REPORTABLE INFECTIOUS DISEASES REFERENCE MANUAL

Routine Reportable Infectious Disease Follow-up for the State and Local Health Departments

Connecticut Department of Public Health
Infectious Diseases Section

March 2016

Reportable Diseases Reference Manual 2016

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Routine Reportable Disease Follow-up

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Introduction

PURPOSE OF REPORTABLE INFECTIOUS DISEASES REFERENCE MANUAL

The *Connecticut* R*eportable Infectious Diseases Reference Manual* contains the recommendations of the Infectious Diseases Section, Connecticut Department of Public Health (DPH) regarding the responsibilities of DPH and local health departments (LHDs) for routine reportable infectious disease case investigation and follow-up. Intended primary users are health directors, public health nurses, sanitarians, and other LHD personnel in Connecticut.

The focus of this reference manual is on the routine follow-up of the reportable infectious diseases that are not covered by the STD/HIV/Hepatitis Programs or the Tuberculosis Program, which have their own disease-specific recommendations. This reference manual does not specifically address possible agents of bioterrorism, except by providing links to the Connecticut Public Health Emergency Response Plan and to the resources available on the Centers for Disease Control and Prevention (CDC) website.

We recommend that all primary users of this reference manual have their own copies of the following resources:

- Control of Communicable Diseases Manual, 20th Edition (American Public Health Association, David L. Heymann, MD, Editor);
- Red Book: 2012 Report of the Committee on Infectious Diseases, 29th Edition (American Academy of Pediatrics, Larry K. Pickering, MD, FAAP, Editor)

We recommend that the primary users of this reference manual start their investigation of a reportable disease by reviewing the appropriate sections of these two primary sources. Much of the disease-specific information in this reference manual is derived from these two resources and from materials available on the CDC website: http://www.cdc.gov/. This reference manual is intended to provide supplemental information that will help public health practitioners in Connecticut implement nationally-recognized disease prevention and control measures for reportable infectious diseases.

In this reference manual, diseases are categorized into the following sections: those indicative of bioterrorism, foodborne, sexually transmitted, vaccine-preventable, vectorborne, and other diseases of public health significance. Within each section, diseases are listed alphabetically. Within each disease topic, the user will find information for routine follow-up of reportable diseases, and a fact sheet. Section 7 contains forms and questionnaires for standardizing disease follow-up.

REPORTABLE DISEASE FOLLOW-UP IN CONNECTICUT

Reportable Diseases Listing

Connecticut General Statutes (CGS) § 19a-2A and §s 19a-36-A2 of the Connecticut Public Health Code mandate the Commissioner of DPH to issue a list of reportable diseases and reportable laboratory findings on an annual basis. An advisory committee of public health officials, clinicians, and laboratorians contribute to the process.

Mandated Reporting

CGS § 19a-215b and §s 19a-36-A3 of the Public Health Code require that health care providers, including administrators of health care facilities, report the diseases listed in the *List of Reportable Diseases* (Attachment A). These reports are confidential (pursuant to CGS § 19a-25 and § 19a-215d,e) and fall into two categories:

- **Category 1**: These diseases are reportable immediately by telephone on the day of recognition or strong suspicion. On weekdays, reports must be made to the DPH and LHD; on evenings and weekends, these reports must be made to the DPH. A Confidential Disease Report (PD-23) (Attachment B) or a disease-specific report form should be mailed to both the DPH and LHD within 12 hours.

- **Category 2**: These diseases are reportable by mail within 12 hours of recognition or strong suspicion to both the DPH and LHD.

Section 19a-36-A3 of the Public Health Code also requires that directors of clinical laboratories must report to DPH any laboratory evidence suggestive of diseases listed in the Laboratory Report of Significant Findings (Attachment C). A completed Form OL-15C (Attachment D) should be mailed to both the DPH and LHD of the town in which the patient resides.

Authority to Conduct Case Follow-up

CGS §19a-215d grants authority to the DPH and the LHD director or his/her authorized personnel to contact the reporting physician (if able to be located) and the person with a reportable condition for the purposes of disease control. All information collected, as part of this follow-up investigation, is considered confidential, pursuant to § 19a-25.

Reportable Disease Follow-up by the State and Local Health Departments

The following reflects the recommendations of the Infectious Diseases Section of the Department of Public Health (DPH) regarding responsibility for the routine follow-up of reportable infectious diseases to obtain additional surveillance data and to implement control measures.

