

Foodborne Poisonings

Including Poisonings by Ciguatera, Scombrototoxin,
Mushroom Toxins, Tetrodotoxin,
Paralytic Shellfish, and Amnesic Shellfish

IMMEDIATELY REPORTABLE DISEASE

Per N.J.A.C. 8:57, healthcare providers and administrators shall immediately report by **telephone** confirmed and suspected cases of foodborne poisonings to the health officer of the jurisdiction where the ill or infected person lives, or if unknown, wherein the diagnosis is made. The health officer (or designee) **must immediately institute the control measures listed below in section 6, “Controlling Further Spread,”** regardless of weekend, holiday, or evening schedules. A directory of local health departments in New Jersey is available at

<http://www.state.nj.us/health/lh/directory/lhdselectcounty.shtml>.

If the health officer is unavailable, the healthcare provider or administrator shall make the report to the Department by telephone to 609.826.5964, between 8:00 A.M. and 5:00 P.M. on non-holiday weekdays or to 609.392.2020 during all other days and hours.



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1 THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent

Foodborne poisoning results from ingestion of foods contaminated with toxins. These toxins may occur naturally, may be chemical or biological contaminants, or may be metabolic products of infectious agents that are present in the food. For the purposes of this manual, surveillance and reporting of foodborne poisonings will be limited to poisonings resulting from ingestion of the following naturally occurring toxins:

- **Ciguatera** poisoning is caused by the consumption of tropical and subtropical finfish that have accumulated naturally occurring toxins through their diet. These toxins, which are produced by reef algae, are endemic in tropical areas.
- **Scombrototoxin** poisoning is caused by the ingestion of foods that contain high levels of histamine. Initially the syndrome was associated with fish in the *Scombroidae* family (tuna, mackerel, skipjack, and bonito); however, nonscombroid fish (mahi-mahi, bluefish, and salmon) have also commonly been associated with this illness. Although scombrototoxin poisoning is usually associated with spoilage of fish, any foods with appropriate amino acids that are subjected to certain bacterial contamination and growth may lead to scombroid poisoning when ingested.
- **Mushroom toxin** poisoning is caused by the consumption of raw or cooked fruiting bodies of a number of species of wild fungi.
- **Tetrodotoxin** poisoning is caused by the consumption of tetrodotoxin, found most commonly in the liver, intestines, and skin of pufferfish. Tetrodotoxin has also been found in other species, including parrotfish, porcupine fish, ocean sunfish, species of newts and salamanders, frogs, blue-ringed octopus, starfish, and xanthid crabs. The metabolic source of the toxin is unknown; however, there is evidence of production by several bacterial species including *Pseudomonas* species and *Vibrionaceae*.
- **Paralytic shellfish poisoning (PSP)** is caused by the consumption of shellfish that have been contaminated with various toxins produced by dinoflagellates they have fed upon. High concentrations of these toxins occur primarily during periods of algae blooms known as “red tides.”

- **Amnesic shellfish poisoning (ASP)** is caused by the consumption of shellfish contaminated with domoic acid, a toxin produced by algae known as *Pseudonitzschia* species.

