New Mexico Foodborne Illness Investigation Manual

NEW MEXICO DEPARTMENT OF HEALTH
Epidemiology and Response Division
Public Health Division
Scientific Laboratory Division

NEW MEXICO ENVIRONMENT DEPARTMENT
Environmental Health Division

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1 Introduction

1.1 Purpose

This purpose of this manual is to provide guidance for prompt detection of and response to foodborne illness outbreaks in New Mexico, recognizing that a successful foodborne illness outbreak investigation requires collaboration between partners from the disciplines of epidemiology, environmental health, food science and microbiology. The most important reason to investigate foodborne illness reports is to identify the cause of disease and how it might be further spread so that appropriate actions can be taken to prevent additional illness. This manual defines foodborne illness investigation partner roles and responsibilities, describes investigation procedures, and addresses public education and corrective measures.

1.2 List of partners

Depending on the nature and scope, foodborne illness investigations in New Mexico can involve government agencies at the federal, state and local levels, as well as private and community partners. A non-exhaustive list of potential partners includes:

- New Mexico Environment Department
- New Mexico Department of Health
- New Mexico Department of Agriculture
- New Mexico Livestock Board
- City of Albuquerque Environmental Health Department
- Bernalillo County Environmental Health Office
- Indian Health Service
- Centers for Disease Control and Prevention
- US Food and Drug Administration
- US Department of Agriculture
- Food service establishments
- Food producers and retailers
- Law enforcement agencies
- Tribal agencies
- Colleges and universities
- Health care facilities, daycares and schools

1.3 Confidentiality

Data on individuals collected during a foodborne illness investigation is strictly confidential under New Mexico law and New Mexico Department of Health policy. For this reason, data collection on individuals is the responsibility of state or local public health officials and should not be delegated. When data collection instruments are distributed to persons involved in an investigation via a third party, the completed original instruments should be returned directly to the state or local public health officials without copies being made and without passing through the third party, except when the third party is obligated by law to maintain patient confidentiality. If it is necessary to provide patient specific information in a written report, patients should be identified using a pseudonym.

2 Background

2.1 Acronyms

- **NMED** - New Mexico Environment Department
- **EHD** – Environmental Health Division
- **NMDOH** - New Mexico Department of Health
- **ERD** – Epidemiology and Response Division
- **PHD** – Public Health Division
- **SLD** – Scientific Laboratory Division
- **ID EPI** – Infectious Disease Epidemiology Bureau

2.2 Epidemiology of foodborne disease

(Adapted from the Centers for Disease Control and Prevention Foodborne Illness fact sheet: http://www.cdc.gov/ncidod/dbmd/diseaseinfo/foodborneinfections_g.htm)

2.2.1 Etiologic agents

More than 250 different foodborne illnesses have been described. Many of these illnesses are infections, caused by a variety of bacteria, viruses, and parasites that can be transmitted through food. Other illnesses are poisonings, caused by toxins or chemicals that have contaminated food.

The most commonly recognized foodborne infections are those caused by the bacteria *Campylobacter*, *Salmonella*, and *E. coli* O157:H7, and by a group of viruses called calicivirus, also known as Norwalk-like viruses or Norovirus. Some common infections are occasionally foodborne, even though they are usually transmitted by other routes. These include infections caused by *Shigella*, hepatitis A, and the parasites *Giardia lamblia* and *Cryptosporidium parvum*.

In addition to illness caused by direct infection, some foodborne illnesses are caused by the presence of a microbe-produced toxin in food. For example, *Staphylococcus aureus* can grow in some foods and produce a toxin that causes intense vomiting. Botulism occurs when the bacterium *Clostridium botulinum* grows in food and produces a powerful paralytic toxin. These toxins can produce illness even if the microbes that produced them are no longer present.

Other toxins and poisonous chemicals can cause foodborne illness. People can become ill if a pesticide is inadvertently added to a food, or if naturally poisonous substances are used to prepare a meal, such as poisonous mushrooms or reef fishes.

Refer to Appendix 10.6 and Appendix10.7 for detailed information on specific foodborne illnesses and their associated characteristics.

2.2.2 Reservoirs

Reservoirs for some common foodborne illness agents are shown below:

Humans: Hepatitis A virus, Norovirus, *Shigella* species, *Salmonella* Typhi, *Staphylococcus aureus* and *Vibrio cholerae*.

Animals: *Campylobacter* species, *Cryptosporidium parvum*, *Giardia lamblia*, *Cyclospora cayetanensis*, Shiga toxin-producing *E. coli* (including *E. coli* O157:H7), *Giardia lamblia*, *Listeria monocytogenes*, *Salmonella* species, *Trichinella spiralis*, *Yersinia enterocolitica*, *Vibrio parahaemolyticus* and *Vibrio vulnificus*.

Environment: *Bacillus cereus*, *Clostridium* species, heavy metals, marine toxins and mushroom toxins.

2.2.3 Modes of transmission

Foodborne illness agents may be transmitted in more than one way, such as person-to-person or animal-to-person. Foodborne illness outbreaks due to *Shigella*, *Staphylococcus aureus*, hepatitis A and Norovirus are generally caused by contamination of uncooked or cooled foods by an infected food handler. Foodborne illness agents from animal-derived foods like eggs or meat can cross-contaminate raw foods through cooking utensils, the hands of food handlers or food preparation surfaces. Pathogens with an animal reservoir may also be transmitted directly through food, such as ground beef contaminated with *E. coli* O157:H7 or eggs infected with *Salmonella* Enteritidis. *Clostridium perfringens* and *Bacillus cereus* are ubiquitous in the environment and outbreaks caused by these agents generally result from holding food at a temperature that allows the organism to proliferate.

2.2.4 Incubation and communicability periods

Incubation and communicability periods vary greatly among foodborne illnesses. Refer to Appendix 10.6 and Appendix 10.7 for more information on a specific agent.

2.2.5 Diagnosis and treatment

Foodborne infections are usually diagnosed by specific laboratory tests that identify the causative organism. Bacteria such as *Campylobacter*, *Salmonella*, and *E. coli* O157 are found by culturing stool samples. Parasites like *Giardia lamblia* can be identified by examining stool under the microscope. Viruses like Norovirus are more difficult to detect and are usually identified by testing stool samples for genetic markers that indicate a specific virus is present. Foodborne illnesses caused by toxins or poisonous chemicals are usually diagnosed by the presence of specific signs and symptoms in the ill person.

Foodborne illnesses require different treatments depending on the symptoms they cause. Illnesses that involve primarily diarrhea or vomiting may require only adequate hydration. Antibiotics are usually not recommended for most foodborne illnesses and

healthy people typically recover without medical treatment. Pregnant women, the elderly, very young children and those with weakened immune systems are more likely to develop serious illness and may need special treatment.

2.3 Hazard Analysis and Critical Control Points

Hazard Analysis and Critical Control Points (HACCP) is a system of preventive controls that is the most effective way to insure that food products are safe. Pillsbury developed this system for the space program over 30 years ago. HACCP focuses on preventing, controlling, or eliminating hazards that could cause foodborne illnesses by applying science-based controls, from raw materials to finished products.

HACCP involves seven principals:

- **Analyze hazards.** Potential hazards associated with a food and measures to control those hazards are identified. The hazard could be biological, such as a microbe; chemical, such as a toxin; or physical, such as ground glass or metal fragments.
- **Identify critical control points.** These are points in a food's production – from its raw state through processing and shipping to consumption by the consumer – at which the potential hazard can be controlled or eliminated. Examples are cooking, cooling, packaging, and metal detection.
- **Establish preventive measures with critical limits for each control point.** For a cooked food, for example, this might include setting the minimum cooking temperature and time required to ensure the elimination of any harmful microbes.
- **Establish procedures to monitor the critical control points.** Such procedures might include determining how and by whom cooking time and temperature should be monitored.
- **Establish corrective actions to be taken when monitoring shows that a critical limit has not been met.** For example, reprocessing or disposing of food if the minimum cooking temperature is not met.
- **Establish procedures to verify that the system is working properly.** For example, testing time-and-temperature recording devices to verify that a cooking unit is working properly.
- **Establish effective recordkeeping to document the HACCP system.** This would include records of hazards and their control methods, the monitoring of safety requirements and action taken to correct potential problems.

Each of these principles must be backed by sound scientific knowledge, such as published microbiological studies on time and temperature factors for controlling foodborne pathogens.

When conducting an environmental inspection as part of a foodborne illness investigation, the investigator should apply HACCP principals to focus on those food handling procedures and processes that pose the greatest potential for foodborne illness. Group menu items into one of three food prep processes: 1) food preparation with no cook step, 2) preparation for same day service, or 3) complex food preparation. Identify the hazards of the particular food prep process. Check whether the associated Critical Control Points (CCPs) were achieved and if not, why they were not achieved.

3 Roles and Responsibilities

3.1 New Mexico Department of Health

The New Mexico Department of Health (NMDOH) has legal authority to protect the public health and is responsible for directing and coordinating investigations of potential foodborne illness. Through the New Mexico Administrative Code (http://www.nmcpr.state.nm.us/nmac/parts/title07/07.004.0003.htm), the Epidemiology and Response Division (ERD) maintains the New Mexico notifiable conditions list, which defines conditions that must be reported to NMDOH, including foodborne infections and suspected foodborne illnesses and outbreaks.

3.1.1 Public Health Division

There are five regions in the NMDOH Public Health Division (PHD) and each region encompasses a number of local public health offices (PHO) (see Appendix 10.3 for a Region map). Within their respective jurisdictions, local and regional PHD staff members have primary responsibility for the following foodborne illness investigation activities:

- Investigate reports of notifiable foodborne illness in collaboration with ID EPI.
- Serve as liaisons between NMDOH foodborne illness investigation partners and those in the community, such as health care providers, schools, and others.
- Regional PHD investigation representative ensures involvement of appropriate local PHO(s).
- Gather descriptive epidemiologic information in collaboration with investigation partners.
- Develop patient and food handler questionnaires in collaboration with ID EPI and NMED.
- Administer patient interviews in collaboration with ID EPI.
- Administer food handler interviews in collaboration with ID EPI and NMED.
- Collect, package and ship patient and food handler specimens in coordination with ID EPI and SLD.
- Perform preliminary data analyses as appropriate.

3.1.2 Infectious Disease Epidemiology Bureau

The Infectious Disease Epidemiology Bureau (ID EPI) of the NMDOH Epidemiology and Response Division (ERD) has primary responsibility for the following foodborne illness investigation activities:

- Investigate reports of notifiable foodborne illness in collaboration with PHD.
- Determine nature and extent of epidemiologic investigation required for reports of potential foodborne illness.
- Coordinate foodborne illness investigations and ensure involvement of all appropriate federal, state, regional and local agencies.
- Gather descriptive epidemiologic information in collaboration with investigation partners.
- Develop patient and food handler questionnaires in collaboration with PHD and NMED.
- Provide quality assurance for patient interviews in collaboration with PHD.

- Provide quality assurance for food handler interviews in collaboration with NMED.
- Coordinate with PHD and SLD on proper patient and food handler specimen collection, handling and testing.
- Coordinate with NMED and SLD on proper food sample collection, handling and testing.
- Report results of laboratory testing to investigation partners.
- Perform statistical analyses to test hypotheses.
- Recommend control measures in collaboration with investigation partners.
- Provide data to assist NMED in implementing legal administrative actions.
- Decide on and develop public notifications in collaboration with NMED.
- Prepare final written report summarizing investigation.
- Complete EFORS report.
- Archive all documentation of investigation activities, including notes, line lists, questionnaire, interview data, laboratory results and written reports.

3.1.3 Scientific Laboratory Division

The NMDOH Scientific Laboratory Division (SLD) is the public health reference laboratory for New Mexico. Hospitals and other laboratories in New Mexico routinely send clinical, environmental, food and water specimens and to SLD for identification, confirmation, serotyping, and molecular subtyping. SLD is the only Laboratory Response Network (LRN) facility in the state and has the capacity to provide emergency response work for bioterrorism events as well as for foodborne illness outbreaks. SLD has primary responsibility for the following foodborne illness investigation activities:

- Provide guidance and consultation regarding proper specimen collection and handling.
- Provide microbiological testing of clinical, food, water and other environmental specimens.
- Report laboratory test results to PHD, ID EPI and NMED and ensure involvement of all appropriate local agencies.
- Coordinate with other state and federal reference laboratories.

3.2 New Mexico Environment Department

The New Mexico Environment Department (NMED) has legal jurisdiction over regulated food facilities and related activities. Facility as used in this manual can mean a regulated food service or food processor facility, any facility regulated under the Food Act, a public water supply, public swimming pool, spa or bath, or any other entity regulated under the Environmental Improvement Act.

3.2.1 Environmental Health Division

There are five districts in the NMED Environmental Health Division (EHD) and each district encompasses a number of local field offices (see Appendix 10.2 for a District map). Within their respective jurisdictions, EHD staff members have primary responsibility for the following foodborne illness investigation activities:

- Investigate reports of foodborne illness that implicate a regulated facility.

- Perform facility inspections in accordance with established procedures, including a review of food handling practices by facility food handlers.
- Generate list of foods and beverages consumed or menu items potentially associated with a foodborne illness investigation.
- Develop food handler questionnaires in collaboration with PHD and ID EPI.
- Administer food handler interviews in collaboration with PHD and ID EPI.
- Collect, package and ship food, water or other environmental samples in coordination with ID EPI and SLD.
- Coordinate food trace backs with appropriate government agencies, if indicated.
- Decide on and develop public notifications in collaboration with ID EPI.
- Implement legal administrative actions, if warranted, including permit suspension and facility closure.
- Prepare official report summarizing facility inspection findings and assure incorporation into final ID EPI written report.

4 Detecting a Foodborne Illness Outbreak

Foodborne illness outbreaks are detected through routine surveillance for notifiable foodborne illnesses, individual foodborne illness complaints, and reports of gastrointestinal illness by health care providers, schools, daycares and other institutions.

4.1 Routine surveillance for notifiable conditions

Routine surveillance for foodborne illness in New Mexico consists of the systematic collection, analysis, interpretation and dissemination of data on persons with confirmed or suspected notifiable foodborne illness. The following diseases that are commonly transmitted through food are included on the New Mexico notifiable conditions list (see Appendix 10.4):

Emergency Reporting – Report immediately to ID EPI

- Botulism
- Cholera
- Typhoid fever (*Salmonella* Typhi infection)
- Suspected foodborne or waterborne illness in two or more unrelated persons
- Other conditions of public health significance

Routine reporting – Report within 24 hours to ID EPI

- Brucellosis
- *Campylobacter* infections
- Cryptosporidiosis
- Cyclosporiasis
- Giardiasis
- Hepatitis A infections
- Listeriosis
- Shiga toxin-producing *E. coli* (STEC) infections, including *E. coli* O157:H7
- Shigellosis
- Salmonellosis
- Trichinosis
- *Vibrio* infections
- Yersiniosis

Each report of a notifiable foodborne illness is referred to a local or regional public health office for investigation. Patients are interviewed with a standardized questionnaire (see Appendix 10.12.1) to collect information on risk factors. Regional and ID EPI epidemiologists review results of those investigations to identify important exposures.

Another key component of routine surveillance is laboratory testing. Bacterial isolates of *Salmonella*, *Shigella*, *Listeria* and Shiga toxin-producing *E. coli* (STEC) are routinely submitted to SLD for serotyping and DNA fingerprinting using pulsed-field gel

electrophoresis (PFGE). ID EPI epidemiologists review serotype and PFGE results to identify clusters of potentially related organisms.

Although most routine foodborne illness investigations do not detect outbreaks, timely and complete investigations remain crucial to identifying clusters and outbreaks of foodborne illness.

4.2 Individual foodborne illness complaints

Individual potential foodborne illness complaints can lead to the detection of foodborne illness outbreaks. Potential foodborne illness complaints may be received by a number of state and local government agencies. All potential foodborne illness complaints without laboratory confirmation received by NMDOH or NMED personnel should be documented using the Foodborne Illness Complaint Worksheet (Appendix 10.12.2) and forwarded to the appropriate agency as described below.