Diseases for which the DPH *takes primary responsibility for obtaining surveillance and additional case information*.

The DPH is responsible for obtaining additional case data for a number of diseases that are reportable to the CDC. For some diseases, federal funding has been awarded to enable follow-up specifically for surveillance purposes.

The additional information is usually obtained by either calling the reporting source or mailing a more detailed report form. The assistance of the local health department is usually not required, *unless there is an urgent need to simultaneously initiate control measures* for the following diseases.

Anaplasma	Healthcare-associated infections	Salmonellosis
AIDS	Hemolytic-uremic syndrome	SARS-CoV
Anthrax	Hepatitis B in Pregnant women	Shiga toxin-related disease (gastroenteritis)
Babesiosis	HIV	Silicosis
Botulism	HPV	Smallpox
Brucellosis	Influenza-associated death	St. Louis encephalitis virus infection
California Group arbovirus infection	Influenza-associated hospital	Staph enterotoxin B pulmonary poisoning
Carbapenem-resistant enterobacteriaceae	Lead toxicity	*Staph aureus* disease
Carbon monoxide poisoning	Legionellosis	*Staph aureus* Methicillin resistant
Chickenpox-related death	Listeriosis	*Staph epidermidis* disease
Chikungunya virus	Lyme disease	Syphilis
Cholera	Malaria	Tetanus
Cyclosporiasis	Melioidosis	Trichinosis
Dengue	Mercury poisoning	Tularemia
EEE virus infection	Neonatal herpes	Vaccinia disease
Ehrlichia chaffeensis i	Neonatal bacterial sepsis	Venezuelan equine encephalitis
E. coli O157:H7	Occupational asthma	Viral hemorrhagic fever
Glanders	Plague	West Nile virus infection
Group A Streptococcal disease	Pneumococcal disease	Yellow fever
Group B Streptococcal disease	Q fever	
Haemophilus influenzae disease	Rabies	
Hansen's disease (Leprosy)	Ricin poisoning	
	Rocky Mountain spotted fever	
	Rotavirus	

Diseases for which the* LHD *takes primary responsibility for obtaining additional surveillance data and case information.

The following diseases are those for which the local health department has primary responsibility for obtaining surveillance data, including completing state and/or CDC case report forms if indicated, and assuring that appropriate control measures are being taken independently of any assistance from the DPH.

Campylobacteriosis Chancroid Chlamydia Cryptosporidiosis Giardiasis Gonorrhea	Hepatitis B Hepatitis C Shigellosis Typhoid fever *Vibrio* infection, non-cholera Yersiniosis

Diseases for which the* DPH *assumes responsibility for follow-up and control. The following diseases are ones for which DPH staff actively do the necessary follow-up.

Botulism
Activities include ensuring that appropriate diagnostic evaluation is done, interviewing suspect cases for possible exposures, and coordinating shipment of antitoxins from the CDC.

Dengue Fever
Activities include determining if and where the diagnosed individual travelled during incubation. If the case is determined to be locally acquired (within the United States), detailed clinical history is obtained and shared with CDC.

Hepatitis B in Pregnant Women
The DPH hepatitis B perinatal prevention staff perform surveillance (contact providers of all HBsAg+ women aged 12 – 45 years) to identify pregnant HBsAg carriers and initiate the following prevention measures to assure that: the prospective mothers receive prenatal education; information on the mother's carrier status is transferred to hospital-based providers and pediatricians; the infant is vaccinated and tested in a timely manner; and household contacts are educated, tested, and vaccinated if needed.

HIV
Activities include interviewing selected referrals for contacts and counseling them.

Syphilis
Activities include interviewing primary, secondary, and early latent cases for contacts and performing partner clinic referrals. They also include follow-up of

selected positive laboratory results to ensure that appropriate therapy has been given.

Diseases with joint responsibility for follow-up and control.

For some diseases, follow-up for both investigation and control is a joint responsibility. In general, the primary role of the DPH is to assure that appropriate investigative/control action is being taken on each case. The role of the local health department is to take the necessary action. If local health departments do not have the resources, DPH may perform the necessary investigation and control actions.

