	Pathogen / Agent		
	Suspected source		
	Environmental health findings		
	Control & prevention measures to date		

Copy and paste the following table to the next page and enter information, leaving the blank template for future meetings so that the final outbreak control team meeting is at the top of the front page. Save into the appropriate outbreak folder

Meeting number:	**Date:**	**Time:**
Chair		
Attendees		
Previous minutes	Proposed / accepted	
	Actions arising from minutes	
New information	Epi / Clinical	• • • •

	Lab	• • •
	EH	• • •
	Other agencies	• • • •
Hypotheses	•	
Decisions	• • •	
Actions	• • • • • •	
Next meeting		

Attachment 4: Outbreak Investigation Log

Item No.	Date	Time	Action / Task	Action Officer	Outcome
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					

Attachment 5: Conducting an analytic study

(adapted from https://PHE Communicable Disease Outbreak Management, Operational Guidance 2014)

Cohort studies:

These are normally used when the 'population at risk' is well-defined, meaning you can clearly identify the group of people (both sick and well) who were potentially at risk. Examples might include a restaurant meal, a wedding function, or a school function where food was consumed at the same point in time.

Cohort studies are commonly employed in foodborne outbreak investigations because they fit the circumstances of a group of people, who have eaten together, with illness becoming recognised relatively soon afterwards. The 'cohort' is the complete group of people who attended the event, and so were potentially 'exposed' to the foods being investigated. The food consumed by each member of the group (ill and well persons), and if possible the amount, is recorded. The investigators should attempt to interview the total cohort of people who were at risk or a representative sample of participants.

The cohort method has the advantage over case-control studies that there is no need to identify and select controls, so the possibility of bias is reduced. The statistical analysis is similar to case-control studies.

A case-control study can still be employed when investigating a well-defined cohort if the response rate is inadequate or it is difficult to identify and contact all members of the cohort.

Case-control studies:

These are normally used when you cannot clearly delineate the 'population at risk' group (defined above) or when this group is so large in relation to the number of sick people that it is impracticable or uneconomical to include them all in a study. A case-control study would also be appropriate for a continuous source outbreak i.e. when cases are exposed to the causal agent over a period of days, weeks, or longer with the exposure being either intermittent or continuous (e.g. a nationally distributed food that is contaminated or an outbreak associated with a contaminated swimming pool).

Although it may be clear that there is an outbreak, it may not be apparent that cases had an exposure in common to a single food. With a case-control study, you identify people

with the disease (cases) and then identify people without the disease (controls); then you ask everyone the same questions about past exposures during the outbreak period.

Interviews with known cases may suggest that several foods, distributed throughout the affected area could possibly be contaminated. By showing that cases are significantly more likely than well (non-ill) people to have eaten one of the foods under investigation, the most likely food can be determined. The diet of 'well people' is determined by asking a sample of well people to be 'controls' and provide details of the foods that they have eaten.

The most difficult part of a case-control study is selecting the controls. Defining the source population (the population that gave rise to the cases) will assist in the process for selecting controls as controls need to come from the same source population to be at risk of disease.

In a case-control study, there has to be a specific hypothesis that consumption of a single or a small number of foods is associated with disease. Controls should be people who have had similar opportunities to eat the suspect foods. Consideration also needs to be given as to whether or not controls should be matched. For instance, if the suspect food is a dairy food and most of the cases are children, matched controls would be children of similar age who live in the same area (e.g. neighbours and friends of the cases or children who visit the same general practitioner). Each case may have one, but preferably, at least two controls. When the data for a case-control study have been collected, they are analysed by standard statistical methods.

These two epidemiological study designs provide a scientifically rigorous framework for the assessment of the relationship between exposure to a risk factor and the incidence of illness. The type of design that is appropriate will depend on the nature of the outbreak.

Case-case (or case-case comparison) studies have recently been employed as an alternative analytic method during outbreak investigations[3]. The application and methodology for case-case studies in outbreak investigations is basically the same as the standard case-control study except that another case population (of ill persons) is used as a comparison group in place of the control group (of well persons). The comparison group can be drawn from cases of another enteric pathogen or from cases of the same pathogen as the outbreak strain but a different subtype or genotype (non-outbreak strains). Odds ratios for case-case studies should be interpreted in the context of the study design. Measures of association are limited to differences in exposures between outbreak cases

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[3] Pogreba-Brown K, Ernst K, Harris RB. *Case-case methods for studying enteric diseases: A review and approach for standardisation*. OA Epidemiology 2014;2(1):7.

and non-outbreak cases, rather than the population of unaffected individuals. Case-case studies can be implemented rapidly and are usually less resource intensive than case-control studies. Response rates from the comparison group are improved and recall bias is reduced.

Measures of association:

Relative Risk (RR) is used in cohort studies to compare the occurrence of disease in the group of people who ate a particular food ('risk' in the exposed group), with the occurrence of disease in those who didn't ('risk' in the non-exposed group). RR is the ratio of the percentage of people who ate a particular food and became sick (attack rate in the exposed group) compared with the percentage that did not eat the particular food but still got sick (attack rate in the unexposed group).

An RR greater than 1 indicates an increased risk of becoming sick for people who ate the particular food. An RR less than 1 indicates a lower risk of becoming ill if you ate the food than if you didn't eat the food.

For case-control studies, odds ratios (OR) are calculated. While technically different from relative risk, odds ratios are often interpreted in the same way as relative risks and for practical purposes interpretation of the two measures can be considered inter-changeable in outbreak investigations.