A. Complaints involving two or more unrelated persons (i.e., from different households and/or otherwise unrelated) who develop similar illness at about the same time after sharing a common food or meal:

- Notify immediately by phone and fax completed worksheet to:
  - ID EPI Epidemiologist On-Call* (Phone: 505-827-0006, Fax: 505-827-0013)
  - Environmental health regulatory agency with jurisdiction over implicated food facility:
    - NMED EHD Field Office
    - City of Albuquerque Environmental Health Department
    - Bernalillo County Environmental Health Office
    - IHS Environmental Health

*The ID EPI Epidemiologist On-Call will notify regional and local public health staff as appropriate per protocol.

B. Complaints involving 1) a single ill person OR 2) two or more persons with similar illness from the same household or otherwise related:

- Fax completed worksheet within one working day to:
  - Environmental health regulatory agency with jurisdiction over implicated food facility:
    - NMED EHD Field Office
    - City of Albuquerque Environmental Health Department
    - Bernalillo County Environmental Health Office
    - IHS Environmental Health
  - Foodborne Disease Epidemiologist
  - Regional or local public health office (only if prior arrangement has been made with the office)

5 Conducting the Epidemiologic Investigation

This chapter outlines the basic steps that should be followed when conducting an epidemiologic investigation of a potential foodborne illness outbreak. Refer to Appendix 10.11.1 for a flowchart and timeline of these steps and Appendix 10.11.2 for a checklist of activities.

5.1 Assess the nature and scope of illness

Collect the following information from each person associated with a possible foodborne illness outbreak. For individual complaints of possible foodborne illness, use the Foodborne Illness Complaint Worksheet (see Section 4.2 and Appendix 10.12.2). For clusters of possible foodborne illness associated with a common exposure, use the Foodborne Illness Shotgun Questionnaire (Appendix 10.12.3) or Outbreak Questionnaire (Appendix 10.12.4) templates to generate a questionnaire.

- Demographics – Including name, address, telephone number, age, gender, and other relevant information such as occupation, school or daycare.
- Signs and symptoms – Including nausea, vomiting, diarrhea, bloody diarrhea, fever, abdominal cramps, muscle aches, chills, unusual fatigue, headache and any other signs or symptoms present.
- Illness onset date and time.
- Duration of symptoms.
- Food and beverage consumption history for at least 72 hours prior to illness onset.
- Diagnosis – Whether or not medical care sought and results of any laboratory testing.
- Contact information for any other persons who might be involved in the outbreak, including both ill and non-ill persons.

5.2 Determine if a foodborne illness outbreak exists

Based on the information collected in Step 1 determine whether or not a foodborne illness outbreak exists and if so, the level of investigation required. Consider the following questions:

- Are there two or more unrelated persons who developed similar illness after sharing a common food or meal?
- Are the clinical signs and symptoms, dates of illness onset, duration of illness and incubation period consistent with a foodborne disease agent?
- Is the number of ill persons higher than would normally be expected in this group of people and in the population as a whole?
- Have other organizations or agencies received reports of potentially associated illness?
- What is the likelihood of ongoing exposure?

5.3 Designate investigation team

- Primary and secondary lead investigators should be assigned to each outbreak investigation.
- Depending on the situation, the outbreak investigation team could include representatives from ID EPI, local and regional PHD offices, SLD, local and regional NMED offices and other government agencies.
- Daily verbal and written communication between investigation team members should be maintained throughout the investigation.

5.4 Develop working hypothesis, initial case definitions and type of study

- Develop a preliminary case definition that includes person, place and time.
- Based on signs, symptoms, dates of illness onset, duration of illness incubation period, hypothesize the most likely foodborne pathogen(s). (Use Appendix 10.6 and Appendix 10.7 to compare signs, symptoms, duration of illness and potential incubation period to known foodborne illness agents.)
- Decide on type of study: descriptive, case-control, or cohort.

5.5 Get list of potentially exposed persons and identify additional cases

- Obtain as complete a list as possible of all potentially exposed persons and conduct case finding by means appropriate to the investigation. For example, talking to cases, contacting area health care providers, obtaining restaurant reservation lists and/or credit card receipts, obtaining event guest lists or issuing a press release.
- Consider other groups that may have been affected, such as other parties catered by the same food service establishment or other groups attending the same gathering.

5.6 Create line list of cases

- As cases are identified, document information in a line list using the Foodborne Illness Line List Template (Appendix 10.12.5).
- The line list should at a minimum contain the following information:
    - Demographics
    - Symptom profile
    - Illness onset date and time
    - Case definition classification
    - Laboratory testing results
    - Notes

5.7 Obtain a menu or list of foods

- Coordinate with NMED to obtain a menu from the food service establishment or other list of foods as appropriate (see Section 6.3). Use the list of foods and beverages for hypothesis generation and questionnaire development.

5.8 Develop and administer questionnaire

- Develop a standardized questionnaire and interview as many exposed persons, both ill and well, as possible. The Foodborne Illness Shotgun Questionnaire (Appendix 10.12.3) or Outbreak Questionnaire (Appendix 10.12.4) templates may be used to generate the questionnaire.
- Begin interviews as soon as possible after the first case is identified in order to obtain the most reliable data.
- Ask all questions of both ill and well persons in order to facilitate data analysis.

5.9 Interview food handlers

- Coordinate food handler interviews with NMED (see Section 6.3).
- Develop a standardized questionnaire and interview all food handlers, regardless of job duties or shifts worked. The Food Handler Questionnaire Template (Appendix 10.12.6) should be used to generate the questionnaire.
- At a minimum, the questionnaire should include the following information:
    - Work history or schedule
    - Job tasks and responsibilities
    - Illness history
    - Recent illness among household members
    - Other establishments where employed
- Food service establishment employee absentee records should also be reviewed in collaboration with NMED (see Section 6.3).

5.10 Collect food and clinical specimens

- Coordinate with SLD on proper specimen collection and handling (see Appendix 10.10).
- Collect stool specimens from cases and food handlers as appropriate to the investigation. Refer to Appendix 10.10.1 and Appendix 10.10.2 for proper collection and shipping of stool specimens.
- Specimens should be collected as soon as possible after illness onset in order to facilitate recovery of the etiologic agent.
- If cases have food specimens available in the form of leftovers or doggie bags, request that they be saved and refrigerated in the event they are needed for testing.
- Coordinate with NMED on proper collection and handling of food specimens (see Section 10.3 and Appendix 10.10.3).

5.11 Establish surveillance for additional cases

- Establish a surveillance system for identifying subsequent cases and assessing ongoing transmission as appropriate to the investigation. This system could be passive or active in nature.

5.12 Enter data

- Develop a database and enter questionnaire data in a timely fashion for analysis. A number of software applications can be used to create the database, such as MS Excel, MS Access or EpiInfo.

5.13 Finalize case definition and perform data analysis

- Finalize a case definition that includes person, place and time.
- Perform the following analyses, if possible:
- **Demographic profile:** the number and percentage of cases by age group and gender (Refer to Appendix 10.12.7 for appropriate age groups).
- **Symptom profile:** the number and percentage of cases who reported nausea, vomiting, diarrhea, bloody diarrhea, abdominal cramps, chills, fever and any other signs or symptoms systematically collected.
- **Epidemic curve:** bar graph depicting the number of cases by time of illness onset.
- **Duration of illness**: including median and range.
- **Incubation period:** including median and range.
- **Total attack rate:** the number of cases divided by the number of persons exposed.
- **Food-specific attack rates:** the percentage of persons who became ill after eating a specific food item.
- **Measure of association**: such as the odds ratio or relative risk.
- **Measure of significance**: such as the *P* value or confidence interval.

5.14 Recommend control measures

- Control measures and prevention activities should be recommended based on the characteristics of the outbreak, such as etiologic agent, implicated food item(s), environmental investigation findings and setting.
- Depending on the etiologic agent, isolation and work or daycare exclusion criteria may apply. Refer to Appendix 10.8 for a summary of exclusion criteria.
- If indicated, coordinate recall and traceback and activities with NMED and other partners. See Appendix 10.9 for general recall and traceback procedures.

5.15 Complete final report and evaluation

- Prepare a final written report summarizing the epidemiologic investigation within 2 weeks of investigation completion. Refer to Section 7.1 and Appendix 10.12.7 for more information on writing the final report.
- If appropriate, conduct an evaluation of the investigation process detailing key points and lessons learned from the investigation.

6 Conducting the Environmental Investigation

6.1 Preparation

An environmental investigation is not a routine inspection. The purpose of the investigation is to provide evidence to support or disprove the working hypothesis. Plan the environmental investigation before arriving at the food establishment. The following items should be checked before leaving the office:

- Review facility file for previous violations relevant to the outbreak.
- Check the complaint log to see if other similar complaints on the food establishment have been registered with the office.
- Gather the appropriate forms and EPI Kit.
- Coordinate the specimen collection through the Health Authority(s).
- Gather the necessary inspection equipment such as personal wear (hair restraint and lab coat), sanitizer test kits, thermocouples, thermometers, pH meter, and other measuring devices. Insure that all the measuring devices have been calibrated (if necessary), are fully charged, and are functioning properly.
- Whenever possible identify implicated food(s) and causative agent(s).
- Conduct the inspection of the food establishment and collect food samples (when applicable) as soon as possible, but no later than 24 hours after notification of possible foodborne illness outbreak.

6.2 Inspector knowledge and investigation focus

- Understand how microorganisms that can cause foodborne illness grow, survive and multiply, and the relationship to food handling practices.
- Understand the food flow in the food establishment and the relationship to the hazards. Identify the type of food operation (simple or complex).
- Focus the investigation on the CDC Risk Factors – food source, inadequate cooking, improper holding, contamination, poor personal hygiene, and environmental contamination.

6.3 Investigation steps

- Introduce yourself to the manager or person in charge upon arrival at the food establishment. State the purpose for the inspection. Try to establish a level of cooperation with management. Assure management that every possibility will be investigated.
- Get information on menus, recipes, food preparation, food flow, names of food handlers and their food handling responsibilities.
- Interview the food handlers on their present and past health using the Food Handler Questionnaire in Appendix 10.9.6. Observe their hygiene practices.
- Review food handling practices with food handlers. Concentrate on the preparation of those suspect foods previously identified, including amounts, recipes and sources of raw ingredients.

- Observe the food handling practices taking place while in the food establishment, primarily those associated with the suspect food or foods.
- Collect leftover foods from the suspect meal. When no leftover foods are available, collect raw ingredients or similarly prepared foods. Refer to sampling procedures in Appendix 10.10.3.
- Maintain an unbiased attitude throughout the inspection. The objective of the inspection is to ascertain source and mode of microbial or chemical contamination of the food, likelihood that pathogens survived processes designed to kill or reduce their numbers and opportunities for growth of pathogenic bacteria or toxigenic molds.
- Draw a separate flow chart showing each operation that the suspect food(s) underwent. Identify the hazards, CCPs, specific food handler involved with the operation, and actual food handling of the food (information obtained from the food handlers). This approach may help to identify the breakdown in food handling that led to the foodborne illness. The flow chart may be revised repeatedly as new information is gathered.

6.4 Exclusions and restrictions of food handlers

- Persons should be excluded from food handling if diagnosed with any communicable disease that can be transmitted through food or if suffering symptoms of acute gastrointestinal illness including diarrhea, vomiting, or jaundice. (Note: If the food handler can substantiate that these symptoms are the result of a noninfectious condition such as Crohn's disease or during the early stages of a pregnancy, the food handler many remain working in a full capacity.)
- Persons should not be allowed to return to food handling duties until recommended by NMDOH and NMED. Refer to Appendix 10.8 for the exclusion criteria for specific foodborne illnesses.

6.5 Recalls and tracebacks

- If the epidemiologic and environmental investigation findings indicate that a recall or traceback is necessary, coordinate with NMED, NMDOH and other partners to complete these activities. Refer to Appendix 10.9 for general recall and traceback procedures.

7 Reporting the Investigation

7.1 NMDOH final written report

7.1.1 Preparation

The NMDOH lead epidemiologist will prepare a final written report summarizing the outbreak investigation within 2 weeks of investigation completion. The report should include, if appropriate, the following sections (see Appendix 10.12.7 for report template):

- Background
- Methods
- Epidemiologic Investigation Results
- Laboratory Results
- Environmental Investigation Results
- Discussion
- Recommendations
- Appendices
    - EFORS Appendix
    - Official environmental investigation report

A summary of any NMED environmental investigation findings should be included in the Environmental Investigation Results section of the final NMDOH written report. If available, a copy of the official environmental investigation report from NMED should be included as an appendix. If a member of the outbreak investigation team other than the NMDOH lead epidemiologist completes the final written report, the report should be routed through the NMDOH lead epidemiologist for final approval and filing.

7.1.2 Retention of electronic and hard copies

Electronic copy retention: Once the final written report is completed, the outbreak should be entered into the NMDOH outbreak database using established procedures. This database will assign the outbreak investigation a number that should be used to file electronic and hard copies of all documentation, including investigation notes. Electronic copies of documents associated with the investigation (e.g., questionnaires, databases, final report) should be copied to the numbered outbreak folder.

Hard copy retention: Hard copies of documents associated with the investigation (e.g., questionnaires, lab results, final report) should be filed together by outbreak number using established procedures.

7.1.3 Distribution to stakeholders

The final NMDOH report should be distributed electronically (unless other format requested) to the stakeholders listed below as well as other collaborators as deemed appropriate by lead investigator (e.g., facility administrators, infection control practitioners).

NMDOH

- Epidemiology and Response Division
  - Division Director
  - Bureau Chief, ID EPI
  - Foodborne Disease Epidemiologist, ID EPI
- Public Health Division
  - Regional Health Officer of involved Region(s)
  - Regional Infectious Disease Epidemiologist of involved Region(s)
  - Other collaborators as deemed appropriate by lead investigator
- Scientific Laboratory Division
  - Division Director
  - Bureau Chief, Biological Sciences Bureau
  - Supervisor, General Microbiology Section
  - Supervisor, Environmental Microbiology Section

NMED

- Environmental Health Division
  - Director, EHD
  - Manager, Food Program
  - District Manager in involved District(s)
  - Other collaborators as deemed appropriate by lead investigator

7.2 EFORS report

The Electronic Foodborne Outbreak Investigation and Reporting System (EFORS) is a surveillance system maintained by the Centers for Disease Control and Prevention (CDC). State and local health departments in all 50 states use EFORS to electronically report data about foodborne outbreak investigations to CDC. The NMDOH Foodborne Disease Epidemiologist has the primary responsibility for completing EFORS reports.

An EFORS report should be filed for each foodborne outbreak investigation within 1 week of the completion of the final written report. Once the final written report is completed, it should be forwarded to the Foodborne Disease Epidemiologist for entry. The EFORS Appendix in the final written investigation report template (Appendix 10.12.7) should be completed to facilitate EFORS reporting.

7.3 NMED final written report

The goal of the NMED final report is to provide accurate and complete documentation about the establishment during the foodborne illness investigation. Some or all of the following items may be contained within the report:

- Date and time food related complaint(s) were received by NMED.
- Date and time of inspection.
- Samples collected.
- Food temperatures taken during the inspection.
- Dishwasher sanitizing rinse or disinfectant level in the equipment washing area.
- If any of the food handlers during the inspection showed signs of gastrointestinal illness, or open wounds or cuts without a bandage.
- All violations that were noted.

The NMED inspector(s) performing the investigation prepare the final report, which should be restricted to actual inspection findings. All conclusions about suspected foods should be left to the ID EPI final written report (see Section 7.1) and will be based on environmental samples, conditions in the facility, patient samples, and statistical analyses. A corrective action plan should be included that addresses deficiencies found during the inspection. The NMED final report should be included as an appendix in the ID EPI final written report.

8 Investigation Follow-up Activities

This section is under development and will likely include the topics listed below. Material addressing these topics will be developed as this manual is implemented throughout New Mexico.

8.1 Assure recommendations are followed

8.2 Implementation of remediation and prevention measures

8.3 Evaluation of investigation process

9 Regional and local procedures

This section has been intentionally left blank as a placeholder for regional or local investigation procedures.