Chickenpox/Measles/Mumps/Pertussis/Polio/Rubella/Diphtheria

The DPH Immunization Program staff assures that appropriate diagnostic work has been done and works with local health department staff to assure that contacts to each case have been identified and that appropriate recommendations for vaccination, exclusion, etc., have been made.

***Haemophilus influenzae* disease/Meningococcal disease**

The DPH Epidemiology Program staff assures that appropriate diagnostic work has been done and works with local health department staff to assure that close contacts have been identified and referred to their physicians for prophylactic treatment.

Hepatitis A

The DPH Field Epidemiology staff conduct follow-up with the clinical lab or physician to ascertain if the report meets the hepatitis A surveillance case definition (http://www.cdc.gov/osels/ph_surveillance/nndss/phs/infdis.htm#top). If not a case, the local health department is notified that there is no need for further follow-up. If case is confirmed local health department staff completes the case investigation and assist with appropriate prophylaxis when necessary.

Tuberculosis

The DPH Tuberculosis Control Program staff work with LHD staff to ensure that a treatment plan is developed, a contact investigation is done on each case, those infected are offered preventive therapy, and progress with completing therapy is monitored.

Infectious Disease Outbreak Investigations and the Public Health Emergency Response Plan

In Connecticut, the investigation and control of reportable diseases and outbreaks, including simultaneous outbreaks, is the joint responsibility of the CT DPH and the local health departments involved. If an outbreak occurs within a town (exposure and ill residents) and if the town is covered by a fulltime local health department (LHD), the LHD will have the lead in the outbreak investigation and DPH will provide assistance. If an outbreak is multi-jurisdictional (exposure and ill residents), the DPH will have the lead in the outbreak investigation, and the LHDs will provide assistance.

Foodborne outbreak investigations provide an opportunity to determine the epidemiology of foodborne illness and identify the etiologic agent. The DPH Epidemiology Program Staff will work with the LHD to assure that an appropriate epidemiologic investigation is conducted.

Foodborne outbreak investigations can also result in the identification of specific contributing factors that lead to control of the immediate situation and development of practical and effective methods of preventing future outbreaks. The Food Protection Program will work with the LHD to assess food handling practices and implement control measures. "Foodborne Outbreak Investigations: A Practical Guide for Local Health Departments" is available for the primary users of this resource manual from the DPH Food Protection Program.

When the public health response to an infectious disease outbreak or multiple outbreaks exceeds the resources of the local health departments involved or threatens to become a statewide public health emergency as defined in the Public Health Emergency Response Act, the Commissioner of the Department of Public Health will notify the Governor. In the event of a statewide or regional public health emergency, the Governor may order the Commissioner of Public Health to implement all or a portion of the Public Health Emergency Response Plan.

A Public Health Emergency is defined as: "An occurrence or imminent threat of a communicable disease, except sexually transmitted disease, or contamination caused or believed to be caused by bioterrorism, an epidemic or pandemic disease, a natural disaster, a chemical attack or accidental release or a nuclear attack or accident that poses a substantial risk of a significant number of human fatalities or incidents of permanent or long-term disability." [C.G.S. PA 03-236]

Depending on the nature of the investigation (terrorism versus "natural"; biologic agents versus chemical or radiological agents; investigation of disease versus exposure only), a number of investigative teams may need to be formed.

Infectious Diseases

- Investigation oversight team - lead by Infectious Diseases Section Chief (State Epidemiologist) and Epidemiology and Emerging Infections Program Coordinator (Associate State Epidemiologist), potentially also with a CDC co-team leader if CDC is invited to join the investigation.

- Surveillance team - lead by senior staff from Epidemiology and Emerging Infections Program.

- Case investigation team - lead by EIS Officer in the Epidemiology and Emerging Infections Program or other CDC medical epidemiologist with assistance from Epidemiology and Emerging Infections staff.

- Field epidemiology team - lead by the six field epidemiologists, working with instructions from the Senior Epidemiologist and/or EIS Officer in the Epidemiology and Emerging Infections Program.

- Epidemiology team - lead by senior staff from the Epidemiology and Emerging Infections Program in consultation with the State and Associate State Epidemiologists.

- Environmental sampling team - lead by DEP and/or CDC staff with HAZMAT training in consultation with the State and Associate State Epidemiologists.

- Laboratory team - led by the DPH Laboratory Director and designated Bioterrorism Coordinator, in consultation with the Investigation Oversight Team.

