

## CRYPTOSPORIDIOSIS

Based on the MoH Communicable Diseases Control Manual 2012 – December 2017<sup>1</sup> update

### Associated Documents

Case Report Form:

[K:\CFS\ProtectionTeam\FinalDocs\NotifiableConditions\Campylobacter\FormsStdLettersQuest\CaseReportFormEnteric\\_Dec2017.pdf](K:\CFS\ProtectionTeam\FinalDocs\NotifiableConditions\Campylobacter\FormsStdLettersQuest\CaseReportFormEnteric_Dec2017.pdf)

Fact Sheet:

<K:\CFS\Quality\ApprovedDocuments\ProtectionTeam\FactSheets\CryptosporidiosisFactSheet.pdf>

C&PH Outbreak Response Procedure:

<http://cdhbintranet/communitypublichealth/cphpoliciesandprocedures/Documents/Forms/C.aspx>

the CPH Outbreak checklist:

<K:\CFS\ProtectionTeam\FinalDocs\NotifiableConditions\OUTBREAK GENERAL\FormsStdLettersQuest\OutbreakChecklists\Checklist01FoodWaterOutbreak.docx>

Other relevant outbreak documents:

<K:\CFS\ProtectionTeam\FinalDocs\NotifiableConditions\OUTBREAK GENERAL\FormsStdLettersQuest>

CDHB Infection Prevention and Control. R Barratt. Standard Precautions Policy

(<http://www.cdhb.health.nz/Hospitals-Services/Health-Professionals/CDHB-Policies/Infection-Prevention-Control-Manual/Documents/Standard%20Precautions.pdf>)

NZ Communicable Diseases Control Manual 2012-December 2017, Appendices (1-3):

<http://www.health.govt.nz/system/files/documents/publications/cd-manual-appendices-may2012.pdf>

### The Illness<sup>2,3</sup>

Cryptosporidiosis is a gastrointestinal illness caused by the protozoa *Cryptosporidium* of which there are at least 15 species. *C. hominis* and *parvum* are the commonest species affecting humans. The most common symptom of cryptosporidiosis is watery diarrhoea. Other symptoms include: stomach pain, nausea, vomiting, fever and weight loss. Symptoms usually last about 1 to 2 weeks in persons with healthy immune systems. People with weakened immune systems (eg, AIDS, malignancy etc) may develop serious, chronic, and sometimes fatal illness. Besides humans, the parasite can infect many other species of animals (eg, mammals, birds and reptiles). Host immune response limits the duration and severity of infection.

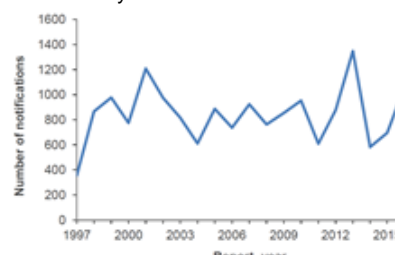
Extensive waterborne outbreaks have occurred from contamination of municipal water and recreational waters. The oocyst stage is resistant to disinfection, including chlorination, filters may not remove it because of its small size (4.2-5.4 µm diameter) and it can survive for a prolonged period in the environment.

#### New Zealand Epidemiology<sup>3</sup>

In 2016, the highest notification rates for cryptosporidiosis were reported in Northland, Wairarapa, Taranaki and Whanganui DHBs. Children aged 1–4 years (124.3 per 100,000) had the highest notification rates compared with other age groups. Nearly half (48.8%) of all cases were children aged less than 15 years.

In 2016 contact with farm animals and consumption of untreated water were the most common risk factors.

Fig. 1. NZ Cryptosporidiosis notifications by month 2011-2016



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There were 33 outbreaks of cryptosporidiosis reported, involving 188 cases. There is a distinct seasonal pattern (Fig. 1) with the highest number of notifications generally reported during spring each year.

**CASE DEFINITION**

**Clinical description**

An acute illness that includes symptoms of diarrhoea (may be profuse and watery) and abdominal pain. The infection may be asymptomatic but to meet the case definition the individual must have compatible symptoms.