Confidence intervals give you an estimate of certainty – an understanding of how precise your estimates of relative risk or odds ratio are. Confidence intervals are necessary because all studies have limitations such as small numbers of participants, which lead to a degree of imprecision or error. A confidence interval of an RR that does not include '1' indicates that the effect you have seen is unlikely to be simply due to random variation or chance alone. The term 'statistically significant' is sometimes used for such findings. For example, a RR of 3.2 with a CI of 1.4 – 5.0 would be considered 'statistically significant' but an RR of 3.2 with a CI of 0.8 – 6.0 would not. Interpretations of confidence intervals should be treated with caution if the sample size is small.

Other statistical tests

Other statistical tests may also be undertaken in the analysis of the outbreak study. The interpretation of the findings of these tests should be explained in plain language in the results section of the outbreak investigation report to assist risk managers.

Attachment 6: Outbreak Situation Report

Outbreak Situation Update			
Outbreak name			
Sit Rep #		Investigation start date	
Date of report		Lead agency	

Case information			
Confirmed	Possible	Total	Hospitalised

Case definitions

Confirmed outbreak case:

Possible outbreak case:

Summary of investigation

Epidemiological

Food/environmental/traceback

Control measures

Actions

Supporting documentation

e.g. Epidemic curve, tables, etc

Attachment 7: Final Internal Outbreak Report

Final Outbreak Report			
Outbreak name			
Investigation number		Investigation start date	
Date of report		Investigation coordinator	

Summary/abstract
• A short summary of the investigation
Introduction
• Overview of the epidemiology of the disease / pathogen • Disease prevalence information locally, statewide, nationally • Source and risk factor information from previous outbreaks due to same pathogen
Background to the investigation
• Contains a statement of the problem and the events that led to the investigation
Methods
a) Epidemiological • case definition • descriptive and analytic methods b) Environmental Health • environmental assessment and traceback methods c) Microbiological • clinical, food and environmental sample analyses
Results
d) Epidemiological • descriptive results, epidemic curve • analytic results e) Environmental Health • results of assessment and traceback f) Microbiological
Control methods
• used in the investigation to prevent further spread of outbreak
Discussion
• interpretation and validity of all results, limitations and potential biases, Bradford Hill's framework for examining causation
Conclusions and recommendations
•
Supporting documentation
• Environmental assessment reports, letters, menus, laboratory results, etc

Attachment 8: Public Fact Sheet – How to collect a faecal or vomitus specimen

To aid in determining the cause of your illness, it is important to collect a specimen of faeces and/or vomitus. This specimen will then be forwarded to the laboratory for examination. The following guide is provided for your assistance.

1. Check the label on the specimen container and ensure you have provided the following patient and specimen details:
    a) patient's first name and surname
    b) date of birth
    c) address
    d) time and date the sample was taken.
2. Collect the specimen using one of the following methods:
    a) Rinse an ice-cream container in hot water until it is clean. Place the container into the toilet bowl and defaecate or vomit directly into it, taking care to exclude any urine if possible, or
    b) Place 2 sheets of newspaper, aluminium foil or plastic wrap under the toilet seat and push down in the centre, without touching the water in the bowl. Defaecate or vomit into the paper, taking care to exclude any urine if possible.
3. Put on the disposable gloves. Then, using the plastic spoon or scoop that is provided, remove a portion of the deposited faeces or vomitus and add to the empty specimen container so that the specimen container is one third filled. Discard any remaining faecal or vomitus matter into the toilet. Firmly screw the lid onto the specimen container and place container into the plastic biohazard bag that is supplied. The soiled spoon, gloves and ice cream container or paper/foil/wrap can be placed in the original plastic bag and disposed of into a refuse container.
4. Wash hands thoroughly with warm water and soap.
5. Return the specimen container to the Environmental Health Officer without delay as arranged. If provided, the plastic biohazard bag can be placed into a larger foil bag. The bag should be refrigerated until collection by an Environmental Health Officer can be arranged. DO NOT FREEZE unless you are asked to do so.

Attachment 9: List of agents/toxins able to be examined by the Public Health laboratories (FSS)

Pathogen		Clinical specimen	Environmental sample
Bacteria	Coagulase positive / negative staphylococci	faeces, vomitus	food, water
	Staphylococcal enterotoxin	faeces, vomitus	food
	Enterococci/faecal streptococci		water
	Clostridium perfringens	faeces	food
	Clostridium perfringens enterotoxin genes	faeces	food
	Bacillus spp. (including *Bacillus cereus*)	faeces, vomitus	food
	Bacillus cereus emetic toxin and cereulide gene	faeces, vomitus	food
	Bacillus spp. Diarrhoeal toxin	faeces	food
	Salmonella spp.	faeces	food, water
	Campylobacter spp.	faeces	food, water
	Shigella spp.	faeces	food, water
	Shiga-toxin producing E. coli	faeces	food, water
	Shiga-like toxins and toxin genes/virulence factors	faeces	food, water
	Coliforms/*E. coli*	-	food, water
	Enteropathogenic/toxigenic *E. coli* genes	faeces	food, water
	Vibrio parahaemolyticus and virulence genes	faeces	food
	Vibrio cholerae O1 and O139 and cholera toxin genes	faeces	food, water
	Listeria monocytogenes (and other *Listeria spp.*)	faeces	food
	Yersinia enterocolitica	faeces	food, water
	Pseudomonas aeruginosa	-	water
	Legionella spp.	-	water
Parasites	*Cryptosporidium/Giardia*	faeces	water
	Other parasites	faeces	possibly food and water
	Cyclospora cayetanensis	faeces	food, water
Viruses	Calicivirus (Norovirus)	faeces, vomitus	-
	Hepatitis A virus	faeces, vomitus, serum	-
	Rotavirus	faeces	-
	Astrovirus	faeces	-
	Adenovirus	faeces	-
Toxins and chemicals	Botulinum toxin*	Faeces, whole blood	food
	Ciguatoxin	-	food
	Histamine	-	food
	Shellfish poisoning	-	food
	Heavy metals	-	food

