

YERSINIOSIS

Based on the MoH Communicable Diseases Control Manual 2012- December 2017 Update¹

Associated Documents

Case Report Form:

Y:\CFS\ProtectionTeam\FinalDocs\notifiableConditions\Yersiniosis\FormsStdLettersQuest\CaseReportFormEnteric_Dec2017.pdf

Fact Sheet:

Manatū Hauora | Ministry of Health website:

<https://www.health.govt.nz/your-health/conditions-and-treatments/diseases-and-illnesses/yersiniosis>

Ministry for Primary Industries (MPI) website:

<https://www.mpi.govt.nz/food-safety-home/preparing-and-storing-food-safely-at-home/safe-food-preparation-cooking-and-storage-at-home/>

The Illness

Yersiniosis usually presents as a diarrhoeal illness caused by *Yersinia* bacteria. Infection may result in the following conditions: enteritis, terminal ileitis and mesenteric lymphadenitis (a clinical presentation that is often difficult to differentiate from acute appendicitis). If the infection spreads systemically however, it can result in fatal sepsis. Signs and symptoms include acute diarrhea (maybe blood stained), a low-grade fever, abdominal pain and vomiting (15-40% of cases). The patient may also develop erythema nodosum, which manifests as painful, raised red or purple lesions, mainly on the patient's legs and trunk. Lesions appear 2-20 days after the onset of fever and abdominal pain and resolve spontaneously in about a month.²

Epidemiology in New Zealand³

Prior to 2014, the vast majority of cases of yersiniosis in New Zealand were caused by *Yersinia enterocolitica* biotype 4 (commonly found in pigs in New Zealand). In 2014 *Y. pseudotuberculosis* isolates accounted for almost half of all notifications and *Y. enterocolitica* biotype 2 has become the most common biotype isolated in New Zealand. In 2016, 857 cases of yersiniosis were notified. The 2016 notification rate (18.3 per 100,000) was significantly higher than the 2015 rate (13.8 per 100,000, 634 cases).

Canterbury, Capital & Coast, South Canterbury and Lakes DHBs had the highest notification rates (34.5, 28.7, 25.3, and 23.5 per 100,000, respectively) (Figure 41).

Ethnicity was recorded for 819 (95.6%) cases. The Asian (33.6 per 100,000), European or Other (16.9 per 100,000) and MELAA (15.3 per 100,000) ethnic groups had the highest notification rates. .

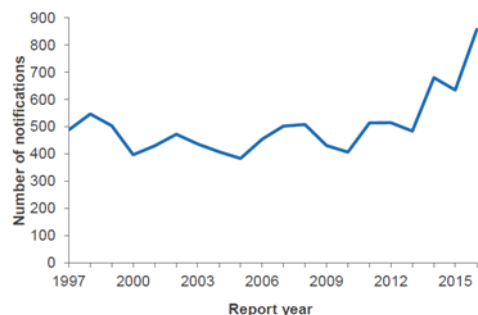
The highest rates were as follows:

- ◆ Ages: children aged 0 – 4 year
- ◆ Regions: Canterbury, Capital and Coast and South Canterbury DHBs.
- ◆ Ethnicity: Asian being twice the next highest European, then MELAA.
- ◆ 11% were hospitalised.

The most common risk factors reported were consuming food from retail premises and contact with farm animals.

748 isolates as *Yersinia enterocolitica* and 32 isolates as *Y. pseudotuberculosis* during 2016. The most common *Y. enterocolitica* biotypes identified were biotype 2 (411 isolates, 54.9%),