10 Appendices

10.1 Contact Lists

10.1.1 New Mexico Department of Health Contacts

Office	City	Phone	Fax
Infectious Disease Epidemiology Bureau	Santa Fe	(505)827-0006 (24/7/365)	(505)827-0013
Regions 1 and 3 Infectious Disease Epidemiologist	Albuquerque	(505)841-4145	(505)841-4147
Region 2 Infectious Disease Epidemiologist	Santa Fe	(505)476-2643	(505)476-2694
Region 4 Infectious Disease Epidemiologist	Roswell	(575)347-2409 x 6246	(575)347-2546
Region 5 Infectious Disease Epidemiologist	Las Cruces	(575)528-5058	(575)528-6060
Scientific Laboratory Division	Albuquerque	(505)841-2500	(505)841-2543
General Microbiology	Albuquerque	(505)841-2541	(505)841-2509
Environmental Microbiology	Albuquerque	(505)841-2537	(505)841-2543
Virology and Serology	Albuquerque	(505)841-2535	(505)841-2543

NMDOH Public Health Offices by County				
Office	**County**	**City**	**Phone**	**Fax**
Stanford	Bernalillo	Albuquerque	(505)841-4100	(505)841-4153
Catron County	Catron	Reserve	(575)533-6432	(575)533-6469
Chaves County	Chaves	Roswell	(575)624-6050	(575)624-6170
Cibola	Cibola	Grants	(505)285-4601	(505)287-9367
Colfax County	Colfax	Raton	(575)445-3601	(575)445-2848
Curry County	Curry	Clovis	(575)763-5584	(575)763-1842
De Baca County	De Baca	Ft. Sumner	(575)355-2362	(575)355-7942
Dona Ana County	Dona Ana	Las Cruces	(575)528-5000	(575)528-6024
Artesia	Eddy	Artesia	(575)746-9819	(575)748-9755
Carlsbad	Eddy	Carlsbad	(575)885-4191	(575)885-4194
Grant County	Grant	Silver City	(575)538-5318	(575)388-4847
Santa Rosa	Guadalupe	Santa Rosa	(575)472-3211	(575)472-3143
Harding County	Harding	Roy	(575)485-2484	(575)485-2261
Hidalgo County	Hidalgo	Lordsburg	(575)542-9391	(575)542-3544
Hobbs	Lea	Hobbs	(575)397-2463	(575)393-1330
Lovington	Lea	Lovington	(575)396-2853	(575)396-6270
Lincoln County	Lincoln	Ruidoso	(575)258-3252	(575)258-5743
Los Alamos	Los Alamos	Los Alamos	(505)662-4038	(505)662-3899
Luna County	Luna	Deming	(575)546-2771	(575)546-9427
McKinley County	McKinley	Gallup	(505)722-4391	(505)722-3034

NMDOH Public Health Offices by County				
Office	**County**	**City**	**Phone**	**Fax**
Mora County	Mora	Mora	(575)387-2748	(575)387-9016
Otero County	Otero	Alamogordo	(575)437-9340	(575)434-6629
Quay County	Quay	Tucumcari	(575)461-2610	(575)461-4862
Northern Rio Arriba	Rio Arriba	Tierra Amarilla	(575)588-7215	(575)588-7097
Espanola	Rio Arriba	Espanola	(505)753-2794	(505)753-5522
Roosevelt County	Roosevelt	Portales	(575)356-4453	(575)359-2926
Bloomfield	San Juan	Bloomfield	(505)634-0229	(505)634-0849
San Juan County	San Juan	Farmington	(505)327-4461	(505)326-1762
San Miguel County	San Miguel	Las Vegas	(505)425-9368	(505)454-0042
Cuba	Sandoval	Cuba	(575)289-3718	(575)289-3437
Sandoval County	Sandoval	Bernalillo	(505)867-2291	(505)867-0107
Santa Fe County	Santa Fe	Santa Fe	(505)476-2600	(505)476-2692
Sierra County	Sierra	Truth or Consequences	(575)894-2716	(575)894-3478
Socorro County	Socorro	Socorro	(575)835-0971	(575)835-3119
Taos	Taos	Taos	(575)758-4719	(575)751-3031
Estancia	Torrance	Estancia	(505)384-2351	(505)384-2626
Moriarty	Torrance	Moriarty	(505)832-6782	(505)832-1507
Clayton	Union	Clayton	(575)374-8393	(575)374-9486
Belen	Valencia	Belen	(505)864-7743	(505)864-7605
Los Lunas	Valencia	Los Lunas	(505)841-5315	(505)841-5320

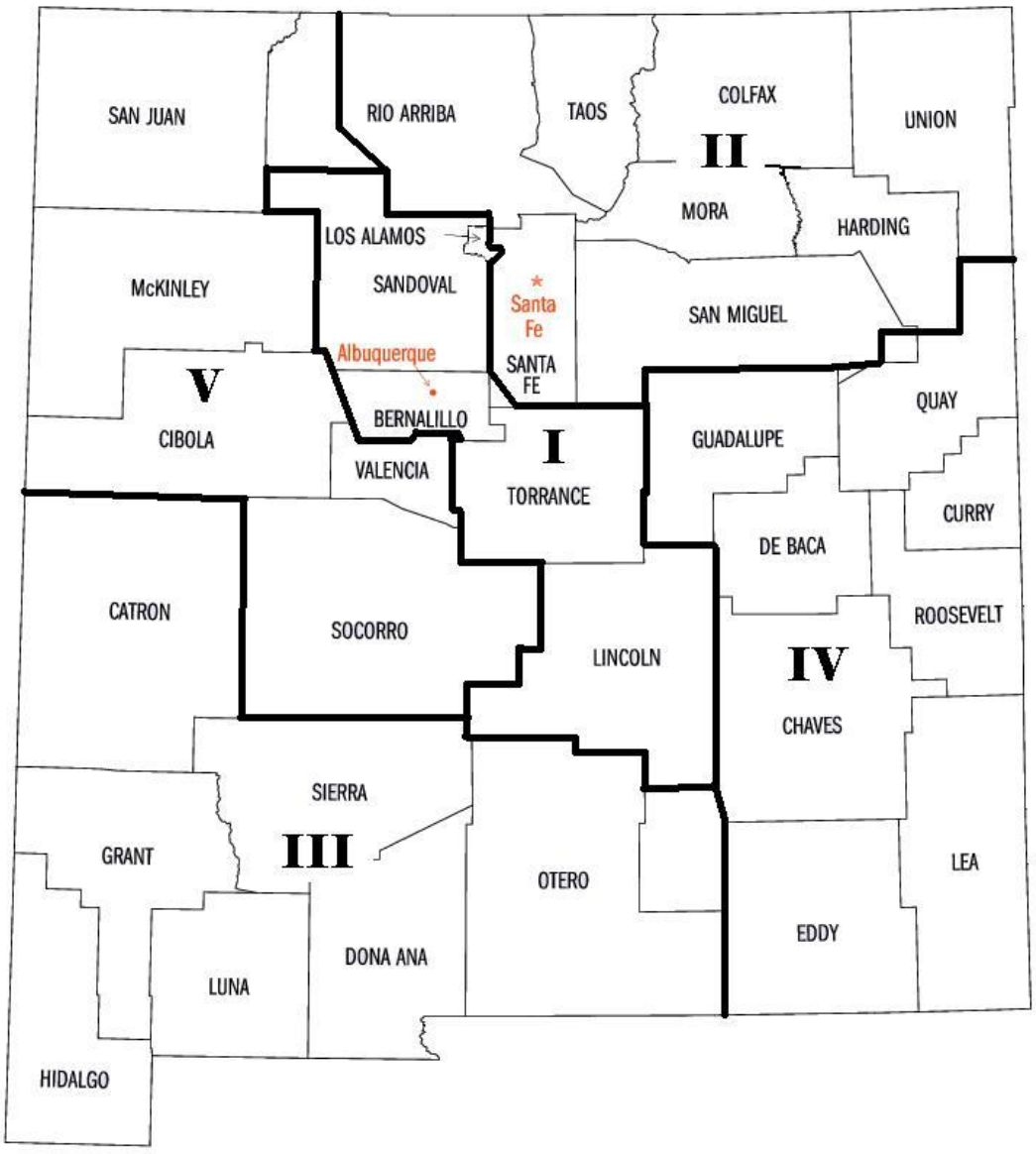
10.1.2 New Mexico Environment Department Contacts

Office	**City**	**Phone**	**Fax**
Food Program Manager	Santa Fe	(505)476-8608	(505)476-8654
District I Office	Albuquerque	(505)222-9500	(505)222-9510
District II Office	Santa Fe	(505)827-1840	(505)827-1839
District III Office	Las Cruces	(575)524-6300	(575)526-3891
District IV Office	Roswell	(575)624-6046	(575)624-2023
District V Office	Grants	(505)287-8845	(505)287-3415

NMED Field Offices by County				
Office	**County**	**City**	**Phone**	**Fax**
Albuquerque	Bernalillo	Albuquerque	(505)222-9500	(505)222-9510
Roswell	Chaves	Roswell	(575)624-6046	(575)624-2023
Grants	Cibola	Grants	(505)287-8845	(505)287-3415
Raton	Colfax	Raton	(575)445-3621	(575)445-3376

NMED Field Offices by County				
Office	**County**	**City**	**Phone**	**Fax**
Clovis	Curry	Clovis	(575)762-3728	(575)769-2527
Las Cruces	Dona Ana	Las Cruces	(575)524-6300	(575)526-3891
Carlsbad	Eddy	Carlsbad	(575)885-9023	(575)887-9283
Silver City	Grant	Silver City	(575)388-1934	(575)388-3258
Hobbs	Lea	Hobbs	(575)393-4302	(575)393-0906
Ruidoso	Lincoln	Ruidoso	(575)258-3272	(575)258-4891
Deming	Luna	Deming	(575)546-1464	(575)546-9075
Gallup	McKinley	Gallup	(505)722-4160	(505)863-2664
Alamogordo	Otero	Alamogordo	(575)437-7115	(575)434-1813
Tucumcari	Quay	Tucumcari	(575)461-1671	(575)461-1864
Espanola	Rio Arriba	Espanola	(505)753-7256	(505)753-1840
Farmington	San Juan	Farmington	(505)327-9851	(505)326-3747
Las Vegas	San Miguel	Las Vegas	(505)454-2800	(505)425-6604
Rio Rancho	Sandoval	Rio Rancho	(505)771-5980	(505)771-5981
Santa Fe	Santa Fe	Santa Fe	(505)827-1840	(505)827-1839
Socorro	Socorro	Socorro	(575)835-1287	(575)838-0962
Taos	Taos	Taos	(575)758-8808	(575)758-9851
Los Lunas	Valencia	Los Lunas	(505)841-5280	(505)841-5284

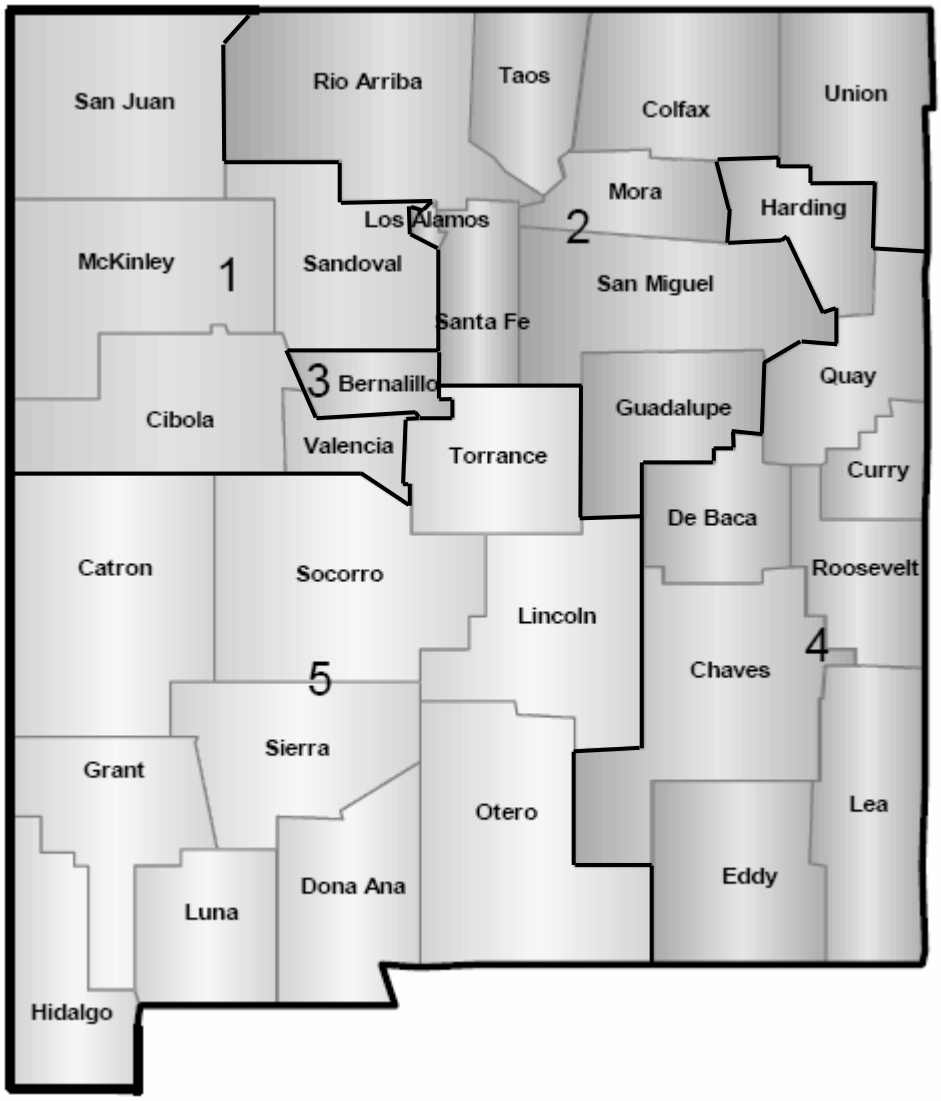
10.2 NMED Environmental Health Division District Map



Note: Some NMED District boundaries cross county lines.

District I: Los Alamos, Sandoval, Bernalillo, Torrance and Lincoln Counties
District II: Rio Arriba, Taos, Colfax, Union, Harding, Santa Fe, Mora and San Miguel Counties
District III: Catron, Grant, Sierra, Hidalgo, Luna, Doña Ana and Otero Counties
District IV: Guadalupe, Harding, Quay, DeBaca, Curry, Roosevelt, Chaves, Eddy and Lea Counties
District V: San Juan, Rio Arriba (East), McKinley, Cibola, Valencia and Socorro Counties

10.3 NMDOH Public Health Division Regional Map



Region 1: San Juan, McKinley, Sandoval, Cibola and Valencia Counties
Region 2: Rio Arriba, Taos, Colfax, Union, Los Alamos, Santa Fe, Mora, San Miguel, Guadalupe Counties
Region 3: Bernalillo County
Region 4: Harding, Quay, DeBaca, Curry, Roosevelt, Chaves, Eddy and Lea Counties
Region 5: Torrance, Catron, Socorro, Lincoln, Grant, Sierra, Hidalgo, Luna, Doña Ana and Otero Counties

10.4 New Mexico Notifiable Conditions List

http://www.health.state.nm.us/epi/NotifiableConditions_Final_063006.pdf

NOTIFIABLE DISEASES OR CONDITIONS IN NEW MEXICO
7.4.3.13 NEW MEXICO ADMINISTRATIVE CODE

ALL REPORTS MUST INCLUDE:

1. The disease or problem being reported;
2. Patient's name, date of birth/age, gender, race/ethnicity, address, telephone number, and occupation;
3. Physician or licensed healthcare professional (or laboratory) name and telephone number.
4. Laboratory or clinical samples for conditions marked with [*] are required to be sent to the Scientific Laboratory Division.
5. The Epidemiology and Response Division will provide guidance about what information to include for laboratory-confirmed influenza cases.

EMERGENCY REPORTING OF DISEASES OR CONDITIONS:

The following diseases, confirmed or suspected, require **immediate reporting** by telephone to Epidemiology and Response Division at (505) 827-0006. If no answer, call 1-866-885-6485.