* any samples collected in relation to suspected botulism should be taken in consultation with the FSS Medical Microbiologist, who can advise on appropriate clinical samples depending on the age of the suspected case

Attachment 10: Summary of food and environmental laboratory testing

FOOD AND ENVIRONMENTAL SAMPLES			
Date of report		Outbreak / Incident name	
Report Number		PHU	

Description of sample	Number sampled	Identifier	Site	Batch / date marking	Sampling Date	Laboratory	Lab ID	Test	Result	Pathogen	Result date	Comments
e.g. food, water, swab, wash water		e.g. brand, business, shed, boot swab	e.g. farm, home, food business	BB dd/mm/yy	dd/mm/yy			e.g. PCR, culture	+/-		dd/mm/yy	(e.g. company testing, agency testing, storage temperatures, results expected date)

Attachment 11: Structured Debrief Tool

Outbreak name:

Facilitator:

Date / time:

General objectives:

- What were positive outcomes from investigation?
- What was learnt from investigation and where can we improve (epi/environ/lab investigations)?
- How successful was outbreak team collaboration and communication?
- How useful was the outbreak management guidelines in assisting the investigation?
- Can we make recommendations to improve the conduct of future investigations to other PHS staff/units?

AN OUTBREAK SUMMARY REPORT SHOULD BE DISTRIBUTED TO ALL PARTICIPANTS AT LEAST THREE DAYS PRIOR TO DEBRIEF MEETING

Debrief Trigger Questions/Prompts (to be distributed to Debrief participants)

The trigger questions (prompts) on the following three pages are not intended to be addressed in their entirety during a structured debrief, but should be used to prompt participants to nominate a wide range of issues for consideration during the debrief.

From the prompts on the following three pages, what are the major issues you would like to discuss in the outbreak debrief?

-
-
-
-

Comments:

(please add any comments you want to make about the investigation)

Identifying issues

Please tick the important issues for possible inclusion in the debrief.

Preparedness	Issue	Tick for possible inclusion in debrief
1.	Were there adequate numbers of trained staff to respond to outbreak?	☐
2.	Were there adequate epidemiological, environmental health and laboratory resources?	☐
3.	Are there adequate pre-prepared sources of public information (fact sheets, web-based resources) for dissemination in the event of an outbreak?	☐
4.	Was the 'Queensland Health Guideline for the investigation and management of suspected FBI outbreaks' useful for this investigation?	☐

Response	Issue	Tick for possible inclusion in debrief
Epidemiological investigation		
1.	Was the outbreak recognised in time to investigate the cause?	☐
2.	Were the appropriate hypothesis-generating questionnaires used?	☐
3.	Was timeliness of hypothesis-generating interviews appropriate?	☐
4.	Were the hypothesis-generating questionnaires completed adequately?	☐
5.	Were outbreak caselists / databases adequate?	☐
6.	Was epidemiological reporting adequate and timely during the investigation?	☐
7.	Was the epidemiological study type appropriate for the investigation?	☐
8.	For analytic studies, was there an issue with selection of controls?	☐

Environmental Health investigation		☐
1.	Was the timeliness of environmental sampling adequate?	☐
2.	Were the appropriate environmental samples collected?	☐
3.	Were environmental sampling results adequately recorded?	☐
4.	Was environmental reporting adequate?	☐
5.	Were there issues with agencies outside of Queensland Health regarding the traceback investigation (other govt agency, industry, private stakeholder, etc)?	☐
6.	Was the traceback investigation conducted appropriately (e.g. adequate documentation)?	☐
Laboratory investigation		
1.	Were sufficient specimens collected from cases?	☐
2.	Were sufficient environmental samples collected from cases?	☐
3.	Were environmental samples adequately labelled, transported and stored?	☐
4.	Were there issues with laboratory capacity to perform testing?	☐
5.	Were there issues with timeliness of test results?	☐
Communication		
1.	Was there adequate / timely communication of information within the outbreak control team?	☐
2.	Was there adequate / timely communication of information to stakeholders?	☐
3.	Was there adequate / timely communication of information to management?	☐
4.	Was there a coordinated / timely response of information to media?	☐
Outbreak management		
1.	Were sufficient OCT meetings held and were they adequately attended?	☐
2.	Were members of the OCT clear on their own	☐

	roles / responsibilities and those of others?	
3.	Were records of telephone calls, meeting minutes, and major actions/decisions logged contemporaneously?	☐
4.	Were ethical, legal and privacy issues adequately considered and addressed?	☐
5.	Did the final outbreak investigation reports adequately communicate the required information and findings?	☐
6.	Do outbreak management guidelines require updating?	☐
Control and Prevention		
1.	Were initial control measures appropriate in terms of timeliness and effectiveness?	☐
2.	Could control of the outbreak have been more timely through better outbreak detection methods?	☐
Other issues		
1.		☐
2.		☐
3.		☐
4.		☐
5.		☐

Structured Debrief: List of action items

Topic	Issues identified	Actions	By Whom	Date due
Preparedness				
e.g. appropriate resources – questionnaires, databases, fact sheets? *e.g. could pre-outbreak surveillance have resulted in earlier detection?*				
Response				
Outbreak detection *e.g. timeliness?*				
Epidemiological investigation *e.g. timeliness of epi investigation?* *e.g. appropriateness of investigation type / controls?*				
Environmental health investigation *e.g. timeliness of sample collections?*				
Laboratory issues *e.g. specimen collection & handling; specimen transport?* *e.g. were sufficient laboratory samples taken?*				