- Epidemiology Surge Capacity - Epidemiological support, if needed, will come from: Epidemiologists in the Yale Emerging Infections Program and other Infectious Disease programs (HIV/AIDS, Immunizations, STD, TB) first, followed by Epidemiologists in Health Information Systems Reporting Section.

- Laboratory Surge Capacity - If needed, laboratory surge capacity will come from other laboratories in the Connecticut LRN, followed by CDC and other state health departments.

- Environmental Investigation Surge Capacity - If needed, environmental investigation surge capacity will come from CDC/NIOSH, the DPH Environmental Health Section and local health departments.

What is Maven CTEDSS?

Maven is Connecticut's electronic disease surveillance system (CTEDSS). Maven is web-based system that can be used to share information between local health departments and the DPH. Interview data for foodborne disease follow-up can be directly entered into Maven, and LHDs can complete follow-up forms online without sending the hardcopies to DPH. With Maven, local health staff is also able to generate reports of case data for their jurisdiction.

The CT DPH continues to expand disease reporting in Maven. One of the system's main benefits is that it is able to receive electronic disease reports. Local health departments will be able to access all of their disease reports in Maven when electronic laboratory reporting is fully implemented. Although most diseases are still reported to DPH on paper-based forms, we anticipate transitioning to electronic laboratory reporting over the next several years.

WHAT IS FOODNET?

The Foodborne Diseases Active Surveillance Network (FoodNet) is a collaborative project between the DPH, CDC, and Yale University. It is the principle foodborne disease component of the CDC Emerging Infections Program (EIP). The objectives of FoodNet are to describe the epidemiology of emerging foodborne pathogens, estimate the frequency and severity of foodborne diseases that occur in the United States each year, and determine the proportion of specific foodborne diseases associated with certain contaminated foods.

Currently, FoodNet conducts active surveillance for nine foodborne pathogens: campylobacteriosis, cryptosporidiosis, cyclosporiasis, *Escherichia coli* O157:H7 and other shiga toxin-producing *E. coli*, listeriosis, salmonellosis, shigellosis, yersiniosis, and *Vibrio* infections. Data from FoodNet is also used to assist in the evaluation of new food safety programs and regulations.

Each year, as part of multi-site foodborne disease research studies, FoodNet staff may interview cases of specific types of foodborne disease to determine risk factors for acquiring infection. The DPH notifies directors of health of these activities each year to request continued collaboration on follow-up interviews of cases to minimize the potential for duplication of efforts.

What is FoodCORE?

Beginning in 2012, the DPH was awarded CDC funding to join the Foodborne Diseases Centers for Outbreak Response Enhancement (FoodCORE), which focuses on developing new and better methods to detect, investigate, respond to, and control local and multistate foodborne disease outbreaks. A primary focus of FoodCORE is to conduct rapid interviews of all cases of *Salmonella*, Shiga-toxin producing *Escherichia coli* (STEC), and Listeria (SSL).

CONFIDENTIALITY

The information that public health officials collect as part of disease follow-up contains identifiable health data. Identifiable health data is any item, collection, or grouping of health data that makes the individual or organization supplying it or described in it identifiable. Identifiable health data cannot be disclosed unless it is:

- Needed to protect the health, life, well-being of the person with a reportable disease or condition pursuant to CGS §19a-215;
- Needed for disease prevention and control pursuant to CGS §19a-215 or for the purpose of reducing morbidity and mortality from any cause or condition;
- Needed for bona fide medical and scientific research;

Both state and local public health officials are required to make every effort to limit the disclosure of identifiable health data to the minimal amount necessary to accomplish the public health purpose. Administrative and support staff, interns, and local board of health members who may be aware of personal information on a case should be familiar with maintaining confidentiality.

We encourage all LHDs to have on file a written confidentiality policy and standard confidentiality agreement form for all LHD staff involved in infectious disease follow-up and control including clerical staff who open mail and information technology (IT) staff with system administrator privileges. Please see Attachment F for the confidentiality statement that DPH uses.
The DPH also encourages you to utilize a confidential fax machine for infectious disease reporting, investigation, and control. This machine should be located in a secured area where disease control staff work and should not be accessible to the general public.

All confidential disease records should be stored in a locked file cabinet and,

when possible, in a room that can be locked. If confidential case information is being entered into electronic databases or other computer programs, all computers should be password protected to ensure confidentiality.