Infectious Diseases

Anthrax*	Measles	Rubella (including congenital)
Avian influenza	Meningococcal infections, invasive*	Severe Acute Respiratory Syndrome (SARS)*
Botulism (any type)*	Pertussis*	Smallpox*
Cholera	Plague*	Tularemia*
Diphtheria*	Poliomyelitis, paralytic	Typhoid fever*
Haemophilus influenzae invasive infections*	Rabies	Yellow fever

Other Conditions

Suspected foodborne illness in two or more unrelated persons*	Illnesses suspected to be caused by the intentional or accidental release of biologic or chemical agents*	Severe smallpox vaccine reaction (includes accidental implantation, eczema vaccinatum, generalized vaccinia, progressive vaccinia)
Suspected waterborne illness in two or more unrelated persons*	Acute illnesses of any type involving large numbers of persons in the same geographic area	Other conditions of public health significance

Infectious Diseases in Animals

Anthrax	Rabies
Plague	Tularemia

ROUTINE REPORTING

Infectious Diseases (Report case within 24 hours to Epidemiology and Response Division at 1-800-432-4404 or 505-827-0006; or contact the local health office)

Brucellosis	Hepatitis A, acute	Rocky Mountain spotted fever
Campylobacter infections	Hepatitis B, acute or chronic	Salmonellosis*
Coccidioidomycosis	Hepatitis C, acute or chronic	Shigellosis*
Colorado tick fever	Hepatitis E, acute	St. Louis encephalitis infections
Cryptosporidiosis	Influenza, laboratory confirmed only (see 5 above)	*Streptococcus pneumoniae* invasive infections*
Cysticercosis	Legionnaires' disease	Tetanus
Cyclosporiasis	Leprosy	Trichinosis
E. coli 0157:H7 infections*	Leptospirosis	Toxic shock syndrome
E. coli , shiga-toxin producing (STEC) infections*	Listeriosis*	Varicella
Encephalitis, other	Lyme disease	*Vibrio* infections*
Giardiasis	Malaria	West Nile Virus infections
Group A streptococcal invasive infections*	Mumps	Western equine encephalitis infections
Group B streptococcal invasive infections*	Psittacosis	*Yersinia* infections*
Hantavirus pulmonary syndrome	Q fever	
Hemolytic uremic syndrome, postdiarrheal	Relapsing fever	

Infectious Diseases in Animals (Report case within 24 hours to Epidemiology and Response Division at 1-800-432-4404 or 505-827-0006; or contact the local health office).

Arboviral, other	Psittacosis
Brucellosis	West Nile Virus infections

Tuberculosis* or Other Nontuberculous Mycobacterial Infections

Report suspect or confirmed cases within 24 hours to Tuberculosis Program, NM Department of Health, P.O. Box 26110, Santa Fe, NM 87502-6110; or call 505-827-2474 or 505-827-2473.

Sexually Transmitted Diseases
Report to Infectious Disease Bureau - STD Program, NM Department of Health, P.O. Box 26110, Santa Fe, NM 87502-6110, Fax 505-476-3638; or call 505-476-3636.

Chancroid
Chlamydia trachomatis infections
Gonorrhea
Syphilis

HIV (Human Immunodeficiency Virus) and AIDS (Acquired Immunodeficiency Syndrome).
Report to HIV/AIDS Epidemiology Program, 1190 St. Francis Dr., N1350, Santa Fe, NM 87502, fax 505-476-3544 or call 505-476-3515.

HIV: (1) confirmed positive HIV antibody test (screening test plus confirmatory test), or (2) any test for HIV RNA or HIV cDNA ('viral load'), or (3) any test to detect HIV proteins, or (4) any positive HIV culture, or (5) any other test or condition indicative of HIV infection as defined by the United States Centers for Disease Control and Prevention.

AIDS: Opportunistic infections, cancers, CD4 lymphocyte count (<200 per □L or <14% of total lymphocytes), or any condition indicative of AIDS.

Occupational Illness and Injury
Report to New Mexico Occupational Health Registry, MSC 105550, 1 University of New Mexico, Albuquerque, NM 87131-0001.

Asbestosis
Chronic beryllium lung disease
Coal worker's pneumoconiosis
Heavy metal poisoning
Hypersensitivity pneumonitis
Mesothelioma
Noise induced hearing loss
Occupational asthma
Occupational pesticide poisoning
Silicosis
Other illnesses related to occupational exposure

Health Conditions Related to Environmental Exposures and Certain Injuries
Report to Epidemiology and Response Division, NM Department of Health, P.O. Box 26110, Santa Fe, NM 87502-6110; or call 1-800-432-4404 or 505-827-0006.

Environmental Exposures

Acetylcholinesterase (all blood levels)
All pesticide poisoning
Arsenic in urine greater than 50 micrograms/liter
Infant methemoglobinemia
Lead (all blood levels)
Mercury in urine greater than 3 micrograms/liter and/or
Mercury in blood greater than 5 micrograms/liter
Other suspected environmentally-induced health conditions

Select Injuries
Drug overdose
Firearm injuries
Spinal cord injuries
Traumatic brain injuries

Adverse Vaccine Reactions
Report to Vaccine Adverse Events Reporting System, http://www.vaers.hhs.org. Send copy of report to Immunization Program Vaccine Manager, NM Department of Health, P.0. Box 26110, Santa Fe, NM 87502-6110; fax 505-827-1741.

Cancer
Report to New Mexico Tumor Registry, University of New Mexico School of Medicine, Albuquerque, NM 87131. Report all malignant and in situ neoplasms and all intracranial neoplasms, regardless of the tissue of origin.

Human Papillomavirus (HPV)
Laboratories report the following tests to the New Mexico HPV Pap Registry, 1816 Sigma Chi Rd NE, Albuquerque, NM 87131, phone (505) 272-5785 or (505) 277-0266.

Papanicolaou test results (all results)
Cervical pathology results (all results)
HPV test results (all results)

Birth Defects and Congenital Hearing Loss
Report to Children's Medical Services, 2040 S. Pacheco, Santa Fe, NM 87505; or call 505-476-8868.

All birth defects diagnosed by age 4 years, including:
Defects diagnosed during pregnancy
Defects diagnosed on fetal deaths

Suspected or confirmed congenital hearing loss in one or both ears
All conditions identified through statewide newborn genetic screening

For details online of 7.4.3.13 NMAC see: http://www.nmcpr.state.nm.us/nmac/parts/title07/07.004.0003.htm

10.5 Recommended references

Publications

Manual for Investigation and Control of Communicable Diseases in New Mexico
New Mexico Department of Health, Epidemiology and Response Division

Red Book: 2006 Report of the Committee on Infectious Diseases, 27th Edition
American Academy of Pediatrics
aapredbook.aappublications.org

Control of Communicable Diseases Manual, 18th Edition
American Public Health Association
www.apha.org/media/science.htm

Procedures to Investigate Foodborne Illness, 5th Edition
International Association for Food Protection
www.foodprotection.org/publications/otherpublications.asp

Diagnosis and Management of Foodborne Illnesses
American Medical Association, American Nurses Association, CDC, FDA and USDA
www.ama-assn.org/ama/pub/category/3629.html

Websites

CDC Food Safety Information
www.cdc.gov/foodsafety

US Government Food Safety Information Gateway
www.foodsafety.org

FDA Bad Bug Book
www.cfsan.fda.gov/~mow/intro.html

Fight BAC!™ Education Campaign
www.fightbac.org

CDC listing of foodborne diseases, pathogens and toxins
www.cdc.gov/foodsafety/disease.htm

CDC listing of foodborne disease outbreaks by year
www.cdc.gov/foodborneoutbreaks/outbreak_data.htm

10.6 Table of foodborne illnesses and associated characteristics

10.6 Table of Foodborne Illnesses and Associated Characteristics: Bacterial Agents[1]

Agent	Usual Incubation Period (Range)[2,3,4]	Signs and Symptoms[2,3,4]	Duration[2,3]	Associated foods[2]	Period of Communicability[2,3]	CDC criteria for outbreak confirmation[5]
						SLD Test Kit
Bacillus cereus (diarrheal form)	10-16 hours	Abdominal cramps, watery diarrhea, nausea.	24-48 hours	Meats, stews, gravies, vanilla sauce.	Not communicable (enterotoxin formed in vivo).	Isolation of 10^5 organisms per gram from stool of two or more ill persons and not from stool of control patients OR isolation of 10^5 organisms per gram from epidemiologically implicated food, provided specimen is properly handled.
						Enteric Transport Kit
Bacillus cereus (emetic form)	1-6 hours	Sudden onset of severe nausea and vomiting, diarrhea may be present.	24 hours	Improperly refrigerated cooked and fried rice, meats.	Not communicable (preformed enterotoxin).	Isolation of 10^5 organisms per gram from stool of two or more ill persons and not from stool of control patients OR isolation of 10^5 organisms per gram from epidemiologically implicated food, provided specimen is properly handled.
						Enteric Transport Kit
Brucellosis (*Brucella abortus, B. melitensis, B. suis*)	7-21 days	Fever, chills, sweating, weakness, headache, muscle and joint pain, diarrhea, bloody stool during acute phase.	Weeks	Unpasteurized milk, unpasteurized cheese, contaminated meat.	Not known to be communicable from person to person.	Isolation of organism in culture of blood or bone marrow from two or more ill persons OR greater than fourfold increase in standard agglutination titer (SAT) over several weeks or single SAT greater than or equal to 1:160 in two or more ill persons who have compatible clinical symptoms and history of exposure.
						Call SLD General Microbiology at 841-2541 for testing options.
Campylobacter jejuni	2-5 days (1-10 days)	Diarrhea, cramps, vomiting and fever; diarrhea may be bloody.	2-10 days	Raw and undercooked poultry, unpasteurized milk, contaminated water.	2-7 weeks	Isolation of organism from clinical specimens from two or more ill persons OR isolation of organism from epidemiologically implicated food.
						Enteric Transport Kit
Clostridium botulinum (Foodborne botulism)	12-72 hours	Vomiting, diarrhea, blurred vision, diplopia, dysphagia, descending muscle weakness.	From days to months, can be complicated by respiratory failure and death	Home-canned foods with a low acid content, improperly canned commercial foods, home-canned or fermented fish, foil-wrapped baked potatoes	*Not communicable (preformed enterotoxin).*	Detection of botulinum toxin in serum, stool, gastric contents, or implicated food OR isolation of organism from stool or intestine.
						Stool, serological and food testing available through CDC. Call SLD General Microbiology at 841-2541 for specimen requirements.

10.6 Table of Foodborne Illnesses and Associated Characteristics: Bacterial Agents[1]

Agent	Usual Incubation Period (Range)[2,3,4]	Signs and Symptoms[2,3,4]	Duration[2,3]	Associated foods[2]	Period of Communicability[2,3]	CDC criteria for outbreak confirmation[5]
						SLD Test Kit
Clostridium perfringens	8-16 hours	Watery diarrhea, nausea, abdominal cramps.	24-48 hours	Meats, poultry, gravy, dried or precooked foods.	Not communicable (enterotoxin formed in vivo).	Isolation of 10^6 organisms per gram from stool of two or more ill persons, provided specimen is properly handled OR Demonstration of enterotoxin in the stool of two or more ill persons OR Isolation of 10^5 organisms per gram from epidemiologically implicated food, provided specimen is properly handled.
						Culture - Enteric Transport Kit Toxin testing - Bulk Stool Kit
Enterohemorrhagic *E. coli* (EHEC) including *E. coli* O157:H7 and other Shiga toxin-producing *E. coli* (STEC)	3-4 days (2-8 days)	Diarrhea that is often bloody, severe abdominal pain; fever occurs in less than 1/3 of cases.	5-10 days	Ground beef, unpasteurized milk and juice, fresh produce.	For the duration of excretion of the pathogen; typically a week or less in adults, but 3 weeks in 1/3 of children.	Isolation of organism from clinical specimens from two or more ill persons OR isolation of organism from epidemiologically implicated food.
						Enteric Transport Kit
Enterotoxigenic E. coli (ETEC)	1-3 days (6 hours to 3 days)	Diarrhea, abdominal cramps, nausea; vomiting and fever less common	3-7 days or longer	Contaminated fruits, vegetables and water.	For the duration of excretion of the pathogen, which may be prolonged.	Isolation of organism of same serotype, demonstrated to produce heat-stable (ST) and/or heat-labile (LT) enterotoxin, from stool of two or more ill persons
						Enteric Transport Kit. Requires special laboratory techniques. Contact General Microbiology at 841-2541.
Listeria monocytogenes	9-48 hours for gastrointestinal symptoms, 2-6 weeks for invasive disease	Fever, muscle aches and nausea or diarrhea. Pregnant women may have mild flu-like illness and infection may lead to miscarriage. High risk patients may have meningitis or sepsis. Neonates may have pneumonia, sepsis or meningitis.	Variable	Unpasteurized milk, fresh soft cheeses, ready-to-eat deli meats, hot dogs.	Infected persons can shed the organism for a week to several months.	Isolation of organism of same serotype from stool of two or more ill persons exposed to food that is epidemiologically implicated or from which organism of same serotype has been isolated.
						Enteric Transport Kit.

10.6 Table of Foodborne Illnesses and Associated Characteristics: Bacterial Agents[1]

Agent	Usual Incubation Period (Range)[2,3,4]	Signs and Symptoms[2,3,4]	Duration[2,3]	Associated foods[2]	Period of Communicability[2,3]	CDC criteria for outbreak confirmation[5]
						SLD Test Kit
Salmonella spp. (non-Typhi)	12-36 hours (6-72 hours)	Diarrhea, fever, abdominal pain, nausea, headache.	4-7 days	Eggs, poultry, meat, unpasteurized milk or juice, contaminated fresh produce.	Throughout course of infection; Carrier state may occur with excretion months to >1 year.	Isolation of organism of same serotype from clinical specimens from two or more ill persons OR isolation of organism from epidemiologically implicated food.
						Enteric Transport Kit
Salmonella Typhi	8-14 days (3-30 days)	Gradual onset of fever, headache, malaise, anorexia, abdominal pain. May have rose spots on trunk, hepato-splenomegaly.		Food or water contaminated by feces or urine of infected patients or chronic carriers.	As long as organism is in excreta (i.e., stool or urine); 2-5% of infected persons become permanent gallbladder carriers.	Isolation of organism from clinical specimens from two or more ill persons OR isolation of organism from epidemiologically implicated food.
						Enteric Transport Kit
Shigella spp.	1-3 days (1-7 days)	Diarrhea, fever, and cramps; stool may contain blood or mucus.	4-7 days	Food or water contaminated by feces of infected persons; usually person-to person spread.	During acute phase of illness, and usually less than 4 weeks.	Isolation of organism of same serotype from clinical specimens from two or more ill persons OR Isolation of organism from epidemiologically implicated food.
						Enteric Transport Kit
Staphylococcus aureus	1-6 hours	Sudden onset of severe nausea and vomiting. Abdominal cramps. Diarrhea and fever may be present.	24-48 hours	Unrefrigerated or improperly refrigerated foods.	Not communicable (preformed enterotoxin)	Isolation of organism of same phage type from stool or vomitus of two or more ill persons OR Detection of enterotoxin in epidemiologically implicated food OR Isolation of 10^5 organisms per gram from epidemiologically implicated food, provided specimen is properly handled.
						Enteric Transport Kit
Vibrio cholerae, O1 or O139	1-3 days (few hours to 5 days)	Profuse watery diarrhea and vomiting.	3-7 days	Fish, shellfish, water or food contaminated by infected persons	Usually a few days after recovery, except carrier state.	Isolation of toxigenic organism from stool or vomitus of two or more ill persons OR significant rise in vibriocidal, bacterial-agglutinating, or antitoxin antibodies in acute- and early convalescent-phase sera among persons not recently immunized OR isolation of toxigenic organism from epidemiologically implicated food.
						Enteric Transport Kit

