SALMONELLOSIS

(There are separate protocols for disease due to *Salmonella typhi* and *Salmonella paratyphi*)

Based on the MoH Communicable Diseases Control Manual 2012-December 2017 Update[1]

Associated Documents

Case Report Form:
Y:\CFS\ProtectionTeam\FinalDocs\NotifiableConditions\Salmonellosis\FormsStdLettersQuest\CaseReportFormEnteric_Dec2017.pdf

Fact Sheet:
Ministry for Primary Industries (MPI) -
https://www.mpi.govt.nz/food-safety-home/food-poisoning-symptoms-causes/salmonella-symptoms-and-advice/

The Illness[2-5]

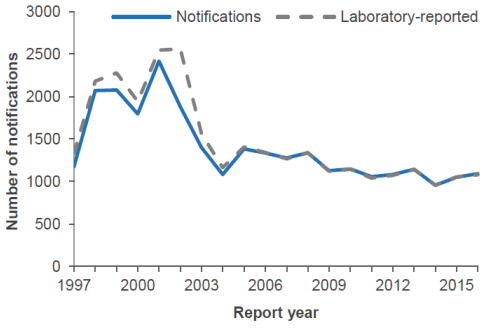
Salmonella infection is a common bacterial enteric disease. The bacteria typically live in animal and human intestines and are shed through faeces. Humans become infected most frequently through contaminated food or water sources and although outbreaks are common, outbreaks due to infected food handlers are uncommon. Transmission from asymptomatic food handlers has rarely been documented.[3]

Typically, *Salmonella* infection causes diarrhoea, fever and abdominal cramps. Most people recover within a week without specific treatment. In some cases, the diarrhoea associated with salmonella infection can be severe and requires prompt medical attention. Life-threatening complications also may develop if the infection spreads beyond the intestines. Although uncommon, extra-intestinal complications of salmonellosis are associated with increased mortality rates. Such complications include endocarditis, vascular infections, cholecystitis, hepatic and splenic abscesses, urinary tract infections, pneumonia or empyema, meningitis, septic arthritis, and osteomyelitis.[4] Asymptomatic convalescent excretion of *Salmonella* bacilli is common after infection (see Communicability and Carriers below).

Epidemiology in New Zealand[5]
In 2016, 1091 cases of salmonellosis were notified. The 2016 notification rate (23.2 per 100,000) showed a slight increase from the 2015 rate (22.9 per 100,000, 1051 cases). Notifications for salmonellosis saw a large decrease between 2001 and 2004 and have remained relatively stable since 2005. 22% were hospitalised. The highest rates were as follows:

- by age: children aged 0 – 4 years
- by region: Tairawhiti and South Canterbury
- by ethnicity: European or other and Pacific Peoples.

Salmonellosis notifications and laboratory reported cases by year, 1997-2016



The most common risk factors reported for salmonellosis in 2016 were consuming food from retail premises, travelling overseas and having contact with farm animals.

CASE DEFINITION
Clinical description
Salmonellosis presents as gastroenteritis, with abdominal pains, diarrhoea (occasionally bloody), fever, nausea and vomiting.
Asymptomatic infections may occur and symptoms are not necessary to meet the case definition.

Incubation: 6 - 72 hours, commonly 12 - 36 hours.

Transmission: Ingestion of organisms in contaminated foodstuffs, often associated with undercooking or cross-contamination in the kitchen. Ingestion of untreated (contaminated) water or by direct contact with farm animals and pets, including fish and reptiles. Exposure to these risk factors with overseas travel. Person-to-person spread occurs from infants and faecally-incontinent adults if hand hygiene is inadequate. Transmission from infected food handlers is uncommon.

Communicability and Carriers: Variable; typically several days to several weeks. Intermittent shedding is common, so a single negative culture is not that reassuring.

- The median duration of excretion is approximately 5 weeks (over all age groups) with S. typhimurium being more rapidly cleared than other serotypes.
- The median duration of excretion is approximately 7 weeks in patients less than 5 years of age.
- Approximately 1% of infected adults and 5% of infected children aged less than 5 years excrete *Salmonella* spp. for more than one year.[6]

Prevention: Ensure potable water supplies and food hygiene in commercial and domestic kitchens (avoid undercooking, cross contamination and time-temperature abuse). The incidence of disease is reduced by decreasing the *Salmonella* contamination of foods including poultry during storage and processing. Personal protection involves strict attention to hand washing after risk exposure and before handling food, avoiding contaminated drinking water and unpasteurized dairy products.

Notification Procedure

Attending medical practitioners or laboratories must immediately notify the local medical officer of health of probable or confirmed cases including asymptomatic cases when identified.

All health care workers are encouraged to talk with a medical officer of health about any suspected outbreaks of acute gastroenteritis or cases in people working in high-risk occupations.

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 as a confirmed case – 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 identification of *Salmonella* species from a clinical specimen by one of the following methods:

- isolation (culture)
- detection of *Salmonella* nucleic acid.

Where possible culture should be attempted to facilitate serological or molecular typing to inform epidemiological investigations.

All isolates should be referred 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 - see 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 the 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, until a clearance is given.}

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 (using the ESR salmonella questionnaire available in file at: Y:\CFS\ProtectionTeam\FinalDocs\NotifiableConditions\Salmonellosis\Outbreaks – *STM1090212 or STM42081210* Questionnaires).
  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 *Salmonella*.
  - Sporadic cases: review returned questionnaire and follow-up as appropriate.
  - if food premise involved liaise with the MPI and the environmental health officer of the local territorial authority.
  - if a contaminated commercial food source is involved liaise with the Ministry for Primary Industries (MPI).
  - If specific food is suspected, discuss with MPI.