Communication *e.g. within response team?* *e.g. with stakeholders?* *e.g. with management?* *e.g. with media*				
Control and Prevention *e.g. were initial control measures appropriate?* *e.g. timeliness & effectiveness of initial control measures?*				
Outbreak management *e.g. sufficient OCT meetings held?* *e.g. adequate attendance at OCT meetings?* *e.g. staff roles clear?* *e.g. legal issues?*				
Other issues				

Attachment 12: Foodborne Pathogens Compendium for Outbreak Investigations

Table 1 Agents characterised by nausea and vomiting, without fever, within 8 hours of eating

Agent	Usual incubation period (range)	Symptom profile	Duration of illness	Period of communicability	Characteristic foods	Criteria for confirmation of outbreak	Specimen required (and transport requirements)
Bacillus cereus (pre-formed emetic toxin)	2-4 hours (1-6 hours)	Sudden onset of severe nausea and vomiting. Diarrhoea may be present.	6-24 hours	Not communicable (pre-formed enterotoxin in food)	Improperly refrigerated fried or boiled rice is a common vehicle. Other implicated vehicles include other starchy foods such as cereals and pasta; and dairy foods such as vanilla slice and cream. Toxin is heat stable to 126°C for 90 mins.	Isolation of ≥ 10^5 orgs/gm from implicated food OR isolation of ≥ 10^5 orgs/gm from stools or vomitus of two or more ill persons OR detection of *B. cereus* enterotoxin in food or stool/vomitus OR detection of the cereulide gene in isolates from food and clinical samples.	Stool/vomitus samples preferably collected within 3 days of onset of illness. Refrigerate prior to transport. DO NOT FREEZE. Collect 50-150 grams of food. Transport specimens in a cold pack.
Staphylococcus aureus	2-4 hours (1-7 hours)	Sudden onset of nausea, vomiting, abdominal cramps and diarrhoea. In mild cases there may be nausea and vomiting without diarrhoea or cramps.	24-48 hours	Not communicable (pre-formed enterotoxin in food)	*S. aureus* competes poorly with other bacteria, therefore seldom causes food poisoning in raw products. *S. aureus* grow well in cooked foods in which normal flora has been killed or inhibited (e.g. cooked, cured or salted meats). Foods high in protein, sugar or salt, or food with moist fillings are particularly susceptible (e.g. meat and meat products, poultry, dairy products, cream sauces, custards and cream-filled bakery products. Improper temp storage of foods and poor personal hygiene of food handlers are main contributing factors. Staphylococci multiply in food and produce enterotoxin (>10^5 orgs/gm of food are required for food to be hazardous). Organism readily killed by cooking; enterotoxin extremely heat resistant.	Isolation of ≥ 10^5 orgs/gm from implicated food OR detection of staphylococcal enterotoxin in implicated food OR detection of staphylococcal enterotoxin in the stools or vomitus of two or more ill persons OR detection of organism of the same WGS profile from stools or vomitus of two or more ill persons.	Stool or vomitus samples collected during acute phase of illness. Refrigerate prior to transport. DO NOT FREEZE. Collect 50-150 grams of suspected food. Transport specimens in a cold pack. Vomitus is the preferred specimen for detection of enterotoxin.

Table 2 Agents characterised by abdominal cramps and diarrhoea, without fever, within 24 hours of eating

Agent	Usual incubation period (range)	Symptom profile	Duration of illness	Period of communicability	Characteristic foods	Criteria for confirmation of outbreak	Specimen required (and transport requirements)
Bacillus cereus (diarrhoeal toxin)	10-13 hours (8-16 hours)	Abdominal cramps and diarrhoea; vomiting uncommon.	12-48 hours.	Not communicable (enterotoxin produced *in vivo* after ingestion of food)	Meats, casseroles and stews, gravies, fried and boiled rice, potato and other vegetables. Infective dose >10^5 vegetative orgs/gm food. Toxin is heat labile at 56°C after 5 mins.	Isolation of ≥ 10^5 orgs/gm from implicated food OR isolation of ≥ 10^5 orgs/gm from stools of two or more ill persons OR detection of B. cereus enterotoxin in stools of two or more ill persons OR detection of appropriate diarrhoeal toxin genes by PCR in isolates from food and clinical samples.	Stool samples preferably collected within 3 days of onset of illness. Refrigerate prior to transport. DO NOT FREEZE. Collect 50-150 grams of food. Transport specimens in a cold pack.
Clostridium perfringens	10-12 hours (6-24 hours)	Profuse diarrhoea and abdominal cramps (usually no vomiting or fever).	24-48 hours	Not communicable (enterotoxin produced *in vivo* after ingestion of food)	Meat products including stews, meat pies, sauces and gravy. Often associated with settings involving large quantities of food, especially meat and poultry dishes which are prepared in advance and allowed to cool slowly or are inadequately refrigerated. Infective dose >10^5 vegetative orgs/gm food. *C. perfringens* enterotoxin is inactivated by heating for 5 mins at 60°C.	Isolation of ≥ 10^5 vegetative orgs/gm from stools of two or more ill persons OR isolation of ≥ 10^6 spores/gm from stools of two or more ill persons OR detection of chromosomal cpe genes in food isolates or stool isolates of two or more ill persons OR isolation of ≥ 10^5 vegetative orgs/gm in implicated food. WGS can be performed on food and clinical isolates.	Stool samples preferably collected within 2 days of onset of illness. Refrigerate prior to transport. DO NOT FREEZE. Collect 50-150 grams of food. Transport specimens in a cold pack (frozen foods or foods held under prolonged refrigeration will reduce viable cell numbers).