**Incubation:** 1–12 days (average of 7)

**Transmission:** Faecal-oral, including person to person, from infected animals or from contaminated water or food. Faecal-oral which includes person to person, animal to person, waterborne and foodborne transmission. Swimming pools can act as amplifiers in a community outbreak. Oocysts are highly resistant to chemical disinfectants used to purify drinking water.

**Reservoir**

The gastrointestinal tract of humans (*C. hominis*) and animals (*C. parvum*) including cattle, sheep, pigs, cats, dogs, poultry and fish. Asymptomatic carriage.

**Communicability:** Oocysts, the infectious stage, appear in the faeces at the start of illness and are excreted for several weeks after symptoms resolve. The infectious dose is low; ingestion of as few as 10-30 oocysts can cause infection in healthy persons. *Cryptosporidium* does not multiply outside of the host but oocysts may remain infectious for 2-6 months or longer in a moist environment outside the body.

**Susceptibility:** Immunocompetent persons may have asymptomatic or self-limited infections; it is not clear whether re-infection or latent infection with re-activation can occur. In HIV/AIDS patients the clinical course may vary.

**Prevention:** By ensuring safe drinking water, hygienic food preparation and cooking, avoiding contaminated recreational water and thorough hand washing after activities at risk of acquiring or spreading the disease such as contact with animals.

**Notification Procedure**

On suspicion. Notification should not await confirmation.

**CASE CLASSIFICATION**

- **Under investigation:** A case that has been notified, but information is not yet available to classify it as probable or confirmed.
- **Probable:** A clinically compatible illness that either is a contact of a confirmed case of the same disease or has had contact with the same common source – that is, is part of a common-source outbreak.
- **Confirmed:** A clinically compatible illness accompanied by laboratory definitive evidence.
- **Not a case:** A case that has been investigated and subsequently found not to meet the case definition.

**Possible notification to WorkSafe**

- Refer to Reporting section, page 5.

**Laboratory Testing**

**Laboratory definitive evidence for a confirmed case requires** detection of *Cryptosporidium spp* oocysts in a faecal specimen by at least one of the following methods\* :

Cryptosporidium antigen detection by either:

- detection of direct fluorescence using monoclonal antibodies
- detection of antigens using a rapid antigen test

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- enzyme immunoassay
- detection of *Cryptosporidium* nucleic acid
- visualisation by direct microscopy detection of *Cryptosporidium* cysts.

\*Once confirmed, the sample is anonymised and sent to Massey University for genotyping.

## Management of Case

### Investigation

**If case known to be high risk** (for transmitting the infection to others – refer to Table 1 below).

- If known that case is a food handler or other person in high risk category, administer questionnaire by telephone and post out disease information on day of notification. Otherwise see box below for Christchurch, Timaru and Greymouth responses.  
{Note: The letter accompanying the questionnaire mentions that if the case is a child, the letter and disease information are to accompany the child if he/she stays in another household, up to 2 weeks after the diarrhoea stops.}

### If risk category of case not known

#### **Christchurch**

- Post questionnaire to case with covering letter, disease information and self-addressed envelope within 1-2 working days.
- If the case lives in the Selwyn, Kaikoura or Waimakariri District Council areas, fax or email details to the appropriate Local Authority EHO for follow-up.

#### **Timaru and Greymouth**

- Post questionnaire to case with covering letter, information pamphlet and self-addressed envelope within 1-2 working days.

- Investigate further and obtain a more detailed history if there is an outbreak or if the case is in a high-risk occupation or attends an early childhood service.
- Ensure symptomatic persons submit faecal samples for testing for *Cryptosporidium* spp.
- Sporadic cases: review returned questionnaire and follow-up or investigate as appropriate, eg. if:
  - ◊ case has been swimming in pool while symptomatic, have there been other cases associated with the pool?
  - ◊ Has there been more than one case from same source/situation, for instance at a preschool?
  - ◊ Has the case attended a farm visit as part of a group?
- Liaise with the environmental health officer of the local territorial authority where food premises are thought to be involved.
- Liaise with the Ministry for Primary Industries if a contaminated commercial food source is thought to be involved.

