
NEVADA STATE HEALTH LABORATORY

Foodborne Outbreak Investigation

Laboratory Component

Nevada State Health Laboratory

Overview

- Criteria for Testing
- Key Items for a Field Sample Kit
- Collection of Clinical Specimens
- Collection of Food Samples and Environmental Sampling
- Lab Requisition Forms and Chain of Custody
- Testing performed at the *NSHL* and Reference Laboratories
- *Nevada State Health Laboratory* Contact Information

Criteria for Testing

- Communication and team work is the key for a successful out come of an investigation of a foodborne outbreak
- Environmental Health Assessment
- Epidemiological Investigation
- Laboratory Guidance and Support
- Education and Training
- Testing performed is determined by the local health department in collaboration with the above specialty areas as a foodborne outbreak investigation team

Criteria for Testing (Continued)

- Joint evaluation of the outbreak by the Response Team will direct what samples are to be collected and submitted to the lab for testing
- Information in the initial stages of an outbreak may be insufficient for an adequate assessment
- Accordingly the response team will make decisions of what to collect and then hold samples in the Laboratory until more information and assessment is available to direct testing
- Such a plan will ensure that the opportunity to collect the appropriate specimens is not missed while still ensuring that costly and time consuming lab resources are utilized effectively

Key Items for a Field Sample Kit

- Collection of Clinical Samples
- Collection of Food Samples
- Collection of Environmental Samples

- Be prepared

Collection Kit for Clinical Samples

- Cary-Blair Preservative Stool Sample Containers
- Sterile Specimen Containers without Preservative
- Ova & Parasite Collection Containers – Formalin and PVA
- Labels and marker pens
- *NSHL* Lab Requisition Forms
- Written Instructions for the proper collection and transport of clinical, usually stool, samples

Collection Kit for Food Samples

- Sterile Plastic Collection Containers
  Such as Whirl Pac – Various sizes
- Sterile Disposable Collection Utensils
  Spoons and Scoops
  Tongs
  Knife and cutting utensils
- Sterile Disposable Gloves
- Labels and Marker pens
- Chain of Custody Forms
- *NSHL* Requisition Forms

Collection Kit for Environmental Samples

- Sterile Collection Containers
  Sterile Plastic such as Whirl Pac Bags
- Sterile Saline, Buffer or Enrichment Broth
- Sterile Swabs or Sponges
- Sterile Disposable Gloves
- Disposable Biohazardous or Garbage Bags
- Labels and Marker Pens
- *NSHL* Requisition Forms

Instructions for Collection and Transport of Clinical Samples

- Stool samples
- Emesis
- Completing lab requisition forms

Instructions for Collection of Stool Samples

- Do not pass directly into specimen containers
- Collect with newspaper on toilet set
- Add portion of stool sample to the appropriate specimens containers – do not fill above line
- Secure lid – No leaking samples
- Provide verbal and written instructions to patients
- Label specimen
  Patient name, date and time of collection
  Indicate if case patient or food handler
- Complete *NSHL* lab form
- Transport Cary-Blair specimen at room temperature without delay
- Transport sterile container without preservative at refrigerator temperature without delay (Norovirus)
- Transport sterile container without preservative frozen without delay (electron microscopy)
- Transport Ova & Parasite specimens at ambient temperature without delay
- Without delay is defined as delivery to the lab with in 24 hours of collection

Collection of Emesis

- Sterile container without preservative
- Label and transport refrigerated without delay
- Norovirus testing
- Not recommended for routine bacterial culture
- Requires immediate neutralization of specimen acidic pH at the time of collection

Instructions for Collection of Food and Environmental Samples

- Our results are only as good as the Samples we receive
- Contact the laboratory prior to collection and transport of samples for testing
- Ensures correct collection and transport and faster lab turn around times

Collection of Food Samples

- Wear sterile disposable gloves
- Use sterile technique
- Use sterile utensils for collection
- Use sterile transport containers
- Secure sample container – No leaking specimens
- Label all samples
  Description and condition of food sample
  Initials of sample collector
  Time and date of collection