10.6 Table of Foodborne Illnesses and Associated Characteristics: Bacterial Agents[1]

Agent	Usual Incubation Period (Range)[2,3,4]	Signs and Symptoms[2,3,4]	Duration[2,3]	Associated foods[2]	Period of Communicability[2,3]	CDC criteria for outbreak confirmation[5]
						SLD Test Kit
Vibrio parahaemolyticus	2-48 hours	Watery diarrhea, abdominal cramps, nausea, vomiting.	2-5 days	Undercooked or raw fish or shellfish.	Not normally communicable from person to person.	Isolation of Kanagawa-positive organism from stool of two or more ill persons OR Isolation of 10^5 Kanagawa-positive organisms per gram from epidemiologically implicated food, provided specimen is properly handled.
						Enteric Transport Kit
Yersinia enterocolitica and *Yersinia pseudotuberculosis*	24-48 hours	Appendicitis-like symptoms (diarrhea and vomiting, fever, and abdominal pain) occur primarily in older children and young adults. May have a scarlitiniform rash with *Y. pseudotuberculosis*.	1-3 weeks	Undercooked pork, unpasteurized milk, tofu, contaminated water. Infection has occurred in infants whose caretakers handled chitterlings.	Secondary transmission appears rare. There is fecal shedding as long as symptoms exist. Untreated cases may excrete organism for 2-3 months. Prolonged asymptomatic carriage has been reported in children and adults.	Isolation of organism from clinical specimen from two or more ill persons OR Isolation of pathogenic strain of organism from epidemiologically implicated food.
						Enteric Transport Kit

10.6 Table of Foodborne Illnesses and Associated Characteristics: Viral Agents[1]

Agent	Usual Incubation Period (Range)[2,3,4]	Signs and Symptoms[2,3,4]	Duration[2,3]	Associated foods[2]	Period of Communicability[2,3]	CDC criteria for outbreak confirmation[5]
						SLD Test Kit
Norovirus (and other caliciviruses)	12-48 hours (10-72 hours)	Nausea, vomiting, abdominal cramping, diarrhea, fever, myalgia and some headache. Diarrhea is more prevalent in adults and vomiting is more prevalent in children.	16-60 hours	Shellfish harvested from contaminated waters, fecally contaminated foods, ready-to-eat foods contaminated by infected food handlers.	Not well characterized, generally thought to be 48-72 hours after symptoms resolve but in some studies viral antigen has been detected in stool up to 2 weeks after exposure.[6]	Detection of viral RNA in at least two bulk stool or vomitus specimens by real-time or conventional reverse transcriptase-polymerase chain reaction (RT-PCR) OR Visualization of viruses (NoV) with characteristic morphology by electron microscopy in at least two or more bulk stool or vomitus specimens OR Two or more stools positive by commercial enzyme immunoassay (EIA).
						Bulk Stool Kit
Hepatitis A	28 days (15-50 days)	Diarrhea, dark urine, jaundice, fever, headache, nausea, and abdominal pain.	Variable, 2 weeks-3 months	Shellfish harvested from contaminated waters, fecally contaminated foods, ready-to-eat foods contaminated by infected food handlers.	Maximum infectivity occurs during the 1 to 2 weeks before illness onset and diminishes by one week after onset of jaundice.	Detection of immunoglobulin M antibody to hepatitis A virus (IgM anti-HAV) in serum from two or more persons who consumed epidemiologically implicated food.
						Serologic testing available at SLD. Contact Virology/Serology at 841-2535.

10.6 Table of Foodborne Illnesses and Associated Characteristics: Parasitic Agents[1]

Agent	Usual Incubation Period (Range)[2,3,4]	Signs and Symptoms[2,3,4]	Duration[2,3]	Associated foods[2]	Period of Communicability[2,3]	CDC criteria for outbreak confirmation[5]
						SLD Test Kit
Cryptosporidium	7 days (2-28 days)	Diarrhea (usually watery), stomach cramps, upset stomach, slight fever.	May be remitting and relapsing over weeks to months.	Drinking water, food contaminated by infected food handlers.	Usually 2 weeks after recovery, but shedding can continue for up to 2 months.	Demonstration of organism or antigen in stool or in small-bowel biopsy of two or more ill persons OR demonstration of organism in epidemiologically implicated food.
						Ova and Parasite Exam Kit
Cyclospora cayetanensis	7 days (1-14 days)	Diarrhea (usually watery), loss of appetite, weight loss, stomach cramps, nausea, vomiting, fatigue.	May be remitting and relapsing over weeks to months.	Fresh produce, berries, lettuce, herbs.	Unknown, person-to-person transmission has not been documented.	Demonstration of organism in stool of two or more ill persons.
						Ova and Parasite Exam Kit
Giardia lamblia	7-10 days (3-25 days)	Diarrhea, stomach cramps, gas.	Days to weeks	Any food contaminated by infected food handler, drinking water.	As long as the organism is excreted in stool. Symptomatic giardiasis in adults usually lasts from 2 weeks to 2 months.	Demonstration of the parasite in stool or small-bowel biopsy specimen of two or more ill persons.
						Bulk Stool Collection Kit

10.6 Table of Foodborne Illnesses and Associated Characteristics: Non-infectious Agents[1]

Agent	Usual Incubation Period (Range)[2,3,4]	Signs and Symptoms[2,3,4]	Duration[2,3]	Associated foods[2]	Period of Communicability[2,3]	CDC criteria for outbreak confirmation[5]
						SLD Test Kit
Ciguatoxin	2-8 hours (1-48 hours)	Usually abdominal pain, nausea, vomiting, diarrhea, followed by neurologic symptoms including paresthesias, and reversal of hot or cold sensation.	Variable, days to months	Large reef fish. Grouper, red snapper, amberjack, and barracuda.	Not communicable.	Demonstration of ciguatoxin in epidemiologically implicated fish OR Clinical syndrome among persons who have eaten a type of fish previously associated with ciguatera fish poisoning (e.g., snapper, grouper, or barracuda).
						No patient testing available. Collect suspect fish and contact Environmental Microbiology at 841-2537.
Scombroid toxin (histamine)	Within 6 hours (1 minute to 3 hours)	Flushing, rash, burning sensation of skin, mouth and throat, dizziness, urticaria, paresthesias.	3-6 hours	Mishandled fish (bluefin, tuna, skipjack, mackerel, marlin, escolar and mahi mahi)	Not communicable.	Demonstration of histamine in epidemiologically implicated fish OR Clinical syndrome among persons who have eaten a type of fish previously associated with histamine fish poisoning (e.g., mahi-mahi or fish of order Scomboidei).
						No patient testing available. Collect suspect fish and contact Environmental Microbiology at 841-2537.
Paralytic shellfish poisoning	30 minutes to 3 hours	Diarrhea, nausea, vomiting leading to parasthesias of mouth, lips, weakness, dysphagia, dysphonia, respiratory paralysis.	Days	Scallops, mussels, clams, cockles.	Not communicable.	Detection of toxin in epidemiologically implicated food OR Detection of large numbers of shellfish-poisoning-associated species of dinoflagellates in water from which epidemiologically implicated mollusks are gathered.
						No patient testing available. Collect suspect food and contact Environmental Microbiology at 841-2537.
Puffer fish (tetrodotoxin)	10-45 minutes (10 minutes to 3 hours)	Parasthesias, vomiting, diarrhea, abdominal pain, ascending paralysis, respiratory failure.	Death, usually in 4-6 hours	Puffer fish.	Not communicable.	Demonstration of tetrodotoxin in epidemiologically implicated fish OR Clinical syndrome among persons who have eaten puffer fish.
						No patient testing available. Collect suspect food and contact Environmental Microbiology at 841-2537.
Heavy metals (antimony, cadmium, copper, iron, tin, zinc)	5 minutes to 8 hours, usually < 1 hour	Vomiting, nausea, often metallic taste	Usually self-limited	Acidic foods or beverages prepared, stored or cooked in containers coated, lines or contaminated with metal.	Not communicable.	Demonstration of high concentration of metal in epidemiologically implicated food.
						No patient testing available. Collect suspect food or metal container and contact Environmental Microbiology at 841-2537.

10.6 Table of Foodborne Illnesses and Associated Characteristics: Non-infectious Agents[1]

Agent	Usual Incubation Period (Range)[2,3,4]	Signs and Symptoms[2,3,4]	Duration[2,3]	Associated foods[2]	Period of Communicability[2,3]	CDC criteria for outbreak confirmation[5]
						SLD Test Kit
Mushroom toxins, shorter-acting (muscimol, muscarine, psilocybin, coprinus artrementaris, ibotenic acid	< 2 hours	Vomiting, diarrhea, confusion, visual disturbance, salivation, diaphoresis, hallucinations, disulfiram-like reaction.	Self-limited	Wild mushrooms	Not communicable.	Clinical syndrome among persons who have eaten mushroom identified as toxic type OR Demonstration of toxin in epidemiologically implicated mushroom or food containing mushroom
						No patient testing available. Collect suspect food and contact Environmental Microbiology at 841-2537.
Mushroom toxins, longer-acting (amanitin)	4-8 hours diarrhea; 24-48 hours liver failure	Diarrhea, abdominal cramps, leading to hepatic and renal failure	Often fatal	Mushrooms	Not communicable.	Clinical syndrome among persons who have eaten mushroom identified as toxic type OR Demonstration of toxin in epidemiologically implicated mushroom or food containing mushrooms.
						No patient testing available. Collect suspect food and contact Environmental Microbiology at 841-2537.

1. This table is based on a similar table developed by the Acute and Communicable Disease Prevention Program of the Oregon Department of Human Services. Available at http://oregon.gov/DHS/ph/acd/reporting/guideln/compend.pdf. Accessed October 18, 2006.
2. CDC. Diagnosis and management of foodborne illness: a primer for physicians and other healthcare providers. MMWR. 2004;53(RR4):1-33. Produced collaboratively by the American Medical Association; American Nurses Association - American Nurses Foundation; Centers for Disease Control and Prevention, Center for Food Safety and Applied Nutrition, Food and Drug Administration; Food Safety and Inspection Service, US Department of Agriculture. Available at http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5304a1.htm. Accessed October 18, 2006.
3. Heymann DL, ed. Control of Communicable Diseases Manual, 18th ed. Washington, DC: American Public Health Association; 2004.
4. Pickering LK, ed. Red Book: 2003 Report of the Committee on Infectious Diseases, 26th ed. Elk Grove Village, IL: American Academy of Pediatrics; 2003.
5. CDC. Guide to confirming a diagnosis in foodborne disease. Available at http://www.cdc.gov/foodborneoutbreaks/guide_fd.htm. Accessed October 18, 2006.
6. CDC. "Norwalk-like viruses:" public health consequences and outbreak management. MMWR 2001;50(RR9):1-13.

10.7 Table of clinical syndromes associated with foodborne illnesses

10.7 Table of Clinical Syndromes Associated with Foodborne Illnesses[1]

Nausea and vomiting, *without fever*

Usual incubation period	Agent	Table
Usually < 1 hour	Heavy metals (copper, tin, cadmium, iron, zinc)	Non-infectious
1-6 hours	*Bacillus cereus*, emetic form	Bacterial
1-6 hours	*Staphylococcus aureus*	Bacterial

Abdominal cramps, watery diarrhea, vomiting, *without fever*

Usual incubation period	Agent	Table
8-16 hours	*Clostridium perfringens*	Bacterial
10-16 hours	*Bacillus cereus*, diarrheal form	Bacterial
10-72 hours	Norovirus, including other caliciviruses	Viral
1-3 days	*Vibrio cholerae*	Bacterial
1-3 days	Enterotoxigenic *E. coli* (ETEC)	Bacterial
7 days	*Cyclospora*	Parasitic
7 days	*Cryptosporidium*	Parasitic
7-10 days	*Giardia lamblia*	Parasitic

Abdominal cramps, bloody diarrhea, *with fever*

Usual incubation period	Agent	Table
2-48 hours	*Vibrio parahaemolyticus*	Bacterial
6-72 hours	*Salmonella* species (non-Typhi)	Bacterial
1-2 days	*Yersinia enterocolitica*	Bacterial
1-3 days	*Shigella* species	Bacterial
2-5 days	*Campylobacter* species	Bacterial

Abdominal cramps, bloody diarrhea, *without fever*

Usual incubation period	Agent	Table
3-4 days	Enterohemorrhagic *E. coli* (*E. coli* O157:H7 and STECs)	Bacterial

Neurologic manifestations (e.g., paresthesias, respiratory depression, cranial nerve palsies)

Usual incubation period	Agent	Table
10-45 minutes	Puffer fish (tetrodotoxin)	Non-infectious
30 minutes-3 hours	Paralytic shellfish poisoning	Non-infectious
< 2 hours	Mushroom toxins, shorter-acting	Non-infectious
2-8 hours	Ciguatoxin	Non-infectious
< 6 hours	Scombroid (histamine)	Non-infectious
4-8 hours GI symptoms, 1-2 days liver failure	Mushroom toxins, longer-acting	Non-infectious
12-72 hours	*Clostridium botulinum* (foodborne botulism)	Bacterial

Systemic illness (e.g., fever, weakness, arthritis, jaundice)

Usual incubation period	Agent	Table
9-48 hours GI symptoms, 2-6 weeks invasive disease	*Listeria monocytogenes*	Bacterial
7-21 days	Brucellosis	Bacterial
8-14 days	*Salmonella* Typhi	Bacterial
28 days	Hepatitis A	Viral

Adapted from Appendix VI. Clinical Syndromes Associated with Foodborne Diseases. In Pickering LK, ed. Red Book: 2003 Report of the Committee on Infectious Diseases, 26th ed. Elk Grove Village, IL: American Academy of Pediatrics; 2003:810-813.

10.8 Work and daycare exclusion criteria

Daycare attendees and staff

The following exclusion criteria apply to daycare attendees and daycare staff members.

- **Campylobacteriosis**
  - Exclude symptomatic persons until diarrhea has stopped.
- **Cryptosporidosis**
  - Exclude symptomatic persons until diarrhea has stopped.
- **Shiga toxin-producing *E. coli* infections (STEC) (includes *E. coli* O157:H7)**
  - Exclude symptomatic persons until diarrhea has stopped AND two stool cultures obtained at least 24 hours apart and at least 48 hours after completion of antibiotic therapy (if given) have tested negative for STEC.
- **Giardiasis**
  - Exclude symptomatic persons until diarrhea has stopped.
- **Hepatitis A**
  - Exclude persons for 1 week after onset of illness.
- **Salmonellosis**
  - Exclude symptomatic persons until diarrhea has stopped.
- **Salmonella Typhi infection (Typhoid fever)**
  - Exclude symptomatic persons and asymptomatic chronic carriers until diarrhea has stopped AND three consecutive stool or urine cultures taken at least one month apart and 48 hours after completion of antibiotic therapy (if given) have tested negative for *S.* Typhi. The first stool culture should be taken no earlier than one month after symptom onset. If any culture is positive, repeat cultures at intervals of one month during the 12 months following symptom onset until at least three consecutive negative cultures are obtained.
- **Shigellosis**
  - Exclude symptomatic persons until diarrhea has stopped AND two consecutive stool cultures obtained at least 24 hours apart and at least 48 hours after completion of antibiotic therapy (if given) have tested negative for *Shigella*.
- **Other infectious diarrheal illness**
  - Exclude symptomatic children and staff until diarrhea has stopped.

Health care workers

The following work exclusion criteria apply to persons providing direct care for infants, elderly or immunocompromised persons, or hospitalized or institutionalized patients.