B. Clinical Description

- **Ciguatera:** Symptoms occur within 24 hours of eating tropical or subtropical finfish, with gastrointestinal (GI) symptoms occurring as early as one hour after consumption. Predominant GI symptoms include diarrhea, vomiting, and abdominal pain. Neurologic symptoms, including paresthesia, pain, and weakness in the lower extremities, “aching teeth,” hot and cold temperature reversal, headache, vertigo, and myalgias, are common and may occur at the same time as the GI symptoms or follow one to two days later. In severe cases, patients may also develop hypotension (low blood pressure). Most patients recover within a few weeks; however, in severe cases neurologic symptoms may persist for weeks to months.
- **Scombrototoxin:** The initial symptoms of mouth tingling or burning, facial flushing, sweating, palpitations, dizziness, rash, headache, and itching of the skin occur rapidly and often progress to nausea, vomiting, and diarrhea within a few hours. Symptoms resolve completely within 12 hours with no long-term sequelae.
- **Mushroom toxins:** Clinical disease varies with the type of mushroom and dose ingested. Mushroom toxicity can in some cases be fatal. Incubation periods can be as short as 15 minutes to as long as two weeks. There are four general categories of mushroom toxins. The first are the protoplasmic toxins. Characteristic symptoms include sudden or severe seizures of abdominal pain, persistent vomiting, extreme thirst, lack of urine production, and headache. More than 50% of cases will experience liver, kidney, cardiac, or muscular damage. Protoplasmic toxins are the most likely of the mushroom toxins to cause death or irreversible organ damage. The second category of mushroom toxins is the neurotoxin, which results in neurologic signs and symptoms. Neurotoxins found in certain species of mushrooms may cause dizziness, periods of drowsiness followed by periods of hyperactivity, illusions, delirium, and hallucinations. The third category is the gastrointestinal irritants, which cause diarrhea, vomiting, and nausea. The fourth category is disulfiram-like toxins, which are generally nontoxic unless alcohol is consumed within 72 hours of ingestion of the toxin, in which case a short-lived, acute toxic syndrome can occur.
- **Tetrodotoxin:** The first symptoms of intoxication usually appear within 20 minutes to three hours, and they include numbing of the lips and tongue followed by paresthesia in the face and extremities. Dizziness, ataxia, headache, nausea, and diarrhea may also occur. Paralysis, convulsions, mental impairment, and cardiac arrhythmia cause death in up to 60% of cases.
- **PSP:** Ingestion of contaminated shellfish results in symptoms appearing within minutes to several hours. Symptoms are predominantly neurological, including paresthesias of the mouth and extremities, drowsiness, and incoherent speech. These symptoms are also frequently accompanied by GI symptoms. Symptoms usually resolve within a few days. Severe cases involving ataxia, muscle paralysis, and respiratory arrest may result in death.

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- **ASP:** Symptoms can be both gastrointestinal and neurologic. GI symptoms include nausea, vomiting, abdominal cramps, and diarrhea and usually develop within 24 hours of the consumption of toxic shellfish. In severe cases, neurological symptoms also appear, usually within 48 hours of toxic shellfish consumption. These symptoms include dizziness, headache, seizures, disorientation, short-term memory loss, peripheral neuropathy, respiratory difficulty, and coma. Some persons develop permanent neurologic deficits, especially dementia.

C. Reservoirs

Foodborne poisonings occur as a result of consuming preformed toxins found in the sources listed above.

D. Modes of Transmission

Foodborne poisonings are caused by the ingestion of preformed toxins and are not transmitted from person to person.

E. Incubation Period

- **Ciguatera:** one to 24 hours
- **Scombrototoxin:** immediate to three hours
- **Mushroom toxins:** immediate to 14 days
- **Tetrodotoxin:** immediate to three hours
- **PSP:** immediate to three hours
- **ASP:** GI symptoms usually develop within 24 hours; neurologic symptoms within 48 hours.

F. Period of Communicability or Infectious Period

These toxins are preformed when ingested and affect only the person who has consumed them, but as long as the contaminated sources are available for consumption, foodborne poisoning is a threat. These toxins are not killed by heat or cold storage. These foodborne poisonings are not transmitted person to person.

G. Epidemiology

- **Ciguatera** poisoning is a significant public health threat in areas of the world where consumption of reef fish is common. It is estimated that more than 400 species of fish have the potential for becoming toxic, with large predatory fish being the most toxic of these. Domestically, numerous cases of ciguatera poisoning are reported each year from Hawaii, Florida, Puerto Rico, and the U.S. Virgin Islands.
- All humans are susceptible to **scombroid** poisoning, and it remains one of the most common causes of fish poisoning in the United States. Occurrence of scombroid poisoning is worldwide. Because of the global nature of fish processing and packaging,

there are no geographic boundaries for fresh, processed, or frozen products. Risks appear to be greatest, however, from fish caught by recreational fishermen or fish caught in areas without adequate refrigerated storage.