Figure 1. New Zealand Yersiniosis notifications by year 1997-2016



	<p>biotype 1A (157 isolates, 21.0%), biotype 4 (96 isolates, 12.8%) and biotype 3 (82 isolates, 11.0%).</p> <p>Three outbreaks due to <i>Yersinia</i> were reported in 2016, involving 88 cases.</p> <p>CASE DEFINITION Clinical description In children under 5 years old, <i>Y. enterocolitica</i> infection typically causes diarrhoea, vomiting, fever and occasionally abdominal pain. In contrast, older children and adults are more likely to experience abdominal pain as the prominent symptom. Bacteraemia and sepsis may occur in immunocompromised individuals. <i>Y. pseudotuberculosis</i> is more likely to cause mesenteric adenitis and septicaemia than <i>Y. enterocolitica</i>.</p> <p>Reservoir Animals. Pigs are the main reservoir for <i>Y. enterocolitica</i>; <i>Y. pseudotuberculosis</i> is widespread among many avian and mammalian hosts including deer.</p> <p>Incubation period From 3–7 days, generally under 10 days.(CDC, range 1-14 days)</p> <p>Mode of transmission Mostly through ingestion of contaminated food, including pork and pork products, dairy products (especially unpasteurised milk), fruit, vegetables and tofu.</p> <p>Although optimal growth is seen at 28–30°C, <i>Y. enterocolitica</i>, like <i>L. monocytogenes</i>, also grows well in a refrigerator (4°C) and survives freezing.</p> <p>In New Zealand yersiniosis is also associated with ingestion of untreated water, direct contact with an infected animal, and person-to-person spread. Person-to-person transmission in a hospital has been reported. <i>Yersinia</i> spp. have rarely been transmitted from asymptomatic patients by blood transfusion.</p> <p><i>Y. pseudotuberculosis</i> is thought to be distributed less widely in the environment than <i>Y. enterocolitica</i> but both are considered to be significant foodborne pathogens. Outbreaks caused by <i>Y. pseudotuberculosis</i> are rare, but they have been noted overseas where carrots, lettuces and milk were the vectors. While implicated in the 2014 <i>Y. pseudotuberculosis</i> outbreak, produce was not confirmed as the source of the outbreak. Infections from <i>Y. enterocolitica</i> are often linked to pork products and pigs are considered to be a major reservoir of human pathogenic strains. <i>Y. pseudotuberculosis</i> is also found in the gut of many wild and domestic animals and is considered one of the most serious and common infectious disease of deer in New Zealand.</p> <p>Note that methods for detection of <i>Yersinia</i> spp. in foods are poor and hence attribution of human illness to specific foods is difficult.</p> <p>Communicability Faecal shedding generally persists for 2–3 weeks but can be prolonged (months) in both children and adults.</p>
<p>Notification Procedure</p>	
	<p>Cases must be or notified on suspicion. Notification should not await confirmation.</p> <p>Under investigation: A case that has been notified, but information is not yet available to classify it as probable or confirmed.</p> <p>Probable: A clinically compatible illness that is epidemiologically linked to a confirmed case or has had contact with the same common source – that is, is part of a common-source outbreak.</p> <p>Confirmed: A clinically compatible illness that is laboratory confirmed.</p> <p>Not a case: A case that has been investigated and subsequently found not to meet the case definition.</p> <p>Possible notification to WorkSafe</p> <ul style="list-style-type: none"> • Refer to Reporting section, page 6.

Laboratory Testing

Laboratory definitive evidence for a confirmed case requires:

- isolation of *Yersinia enterocolitica* or *Y. pseudotuberculosis* from blood or faeces
- detection of *Yersinia* spp nucleic acid from faeces. (However, note that at the present PCR testing may not detect *Y. pseudotuberculosis* and the ability of the assays to adequately detect of *Y. enterocolitica* biotype 1A is uncertain as of July 2017.)

Serology does not meet the criteria for laboratory confirmation.

All isolates should be sent to the Enteric Reference Laboratory at ESR for further characterisation.

Management of Case

Investigation

If case known to be high risk (for transmitting the infection to others – refer 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 refer to table 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.

- Obtain a food history, details of ingestion of untreated water, contact with animals, possible human contacts and travel.
- Investigate and obtain a more detailed history if there is an outbreak. Ensure symptomatic persons submit faecal samples for testing for *Yersinia* spp.
- In the event of non-return of the questionnaire no further follow up is required unless the case or situation is high risk.
- Review returned questionnaire and take action as required, eg. further follow-up if:
 - ◊ more than one case from same source/situation, eg. water source/a pre-school
 - ◊ cases attended the same event eg. farm visit, school camp, BBQ.
- Sporadic cases: collect Case Report Form data for EpiSurv (may assist in identifying outbreaks/clusters).
- 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 yersiniosis. Such an increase is to be promptly reported to the MOH. Refer to:

- ◊ [Te Mana Ora Outbreak-Response-Plan⁴](#)
- ◊ Te Mana Ora Outbreak Guide Template:⁵ Available via [CD – Outbreaks intranet page](#).