Important Points Regarding Confidentiality

- The information that public health officials collect as part of disease follow-up contains identifiable health data.
- Limit the disclosure of identifiable health data to the minimal amount necessary to accomplish the public health purpose.
- Confidential information can be released only to those who "need to know" to accomplish the public health purpose. Those to whom it is released must maintain confidentiality.
- When mailing case report forms, stamp envelopes "CONFIDENTIAL." If reporting by fax, be certain that the receiving number is a confidential fax.

HEALTH INSURANCE PORTABILITY AND ACCOUNTABILITY ACT OF 1996 (HIPAA)

Background

The privacy provisions of the federal law, the Health Insurance Portability and Accountability Act of 1996 (HIPAA), apply to health information created or maintained by health care providers who engage in certain electronic transactions, health plans, and health care clearinghouses. The Department of Health and Human Services (HHS) has issued regulations, "Standards for Privacy of Individually Identifiable Health Information," applicable to entities covered by HIPAA. The intent of HIPAA, which went into effect on April 14, 2003, was to establish national standards for consumer privacy protection and insurance market reform. In some instances, confusion about the intent and implementation of the rules has resulted in health care providers refusing public health officials access to patient records and is having unintended consequences on some of the core functions of public health.

Connecticut General Statutes

Hospitals and providers must be compliant with HIPAA requirements. Due to the importance of protecting the public's health, state and local health departments are authorized by law to collect personal information as part of such activities. However, because of HIPPA, hospitals and providers may question our ability to collect this information. The following statement, developed by DPH attorneys, can be used with hospitals or providers who question our ability to collect personal information from medicals records for patients with reportable diseases without their consent.

"Pursuant to Connecticut General Statutes §19a-2a and §19a-215 and the Regulations of Connecticut State Agencies §s19a-36-A3-4, the requested information is required to the Department of Public Health."

Please note that Connecticut General Statutes § 52-146(b) (1) authorizes the release of these records to the Department without the patient's consent. Additionally, HIPAA also authorizes you to release this information without an authorization, consent, release, opportunity to object by the patient, as information (i) required by law to be disclosed [HIPAA Privacy regulation 42 CFR §164, 512 (a)] and (ii) as part of the Department's public health activities [HIPPA Privacy regulation §164.512(b)]. The requested information is what is minimally necessary to achieve the purpose of the disclosure, and you may rely upon this representation in releasing the requested information, pursuant to 42 CFR § 64.514(d)(3)(iii)(A) of the HIPAA Privacy regulations.

ADDITIONAL RESOURCES FOR CONTROL RELATED FOLLOW-UP

Control Measures

- American Public Health Association. Chin J, ed. *Control of Communicable Diseases Manual*. 20th ed. Washington, DC: American Public Health Association, 2014.
- American Academy of Pediatrics. Pickering LK, ed. *Red Book: 2012 Report of the Committee on Infectious Diseases*. 29th ed. Elk Grove Village, IL: American Academy of Pediatrics; 2012.
- Nationally Notifiable Infectious Diseases case definition website: http://www.cdc.gov/epo/dphsi/phs/infdis.htm

Educational Resources

- Centers for Disease Control and Prevention online: http://www.cdc.gov
- Connecticut Department of Public Health online: http://www.ct.gov/dph
- Center for Food Safety & Applied Nutrition "Bad Bug Book" online: http://vm.cfsan.fda.gov/~mow/intro.html

This reference manual addresses possible agents of bioterrorism by linking to the Connecticut Public Health Emergency Response Plan and to the agent-specific resources available on the Centers for Disease Control and Prevention (CDC) website related to bioterrorism.

http://www.ct.gov/dph/cwp/view.asp?a=3936&q=491438&dphNavPage=%7C

http://emergency.cdc.gov/bioterrorism/index.asp

1) THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent

Botulism is caused by exposure to a neurotoxin produced by *Clostridium botulinum*. *C. botulinum* is an anaerobic, spore-forming bacterium. The toxin is produced as the bacteria are multiplying, and the bacteria multiply under anaerobic (no oxygen) conditions and low acid (generally pH<4). There are seven types of botulinum toxin (A-G), but types A, B, and E primarily cause human botulism.