- All humans are susceptible to **mushroom toxins**. Poisoning resulting from mushroom consumption occurs most often among novice mushroom hunters who misidentify and consume toxic species. Poisonings have also occurred among immigrants who consume poisonous North American mushroom species that closely resemble edible species from their native lands. Mushroom poisonings tend to be more frequent in the spring and fall, when most species are at the height of their fruiting stage.
- Cases of **tetrodotoxin** poisoning are rarely reported in the United States. Outbreaks have occurred in the Indo-Pacific region of the world, with numerous cases reported from Japan annually.
- All humans are susceptible to **PSP**. High concentrations of these neurotoxins occur most frequently during algae blooms known as “red tides” and are particularly common in shellfish harvested from colder waters. Most cases of PSP occur in those who gather shellfish for their own consumption, perhaps while unaware of or disregarding local shellfish harvesting warnings and regulations.
- **ASP** was first identified as a marine toxin disease in late 1987 in Canada, but it was later also identified in Washington and Oregon and in the marine food web along the coast of Texas. All humans are susceptible to this shellfish poisoning. The elderly are particularly predisposed to serious neurological symptoms similar to those of Alzheimer disease. All fatalities to date have involved elderly patients.

2 CASE DEFINITION

A. New Jersey Department of Health and Senior Services (NJDHSS) Case Definition

There is no formal case definition.

Report all cases diagnosed by a healthcare provider of ciguatera poisoning, scombrototoxin poisoning, mushroom toxin poisoning, tetrodotoxin poisoning, paralytic shellfish poisoning, or amnesic shellfish poisoning.

3 LABORATORY TESTING AVAILABLE

Testing of food samples for histamines is available from the NJDHSS Public Health and Environmental Laboratories. Testing of food samples for additional toxins may be available from US Food and Drug Administration (FDA) laboratories. NJDHSS will assist in arranging sample testing when applicable.

4 PURPOSE OF SURVEILLANCE AND REPORTING AND REPORTING REQUIREMENTS

A. Purpose of Surveillance and Reporting

To identify transmission sources of public health concern (e.g., a restaurant or commercially distributed food product) and to stop transmission from such sources.

B. Healthcare Provider Reporting Requirements

The New Jersey Administrative Code (NJAC 8:57-1.8) stipulates that healthcare providers immediately report (by telephone) all cases of foodborne poisonings to the local health officer having jurisdiction over the locality in which the patient lives or, if unknown, to the health officer in whose jurisdiction the healthcare provider is located.

C. Local Department of Health Reporting and Follow-Up Responsibilities

- Reporting Requirements

The New Jersey Administrative Code (NJAC 8:57-1.8) stipulates that each local health officer must report the occurrence of any case of foodborne poisoning immediately (by telephone) to the NJDHSS Infectious and Zoonotic Diseases Program (IZDP).

5 CASE INVESTIGATION

A. Forms

It is the health officer's responsibility to complete a "GI Illness Worksheet" (Insert hyperlink here) by interviewing the patient and others who may be able to provide pertinent information. Much of the Clinical information can be obtained from the patient's healthcare provider or the medical record.

- Obtain a food history for 72 hours before symptoms or, if the specific type of poisoning was diagnosed, the interval between the minimum and maximum incubation periods (refer to section 1 E: Incubation Period). If two or more persons became ill, attempt to focus on the suggested time frame for common meals/food items. Include the date and time food was consumed, number of persons exposed (both ill and well), food item(s) consumed, name of establishment (restaurant, store, and so forth) where food was obtained, and the place food was consumed.

NOTE: If mushrooms or fish are implicated, indicate the species/type suspected, if known.

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- In a case of an outbreak, immediately notify the NJDHSS IZDP by telephone at 609.588.7500 during business hours and 609.392.2020 after business hours and on weekends and holidays.
- If there have been several unsuccessful attempts to obtain patient information, please fill out the report with as much information as possible. Please note on the report why it could not be completed as well as name and affiliation of the person submitting the report and the person reporting the illness.

After completing the investigation, mail the “GI Illness Worksheet” (in an envelope marked “Confidential”) to IZDP, or file the report electronically over the Internet using the confidential and secure CDRSS.

The mailing address is:

NJDHSS
 Communicable Disease Service
 Infectious and Zoonotic Diseases Program
 PO Box 369
 Trenton, NJ 08625-0369

B. Entry into CDRSS:

The mandatory fields for all cases in CDRSS include: disease, last name, county, municipality, gender, race, ethnicity, case status, report status.