### Outbreak

**It is the responsibility of all Communicable Diseases staff** to be vigilant regarding any increased incidence of cryptosporidiosis. Such an increase is to be promptly reported to the MOH. Refer to:

- ◊ the CPH Outbreak Response Procedure (accessed via CPH Policies & Procedures intranet site page):  
<http://cdhbintranet/communitypublichealth/cphpoliciesandprocedures/Documents/Forms/C.aspx>
- ◊ the CPH Outbreak checklist:  
<K:\CFS\ProtectionTeam\FinalDocs\NotifiableConditions\OUTBREAKGENERAL\Forms\StdLettersQuest\OutbreakChecklists\Checklist01FoodWaterOutbreak.docx>  
as well as other relevant documents:  
<K:\CFS\ProtectionTeam\FinalDocs\NotifiableConditions\OUTBREAKGENERAL\Forms\StdLettersQuest>

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- ◊ Organise faecal screening (through ESR) of symptomatic persons involved in the event or associated with the facility. These persons are to be managed as cases until results are known.
  - ◊ Refer to References and other information.
- Amongst other possibilities, consider water as a possible source and check the supply.

In a community outbreak consider implications for swimming pools and if necessary:

1. ask GPs to advise patients with gastroenteritis not to swim in a pool until two weeks after diarrhoea stops.
2. provide media releases with the same advice as 1).
3. liaise with swimming pools to ensure adequate signage and appropriate management of faecal accidents.
4. ask patients where in a pool complex they spent their time, in order to identify the area of greatest risk.

### Restriction and Clearance

- Cases should be particularly careful not to transmit disease to immunocompromised people, this includes avoiding close physical contact with immunocompromised individuals until 2 weeks after symptoms have resolved.
- In any health care facility, only standard precautions are indicated in most cases. (<http://cdhbintranet/medicalandsurgical/perioperativeservices/Documents/Standard%20Precautions.pdf>)
- If the case is a child in nappies or incontinent, apply contact precautions for the duration of illness.
- If person immunocompromised, there is currently no available chemotherapeutic agent that can be used to treat the infection, hence infection prevention and control are of major importance to protect such people.
- Cases should not use public swimming pools for 2 weeks after symptoms have resolved.
- Refer to Table 1 (following) for exclusion and clearance criteria.

**Table 1.4 Exclusion and clearance criteria for people at increased risk of transmitting an infection to others\***

Pathogen	Exclusion* and Clearance	Contacts
<i>Cryptosporidium</i>	<ul style="list-style-type: none"> <li>- Exclude 1,2,3,4 (below) until symptom free for 48 hours</li> <li>- Clearance not required.</li> </ul>	<p>No exclusion or clearance criteria required for any close contacts. Should avoid swimming pools for 2 weeks after symptom free.</p>

\* **Cases of most enteric disease should be considered infectious and should remain off work /school /preschool until 48 hours after symptoms have ceased.** Certain individuals pose a greater risk of spreading infection and additional restriction/exclusion criteria may apply.

**NOTE:** The Health (Infectious and Notifiable Diseases) Regulations 2016 do not contain any exclusionary powers for people at increased risk of transmitting an infection to others (groups 1-4 following). Instead the medical officers of health can resort to broader powers in Part 3A of the Health Act 1956, which include directions to cases and contacts to remain at home until no longer infectious.

1. people whose work involves preparing or serving unwrapped food to be served raw or not subject to further heating (including visitors or contractors who could potentially affect food safety)
2. staff, inpatients and residents of health care, residential care, social care or early childhood facilities whose activities increase risk of transferring infection via the faecal-oral route
3. children under the age of 5 attending early childhood services/groups
4. other adults or children at higher risk of spreading the infection due to illness or disability.

- For further details, refer to Appendix 2 of this protocol and reference 4.