Table 3 Agents characterised by diarrhoea, often with fever, with a moderate to long incubation period

Agent	Usual incubation period (range)	Symptom profile	Duration of illness	Period of communicability	Characteristic foods	Criteria for confirmation of outbreak	Specimen required (and transport requirements)
Campylobacter	2-5 days (1-10 days)	Acute diarrhoea (stools often bloody and with mucus), fever, abdominal cramps, vomiting .	Usually 2-5 days (up to 10 days).	May be excreted in faeces for 2-3 weeks, sometimes longer after symptoms resolve. Person-to-person transmission is uncommon.	Raw or undercooked poultry, offal, unpasteurised milk, contaminated untreated water. The organism does not multiply in food or water (the infective dose required to cause illness is usually 10^3 - 10^5 organisms but may be as low as 400-500 organisms). No toxin produced in foods.	Isolation of organism from stools of two or more ill persons OR isolation of organism from epidemiologically implicated food. WGS can be performed on food and clinical isolates.	Stool samples or a swab of faecal material from stools which is then inserted into transport medium. Refrigerate prior to transport. DO NOT FREEZE. Collect 50-150 grams of food (isolation from food is difficult). Transport specimens in a cold pack.
Salmonella spp. (non-typhoidal)	12-36 hours (8 hours-10days)	Diarrhoea, fever, abdominal pain, vomiting.	2-7 days.	Through the course of infection; usually several days to several weeks. A temporary carrier state occasionally continues for months (<1% become chronic carriers).	Eggs, poultry, meat, raw milk and other faecally-contaminated raw foods (e.g. fruit and vegetables) and cross-contamination of cooked foods. Infective dose 10^2 to 10^3 orgs/gm food (may be lower for immunocompromised). Toxins are not produced in foods. Inactivation 2-6 mins @60°C or <1min @71°C. Some serotypes are more heat resistant than others, particularly in low water content foods.	Isolation of organism of same serotype, or genotype (by MLVA or WGS) from stools of two or more ill persons OR isolation of organism from epidemiologically implicated food.	Stool samples preferably collected within 3 days of onset of illness. Refrigerate prior to transport. DO NOT FREEZE stools. Collect 50-150 grams of suspected food and transport in a cold pack (frozen foods keep frozen; other foods refrigerate prior to transport).
Shigella spp.	24-48 hours (12 hours-6 days)	Watery diarrhoea (often bloody and mucoid), fever, abdominal cramps often with vomiting. Mild and asymptomatic infections occur.	4-7 days	During acute infection; asymptomatic carrier state may develop during convalescence lasting from a few days to several months (usually < one week following appropriate therapy).	Foods contaminated by an infected foodhandler (only significant reservoir is humans). Usually person to person spread or faecal-oral transmission. Infective dose can be low (e.g. 10-100 organisms). Rapidly inactivated at temps above 65°C. *Shigella* is among the most acid-resistant of foodborne pathogens and can survive exposure to pH 2.5-3.0 for 2 hours. Toxins are not produced in foods.	Isolation of organism of same serotype/biotype from stools of two or more ill persons OR isolation of organism from epidemiologically implicated food. WGS and antibiotic profiling may be useful.	Stool samples preferably collected within 3 days of onset of illness. Refrigerate prior to transport. Collect 50-150 grams of suspected food and transport in a cold pack (frozen foods keep frozen; other foods refrigerate prior to transport).

Agent	Usual incubation period (range)	Symptom profile	Duration of illness	Period of communicability	Characteristic foods	Criteria for confirmation of outbreak	Specimen required (and transport requirements)
Shiga toxin-producing *E. coli* (STEC) includes *E. coli* O157, O111, and other enterohaemorrhagic *E. coli* (EHEC)	3-4 days (1-10 days)	Mild to severe diarrhoea (often bloody), abdominal cramps, vomiting (little or no fever)	5-10 days	1-3 weeks (toxin produced *in vivo*)	Mettwurst, salami, undercooked beef, unpasteurised milk, raw fruit & vegetables (e.g. sprouts), salads, and untreated water. Infective dose can be low (e.g. 10-100 organisms) Rapidly inactivated at 71°C but thermal resistance may be higher if organism present in foods with high fat content. Survives well in chilled and frozen foods.	Isolation of *E. coli* O157, or other STEC from stools of two or more ill persons OR detection of shiga toxin in the faeces of two or more ill persons OR detection of the gene (stx1 or stx2) associated with production of shiga toxin by PCR in two or more ill persons OR isolation of STEC from implicated food. WGS can be performed on food and clinical isolates.	Stool samples preferably collected within 3 days of onset of illness. FREEZE stool samples. Collect 50-150 grams of suspected food. Transport specimens in a cold pack.
Vibrio parahaemolyticus	12-24 hours (4-48 hours)	Watery diarrhoea, abdominal cramps, nausea, vomiting, low-grade fever.	1-7 days	Not communicable	Naturally contaminated seafood (eg.shellfish and crustaceans) are the major source, either eaten raw or inadequately cooked. Ingestion of 10^5 - 10^7 orgs (Kanagawa +ve strains) is required to cause illness. Organism inactivated at temps above 65°C. Temperature range for growth 5°C- 43°C, Critical Control Point: chill seafood <5°C.	Isolation of (Kanagawa +ve) organism possessing tdh and/or trh genes from stool or vomitus of two or more ill persons OR isolation of ≥ 10^5 orgs/gm from epidemiologically implicated food.	Stool specimens collected during acute phase of illness. Refrigerate prior to transport. DO NOT FREEZE. Collect 50-150 grams of suspected food (DO NOT FREEZE). Transport specimens in a cold pack.
Vibrio cholerae O1 and O139	12-72 hours (12 hours-5 days)	Watery diarrhoea often with vomiting; mild or asymptomatic infection can occur	3-7 days	While still shedding organism (usually only a few days after recovery); carrier state may persist for several mths. (cholera toxin produced in vivo)	Contamination from infected food handlers or contaminated water. Most commonly implicated foods are seafood, including shellfish, fish and crustaceans. Rice, meat, fruits and vegetables have also been reported as vehicles. Acquired overseas.	Isolation of toxigenic organism from stools of two or more ill persons OR isolation of toxigenic organism from epidemiologically implicated food.	Stool samples collected during acute phase of illness. Refrigerate prior to transport. DO NOT FREEZE. Collect 50-150 grams of suspected food. Transport specimens in a cold pack.