Outbreak

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

- Outbreak-Response-Plan (accessed via Te Mana Ora Policies & Procedures intranet site page)
- Te Mana Ora Outbreak Guide Template – access via Policies Procedures – 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.

- Attempt to identify source of infection such as ingestion of suspect foods, exposure to human cases, animal faeces or recent overseas travel.
- Refer to Investigation (above) for circumstances requiring involvement of MPI and local authority EHO.
- If a cluster of cases or outbreak occurs, contact the Ministry of Health Communicable Diseases Team and outbreak liaison staff at ESR, and complete the Outbreak Report Form.

Restriction and Clearance

- In any health care facility, only standard precautions are indicated in most cases: http://www.cdhb.health.nz/Hospitals-Services/Health-Professionals/CDHB-Policies/Infection-Prevention-Control-Manual/Documents/Standard%20Precautions.pdf.
- If the case is a child in nappies or incontinent, 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
Salmonella	– 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

Antibiotics do not shorten the duration of symptoms and may actually prolong the duration of convalescent carriage, and therefore are not routinely used to treat uncomplicated *Salmonella* gastroenteritis. Current recommendations are that antibiotics be reserved for patients with severe disease, and those who are at high risk for invasive disease.[7]

Carriers and their treatment

- The influence of antimicrobial therapy on *Salmonella* carriage is controversial.
- Refer chronic excreters (more than 3 months) to an Infectious Disease physician.

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.
- A fact sheet is available:
  MPI - https://www.mpi.govt.nz/food-safety-home/food-poisoning-symptoms-causes/salmonella-symptoms-and-advice/
- Educate about hand washing especially hand cleaning.

Management of Contacts

Investigation

A diagnosis should be sought from contacts who are symptomatic.

Prophylaxis
Nil.

Counselling
- Advise early referral if symptoms develop.
- Advise contacts and their caregivers of the nature of the infection and its mode of transmission. A fact sheet is available:
  MPI - https://www.mpi.govt.nz/food-safety-home/food-poisoning-symptoms-causes/salmonella-symptoms-and-advice/
- Educate about hand washing especially hand cleaning.

Other Control Measures

Identification of source
- Investigate potential food and water sources of infection only if there is a cluster of cases or an apparent epidemiological link. Consider checking for other cases in the community.
- Liaise with the Drinking Water team as necessary on case-by-case basis.
- If indicated, check water supply for microbiological contamination and compliance with the latest New Zealand drinking-water standards (Ministry of Health 2008).[9] If a water supply is involved, the MOH will liaise with the local territorial authority to inform the public.
- Liaise with the local territorial authority staff to investigate potential water or pool sources of infection and to ensure appropriate remedial action.
- Advise on the need to boil water.

Disinfection
Clean and disinfect surfaces and articles soiled with faeces. For more details, see Appendix 1 and reference 10.

Health education
- Educate the public about safe food preparation (see 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.
- 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.
- Domestic animals with diarrhoea should be taken to a vet for assessment and treatment.

Reporting

- Ensure complete case information is entered into EpiSurv.
- 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\Salmonellosis\Outbreaks.
- Where food/food businesses are thought to be involved inform the Ministry for Primary Industries.
- 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.

Appendix 1

Extract from the MoH Communicable Disease Control Manual 2012 - December 2017:Appendix1: Disinfection[10]

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.

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.

Personal protective equipment (PPE) must be used during environmental disinfection to prevent self-contamination.

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 [7]

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

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).

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 publichealth 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[11]

Health education resources

Pamphlets, posters and other resources available from the Ministry of Health at 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

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

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 defrosting instructions. Avoid defrosting food at room temperature.
- Thoroughly reheat (until internally steaming or piping hot, at least 70ºC) 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, Salmonellosis: http://www.health.govt.nz/publication /communicable-disease-control-manual-2012
2. Mayo Clinic, Diseases and Conditions, Salmonella infection: http://www.mayoclinic.com/health/salmonella/DS00926
3. Australian Govt Department of Health, Guidelines for the investigation and management of food handlers during non-typhoidal *Salmonella* outbreaks: http://www.health.gov.au/internet/main/publishing.nsf/Content/salmonella-outbreaks-cdna.htm
4. Emedicine, Medscape, Salmonellosis: http://emedicine.medscape.com/article/228174-overview#a0199
5. ESR Annual Surveillance Summary: Notifiable And Other diseases in New Zealand: Annual Surveillance Report 2016: https://surv.esr.cri.nz/PDF_surveillance/AnnualRpt/AnnualSurv/2016/2016AnnualNDReportFinal.pdf
6. UpToDate, Approach to the patient with non-typhoidal Salmonella in a stool culture: http://www.uptodate.com/contents/approach-to-the-patient-with-nontyphoidal-salmonella-in-a-stool-culture?detectedLanguage=en&source=search_result&search=salmonellosis&selected Title=1%7E150&provider=noProvider
7. 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
8. Emedicine, Medscape, Salmonellosis http://emedicine.medscape.com/article/228174-treatment
9. Ministry of Health. 2008. Drinking-Water Standards for New Zealand 2005 (Revised2008): http://www.health.govt.nz/publication/drinking-water-standards-new-zealand-2005-revised-2008-0]
10. 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
11. 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.