- **Campylobacteriosis**
  - Exclude symptomatic persons from direct care duties until diarrhea has stopped.
  - May exclude asymptomatic infected persons from direct care duties if personal hygiene habits (as assessed by trained environmentalist or infections control practitioner) are inadequate to prevent transmission to patients.
- **Cryptosporidiosis**
  - Exclude symptomatic persons from direct care duties until diarrhea has stopped.
- **Shiga toxin-producing *E. coli* infections (STEC) (includes *E. coli* O157:H7)**
  - Exclude symptomatic persons from direct care duties until diarrhea has stopped AND two stool cultures obtained at least 24 hours apart and at least 48 hours after completion of antibiotic therapy (if given) have tested negative for STEC.
- **Giardiasis**
  - Exclude symptomatic persons from direct care duties until diarrhea has stopped.
- **Hepatitis A**
  - Exclude persons from direct care duties for 1 week after onset of illness.
- **Salmonellosis**
  - Exclude symptomatic persons from direct care duties until diarrhea has stopped AND proper hygiene measures can be maintained (as assessed by a trained environmentalist or food sanitarian) AND one stool culture taken at least 48 hours after completion of antibiotic therapy (if given) has tested negative for *Salmonella*. If a stool culture is positive, it should be repeated until negative.
  - May exclude asymptomatic infected persons from direct care duties if personal hygiene habits (as assessed by trained environmentalist or infections control practitioner) are inadequate to prevent transmission to patrons.
- ***Salmonella* Typhi infection (Typhoid fever)**
  - Exclude symptomatic persons and asymptomatic chronic carriers from direct care duties until diarrhea has stopped AND three consecutive stool or urine cultures taken at least one month apart and 48 hours after completion of antibiotic therapy (if given) have tested negative for *S.* Typhi. The first stool culture should be taken no earlier than one month after symptom onset. If any culture is positive, repeat cultures at intervals of one month during the 12 months following symptom onset until at least three consecutive negative cultures are obtained.
  - Health care workers who are household or close contacts of laboratory-confirmed cases should be excluded from direct care duties until at least 2 negative stool or urine cultures, taken at least 24 hours apart, are obtained.
- **Shigellosis**
  - Exclude symptomatic persons from direct care duties until diarrhea has stopped AND two consecutive stool cultures obtained at least 24 hours apart and at least 48 hours after completion of antibiotic therapy (if given) have tested negative for *Shigella*.
- **Other infectious diarrheal illness**
  - Exclude symptomatic persons from direct care duties until diarrhea has stopped.

Food Handlers

The following work exclusion criteria apply to persons with food handling responsibilities.

- **Campylobacteriosis**
  - Exclude symptomatic persons from food handling until diarrhea has stopped.
  - May exclude asymptomatic infected persons from food handling if personal hygiene habits (as assessed by trained environmentalist or food sanitarian) are inadequate to prevent transmission to patrons.
- **Cryptosporidiosis**
  - Exclude symptomatic persons from food handling until diarrhea has stopped.
- **Shiga toxin-producing *E. coli* infections (STEC) (includes *E. coli* O157:H7)**
  - Exclude symptomatic persons from food handling until diarrhea has stopped AND two stool cultures obtained at least 24 hours apart and at least 48 hours after completion of antibiotic therapy (if given) have tested negative for STEC.
- **Giardiasis**
  - Exclude symptomatic persons from food handling until diarrhea has stopped.
- **Hepatitis A**
  - Exclude persons from food handling for 1 week after onset of illness.
- **Salmonellosis**
  - Exclude symptomatic persons from food handling until diarrhea has stopped AND proper hygiene measures can be maintained (as assessed by a trained environmentalist or food sanitarian) AND one stool culture taken at least 48 hours after completion of antibiotic therapy (if given) has tested negative for *Salmonella*. If a stool culture is positive, it should be repeated until negative.
  - May exclude asymptomatic infected persons if personal hygiene habits (as assessed by trained environmentalist or food sanitarian) are inadequate to prevent transmission to patrons.
- ***Salmonella* Typhi infection (Typhoid fever)**
  - Exclude symptomatic persons and asymptomatic chronic carriers from food handling until diarrhea has stopped AND three consecutive stool or urine cultures taken at least one month apart and 48 hours after completion of antibiotic therapy (if given) have tested negative for *S.* Typhi. The first stool culture should be taken no earlier than one month after symptom onset. If any culture is positive, repeat cultures at intervals of one month during the 12 months following symptom onset until at least three consecutive negative cultures are obtained.
  - Food handlers who are household or close contacts of laboratory-confirmed cases should be excluded from food handling until at least 2 negative stool or urine cultures, taken at least 24 hours apart, are obtained.
- **Shigellosis**
  - Exclude symptomatic persons from food handling until diarrhea has stopped AND two consecutive stool cultures obtained at least 24 hours apart and at least 48 hours after completion of antibiotic therapy (if given) have tested negative for *Shigella*.
- **Other infectious diarrheal illness**
  - Exclude symptomatic persons from food handling until diarrhea has stopped.

10.9 Recall and traceback procedures

10.9.1 Recalls

This procedure applies to all Class I, Class II, and Class III recalls including those from the United States Food and Drug Administration (FDA), the United States Department of Agriculture (USDA), and manufacturers of food products identified as adulterated or misbranded by NMED Field Inspectors or through customer complaints.

A recall is intended to remove food products from commerce when there is reason to believe the products may be adulterated or misbranded. The recall can be initiated voluntarily or be made mandatory once sufficient evidence is provided to determine that a food product is adulterated or misbranded.

Definitions

Class I - A Class I recall involves a health hazard situation in which there is a reasonable probability that eating the food will cause health problems or death**.**

Class II - A Class II recall involves a potential health situation in which there is a remote probability of adverse health consequences from eating the food.

Class III - A Class III recall involves a situation in which eating the food will not cause adverse health consequences.

Steps for Class I and Class II Recalls

1. Recall announcements from FDA and USDA are checked daily by the assigned NMED recall coordinator. For each Class I and Class II recall that affects food products distributed in New Mexico, the recall coordinator prepares a recall notice on the NMED Recall Notice Template (Section 10.9.3) and prepares a list of distributors and vendors to which the manufacturer has distributed the product(s).

2. The recall notice and distributor list should be faxed or e-mailed to the following:

    - All NMED Field Offices
    - NMED Food Program Manager
    - NMED Public Information Officer
    - NMED Environmental Health Division Director
    - NMDOH Foodborne Disease Epidemiologist
    - Bernalillo County Environmental Health Office
    - City of Albuquerque Environmental Health Department

3. The NMED Public Information Officer (PIO) will coordinate all press releases regarding the recall.

4. NMED field staff will follow the instructions specified in the recall notice.

5. In the event of vendor resistance, NMED field staff should condemn or embargo the recalled product(s).

Steps for Class III Recalls

1. Class III recall notices are distributed primarily as an "FYI" to enable NMED field staff to answer any questions from the public. Recall announcements from FDA and USDA are checked daily by the assigned NMED recall coordinator. For each Class III recall that affects food products distributed in New Mexico, the recall coordinator prepares a recall notice on the NMED Recall Notice Template (Section 10.9.3).

2. The recall notice information should be faxed or emailed to the following:

    - All NMED Field Offices
    - NMED Food Program Manager
    - NMED Public Information Officer
    - NMED Environmental Health Division Director
    - Bernalillo County Environmental Health Office
    - City of Albuquerque Environmental Health Department

3. There is rarely a need for press releases or further staff action for Class III recalls.

Steps for Notification from Other Sources

If a NMED Field Office receives a recall announcement from a source other than FDA, USDA or a manufacturer, the NMED Food Program Manager should be informed immediately so that all offices and appropriate persons can be notified as quickly as possible.

10.9.2 Tracebacks

The purpose of a traceback is to follow the flow of a food product back to its original source. The steps in the process from the finished product to the farm ingredients used are investigated to identify the source of the product adulteration and/or product process break down.

Traceback of food products processed outside of New Mexico are coordinated by FDA and/or USDA. The NMED Food Program Manager will act as a liaison with FDA and/or USDA and coordinate New Mexico efforts in a traceback.

Traceback of food products processed within New Mexico will be coordinated by the regulatory agency that has jurisdiction over the food processor.

10.9.3 NMED Recall Notice Template

BILL RICHARDSON
GOVERNOR

State of New Mexico
ENVIRONMENT DEPARTMENT
Environmental Health Division
525 Camino de Los Marquez, Suite 5
Santa Fe, New Mexico 87505
Tele: (505) 476-8600
www.nmenv.state.nm.us

RON CURRY
SECRETARY
ANA MARIE ORTIZ
DIRECTOR

RECALL NOTICE

TO: ALL New Mexico Environment Department District and Field Offices
Albuquerque Environmental Health Department
Bernalillo County Environmental Health Department
New Mexico Department of Health, Office of Epidemiology
Indian Health Service, Division of Environmental Health Services
New Mexico Environment Department, EHD Director
New Mexico Environment Department, Public Communications Director

FROM: Mary Lou LaCasse, Food Specialist, District 3, NMED

DATE: < MONTH, DAY, YEAR >

SUBJECT: FOOD RECALL/WARNING/ADVISORY NOTICE:

CLASS I ___ CLASS II ___ CLASS III ___

- -

PRODUCT(S): <PRODUCT(S) >

MANUFACTURER: < COMPANY>

RECALLED BY: <USUALLY Manufacturer>

DISTRIBUTION: <AREA>

QUANTITY: <QUANTITY>

REASON: <EXPLAINATION>

ADD'L INFO: <MISC INFORMATION>

NMED ACTION: <LIST ACTIONS REQUIRED.>

Upon completion of required actions, report findings to Mary Lou LaCasse (marylou.lacasse@state.nm.us).

CONTACTS:

1. Mary Lou La Casse, Food Program Manager, 505-476-8608
2. Johnathan Gerhardt, District 1 Food Specialist, 505-222-9515
3. Anita Roy, District 2 Food Specialist, 505-454-2805
4. Marci Nevarez, District 3 Food Specialist, 505-524-6300
5. Ronald Taylor, District 4 Food Specialist, 575-624-6046
6. Andrew Wilson, District 5 Food Specialist, 575-287-8845
7. NMDOH/Office Of Epidemiology, 505-827-0006
8. IHS/Environmental Health Services, 505-248-4263
9. Albuquerque Environmental Health Department, 505-768-2600
10. Bernalillo County Environmental Health Department, 505-314-0310

Updated November 07

10.10 Laboratory testing information and guidelines

10.10.1 Patient stool specimen collection instructions

Stool Sample Collection Instructions
Bacterial Culture

Important things to remember:

- ❒ **DO NOT** take antacids, laxatives or antidiarrheal medications (like Immodium) before collecting the stool sample. These medicines can interfere with the lab test.
- ❒ **DO NOT** take stool out of the toilet bowl. The stool sample cannot be tested if mixed with water or urine.
- ❒ **DO** wash your hands with soap and water before and after collecting the sample.

Instructions:

- ❒ Get some sheets of clean newspaper or some plastic wrap (like Saran Wrap).
- ❒ Wash your hands with soap and water and put on the gloves.
- ❒ Lift the toilet seat and cover the toilet bowl with the newspaper or plastic wrap.
- ❒ Using your hand, make a dent in the middle of the newspaper or plastic wrap to make room for the stool.
- ❒ Lower the toilet seat and sit to pass stool onto the newspaper or plastic wrap. Do not urinate onto the newspaper or plastic wrap.
- ❒ Unscrew the lid of the collection tube and use the scoop attached to the lid to add stool to the tube only until the liquid reaches the "Fill line." If any parts of the stool are slimy, bloody or watery, try to collect stool from these areas.
- ❒ Stir the liquid with the scoop and screw the lid on tightly. If the tube leaks, the lab may not be able to test it.
- ❒ Peel the paper off the piece of wax tape and stretch the tape around the lid to seal and prevent leaking.
- ❒ Gently shake the tube to make sure it's mixed.
- ❒ Wrap the tube in the piece of cheesecloth and place it in the plastic bag.
- ❒ Place the plastic bag and lab request form inside the paper bag.
- ❒ Dispose of the soiled newspaper or plastic wrap in a safe manner.
- ❒ Dispose of the gloves and wash your hands with soap and water.
- ❒ Call the public health office at _____ to set up a time to drop off the sample or have someone come pick it up.
- ❒ Store the paper bag in the refrigerator until the sample is dropped off or picked up.

For children in diapers:

- ❒ Some disposable diapers have chemicals that will interfere with the lab test. You can line the diaper with plastic wrap or turn the diaper "inside out" with the plastic side next to the skin.
- ❒ After the child has a bowel movement, remove the diaper and follow the instructions above for collecting a stool sample. Try to keep urine out of the stool you collect.

If you have questions, please call the public health office at _____.

Stool Sample Collection Instructions
Ova and Parasite Exam

Important things to remember:

- ❒ **WARNING:** The collection tubes contain a poison. **DO NOT** drink the liquid!
- ❒ **DO NOT** take antacids, laxatives or antidiarrheal medications (like Immodium) before collecting the stool sample. These medicines can interfere with the lab test.
- ❒ **DO NOT** take stool out of the toilet bowl. The stool sample cannot be tested if mixed with water or urine.
- ❒ **DO** wash your hands with soap and water before and after collecting the sample.

Instructions:

- ❒ Get some sheets of clean newspaper or some plastic wrap (like Saran Wrap).
- ❒ Wash your hands with soap and water and put on the gloves.
- ❒ Take the collection tube out of the plastic bag and put it within reach.
- ❒ Lift the toilet seat and cover the toilet bowl with the newspaper or plastic wrap.
- ❒ Using your hand, make a dent in the middle of the newspaper or plastic wrap to make room for the stool.
- ❒ Lower the toilet seat and sit to pass stool onto the newspaper or plastic wrap. Do not urinate onto the newspaper or plastic wrap.
- ❒ Carefully unscrew the lid of each collection tube and use the use the scoop attached to the lid to add stool to the tube only until the liquid reaches the "Fill line." If any parts of the stool are slimy, bloody or watery, try to collect stool from these areas.
- ❒ Stir the liquid with the scoop and screw the lid on tightly. If the tube leaks, the lab may not be able to test it.
- ❒ Peel the paper off the piece of wax tape and stretch the tape around the lid to seal and prevent leaking.
- ❒ Gently shake the tube to make sure it's mixed.
- ❒ Wrap the tube in the piece of cheesecloth and place it in the plastic bag.
- ❒ Place the plastic bag and lab request form inside the paper bag.
- ❒ Dispose of the soiled newspaper or plastic wrap in a safe manner.
- ❒ Dispose of the gloves and wash your hands with soap and water.
- ❒ Call the public health office at _____ to set up a time to drop off the sample or have someone come pick it up.
- ❒ Store the paper bag at room temperature until dropped off or picked up.

For children in diapers:

- ❒ Some disposable diapers have chemicals that will interfere with the lab test. You can line the diaper with plastic wrap or turn the diaper "inside out" with the plastic side next to the skin.
- ❒ After child has a bowel movement, remove the diaper and follow the instructions above for collecting the stool sample. Try to keep urine out of the stool you collect.

If you have questions, please call the public health office at _____.

Stool Sample Collection Instructions
Bulk Specimen

Important things to remember:

- ❒ **DO NOT** take antacids, laxatives or antidiarrheal medications (like Immodium) before collecting the stool sample. These medicines can interfere with the lab test.
- ❒ **DO NOT** take stool out of the toilet bowl. The stool sample cannot be tested if mixed with water or urine.
- ❒ **DO** wash your hands with soap and water before and after collecting the sample.

Instructions:

- ❒ Get some sheets of clean newspaper or some plastic wrap (like Saran Wrap).
- ❒ Wash your hands with soap and water and put on the gloves.
- ❒ Take the collection tube out of the plastic bag and put it within reach.
- ❒ Lift the toilet seat and cover the toilet bowl with the newspaper or plastic wrap.
- ❒ Using your hand, make a dent in the middle of the newspaper or plastic wrap to make room for the stool.
- ❒ Lower the toilet seat and sit to pass stool onto the newspaper or plastic wrap. Do not urinate onto the newspaper or plastic wrap.
- ❒ Unscrew the lid of the collection cup and use the plastic spoon or wooden tongue depressor to add stool to the cup until it is about half full. If any parts of the stool are slimy, bloody or watery, try to collect stool from these areas.
- ❒ Screw the lid on tightly. If the cup leaks, the lab may not be able to test it.
- ❒ Peel the paper off the piece of wax tape and stretch the tape around the lid to seal and prevent leaking.
- ❒ Wrap the cup in the piece of cheesecloth and place it in the plastic bag.
- ❒ Place the plastic bag and lab request form inside the paper bag.
- ❒ Dispose of the soiled newspaper or plastic wrap and plastic spoon or wooden tongue depressor in a safe manner.
- ❒ Dispose of the gloves and wash your hands with soap and water.
- ❒ Call the public health office at _____ to set up a time to drop off the sample or have someone come pick it up.
- ❒ Store the paper bag in the refrigerator until the sample is dropped off or picked up.

For children in diapers:

- ❒ Some disposable diapers have chemicals that will interfere with the lab test. You can line the diaper with plastic wrap or turn the diaper "inside out" with the plastic side next to the skin.
- ❒ After child has a bowel movement, remove the diaper and follow the instructions above for collecting the stool sample. Try to keep urine out of the stool you collect.