Agent	Usual incubation period (range)	Symptom profile	Duration of illness	Period of communicability	Characteristic foods	Criteria for confirmation of outbreak	Specimen required (and transport requirements)
Vibrio cholerae non-O1 and non-O139	12-24 hours (1-5 days)	Watery diarrhoea (milder than O1 and 0139 but may be bloody), abdominal cramps and vomiting.	3-7 days	Several days; usually no long term carriage following infection.	Food usually becomes contaminated through infected food handlers or contact with contaminated water (e.g. with untreated sewerage). Foods previously implicated include seafood (e.g. oysters), raw fruit and vegetables. Non O1 and non-O139 strains are not uncommon in the marine environment.	Isolation of organism of same serotype from stools of two or more ill persons.	Stool specimens collected during acute phase of illness. Refrigerate prior to transport. DO NOT FREEZE. Collect 50-150 grams of suspected food. Transport specimens in a cold pack.
Yersinia enterocolitica	36-48 hours (1-10 days)	Diarrhoea (sometimes bloody), abdominal pain (often severe and mimicking appendicitis), fever, nausea and vomiting.	2-3 days but sometimes 1-3 weeks	Faecal shedding for as long as symptoms persist, about 2-3 weeks.	Raw or undercooked pork or pork products, contaminated dairy products, contaminated water. Toxins are not produced in foods. Able to multiply at refrigeration temps but not a good competitor with other organisms. Inactivation <1min @71°C.	Isolation of pathogenic serotype from clinical specimen (stool, vomitus, blood) of two or more ill persons OR isolation of pathogenic serotype from epidemiologically implicated food.	Stool specimens collected during acute phase of illness. Refrigerate prior to transport. Collect 50-150 grams of suspected food. Transport specimens in a cold pack.
Norovirus and other caliciviruses	24-48 hours (12-72 hours)	Sudden onset nausea, vomiting, abdominal cramps and diarrhoea. Other symptoms may include headache, myalgia and low grade fever.	1-3 days	Duration of vomiting and diarrhoea. Excretion of virus in stools may occur for several days after symptoms resolve. High levels of virus may be discharged in vomit.	Shellfish harvested from contaminated waters or other faecally contaminated foods including contamination by an infected foodhandler. Infective dose can be <10 virus particles.	Detection of viral RNA in stools or vomitus of two or more ill persons by RT-PCR.	Stool/vomit samples preferably collected from the 1st to 7th day of illness however shedding may continue for up to 3 weeks. Refrigerate prior to transport. DO NOT FREEZE.

Agent	Usual incubation period (range)	Symptom profile	Duration of illness	Period of communicability	Characteristic foods	Criteria for confirmation of outbreak	Specimen required (and transport requirements)
Rotavirus	24-48 hours (16-72 hours)	Vomiting, watery diarrhoea, malaise, headache, low-grade fever.	4-8 days	Viral shedding in faeces up to 8 days after onset of illness.	Faecally contaminated foods. Ready-to-eat foods touched by infected food workers (salads, fruits). Mainly transmitted via person-to-person spread and sometimes by food handlers.	Detection of viral RNA in stools of two or more ill persons by RT-PCR at FSS OR antigen detection (EIA) available through Royal Brisbane and Women's Hospital (RBWH) - Consult with the Medical Microbiologist.	Stool samples preferably collected from the 1st to 4th day of illness are optimal however shedding may continue for up to 3 weeks. Refrigerate prior to transport. DO NOT FREEZE.
Other viral agents (Astrovirus, adenoviruses, enteroviruses, parvoviruses)	24-48 hours (12-72 hours)	Nausea, vomiting, diarrhoea, malaise, abdominal pain, headache, fever.	2-9 days	Duration of vomiting and diarrhoea.	Shellfish harvested from contaminated waters or other faecally contaminated foods including contamination by an infected foodhandler.	Detection of viral DNA/RNA in stools of two or more ill persons by RT-PCR OR antigen detection (EIA) for Adenovirus 40/41 available through RBWH - Consult with the Medical Microbiologist.	Stool samples preferably collected from the 1st to 7th day of illness are optimal. Refrigerate prior to transport. DO NOT FREEZE.
Cryptosporidium	1-12 days	Diarrhoea (usually watery) which may be severe, stomach cramps.	4-21 days	Oocysts may be excreted in stools for several weeks after symptoms resolve.	Contaminated water, vegetables & salads, unpasteurised milk. Infective dose ≥ 10 cysts.	Detection of oocysts of same species or genotype from stools of two or more ill persons OR detection of oocysts from epidemiologically implicated food. (May need to collect 3 stool samples/person)	Stool samples preferably collected within 7 days of onset of illness. Refrigerate prior to transport. DO NOT FREEZE. Collect suspected food or water. Transport specimens in a cold pack.
Giardia lamblia	1-2 weeks	Diarrhoea, abdominal pain, bloating, flatulence.	Days to weeks.	Entire period of infection.	Contaminated water, vegetables & salads. Infective dose 10-100 cysts.	Detection of cysts from stools or duodenal aspirates of two or more ill persons. (May need to collect 3 stool samples/person)	Stool samples preferably collected within 7 days of onset of illness. Refrigerate prior to transport. DO NOT FREEZE.