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.

Restriction and Clearance

- In a health care facility, only standard precautions⁶ (<http://www.cdhb.health.nz/Hospitals-Services/Health-Professionals/CDHB-Policies/Infection-Prevention-Control-Manual/Documents/Standard%20Precautions.pdf>) are indicated in most cases.
- If the case is in nappies or an incontinent child, apply contact precautions for the duration of illness.
- For exclusion and clearance criteria from work, school or an early childhood service, refer to Table 1.

Table 1.7 Exclusion and clearance criteria for people at increased risk of transmitting an infection to others*

Pathogen	Exclusion* And Clearance	Contacts
Yersiniosis	<ul style="list-style-type: none"> - Exclude 1,2,3,4 (below) until symptom free for 48 hours - Clearance not required. 	No exclusion or clearance criteria required for any contact

* **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.

- If personal hygiene habits and hand washing facilities a concern, discuss with MOH.
- For further details, refer to Appendix 2 of this protocol and reference 7.

Treatment

Maintaining fluid balance. Most cases resolve without antibiotics but treatment may require antibiotics depending on severity. A range of antibiotics are effective including ciprofloxacin, doxycycline and trimethoprim-sulfamethoxazole.⁸

Counselling

- 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.

- Educate about hygiene, especially hand cleaning.
- A fact sheet is available:

Manatū Hauora | Ministry of Health website:

<https://www.health.govt.nz/your-health/conditions-and-treatments/diseases-and-illnesses/yersiniosis>

Ministry for Primary Industries (MPI) website:

<https://www.mpi.govt.nz/food-safety-home/preparing-and-storing-food-safely-at-home/safe-food-preparation-cooking-and-storage-at-home/>

- Educate about hygiene especially hand hygiene.
- Since Yersinia infection can be transmitted through blood transfusions the case is not to donate blood for three months and then discuss with the Blood Bank before doing so.

Management of Contacts	
	<p>Definition All those with unprotected close contact with a case during the period of communicability or who have been exposed to the same contaminated food, water or other source in a common-source outbreak.</p> <p>Investigation Test for asymptomatic infection only in an outbreak.</p> <p>Counselling Advise all contacts of the incubation period and typical symptoms of Yersiniosis. and to seek early medical attention if symptoms develop.</p> <ul style="list-style-type: none"> A fact sheet is available at: Manatū Hauora Ministry of Health website: https://www.health.govt.nz/your-health/conditions-and-treatments/diseases-and-illnesses/yersiniosis Ministry for Primary Industries (MPI) website: https://www.mpi.govt.nz/food-safety-home/preparing-and-storing-food-safely-at-home/safe-food-preparation-cooking-and-storage-at-home/ There is no exclusion or clearance required for contacts of infectious cases or for people who have been exposed to the same food suspected to be the source of infection. If symptomatic, contact is to be advised to consult GP and have a faecal test. Manage as a case until the result is known. <p>Outbreak 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.</p> <p>Prophylaxis Nil.</p>
Other Control Measures	
	<p>Identification of source</p> <ul style="list-style-type: none"> Check for other cases in the community. Investigate potential food or water sources of infection only if there is a cluster of cases or an apparent epidemiological link. If indicated, check the water supply for microbiological contamination and compliance with the latest New Zealand drinking-water standards (Ministry of Health 2008).⁹ <p>Disinfection Clean and disinfect surfaces and articles soiled with faecal material. For more details, see Appendix 1 and reference 10.</p> <p>Health education</p> <ul style="list-style-type: none"> Educate the public about safe food preparation (refer Appendix 3 and reference 11). 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. Domestic animals that have diarrhoea should be taken to a vet for assessment and treatment. If a water supply is involved, liaise with the local territorial authority to inform the public. Advise on the need to boil water. 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.
Reporting	
	<ul style="list-style-type: none"> Ensure complete case information is entered into EpiSurv. Where food/food businesses are thought to be involved inform the Ministry for Primary