If you have questions, please call the public health office at _____.

10.10.2 Public Health Office stool specimen collection instructions

New Mexico Department of Health
Instructions for Collecting and Shipping Stool Specimens for Foodborne Illness Outbreak Investigations

Collection

❒ The nature of the foodborne illness outbreak will determine what testing should be done at the Scientific Laboratory Division (SLD). Consult with the Infectious Disease Epidemiology Bureau (ID EPI) at 505-827-0006 to determine appropriate testing. SLD requires approval from ID EPI prior to testing outbreak-related specimens.

❒ Specimens should be collected as soon as possible after onset of symptoms to increase the likelihood of identifying an etiology.

❒ The following test kits are available from SLD and may be ordered by calling 505-841-2516 or faxing a request to 505-841-2543. Note that the kits have expiration dates so rotation or replacement is essential.

Enteric Transport Kit

Use: Isolation and identification of *Salmonella*, *Shigella*, Shiga toxin-producing *E. coli*, *Campylobacter*, *Yersinia, Vibrio* and other bacterial species.
Contents: Zip-lock biohazard bag, white-topped specimen tube containing Cary-Blair media, Parafilm strip, cheesecloth, instructions and General Clinical Test Request Form
Pre-collection storage: Refrigerated
Post-collection storage: Refrigerated

Ova and Parasite Exam Kit

Use: Microscopic exam for detection of intestinal parasites including *Cryptosporidium*.
Contents: Zip-lock biohazard bag, red-topped specimen tube containing PVA fixative, pink-topped specimen tube containing Formalin (10%), Parafilm strips, cheesecloth, instructions and General Clinical Test Request Form
Pre-collection storage: Room temperature
Post-collection storage: Room temperature

Bulk Stool Collection Kit

Use: Identification of Norovirus, *Clostridium perfringens* toxin or *Giardia lamblia* antigen
Contents: Zip-lock biohazard bag, purple-topped specimen cup, Parafilm strip, cheesecloth, instructions and General Clinical Test Request Form
Pre-collection storage: Room temperature
Post-collection storage: Refrigerated

❒ Refer to patient stool collection instructions for proper specimen collection procedures.

❒ If the patient will be collecting the stool specimen at home, create a take-home kit by placing the following items in a paper bag:

- Pair of gloves
- Appropriate SLD test kit(s)

- Plastic spoon or wooden tongue depressor (for Bulk Specimen only)

❒ Review the collection instructions with the patient and write the public health office phone number in the space on the instruction sheet.

Shipping

❒ Notify SLD about the arrival of specimens as soon as possible because some tests require special media that must be prepared in advance.
- For Enteric Transport Kits, Ova and Parasite Exam Kits, *Clostridium perfringens* toxin testing and *Giardia lamblia* antigen testing notify General Microbiology at 841-2541 prior to shipping
- For Norovirus testing, notify Virology/Serology at 841-2535 prior to shipping

❒ Make sure the patient's full name and date and time of specimen collection are written on the sample tube(s).

❒ Check that the sample tube lid is securely tightened and wrapped with Parafilm to prevent leaking.

❒ Complete the General Clinical Test Request Form and place it in the side pocket of the biohazard bag. Make sure the patient information on the sample tube matches that on the request form. Additional request forms may be obtained at http://sld.state.nm.us/lab/forms.htm.

❒ Ship the sample at refrigerator temperatures as soon as possible, preferably via courier or in-person delivery. **DO NOT USE WET ICE,** use refrigerant cold packs instead. Place all materials in a Styrofoam container and place in a mailer. Ship multiple specimens in packaging compliant with USPS or IATA regulations.

10.10.3 Food and water specimen collection instructions

New Mexico Department of Health
Collection, Handling, and Transport of Food and Water Samples for Foodborne Illness Outbreak Investigations

The Environmental Microbiology Laboratory (EM) Section of the Scientific Laboratory Division (SLD) conducts microbiological testing of food and water samples. In order to ensure rapid and efficient service, frequent communication with the EM Lab is very important. Before submitting any food samples for analysis, please contact the EM Lab at 505-841-2537 for guidance and consultation on appropriate testing and proper sample collection.

Food samples should be collected as soon as an outbreak is suspected. The condition of samples received for examination at the lab is of primary importance. All samples should be collected aseptically, with sterile implements, wearing sterile gloves and placing the samples in sterile containers like whirl-pak bags. All suspect samples should be held at refrigerated temperature (< 10° C) when in transit to the laboratory. If the samples are not properly collected, are mishandled during transport to the lab, or are not representative of the sampled lot, then there is an increased likelihood that laboratory results will be meaningless. Of utmost concern are proper collection, identification, and the shipment of a sufficient amount of sample to the laboratory.

Solid Food Sample Collection

1. Whenever possible, submit food samples in their original containers. This is to minimize the chances of cross contamination. Take extra care to package these food sample containers so that they will remain intact and not leak during transport. Note that if the original food sample containers are not stable and there is a possibility they will leak during transport, then aseptically transfer representative sample portions to sterile sample containers like whirl-pak bags as described below in Step #2. Note that the use of glass containers is discouraged due to the possibility of breakage.
2. If the sample product is too bulky or if the sample is in a container that is of impractical size for proper submission, then transfer a representative portion to a sterile sample container (whirl-pak bags) using aseptic technique. For sample transfers use sterile utensils. Pre-sterilized disposable plastic scoopers are preferred, although metal tablespoons, knives, and other metal utensils can be used as well if properly sanitized. To sanitize metal utensils wash thoroughly with soap and hot water, wipe dry with a clean towel, saturate with 70% alcohol, and flame. Remember to allow adequate time for flamed metal utensils to cool before using.
3. If a large amount of the suspected food is available, a representative sample should be taken. When dealing with large food vessels/serving containers take a well mixed sub sample portion from the geometric center as well as from other locations in the food container. Use a sterile utensil to aseptically transfer the samples to sterile leak-proof containers. Remember that a representative sample is essential in order to detect the presence of pathogens or toxins that may be sparsely distributed within the food.

4. Do not mix different types of food or food from different sources. For example, if two plates (A & B) with beans and rice are to be collected, transfer the beans from plate A to one container, the beans from plate B to a second container, the rice from plate A to a third container, and the rice from plate B to a fourth container. Do your best and don't worry if separate food items have been mixed somewhat in previous handling.
5. For each individual sample aseptically collect approximately 200 to 500 grams (sample portion about the size of a clinched fist, or filling a 18 oz whirl-pak bag up to about 50% capacity). Properly seal the sample container to ensure that leakage will not occur during transport. *For sealing whirl-pak bags carefully fold over the twist tie opening of the bag at least three times. It is very important that each fold be wrinkle free. Then fold over each end of the twist tie toward the center of the bag and fasten (twist) the twist ties together. Give the bag a gentle squeeze between the palms of your hands to test the seal. If you notice any air leakage, re-seal the bag.*
6. Identify each sample container with a properly marked strip of masking tape. If marking the sample container directly with a black permanent marker, take care not to puncture through lining the sample container (especially if that container is a whirl-pak bag). Label each sample container with the sample type, date and time of collection.
7. When collecting samples remember to also collect an additional sample to serve as a temperature control. Check and record the temperature of the control sample at the time of collection. Always record the times and dates of all samples collected.
8. Complete a SLD Food Analysis Test Request Form for each sample that is to be submitted. Required information on the Food Test Request Form includes: sample identity, the name of the agency submitting the sample, the SLD User Code for that agency, date and time of collection, the name of the sample collector, the temperature of the temperature control sample at the time of collection, the reason for collection, test(s) being requested, probable patient incubation time, and patient symptoms.
9. Food samples should be held under refrigeration immediately after collection and should be maintained as such during transport to the laboratory. Do not freeze food samples as it causes a significant loss of viability of certain microorganisms. If the food sample was frozen when initially collected, then maintain it in the frozen state until it reaches the laboratory. Note that dry or canned foods that are not perishable and are collected at ambient temperatures need not be refrigerated.
10. When shipping the samples to the laboratory transport frozen or refrigerated samples in insulated containers of rigid construction (like Styrofoam ice chests) so that they will arrive at the laboratory unchanged. Use pre-frozen icepacks or frozen bottles of ice to keep the samples cold. Dry ice should be used to ship frozen samples.
11. Transport samples via the most rapid and convenient means available (e.g., in person, courier, or express mail).

Liquid Food or Beverage Sample Collection

1. Whenever possible, submit food samples in their original containers, like a milk carton or an orange juice bottle. This is to minimize the chances of cross contamination. Take extra care to package these sample containers so that they will remain intact and not leak during transport. Note that if the original sample containers are not stable and that there is a possibility that they will leak during transport then aseptically transfer representative sample portions to sterile sample containers like whirl-pak bags as described below in Step #2. Note that the use of glass containers is discouraged due to the possibility of breakage.
2. If the sample product is too bulky or if the sample is in a container that is of impractical size for proper submission, then transfer a representative portion to a sterile sample container (whirl-pak bags) using aseptic technique. Stir or shake the suspect liquid sample before transfer to ensure homogeneity.
3. Pour or ladle the food item, with a sterile utensil, into a sterile leakproof container. Collect between 100 to 500 grams (milliliters) of sample. Properly seal the sample container to ensure that leakage will not occur during transport.
4. Label the sample container with the sample identifier along with the date and time of collection.
5. Complete a SLD Food Analysis Test Request Form for each sample that is to be submitted. Required information on the Food Analysis Test Request Form includes: sample identity, the name of the agency submitting the sample, the SLD User Code for that agency, date and time of collection, the name of the sample collector, the temperature of the temperature control sample at the time of collection, the reason for collection, test(s) being requested, probable patient incubation time, and patient symptoms.
6. Ensure that all samples are held under refrigeration temperatures (preferably between 0.1°C and 4°C, but not to exceed 10°C) during transit to the laboratory. Do not freeze samples due to the loss of viability of certain microorganisms. If the sample was frozen when initially collected, maintain that sample in the frozen state.
7. When shipping the samples to the laboratory transport frozen or refrigerated samples in insulated containers of rigid construction (like Styrofoam ice chests) so that they will arrive at the laboratory unchanged. Use pre-frozen icepacks or frozen bottles of ice to keep the samples cold. Dry ice should be used to ship frozen samples.
8. Transport samples via the most rapid and convenient means available (e.g., in person, courier, or express mail).

Drinking Water Sample Collection

The EM Lab routinely tests drinking water samples from various municipalities throughout the state for the presence/absence of coliforms and *E. coli* in compliance with the Safe Drinking Water Act. In addition, the laboratory runs quantitative tests on wastewater, surface source water, and sludge samples to obtain coliform and *E. coli* concentrations. Occasionally, the lab will test water samples for bacterial pathogens when the need arises. Please call the EM Lab before submitting or shipping water samples during the investigation of a waterborne outbreak (i.e., non-routine samples).

Samples should be collected, transported to the testing laboratory, and processed as quickly as possible after an outbreak occurs because the contamination may have been transient, and samples collected during later dates may not reflect the condition of the water when it was potentially contaminated. The same sampling procedures are used for collecting water samples from municipal water supply systems and private wells. Sampling procedures can be found on the Water Microbiology Request Form (SLD Bacti-Water Form 5299). Below is a detailed version of our recommended water sampling procedures.

Equipment Listing

- ❒ Pre-sterilized 125 mL screw cap bottle to which has been added a 0.1 mL of a 10% solution of sodium thiosulfate. It is preferable to use bottles supplied by SLD (bottles have SLD etched on top of caps). Not only is there a record trail demonstrating the sterility of the bottles, but also documented records indicating that each bottle has had a sodium thiosulfate addition as well. If it is difficult/impossible to obtain an SLD bacti-water bottle container during the investigation of a waterborne outbreak then use some other sterile container (like a whirl-pak bag) with a capacity of at least 100 mL.
- ❒ Masking tape and ball-point pen
- ❒ Microbiological Water Report Form, SLD 521
- ❒ Sample shipping container with refrigerant such as ice in plastic bottles or reusable ice packs.

The following steps describe the procedure for collecting any piped potable water. Errors in these steps can alter the sample that is received by the lab. This may hamper the analyst's ability to provide meaningful test results. All samples should be representative of the water to be tested. Special care should be exercised during collection to ensure that the samples do not become contaminated by extraneous foreign material dislodged from the surrounding environment.

1. Selection of a sample tap is important. Avoid leaking, obviously dirty or damaged taps. Also avoid faucets with aerators, strainers, screens or similar attachments. Such devices harbor millions of bacteria that could be flushed into the sample bottle.

2. Open fixture to setting which provides a smooth flowing stream of cold water at moderate pressure. Let water flow for sufficient time to allow for clearing of service line, at least 3–5 min.
3. Fill bottle with water leaving at least ½ inch air space between sample and bottle top. This allows for proper mixing of sample prior to analysis. Do not change water flow. Likewise, do not fill bottle and then pour out excess since dilution of the neutralizing solution will occur. Minimum sample size is 100 mL. Samples with less than one inch of air space or less than 100 mLs of sample will not be tested.
4. Properly identify bottle legibly and indelibly on masking tape affixed to side of bottle. Mark sample bottle to correspond to its sample form.
5. Fill out sample form completely. Indicate time, date sample taken, name of sample collector and sample collection location.
6. Indicate examination required on the form. For routine potable water samples check "Total Coliform."

   EXCEPTIONS:

   - Fecal coliform tests are routinely requested on sewage effluents and various surface waters. Occasionally potable water may be suspected of fecal coliform contamination. Likewise, contamination from pathogenic organisms such as *Salmonella* spp, *Shigella* spp, or *Pseudomonas* spp may be suspected.
   - If initial potable water sample membrane filter results indicate TNTC, confluent growth of non-coliform bacteria or turbid culture the sample is invalid. A second sample must be collected from the same site. The test request for this second sample should be designated as MMO-MUG.
   - The category "Other" is used to request tests for any miscellaneous microorganisms not listed on the form (such as *Aeromonas* spp)
7. Place samples in shipping container. Samples **MUST BE REFRIGERATED IMMEDIATELY AND MAINTAINED AT NO MORE THAN 10°C**. It is strongly recommended that samples be submitted on the same day they are collected.
8. Samples for total coliform analysis must be received by the laboratory within 24 hours of collection. Samples for fecal coliform and fecal streptococcus testing must be received within 6 hours after collection. Samples for other miscellaneous microbiological tests should be received within 24 hours of collection.

REMINDER: Aseptic technique should be followed during collection of the sample to insure that organisms from the surrounding environment do not find their way into the sample. This can produce a false positive lab result, which will involve unnecessary expense in recollection and a second analysis.