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	<p><b>Treatment</b></p> <ul style="list-style-type: none"> <li>Maintain fluid and electrolyte balance.</li> </ul> <p><b>Counselling</b></p> <ul style="list-style-type: none"> <li>Advise the case and their caregivers of the nature of the infection and its mode of transmission. If case is a child, ask if he/she stays in any household other than that given at the time of notification and if so, ensure advice accompanies the child when he/she moves.</li> <li>A fact sheet is available at: <a href="K:\CFS\Quality\ApprovedDocuments\ProtectionTeam\FactSheets\CryptosporidiosisFactSheet.pdf">K:\CFS\Quality\ApprovedDocuments\ProtectionTeam\FactSheets\CryptosporidiosisFactSheet.pdf</a></li> <li>Case to be advised not to share bath water with others while symptomatic and until 2 weeks after diarrhoea stops.</li> <li>Educate about hygiene.</li> <li>In early childhood centres or other institutional situations provide instruction in good hygiene practice including hand washing routines, nappy changing routines and correct use and storage of cleaning equipment.</li> <li>Hand washing is better prevention than disinfection of toys or general surfaces.</li> </ul>
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### Management of Contacts

	<p><b>Definition</b></p> <p>All people who have had close physical contact (for example, household) with a symptomatic case or who have been exposed to the same animal, water, food or other material suspected to be the source of infection.</p> <p><b>Investigate</b></p> <ul style="list-style-type: none"> <li>Exclusion and clearance criteria, screening or restriction is not indicated for contacts or for people who have been exposed to the same food suspected to be the source of infection.</li> <li>Symptomatic contacts to be advised to consult GP and have faecal tests. Manage as cases until the result is known.</li> </ul> <p><b>Outbreak</b></p> <p>Organise faecal screening (through ESR) of symptomatic persons involved in the event/facility. Symptomatic contacts are to be managed as cases until results known.</p> <p><b>Counselling</b></p> <ul style="list-style-type: none"> <li>Advise all contacts to seek early medical attention if symptoms develop.</li> <li>Educate about hygiene.</li> <li>Sharing of bath water is not recommended whilst there are symptomatic cases in the household.</li> <li>A fact sheet is available at: <a href="K:\CFS\Quality\ApprovedDocuments\ProtectionTeam\FactSheets\CryptosporidiosisFactSheet.pdf">K:\CFS\Quality\ApprovedDocuments\ProtectionTeam\FactSheets\CryptosporidiosisFactSheet.pdf</a></li> </ul> <p><b>Restriction</b></p> <ul style="list-style-type: none"> <li>None unless symptoms develop (refer to Table 1 above).</li> </ul>
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### Other Control Measures