Agent	Usual incubation period (range)	Symptom profile	Duration of illness	Period of communicability	Characteristic foods	Criteria for confirmation of outbreak	Specimen required (and transport requirements)
Cyclospora cayetanensis	Usually at least a week (1-14 days)	Diarrhoea (often watery), stomach cramps, nausea, vomiting, fatigue (fever is rare).	If not treated, illness may be remitting and relapsing over weeks to months.	Oocysts are not infectious in freshly excreted stools. They require days to weeks outside the host to sporulate and become infectious.	Most likely to be transmitted by eating contaminated produce imported from a developing country. Implicated foods in overseas outbreaks include strawberries, raspberries, lettuce and basil.	Detection of oocysts in the stools of two or more ill persons. Detection of *Cyclospora* DNA by PCR on stools and food samples.	Stool samples preferably collected within 7 days of onset of illness. Refrigerate prior to transport. DO NOT FREEZE.

Table 4 Agents associated with systemic illness

Agent	Usual incubation period (range)	Symptom profile	Duration of illness	Period of communicability	Characteristic foods	Criteria for confirmation of outbreak	Specimen required (and transport requirements)
Hepatitis A	3-4 weeks (15-50 days).	Abrupt onset with fever, malaise, nausea and abdominal discomfort followed by jaundice and dark urine. Asymptomatic infection or mild illness may occur.	2 weeks to 3 months	Infectious during the incubation period, especially latter half and for 1-2 weeks after onset of symptoms.	Shellfish harvested from contaminated waters, raw produce, imported frozen berries, contaminated drinking water, raw/uncooked foods that are not reheated after contact with infected food handler.	Detection of anti-hepatitis A IgM and total anti - hepatitis A IgG in the serum OR detection of viral RNA in stool by RT-PCR from two or more persons who consumed epidemiologically implicated food. Confirmation by genotyping & sequencing is preferable.	Serum collected at the onset of illness OR stool samples preferably collected from the 1st to 7th day of illness. However shedding may continue for up to 3 weeks. Refrigerate prior to transport. DO NOT FREEZE.
Listeria monocytogenes	9-48 hours for non-invasive gastrointestinal symptoms. 4-21 days (range 3 -70 days) for invasive disease.	Fever, muscle aches, nausea or diarrhoea. Pregnant women may have mild flu-like illness and infection can lead to premature delivery or stillbirth. Elderly or immunocompromised patients may have bacteraemia or meningitis. Infants infected from their mothers are at risk of sepsis or meningitis.	Variable	Mothers of infected newborns may shed the infectious agent in vaginal discharges and urine for 7 to 10 days. Infected individuals can shed the organisms in their stools for several months.	Outbreaks have been associated with unpasteurised and inadequately pasteurised milk, soft cheese, ready-to-eat deli meats, frankfurts, turkey and chicken products, pate, smoked mussels, contaminated vegetables, salads, Rockmelon and fruit salads. Rapidly inactivated at 71°C No toxins produced in food. Infective dose >10^3 orgs/gm food.	Isolation of *Listeria monocytogenes* of the same serotype/genotype from two or more ill persons exposed to epidemiologically implicated food OR from food from which the same serotype/genotype of *L. monocytogenes* has been isolated as the cases.	Stool samples collected during the acute phase of illness. DO NOT FREEZE. Collect 50-150 grams of suspected food and transport in a cold pack

Agent	Usual incubation period (range)	Symptom profile	Duration of illness	Period of communicability	Characteristic foods	Criteria for confirmation of outbreak	Specimen required (and transport requirements)
Salmonella Typhi *Salmonella* Paratyphi	Typhoid: 8-14 days (range 3-60 days); Paratyphoid: 1-10 days	Systemic illness characterised by fever, headache, malaise, chills and myalgia; constipation more common than diarrhoea and vomiting is usually not severe.	Days to weeks	May be excreted in faeces for many weeks after symptoms subside. Chronic carriers occur (10% of untreated cases infectious at 3mths; 2-5% permanent carriers).	Faecal contamination of food and water (humans are sole reservoir of this organism). Important vehicles include raw shellfish, raw fruit and vegetables, contaminated water supplies. Infected foodhandlers are a common source. Enteric fever usually associated with foreign travel. Toxins are not produced in foods.	Isolation of organism from clinical specimen of two or more ill persons OR isolation of organism from epidemiologically implicated food.	Stool samples collected from case to monitor success of treatment / eradication of carrier state. Stool samples from household contacts. Refrigerate prior to transport. DO NOT FREEZE stools. Transport in a cold pack.