The following table can be used as a quick reference guide to determine which fields in CDRSS are necessary for accurate and complete reporting of foodborne poisoning cases. The first column represents the tabs along the top of the CDRSS screen. The Required Fields column reflects a detailed explanation of the essential data for each tab.

CDRSS Screen	Required Information
Patient Info	Enter disease name (“FOODBORNE INTOXICATIONS”), patient demographics, patient onset and date report was made to the local health department. There are five subgroups for Foodborne Intoxications (“PENDING,” “CIGUATERA,” “MUSHROOM POISONING,” “PARALYTIC SHELLFISH POISONING,” and “SCROMBROID”) select the appropriate subgroup.
Addresses	Use as needed for additional addresses (e.g., work address, school, temporary NJ address for out-of-state case). Use the Comments section in this screen to record any pertinent information about the alternate address. Entering an alternate address will allow other disease investigators access to the case if the alternate address falls within their jurisdiction.

CDRSS Screen	Required Information
<p>Clinical Status</p>	<p>Clinical information such as past medical history, any treatment that the patient received, name of medical facility(s) including date of initial healthcare evaluation and dates of hospitalization, treating physician(s), and mortality status are entered here.</p> <p>(NOTE: If the patient received care from two or more medical facilities, be sure all are recorded in the case including admit/discharge dates so the case can be accessed by all infection control professionals (ICPs) covering these facilities)</p>
<p>Signs/Symptoms</p>	<p>Make every effort to get complete information by interviewing the physician, family members, ICP, or others who might have knowledge of the patient’s illness. Check appropriate boxes for signs and symptoms and indicate their onset and resolution.</p>
<p>Risk Factors</p>	<p>Enter complete information about risk factors including complete food history for 72 hours before symptoms or if the specific type of poisoning was diagnosed, the interval between the minimum and maximum incubation periods (refer to section 1 E).</p> <p>Determine whether any food (leftovers or unopened) is available for testing (see section 6D, “Environmental Measures”). If the investigation points to a commercially processed food item, attempt to obtain product and manufacturer information and record in Comments section.</p>
<p>Contact Tracing</p>	<p>Record the number of persons ill, symptoms, date(s) of symptom onset, names of ill persons, and other clinical information. Other persons who have eaten the implicated food should be interviewed regarding their exposure and any symptoms of illness they may have experienced. In most cases, illness would have already occurred among these persons, but in some instances, such as mushroom ingestion, they should be advised to seek medical attention. All potentially exposed contacts are entered into the contact tracing tab for local, county and statewide surveillance efforts.</p> <p>Contacts are added individually by selecting the Enter Contact By Name feature:</p> <p>Each contact record reflects the period of exposure, symptomatic or asymptomatic, contact demographics, telephone numbers, marital status, primary language, exposure risk i.e., close, casual, unknown, and LHD response activities are noted.</p> <p>An exposure setting is selected for each contact from the drop down to the right of the contact’s name.</p>

CDRSS Screen	Required Information
	<p>A summary reflecting the following contact details: total number, name, age, relationship, exposure specifics as well as all LHD recommendations to prevent further transmission of illness are entered into the contact tracing text box.</p>
<p>Case Comments</p>	<p>Any additional case investigation findings that can not be entered in discrete data fields are documented in the general comment section.</p>
<p>Epidemiology</p>	<p>Select the route of transmission route, import status of infection i.e., whether the case was imported and from where (another county, state, country), LHD notification of illness and association with high-risk venue type, name, location and last day of attendance.</p> <p>The NJDHSS assigned outbreak or investigation number is selected for all involved cases which automatically populates a summary of the initial report.</p>
<p>Case Classification Report Status</p>	<p>Case status options are:</p> <p>“REPORT UNDER INVESTIGATION (RUI),” “CONFIRMED,” “PROBABLE,” “POSSIBLE,” and “NOT A CASE.”</p> <ul style="list-style-type: none"> • All cases entered by laboratories (including LabCorp electronic submissions) should be assigned a case status of “REPORT UNDER INVESTIGATION (RUI).” • Cases still under investigation by the LHD should be assigned a case status of “REPORT UNDER INVESTIGATION (RUI).” • There is no formal case definition for FOODBORNE INTOXICATIONS (see section 2) • Report status options are: “PENDING,” “LHD OPEN,” “LHD REVIEW,” “LHD CLOSED,” “DELETE,” “REOPENED,” “DHSS OPEN,” “DHSS REVIEW,” and “DHSS APPROVED.” • Cases reported by laboratories (including LabCorp electronic submissions) should be assigned a report status of “Pending.” • Once the LHD begins investigating a case, the report status should be changed to “LHD OPEN.” • The “LHD REVIEW” option can be used if the LHD has a person who reviews the case before it is closed (e.g., health officer or director of nursing). • Once the LHD investigation is complete and all the data are entered into CDRSS, the LHD should change the report status