	<p><b>Identification of source</b></p> <ul style="list-style-type: none"> <li>Check for other cases in the community.</li> <li>Investigate potential food, water or swimming pool sources of infection only if there is a cluster of cases or an apparent epidemiological link.</li> <li>Liaise with Environmental or other CPH teams as necessary on case-by-case basis.</li> <li>If indicated, check water supply for microbiological contamination and compliance with the latest New Zealand drinking-water standards (Ministry of Health 2008). If a water supply is involved, the MOH will liaise with the local territorial authority to inform the public.</li> </ul>
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	<ul style="list-style-type: none"> <li>• Advise on the need to boil water.</li> <li>• If indicated, check swimming pools for compliance with the Standard for Pool Water Quality (NZS 5826:2010) and signage.</li> <li>• Liaise with the local territorial authority staff to investigate potential water or pool sources of infection.</li> </ul> <p><b>Disinfection</b> Clean and disinfect surfaces and articles soiled with faeces. For more details, refer to Appendix 1.<sup>5</sup></p> <p><b>Health education</b></p> <ul style="list-style-type: none"> <li>• Consider a media release and direct communication with relevant early childhood services, schools and health professionals to encourage prompt reporting of symptoms and requesting people with infectious diarrhoea not to swim in a pool until two weeks after diarrhoea stops.</li> <li>• In communicating with doctors, include recommendations regarding diagnosis and infection control.</li> <li>• If a water supply is involved, liaise with the local territorial authority to inform the public.</li> <li>• Advise on the need to boil water.</li> <li>• Hand-cleaning facilities should be available and used after contact with animals. Young children should be supervised during contact with animals and during hand cleaning. Food-related activities should be separated from areas that house animals.</li> <li>• In early childhood services or other institutional situations, ensure satisfactory facilities and practices regarding hand cleaning; nappy changing; toilet use and toilet training; preparation and handling of food; and cleaning of sleeping areas, toys and other surfaces.</li> <li>• Educate the public about safe food preparation (for details refer to Appendix 3<sup>6</sup>).</li> <li>• Domestic animals with diarrhoea should be taken to a veterinarian for assessment and treatment.</li> </ul>
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<b>Reporting</b>	
	<ul style="list-style-type: none"> <li>• Ensure complete case information is entered into EpiSurv.</li> <li>• If a cluster of cases occurs, contact the Ministry of Health Communicable Diseases Team and outbreak liaison staff at ESR, and complete the Outbreak Report Form.</li> <li>• Where food/food businesses are thought to be involved inform the Ministry for Primary Industries.</li> <li>• If an outbreak, write report for Outbreak Report File: <a href="Y:\CFS\ProtectionTeam\FinalDocs\notifiableConditions\Cryptosporidiosis\Outbreaks">Y:\CFS\ProtectionTeam\FinalDocs\notifiableConditions\Cryptosporidiosis\Outbreaks</a>.</li> <li>• If suspected that the infection was acquired at work, complete the WorkSafe notification form 'Notifications under sections 197 and 199 of the Health and Safety at Work Act 2015, Notifications by Medical Officers of Health' (paper copies are kept in the office).</li> <li>• File.</li> </ul>

<b>Appendix 1</b>	
Extract from the MoH Communicable Disease Control Manual 2012 - December 2017:Appendix1: Disinfection <sup>5</sup>	
	<p><b>Disinfection and cleaning the environment</b> Diseases that are notifiable have public health implications. Therefore decontamination of the environment is recommended when cross-infection from the source is possible. Disinfection is also indicated for contamination with y resistant bacteria.</p> <p>Concurrent disinfection is the application of disinfection measures as soon as possible after the discharge of infectious material from the body of an infected person, or after articles have been soiled with such infectious discharges.</p> <p>Personal protective equipment (PPE) must be used during environmental disinfection to prevent self-contamination.</p>

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**Procedures**

**Disposable items:** Any items that can be disposed of should be categorised as in NZS 4304:2002 New Zealand Waste Standard and disposed of.

**Solid surfaces and/or equipment (including children's toys):** Before disinfection, solid surfaces and/or equipment should be cleaned with detergent and dried. Before disinfection chemicals are applied, it should be established that they are fit for purpose a clear process on how to use them and manufacturer's recommendations are followed

Source: Ministry of Health. 2009. *Guidelines for the Management of Norovirus Outbreaks in Hospitals and Elderly Care Institutions*. Wellington: Ministry of Health.

**Appendix 2**

Extract from the MoH Communicable Disease Control Manual 2012 - December 2017 Appendix 2: Enteric Disease <sup>4</sup>

**Exclusion/Restriction**

Cases of most enteric disease should be considered infectious and should remain off work/school until 48 hours after symptoms have ceased. Certain individuals pose a greater risk of spreading infection and additional restriction/exclusion criteria may apply. Microbiological clearance may be required for individuals infected with/exposed to certain pathogens.

The key criteria are:

- the decision to exclude any worker is based on individual risk assessment. As a general rule, any worker with symptoms of gastrointestinal infection (diarrhoea and/or vomiting) should remain off work until clinical recovery and stools have returned to normal (where the causative pathogen has not been identified). Where the pathogen has been identified, specific criteria are summarised in Table 2.4
- the overriding prerequisite for fitness to return to work is strict adherence to personal hygiene, whether symptomatic or not.

The circumstances of each case, carrier or contact should be considered and factors such as their type of employment, availability of toilet and hand washing facilities at work, school or institution and standards of personal hygiene taken into account. For example, a carrier may be relocated temporarily to a role that does not pose an infectious risk.