Collection of Food samples Completing Lab Requisition Form

- Name of individual collecting sample
- Name of Local Health Department conducting investigation
- Contact information
- Date and time of collection
- Temperature, pH and any special conditions of the food at the time of collection
- Lot numbers, producer identification, site or origin of sample collection
- Signs, symptoms, onset times and number of persons ill
- Indicate Lab Tests to be performed

Collection of Food Samples

- Recommend minimum 250 grams of solid food
  Prefer 500 grams
- Recommend 250 minimum milliliters of liquid food
  Prefer 500 milliliters
- In general, samples should be collected from the geometrical center of the food item
- If in doubt, send the entire food sample
- Commercially packaged food samples must be retained and transported the original package
- Most food items are transported at refrigerator temperature
- If the food is already frozen at the time of collection, then transport the sample frozen

Collection and Transport of Food Samples

Sample	Transport
Solid Food	Sterile labeled container Refrigerate
Liquid Food or Beverage	Sterile labeled container Refrigerate
Frozen Food	Keep frozen - Label Send entire packaged sample
Canned Food	Label can or jar Transport at ambient temperature
Dry or Dehydrated Food	Label container Transport at ambient temperature
Meat or poultry	Place meat in sterile container Refrigerate

Instructions for Collection of Environmental samples

- Wear sterile gloves
- Use sterile technique
- Pre-wet sterile swab or sponge with sterile saline, buffer or enrichment broth
- Swab or sponge a one foot square environmental surface area
- Place swab or sponge in a sterile container with sterile saline, buffer or enrichment broth
- Label and transport without delay
- Complete *NSHL* Requisition Form

Lab Requisition Forms

- Complete requested information
- Sample collector and local health agency conducting investigation
- Date and time of collection
- Physical description and condition of sample
- Site of collection
- Lot numbers
- Signs, symptoms, on-set times, number of persons ill
- Indicate lab tests to be analyzed

Food-Borne Illness Requisition Form

UNIVERSITY OF NEVADA RENO

NEVADA STATE HEALTH LABORATORY
1660 NORTH VIRGINIA STREET
RENO, NV 89503
Phone: (775) 688-1335 Fax: (775) 688-1460
MEDICAL DIRECTOR: L.D. BROWN, MD MPH

Client: _____ Clinic: Food Investigation
Address: _____ Attn: _____
_____
_____
Phone: _____ **Copy To:** _____

Date Submitted: _____ Submitted By: _____
Date/Time Collected: _____ Phone Number: _____
Source: _____ Report To: _____
Complainant Name: _____
Complainant Address: _____

Complainant Symptoms (Check Box):

☐	Fever (highest Temp.)	☐	Blurred Vision	☐	Jaundice
☐	Cramps/Abdominal Discomfort	☐	Diarrhea	☐	Dark Urine
☐	Vomiting	☐	Nausea	☐	Light Colored Stools
☐	Headache	☐	Anorexia	☐	Malaise
☐	Severe Weakness			☐	Scleral Icterus (yellow eyes)
☐	Other (specify):				

Date/Time Food Ingested: _____ Date/Time of Illness Onset: _____
Duration of Illness: _____ Number of People Ill: _____
Number of People Consuming Suspect Food (ill or not ill): _____
Physical Description of Sample Being Submitted: _____

** *Check box to the left of test to be ordered* **

BACTERIAL

☐	Bacillus cereus	☐	E. coli O157:H7	☐	Streptococcus group A
☐	Brucella species	☐	Listeria monocytogenes	☐	Vibrio species
☐	Campylobacter species	☐	Salmonella species	☐	Yersinia
☐	Clostridium botulism	☐	Shigella species		
☐	Clostridium perfringens	☐	Staphylococcus aureus		

VIRAL

☐	Hepatitis A	☐	Norwalk Family of viruses	☐	Astrovirus, calcivirus, others
☐	Other (specify):				