Table 5 Botulism

Agent	Usual incubation period (range)	Symptom profile	Duration of illness	Period of communicability	Characteristic foods	Criteria for confirmation of outbreak	Specimen required (and transport requirements)
Clostridium botulinum	12-36 hours (2 hours - several days)	Vomiting, diarrhoea, blurred vision, diplopia, dysphagia and descending muscle weakness.	Variable (from days to months).	Not communicable (preformed enterotoxin in food). Infant botulism occurs from ingestion of spores in food, germination, colonisation and toxin production in the large intestine.	Home canned foods with a low acid content, improperly canned commercial foods, preserved foods, honey (infants). Other foods implicated in outbreaks include dairy foods, vegetables, fish, meat products and condiments. Relatively high moisture, low salt, low acid (pH>4.6) food that is devoid of oxygen and stored without refrigeration or held warm for extended period of time may be at risk.	Detection of botulinum toxin in stools, gastric contents or blood, OR isolation of organism from stools OR detection of toxin in implicated food.	Stool or blood samples. Suspected food.

Table 6 Agents most readily diagnosed from history of eating a particular type of food

Agent	Usual incubation period (range)	Symptom profile	Duration of illness	Period of communicability	Characteristic foods	Criteria for confirmation of outbreak	Specimen required (and transport requirements)
Ciguatera poisoning (ciguatoxin)	2-8 hours (1-24 hours)	Nausea, vomiting, diarrhoea, paresthesia of lips, mouth and extremities, reversal of hot and cold sensation.	Days to weeks to months	Not communicable (toxin)	There are three species of fish, chinaman, red bass and paddle tail, which are considered to be high risk fish and have been prohibited from sale in Australia. Many different warm water ocean fish have been linked with ciguatera poisoning including coral trout, spanish mackerel, dolphin fish, queenfish, red emperor, reef cods, trevally, wrasse and kingfish.	Demonstration of ciguatoxin in epidemiologically implicated fish using HPLC/MS/MS (may take > 1 week to complete) OR similar clinical symptoms in two or more ill persons who have eaten same type of fish.	Collect implicated fish and forward in a cold pack to Organic Chemistry (FSS).
Histamine poisoning (Scombroid poisoning)	< 1hour (1 minute to 3hours)	Flushing (face), rash, burning sensation of skin, mouth and throat, dizziness.	3-6 hours.	Not communicable (toxin)	Mishandled fish, particularly tuna (including canned), mackerel, bonito, mahi mahi (dolphin fish), salmon.	Demonstration of histamine (>200mg/kg of fish muscle) in epidemiologically implicated fish using capillary electrophoresis or ELISA AND/OR similar clinical symptoms in two or more ill persons who have eaten same type of fish.	Collect implicated fish and forward in a cold pack to FSS Food Chemistry.

Agent	Usual incubation period (range)	Symptom profile	Duration of illness	Period of communicability	Characteristic foods	Criteria for confirmation of outbreak	Specimen required (and transport requirements)
Shellfish toxins: diarrhetic (DSP) neurotoxic (NSP) amnesic (ASP)	Diarrhetic - 30 mins to 3 hours Neurotoxic - usually 3-6 hours Amnesic - usually 3-5 hours	Diarrhetic: Nausea, vomiting, diarrhoea, and abdominal pain accompanied by chills, headache and fever. Neurotoxic: chills, headache, diarrhoea, nausea and vomiting, muscle and joint pain, paraesthesia, breathing difficulties, talking, swallowing, double vision. Amnesic: vomiting, diarrhoea, abdominal pain, dizziness, hallucinations, confusion, short-term memory loss, seizures.	Hours to several days	Not communicable (toxin)	A variety of shellfish, primarily mussels, oysters and scallops.	Detection of DSP toxin (okadaic acid) in suspect shellfish above regulatory limit (0.16 mg/kg) using HPLC/MS AND/OR similar clinical symptoms in two or more ill persons who have eaten shellfish from same source. [FSS can also test for a variety of other shellfish toxins except brevetoxins]	Collect implicated shellfish and forward to Organic Chemistry (FSS).
Shellfish toxins: paralytic shellfish poisoning (PSP)	30 mins to 3 hours	Tingling sensation or numbness around lips, prickly sensation in fingertips and toes, headache, dizziness, diarrhoea, nausea, vomiting. Extreme cases - muscular paralysis leading to respiratory difficulty and sometimes death.	Days	Not communicable (toxin)	A variety of shellfish.	Detection of PSP toxin (saxitoxin) in suspect shellfish above regulatory limit (0.8 mg/kg) using HPLC/fluorescence AND/OR similar clinical symptoms in two or more ill persons who have eaten shellfish from same source.	Collect implicated shellfish and forward to Organic Chemistry (FSS).
Heavy metals (antimony, cadmium, copper, iron, tin, zinc)	Usually <1hour (5 mins-8 hrs)	Vomiting with nausea, cramps and diarrhoea, metallic taste	Usually self-limited.	Not communicable	Acidic foods and beverages prepared, stored or cooked in containers coated, lined or contaminated with offending metal.	Detection of high concentration of metallic ion in implicated food. Levels of heavy metals must conform to Food Standards ANZ 1.4.1, 1.4.2, 1.4.3 and 2.6.2	Collect suspect food and forward to Food Chemistry (FSS).

Agent	Usual incubation period (range)	Symptom profile	Duration of illness	Period of communicability	Characteristic foods	Criteria for confirmation of outbreak	Specimen required (and transport requirements)
Poisonous mushrooms	< 2 hours	Vomiting, diarrhoea, drowsiness, confusion, visual disturbances, excessive salivation, irregular pulse, hallucinations.	Usually self-limited.	Not communicable	Wild mushrooms.	Botanical identification of toxic mushroom AND/OR test for toxin in suspect mushrooms AND/OR similar clinical symptoms in two or more ill persons who have eaten mushrooms from same source.	Collect suspect mushrooms (uncooked if possible) and forward to Organic Chemistry (FSS).