**Pathogen specific exclusion criteria for people at increased risk of transmitting an infection to others**

Pathogen specific exclusion (restricting criteria for people from work, school or an early childhood service and for subsequent clearance are summarised in Table 2.4. Additional information is also included in the table for the following groups:

1. people whose work involves preparing or serving unwrapped food to be served raw or not subject to further heating (including visitors or contractors who could potentially affect food safety)
2. staff, inpatients and residents of health care, residential care, social care or early childhood facilities whose activities increase risk of transferring infection via the faecal-oral route
3. children under the age of 5 attending early childhood services/groups
4. other adults or children at higher risk of spreading the infection due to illness or disability.

The Health (Infectious and Notifiable Diseases) Regulations 2016 do not contain any exclusionary powers or incubation periods for infectious children, or for high risk occupational groups such as people who work with children or food handlers. Instead the medical officers of health can resort to broader powers in Part 3A of the Health Act 1956, which include directions to cases and contacts to remain at home until no longer infectious. This Manual contains the recommended exclusion periods for specific diseases (Refer: Table 2.4). There is guidance published about the 2016 regulations and Part 3A of the Health Act in

[www.health.govt.nz/our-work/diseases-and-conditions/notifiable-diseases/summary-infectious-disease-management-under-health-act-1956](http://www.health.govt.nz/our-work/diseases-and-conditions/notifiable-diseases/summary-infectious-disease-management-under-health-act-1956)

The legislation is principles based. In this context this means that medical officer of health must weigh protection of public health (the paramount consideration) with the following principles: trying voluntary means first if likely to be effective, choosing a proportionate, and the least restrictive measure required in the circumstances, fully informing the case or contact of the steps to be taken and clinical implications, treating them with dignity and respect for their bodily integrity and taking account of their special circumstances and vulnerabilities, and applying the measures no longer than is necessary (sections 92A to 92H).

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Under Part 3A a medical officer of health can direct a case or a contact to stay home (section 92I(4)(b) or 92J(4)(b)). This is when the officer believes on reasonable grounds that the case or contact poses a public health risk (as defined in the s2 Act). The direction must specify duration.

Alternatively, in the context of attendance at an educational institution, if the officer believes the infection risk is unlikely to be effectively managed by directing the case or contact, he or she can approach the head and direct them to direct the case or contact to remain at home. In serious cases, the medical officer of health can also direct the head to close the institution or part of it (s 92L).

Medical officers of health have no powers to direct closure of premises or places where people congregate, other than educational institutions. If a medical officer of health needs to manage a public

health risk by excluding infectious people from certain occupations, public pools, campsites, concerts and other public environments, he or she can use directions to the individuals concerned – to stay away from a certain place, or not to associate with certain people.

The Ministry for Primary Industries has powers to close commercial food premises. In contrast, medical officer of health powers focus on the risk the person poses.

Note that while there are provisions that apply to early childhood service workers, there are no provisions for health care workers – instead, advice should be provided to employers in terms of the Health and Safety at Work Act 2015.

Employers may decide to implement more stringent exclusion/restriction criteria in response to their own or their customers' requirements.

### Appendix 3

Extract from the MoH Communicable Disease Control Manual 2012 - December 2017 Appendix 3: Patient Information<sup>6</sup>

#### Health education resources

Pamphlets, posters and other resources available from the Ministry of Health at [www.healthed.govt.nz](http://www.healthed.govt.nz).

#### Food safety practices

##### The Ministry for Primary Industries

The Ministry for Primary Industries (MPI) leads New Zealand's food system, ensuring the food we produce is safe and protecting the health and wellbeing of consumers. MPI is responsible for legislation covering food for sale on the New Zealand market, primary processing of animal products and official assurances related to the export of animal and plant products and the controls surrounding registration and use of agricultural compounds and veterinary medicines. MPI is the New Zealand competent authority for imports and exports of food and food-related products.