CDRSS Screen	Required Information
	<p>to “LHD CLOSED.”</p> <ul style="list-style-type: none"> • “LHD CLOSED” cases will be reviewed by DHSS and be assigned one of the DHSS-specific report status categories. If additional information is needed on a particular case, the report status will be changed to “REOPENED” and the LHD will be notified by e-mail. Cases that are “DHSS APPROVED” cannot be edited by LHD staff.

C. Other Reporting/Investigation Issues

- Case report forms (GI Illness Worksheet and/or labs) DO NOT need to be mailed to NJDHSS as long as mandatory fields in CDRSS indicated in section B are completed.
- Once LHD completes its investigation and assigns a report status of “LHD CLOSED,” NJDHSS will review the case. NJDHSS will approve the case by changing the report status to “DHSS APPROVED.” At this time, the case will be submitted to CDC and the case will be locked for editing. If additional information is received after a case has been placed in “DHSS APPROVED,” you will need to contact NJDHSS to reopen the case. This should be done only if the additional information changes the case status of the report.
- Every effort should be made to complete the investigation within three months of opening a case. Cases that remain open for three months or more and have no investigation or update notes will be closed by NJDHSS.

6 CONTROLLING FURTHER SPREAD

A. Isolation and Quarantine Requirements (NJAC 8:57-1.12)

None.

B. Protection of Contacts of a Case

None.

C. Managing Special Situations

Reported Incidence Is Higher Than Usual/Outbreak Suspected

If the number of reported cases of foodborne poisonings in city/town is higher than usual, or if an outbreak is suspected, investigate to determine the source of infection and mode of transmission. A common vehicle (such as contaminated shellfish or certain species of the fish) should be sought and applicable preventive or control measures should be instituted (e.g., removing implicated food items from the environment). Consult with the IZDP. IZDP

staff can help determine a course of action to prevent further cases and can perform surveillance for cases that may cross several jurisdictions and therefore be difficult to identify at a local level.

D. Preventive Measures

1. Environmental Measures

Implicated food items must be removed from the environment. A decision about testing implicated food items can be made in consultation with IZDP and the Food and Drug Safety Program (FDSP). FDSP can help coordinate pickup and testing of food samples. If a commercial product is suspected, FDSP will coordinate follow-up with relevant outside agencies (e.g., FDA, US Department of Agriculture). FDSP can be reached at 609.588.3123.

NOTE: The role of FDSP is to provide policy and technical assistance with the environmental investigation such as interpreting the New Jersey Food Code, conducting a hazardous analysis and critical control point risk assessment, initiating enforcement actions, and collecting food samples.

2. Personal Preventive Measures/Education

In most cases, individuals cannot properly protect themselves from many foodborne poisonings, especially seafood-related, since there are no telltale signs to indicate the presence of toxins. Individuals can educate themselves, however, about edible mushrooms if harvesting. They should be warned to consume only mushrooms that they can identify. If collecting shellfish, individuals should be warned to pay attention to local warnings and ordinances regarding that practice. They should also buy seafood products only from licensed, commercial, reputable vendors, and handle the products appropriately (i.e., refrigerating immediately and cooking and serving as soon as possible).

Additional Information

Additional information can be obtained from the FDA's Center for Food Safety and Applied Nutrition Web site at www.cfsan.fda.gov.

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