PARASITE

☐	Cryptosporidium parvum	☐	Cyclospora cayetanensis	☐	Giardia lamblia
☐	Trichinella species	☐	Other (specify):		

MISCELLANEOUS

☐	Fungal (specify)	☐	Foreign Material Identification

Chain of Custody

- Legal document verifying integrity of the sample from the moment of collection in the field until the final deposition of the sample
- Official Sample
  Integrity of the sample is verifiable
  includes internal and external transfer information
- Unofficial Sample
  Integrity to the sample is not verified
  example – left-overs from an individuals refrigerator
- 3 most important things when conducting testing for a food borne outbreak
  Document, Document and Document

Testing Preformed at the *Nevada State Health Laboratory*

- Traditional Microbiology Cultures, Virology and Parasitology
- Toxin Assays
- Food Chemistry
- Molecular Biology Methods
- Reference Laboratory Testing

Foodborne Pathogens Tested for on Clinical and Food Samples at the *NSHL*

- *Salmonella* serotypes
- *Shigella* species
- *E.coli* O157:H7
- *Listeria* monocytogenes
- *Vibrio* species
- *Yersinia enterocolytica*
- *Staph aureus*
- *Streptococcus* group A
- *Bacillus cereus* (food samples only with enumeration)
- *Clostridium perfringens* (food samples only with enumeration)

Foodborne Pathogens Tested on Clinical Samples at the *NSHL*

- Norovirus – PCR
- Hepatitis A Virus - Serological
- Parasite – direct observation of parasite with special stains
  Cyclospora cayatensis
  Cryptosporidium parvum
  Giardia lamblia
  Entamoeba histolytica
  Trichinella spiralis

Toxin Assays

- Staphylococcal Enterotoxin B
  Test currently available – TRF method

- *Clostridium botulinum* Neurotoxin
  Test validation in progress

Food Chemistry

- Aluminum, Antimony, Arsenic, Barium, Beryllium, Bismuth, Boron, Cadmium, Calcium, Cesium, Chloride, Chromium, Cobalt, Copper, Cyanide, Fluoride, Iron, Lead, Magnesium, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Nitrate+Nitrite as N, Nitrite-N, Perchlorate, pH, Temperature, Potassium, Selenium, Silica, Silver, Sodium, Strontium, Sulfate, Thallium, Tin, Titanium, Total Phosphorus, Tungsten, Turbidity, Uranium ICP-MS, Vanadium, Zinc

Molecular Testing Currently Available at the *NSHL*

PCR

- PCR based (Polymerase Chain Reaction) amplification of target Nucleic Acid

  Norovirus – Clinical Specimens only

  Salmonella – Food and Environmental samples
  E.coli O157:H7 – Food and Environmental samples
  Listeria species *and Listeria Monocytogens*
  - Food and Environmental samples only

Molecular Testing Currently Available at the *NSHL* PFGE

- Pulsed Field Gel Electrophoresis (PFGE)
  Molecular sub typing of bacterial isolates for establishing laboratory links for epidemiology
- Currently available
  Non-Typhoidal *Salmonella*
  E.coli
  Shigella
- Test validation in progress
  Listeria monocytogens
  Campylobacter
  Vibrio species
- Each isolate PFGE pattern is posted on PulseNet and analysis performed for possible matches
- The *NSHL* participates in sending isolates to the CDC for NARMS

Reference Laboratory Testing

- The *Nevada State Health Laboratory* provides support for testing done at Reference Laboratories such as the CDC and FDA Labs
- Specimens and requisitions are submitted the *NSHL*
- Laboratory results are compiled and forwarded to the client and appropriate health agencies

Nevada State Health Laboratory Contact Information

- 24 hour pager number 775-823-1150
- Fed Ex Account # 1046-0029-8
- Address
  Nevada State Health Lab
  1660 North Virginia Street
  Reno, NV 89503
- Phone number 775-688-1335
- Fax number 775-688-1460

NEVADA
STATE HEALTH
LABORATORY