MPI contact information: [www.mpi.govt.nz/contact-us](http://www.mpi.govt.nz/contact-us)

Food safety practices in preparing and cooking a hangi: He whakatairanga i nga ahuatanga mahi mo te tunu hangi:

[www.mpi.govt.nz/food-safety/community-food/marae-food-safety](http://www.mpi.govt.nz/food-safety/community-food/marae-food-safety)

#### Safe food preparation – key messages

Educate the public about safe food preparation.

- Avoid working with food when you:
  - are unwell especially with a gastro infection
  - have open skin sores, boils or abscesses.
- Clean your hands thoroughly after using the toilet or changing nappies or other incontinent products for others and before and after preparing food.
- Wash raw vegetables and fruits thoroughly before juicing them or eating them fresh.
- Cook meat thoroughly before eating.
- Cook eggs and egg products properly. Avoid eating raw, incompletely cooked eggs or using dirty or cracked eggs.
- Keep hot food hot between cooking and eating it.
- Wash hands, utensils and chopping boards in hot, soapy water after handling uncooked food.
- Keep raw meat, poultry and fish separate from and below other foodstuffs so that any raw meat juice does not contaminate other foods stuffs especially ready-to-eat foods.
- Cover all stored food.
- Cover and put uneaten, cooked food in the refrigerator within 1 hour of cooking.
- Defrost food by placing it on the lower shelves of a refrigerator (if raw meat place on bottom shelf to avoid raw meat juice contaminating other foods) or use a microwave oven according to

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defrosting instructions. Avoid defrosting food at room temperature.

- Thoroughly reheat (until internally steaming or piping hot, at least 70°C) leftover or ready-to-eat foods before eating.
- Strictly follow use-by and best-before dates on refrigerated foods.
- Find out more about how to prepare and store food safely and when you need to take extra care with some types of food at [www.mpi.govt.nz/food-safety/food-safety-for-consumers](http://www.mpi.govt.nz/food-safety/food-safety-for-consumers).

## References and further information

- 1) NZ Communicable Diseases Control Manual 2012 – December 2017, Cryptosporidiosis: <http://www.health.govt.nz/system/files/documents/publications/cd-manual-cryptosporidiosis-dec17.pdf>
- 2) Medscape, Cryptosporidiosis. MM Cabada, M Bronze, Aug 15, 2016. <http://emedicine.medscape.com/article/215490-overview>
- 3) NSW Cryptosporidiosis fact sheet. Updated 1 July 2012. <http://www.health.nsw.gov.au/Infectious/factsheets/Pages/cryptosporidiosis.aspx>
- 4) NZ Communicable Diseases Control Manual 2012 – December 2017, Appendix 2: Enteric disease <http://www.health.govt.nz/system/files/documents/publications/cd-manual-appendix-2-dec17.pdf>
- 5) NZ Communicable Diseases Control Manual 2012 – December 2017, Appendix 1: Disinfection <http://www.health.govt.nz/system/files/documents/publications/cd-manual-appendix-1-dec17.pdf>
- 6) NZ Communicable Diseases Control Manual 2012 – December 2017, Appendix 3: Patient education <http://www.health.govt.nz/system/files/documents/publications/cd-manual-appendix-3-dec17.pdf>.

### Further information

Ministry of Health. 2008. Drinking-water Standards for New Zealand 2005 (Revised 2008): <http://www.health.govt.nz/publication/drinking-water-standards-new-zealand-2005-revised-2008-0>

MPI/ESR microbiological data sheet, Cryptosporidium:

<Y:\CFS\ProtectionTeam\FinalDocs\Admin\OnCall\DocsOnLaptops\MicroDataSheets>

Jan-May 2010 outbreak report:

<Y:\CFS\ProtectionTeam\FinalDocs\NotifiableConditions\Cryptosporidiosis\Outbreaks\Crypto Feb10> – Outbreak report-finalcopy\Aug10.doc

The Hutt Valley experience:

[http://www.moh.govt.nz/moh.nsf/Files/phr698/\\$file/phr698.pdf](http://www.moh.govt.nz/moh.nsf/Files/phr698/$file/phr698.pdf)

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