10.10.4 Clinical sample requisition form

GENERAL CLINICAL REQUEST FORM

NEW MEXICO DEPARTMENT OF HEALTH

Scientific Laboratory Division
700 Camino de Salud NE - P.O. Box 4700
Albuquerque, NM 87196-4700

SLD LAB NO. ONLY
ONE FORM PER SPECIMEN

FORM ORDER ITEM # 5099 | USER CODES -->>

SLD USE ONLY | DATE <<<TIME STAMP

- ☐ 51000 (Epidemiology)
- ☐ 52200 (PHD:Employ. Test)
- ☐ 52110 (PHD:Prenatal)
- ☐ 52320 (PHD:STD)
- ☐ 52340 (PHD:Refugee)
- ☐ 52325 (PHD-Adult Hepatitis)
- ☐ 52310 (PHD:HIV)
- ☐ 52120 (PHD:Family Plan)
- ☐ 52330 (PHD:TB Program)
- ☐ 52350 (PHD:HB Immun.)
- ☐ Other ☐☐☐☐☐

SUBMITTER CODE: ☐☐☐

PATIENT NAME: _____ (PLEASE PRINT Last, First)

SUBMITTER NAME: _____

SEX: ☐ M ☐ F DOB (M / D / Y): ____/____/____

SUBMITTER ADDRESS: _____

PATIENT HOME ZIP CODE : _____

_____

PATIENT ID: _____

SUBMITTER PHONE: ( )

SSN: _____

ATTENTION: _____

Other ID (optional): _____

RACE: **Check all that apply.**

☐ American Indian/Alaskan Native ☐ Asian ☐ Black or African American
☐ Native Hawaiian/Pacific Islander ☐ White ☐ Other

ETHNICITY: ☐ Hispanic ☐ Non-Hispanic

CLINICIAN NAME: _____

CLINICIAN PHONE # : _____

Date/Time Collected: ____/____/____ _____
M D Y Hour Military Time

SPECIMEN (check one)

- ☐ Abortion material
- ☐ Abscess
- ☐ Ascites fluid
- ☐ Bile
- ☐ Blood, dried spot
- ☐ Blood, plasma
- ☐ Blood, serum
- ☐ Blood, umbilical cord
- ☐ Blood, whole
- ☐ Bone
- ☐ Bone marrow
- ☐ Brain
- ☐ Breast
- ☐ Bronch. ☐ Wash ☐ Bx
- ☐ Bronchoalveolar lavage
- ☐ Cervix
- ☐ CSF
- ☐ Ear
- ☐ Endocervix
- ☐ Eye
- ☐ Feces
- ☐ Gastric
- ☐ Hair
- ☐ Intestine
- ☐ Intestine, large
- ☐ Intestine, small
- ☐ Joint fluid
- ☐ Kidney
- ☐ Liver
- ☐ Lymph node
- ☐ Lung
- ☐ Lung, left
- ☐ Lung, right
- ☐ Milk
- ☐ Muscle
- ☐ Nail (site)_____
- ☐ Nasopharyngeal swab
- ☐ Nose
- ☐ Oral Fluid
- ☐ Pericardial fluid
- ☐ Peritoneal fluid
- Pleural ☐ fluid ☐ Bx
- ☐ Rectum
- ☐ Rectum/Vagina
- ☐ Scalp
- ☐ Skin (site)_____
- ☐ Spleen
- ☐ Sputum, natural
- ☐ Sputum, nebulized
- ☐ Throat swab / wash
- ☐ Tissue (site): _____
- ☐ Tracheal aspirate
- ☐ Urine
- ☐ Urethra
- ☐ Uterus
- ☐ Vagina
- ☐ Wound (site):_____
- ☐ Other: _____

PURPOSE (check one)

- ☐ Diagnosis / Screen
- ☐ Check on treatment
- ☐ Confirmation
- ☐ Contact
- ☐ Follow-up
- ☐ Food Handler
- ☐ Outbreak

SPECIMEN TYPE (check one)

- ☐ Clinical material
- ☐ Reference culture
- ☐ Inoculated BACTEC bottle

CLINICAL SYMPTOMS (check all that apply)

- ☐ Asymptomatic
- ☐ Symptomatic:
- Date of onset (M/D/Y): ____/____/____
- ☐ PPD +
- ☐ X-Ray
- ☐ Has been previously treated for STD
- ☐ Other:_____

TUBERCULOSIS and MYCOLOGY

☐ Isolation and/or ID of AFB, and drug susceptibilities (if TB)
☐ AFB Smear Only ☐ RNA Amp Only ☐ AFB Reference culture ID ☐ Fungal culture and/or ID

GENERAL BACTERIOLOGY

- ☐ B. cereus/ S. aureus
- ☐ Campylobacter, speciate
- ☐ Culture, OMI blood
- ☐ Culture, OMI CSF
- ☐ Culture, OMI anaerobic
- ☐ Culture, OMI other
- ☐ Culture, Fecal (Including Salmonella, Shigella, Campylobacter, E. coli 0157)
- ☐ Diphtheria
- ☐ Esch. coli 0157: H7, ID or culture
- ☐ GC culture
- ☐ GC & Chlamydia Amp. (urine)
- ☐ GC and Chlamydia Amp. (genital)
- ☐ Giardia EIA
- ☐ Haemophilus influenzae typing

ID of Bacteria (cont.)

- ☐ -Gram neg. rod _____
- ☐ -Gram pos. rod _____
- ☐ -Staphylococcus
- ☐ -Streptococcus
- ☐ Legionella culture
- ☐ Neisseria meningitidis typing
- ☐ Parasitology (fecal)
- ☐ Parasitology (blood)
- ☐ Pertussis culture only
- ☐ Plague FA
- ☐ Plague FA and culture
- ☐ Salmonella serotype:
- ☐ Shigella serotype:
- ☐ Strep, Group B, isolation
- ☐ Shiga Toxin Test/Isolation
- ☐ Treponema pallidum DFA
- ☐ Tularemia culture
- ☐ Other: _____
- ☐ EIP Isolate:_____

ID of Bacteria (specify, if known:)
☐ -Anaerobe_____

SEROLOGY

- ☐ Brucella antibody
- ☐ HIV-1 antibody
- ☐ HIV Rapid Test Confirmation
- ☐ CDC referral (attach form 50.34)
- ☐ Hepatitis Hep A IgM Only (Diag)
- ☐ Hepatitis A Immune Status
- ☐ Hepatitis B Pre-Vaccination
- ☐ Hepatitis B Prenatal Screen
- ☐ Hepatitis B Post-Vaccination
- ☐ Hepatitis B High Risk (Contact to HBV positive)
- ☐ Hepatitis B High Risk and HCV
- ☐ Hepatitis C Antibody (Anti-HCV)
- ☐ Hepatitis C Antibody-Reflex to Hepatitis A and B
- ☐ Hepatitis A,B and C Diagnositic Panel (Acute)
- ☐ Mumps Immune Status
- ☐ Plague/Tularemia antibody
- ☐ Rubella immune status
- ☐ Rubella diagnosis (call first)
- ☐ Rubeola immune status
- ☐ Rubeola diagnosis (call first)
- ☐ Syphilis: adult
- ☐ Syphilis: congenital
- ☐ Tularemia antibody
- ☐ VZV immune status
- ☐ WNV antibody
- ☐ Other:_____

☐ VIRUS ISOLATION

list agent(s) supected:

- ☐ Influenza
- ☐ HSV
- ☐ Other Specify:

SLD-GEN 5099 revised 01/06

Phone #'s : General Micro.- (505) 841-2542/42 TB/Mycology - (505) 841-2531/67 Virology/Serology - (505) 841-2535/34 Switchboard (505) 841-2500

10.10.5 Food sample requisition form

NEW MEXICO
DEPARTMENT OF
HEALTH

FOOD ANALYSIS REQUEST FORM

Scientific Laboratory Division
700 Camino de Salud NE - P.O. Box 4700
Albuquerque, N. M. 87196-4700
Phone # (505) 841-2536/2537

LAB NO.

Place Lab No. sticker in this area

DATE & TIME OF RECEIPT AT SLD

USER CODE:
☐ 30210 (Bern. Cnty. Env. Hlth.) ☐ 55110 (NMED) ☐ 70101 (VDS)
☐ 70102 (NMDA) ☐ 91300 (FDA) ☐ Other: ☐☐☐☐☐

SUBMITTER CODE: ☐☐☐

COLLECTED BY: _____ DATE SAMPLE COLLECTED (M / D / Y): ____/____/____

SAMPLE IDENTIFICATION

TYPE OF FOOD: _____

COLLECTED FROM

FOOD ESTABLISHMENT

Name: _____
Full Address: _____

PRIVATE SOURCE

Establishment Name: _____
Full Address: _____

CANNED FOOD

Manufacturer/Brand: _____
Code / Lot: _____

Manufacturer/Brand: _____
Code / Lot: _____
Home Processed: (Name) _____

Reason for Collection	Temp. Control at Packing	SLD Use Only
☐ Suspected Foodborne Illness ☐ Routine Surveillance ☐ Consumer Complaint ☐ Other	_____ °C	Temp Control at SLD: _____ ☐ Sample Not Intact ☐ Sample Intact

Analysis Requested (Check the following that applies:)

☐ Anaerobic Culture	☐ Culture ID	☐ Plant ID
☐ Arthropod ID	☐ E. coli 0157:H7	☐ Salmonella
☐ B. cereus count	☐ Foreign Matter / Chemical Exam	☐ Standard Plate Count
☐ Campylobacter isolation	☐ Gram Stain	☐ S.aureus count
☐ Canned Food Analysis	☐ Hair ID	☐ Swabs
☐ C. perfringens count	☐ Listeria	☐ Water Activity
☐ Coliform - Count	☐ Meat Serology (species ID)	☐ Yeast / Mold
☐ Container Analysis	☐ pH	☐ Other: _____

FOODBORNE ILLNESS HISTORY

No. of people who ate food: _____ No. of people who became ill: _____ Probable incubation period : _____

SYMPTOMS

☐ Nausea	☐ Vomiting	☐ Diarrhea	☐ Weakness / Prostration
☐ Speech Defect	☐ Double Vision	☐ Paralysis	☐ Other: _____

Duration of symptoms: _____ If patient specimens taken, indicate type: _____

Tentative Diagnosis by physician or investigator: _____

Physician Name: _____ Physician Phone Number: ( ) -

SLD - Food Form revised 5/00

10.10.6 Water sample requisition form

NEW MEXICO
DEPARTMENT OF
HEALTH

WATER MICROBIOLOGY REQUEST FORM

Scientific Laboratory Division
700 Camino de Salud NE - P.O. Box 4700
Albuquerque, NM 87196-4700
Phone # (505) 841-2537

LAB NO.

DATE & TIME OF RECEIPT AT SLD

USER CODE: ☐ 55420 (NMED Monitor) ☐ 62000 (SDWA) ☐ 64000 (Private) ☐ Other:

SUBMITTER CODE :

WSS CODE NM35 - WSS NAME

COLLECTED BY (please print) :

DATE COLLECTED (MM / DD / YY) :

SAMPLE LOCATION (if private well, specify physical address) :

TIME COLLECTED (24 hr. clock) :

COUNTY

Type of System (Check one):
- ☐ Community
- ☐ Non-Community
- ☐ Private Well
- ☐ Waste Water Treatment Plant
- ☐ Other:

Reason for Sampling (Check one):
- ☐ Routine Sample
- ☐ Special Sample
- ☐ Repeat Sample
- ☐ NMED Monitor Sample
- ☐ Other:

Disinfected (Check one):
- ☐ Yes
- ☐ No Residual: mg/L
- ☐ Downstream
- ☐ Upstream
- ☐ Original location
- ☐ Other location

Original SLD #

Attention to:

Facility/WSS:

Address:

City: State: Zip Code:

FOR SLD USE ONLY:

Temp. Control at SLD

°C

ANALYSIS

Drinking Water:	Waste Water:	Other:
☐ Total Coliform - Membrane filter	☐ E. coli count WWTP - Quanti-Tray	☐ Iron and Sulfur Bacteria
☐ Total Coliform - MMO - MUG	☐ Fecal Coliform - Membrane filter	☐ Pseudomonas
☐ Total Coliform - MPN (Dairy Only)	☐ Fecal Coliform - MPN	☐ Algae ID
☐ Standard Plate Count	☐ Fecal Streptococcus	☐ E. coli count source water - Quanti-Tray
	☐ EC-MUG MPN	☐ Salmonella / Shigella
		☐ Other:

INSTRUCTIONS:

How to collect sample:

*** **You Must Use a SLD container** You can obtain a container from the Kit Preparation Unit at SLD.***

1. Choose a clean non-leaking tap without aerators, strainers or attachments.
2. Flush cold water 3-5 minutes before collecting sample.
3. Carefully remove cap and fill bottle to shoulder line without touching the lip of the bottle to tap rim. **Do Not Rinse Bottle**
4. Replace cap and secure tightly.
5. For Repeat Samples: Please indicate if sample is from the original location, downstream or upstream from the original location that was out of compliance. Otherwise, indicate that it is from another location. Also, indicate the SLD# for the original sample.

Packing and Shipping sample:

1. Refrigerate sample during transit to the lab by using packaged ice or suitable synthetic ice.
2. Sample must be received by lab within 24 hours of collection. (For exceptions, please call SLD)

Hours for receiving samples:

8:00 am to 4:00 pm, Monday - Wednesday
8:00 am to 4:30 pm, Thursday
No Samples Taken by SLD on Friday

No Samples Taken by SLD on Holidays and One Working Day Before a Holiday. Also Refer to the Calender You Can Pick Up at SLD's Kit Preparation Unit, Rm 119, West Side Dock

SLD Bacti Water Form 5299 (filename: waterform.xls revised 11/06)

10.11 ID EPI investigation quality assurance tools

10.11.1 Flowchart and timeline

NEW MEXICO DEPARTMENT OF HEALTH

Infectious Disease Epidemiology Bureau
Foodborne Illness Investigation Flowchart and Timeline
(For internal use only)

Date of incoming call:	**Time of incoming call:** ☐ **AM** ☐ **PM**
Name of establishment:	**Phone:**
Address:	
Primary investigator:	**Secondary investigator:**

1) Complete initial assessment of nature and scope of illness including:

- Demographics, number, and relationship of ill persons
- Symptom profile
- Incubation period, duration and severity of illness
- Likelihood of ongoing exposure

2) Determine if outbreak exists and level of investigation required

3) Designate investigation team, primary and secondary investigators

4) Identify roles and responsibilities of collaborators and establish communication

5) Develop working hypothesis, initial case definitions and type of study

6) Get list of potentially exposed persons and identify additional cases

7) Create line list of cases

8) Obtain menu or line list of foods

9) Develop questionnaire

10) Administer questionnaire

11) Interview food handlers

12) Collect clinical specimens and food specimens

13) Establish surveillance for additional cases

14) Enter data

15) Finalize case definitions and initiate data analysis

16) Recommend control measures

17) Finalize data analysis and complete final report

18) File electronic and hard copies of final report

19) Distribute final report to stakeholders

20) Assure completion of EFORS report

21) Complete investigation follow-up activities as appropriate

within 4 hours	within 8 hours	within 24 hours	within 48 hours	within 72 hours	within 2 weeks of completing investigation
☐	☐	☐	☐	☐	

10.11.2 Quality assurance checklist

NEW MEXICO DEPARTMENT OF HEALTH

Infectious Disease Epidemiology Bureau
Quality Assurance Checklist
for Foodborne Outbreak Investigations
(For internal use only)

Date of incoming call:	**Time of incoming call:** ☐ **AM** ☐ **PM**
Name of establishment:	**Phone:**
Address:	
Primary investigator:	**Secondary investigator:**

Investigation team collaborators

Name	Affiliation	Phone

Section		Action
5.1	☐	Complete assessment of situation
5.2	☐	Determine if outbreak exists and level of investigation
5.3	☐	Designate investigation team, including primary and secondary investigators
5.3	☐	Identify roles and responsibilities of collaborators and establish communication
5.4	☐	Develop working hypothesis, initial case definitions and type of study
5.5	☐	Get list of potentially exposed persons and identify additional cases
5.6	☐	Create line list of cases
5.7	☐	Obtain a menu or list of foods
5.8	☐	Develop and administer questionnaire
5.9	☐	Interview food handlers
5.10	☐	Collect food and clinical specimens
5.11	☐	Establish surveillance for additional cases
5.12	☐	Enter data
5.13	☐	Finalize case definition and perform data analysis
5.14	☐	Recommend control measures
7.1	☐	Complete final report
7.1.2	☐	File electronic and hard copies of the final report
7.1.3	☐	Distribute final report to stakeholders
7.2	☐	Assure completion of EFORS report
8.	☐	Complete investigation follow-up activities as appropriate

10.12 Templates

Electronic versions of these templates are included on the Foodborne Illness Investigation Toolkit CD-ROM.

10.12.1 Foodborne Surveillance Investigation Form

- NMDOH form used for routine foodborne disease surveillance investigations.

10.12.2 Foodborne Illness Complaint Worksheet

- Interagency form used to document foodborne illness complaints.

10.12.3 Foodborne Illness Shotgun Questionnaire

- Sample questionnaire for generating hypotheses about common exposures.

10.12.4 Foodborne Illness Outbreak Questionnaire

- Sample questionnaire for event or restaurant-associated outbreaks.

10.12.5 Foodborne Illness Line List

- Sample line list in MS Excel format.

10.12.6 Food Handler Questionnaire

- Sample questionnaire for interviewing food handlers.

10.12.7 NMDOH Foodborne Illness Investigation Report

- NMDOH final report template.