	<p>Industries.</p> <ul style="list-style-type: none"> • 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. • If an outbreak, write report for Outbreak Report File: [Y:\CFS\ProtectionTeam\FinalDocs\NotifiableConditions\Yersinosis\Outbreaks]. • 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). • File.
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Appendix 1

Extract from the MoH Communicable Disease Control Manual 2012 - December 2017:Appendix1: Disinfection¹⁰

	<p>Disinfection and cleaning the environment 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> <p>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.</p> <p>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</p> <p style="text-align: center;"><i>Source: Ministry of Health. 2009. Guidelines for the Management of Norovirus Outbreaks in Hospitals and Elderly Care Institutions. Wellington: Ministry of Health.</i></p>
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Appendix 2

Extract from the MoH Communicable Disease Control Manual 2012 - December 2017 Appendix 2: Enteric Disease⁷

	<p>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.</p> <p>The key criteria are:</p> <ul style="list-style-type: none"> • 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. <p>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.</p> <p>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:</p> <ol style="list-style-type: none"> 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
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	<p>3. children under the age of 5 attending early childhood services/groups</p> <p>4. other adults or children at higher risk of spreading the infection due to illness or disability.</p> <p>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</p> <p>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).</p> <p>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.</p> <p>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).</p> <p>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.</p> <p>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.</p> <p>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.</p> <p style="padding-left: 40px;">Employers may decide to implement more stringent exclusion/restriction criteria in response to their own or their customers' requirements.</p>
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Appendix 3
Extract from the MoH Communicable Disease Control Manual 2012 - December 2017 Appendix 3: Patient Information¹¹

	<p>Health education resources Pamphlets, posters and other resources available from the Ministry of Health at www.healthed.govt.nz.</p> <p>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</p> <p>Food safety practices in preparing and cooking a hangi refer to He whakatairanga i nga ahuatanga mahi mo te tunu hangi: www.mpi.govt.nz/food-safety/community-food/marae-food-safety</p>
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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 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 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.

References and further information

1. NZ Communicable Diseases Control Manual 2012-December 2017 Update, Yersiniosis:
<https://www.health.govt.nz/system/files/documents/publications/cd-manual-yersiniosis-dec17.pdf>
2. Medscape, Reference/Bacterial infections/Yersinia enterocolitica:
<http://emedicine.medscape.com/article/232343-overview>
3. ESR, Notifiable diseases in New Zealand: 2016 summary.
https://surv.esr.cri.nz/PDF_surveillance/AnnualRpt/AnnualSurv/2016/2016AnnualNDReportFinal.pdf
4. CPH Outbreak Response Procedure:
<http://cdhbdepartments/corporate/documentmanagement/CDHB%20Libraries/Policy%20and%20procedures,%20guidelines,%20protocols,%20staff%20information%20etc/Com-Dis-Outbreak-Response-Plan.docx>.
5. the CPH Outbreak Guide Template:
<Y:\CFS\ProtectionTeam\FinalDocs\NotifiableConditions\OUTBREAKGENERAL\FormSStdLettersQuest>.
6. Standard precautions
<http://www.cdhb.health.nz/Hospitals-Services/Health-Professionals/CDHB-Policies/Infection-Prevention-Control-Manual/Documents/Standard%20Precautions.pdf>
7. NZ Communicable Diseases Control Manual 2012 - December 2017 Update, Appendix 2: Enteric Disease
<https://www.health.govt.nz/system/files/documents/publications/cd-manual-appendix-2-dec17.pdf>
8. Yersiniosis treatment. UpToDate (accessed 13 March 2018)
https://www.uptodate.com/contents/treatment-and-prevention-of-yersinia-enterocolitica-and-yersinia-pseudotuberculosis-infection?search=yersiniosis%20treatment&source=search_result&selectedTitle=1~41&usage_type=default&display_rank=1

9. 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>
10. NZ Communicable Diseases Control Manual 2012, Appendix 1: Disinfection [<http://www.health.govt.nz/publication/communicable-disease-control-manual-2012>].
11. NZ Communicable Diseases Control Manual 2012, Appendix 3: Patient Information [<http://www.health.govt.nz/publication/communicable-disease-control-manual-2012>].

Further information

Further information on foodborne illness is available at www.mpi.govt.nz