C. botulinum toxin is considered a potential bioterrorist agent. If acquired and properly disseminated, botulinum toxin could cause a serious public health challenge in terms of casualties and controlling the spread of disease.

B. Description of Illness

- ***General facts:*** *C. botulinum* toxin is one of the most potent and lethal substances known. In humans, botulism manifests itself in one of three clinical forms: foodborne botulism, infant, or wound botulism. The site of toxin production is different for each of the forms, but they all share the flaccid paralysis that results from exposure to botulinum toxin.

  Foodborne botulism is a severe poisoning caused by the ingestion of pre-formed *C. botulinum* toxin.

  Infant (intestinal) botulism occurs when *C. botulinum* spores are ingested, and the toxin is formed in the intestines in the absence of mature gastrointestinal flora. The disease is usually confined exclusively to infants less than one year of age.

  Wound botulism occurs when *C. botulinum* multiplies in the wound and produces the toxin, which is then absorbed into the bloodstream.

- ***Occurrence:*** Botulism occurs worldwide, as sporadic cases and as family and general outbreaks. In the United States, since 1973 a median of 24 cases of foodborne botulism, 3 cases of wound botulism, and 71 cases of infant botulism have been reported annually to the Centers for Disease Control and Prevention. Recently, use of black tar heroin by chronic drug users has led to a dramatic increase in the number of cases of wound botulism since 1994.

- ***Incubation period:*** The incubation period is variable, but neurological symptoms of foodborne botulism usually appear within 12-36 hours (range: 6 hours to 8 days) after eating contaminated food. The median incubation period for wound botulism is generally longer than for foodborne botulism, with a median of 7 days and a range of 4 to 14 days. In general, the shorter the incubation period the more severe the disease. The incubation period for infant botulism is unknown since it is usually not known when the spores are ingested.

- ***Common symptoms:***

  Foodborne botulism is dominated by neurologic signs and symptoms, including blurred or double vision, dysphasia, dry mouth and peripheral muscle weakness. Symmetric descending flaccid paralysis is classic for botulism, beginning with the cranial nerves. Paralysis then affects the upper extremities, the respiratory muscles, and finally the lower extremities. The clinical symptoms are similar no matter which toxin is responsible for the illness, but type A has been associated with a higher case-fatality rate than B or E. In general, the case-fatality rate for foodborne botulism is 5-10%. Recovery may take months.

  Wound botulism usually presents with the same clinical picture as foodborne botulism.

  Infant botulism has a distinctly different clinical presentation than wound and foodborne botulism. The earliest clinical sign in infant botulism is constipation, which is followed by poor feeding, decreased sucking, lethargy, listlessness, difficulty swallowing, a weak cry, and lack of muscle tone giving rise to the term "floppy baby syndrome." In some cases, respiratory insufficiency and respiratory arrest may occur. Infant botulism presents with a wide range of severity, from mild illness to sudden death.

- ***Treatment:*** Botulism can be treated with an antitoxin which blocks the action of toxin circulating in the blood. Immune globulin for infants is available from the California Department of Public Health (BabyBIG®), and antitoxin for older children and adults is available through CDC. Patients usually require ventilator support, which is commonly needed for 2 to 8 weeks. For wound botulism, in addition to antitoxin, the wound should be debrided and/or drainage established, with appropriate antibiotics (e.g., penicillin). For infant botulism, meticulous supportive care is essential.

C. *Reservoirs*

C. botulinum spores are ubiquitous in soils worldwide. The spores can survive indefinitely in soil under almost any environmental condition. Spores are also found in marine sediment.

D. Modes of Transmission

Foodborne botulism is acquired by ingesting pre-formed toxin. This usually occurs as a result of ingesting food that has been inadequately processed and then inadequately prepared before being eaten. The most frequent source is home-canned foods, but outbreaks have also been attributed to baked potatoes in foil, minced garlic in oil and sautéed onions held under a layer of butter. The toxin is destroyed by boiling.

Wound botulism occurs when wounds are contaminated with dirt or gravel containing botulism spores. Wound botulism has also been reported among drug abusers.

Infant botulism, which is the most common form of botulism in the United States, occurs as a result of ingestion of the spore form of the bacteria, which then goes on to germinate and produce toxin in the intestines. This can happen through ingestion of food, soil, or dust contaminated with botulism spores. Honey often contains *C. botulinum* spores. Some cases of infant botulism have occurred in children living in areas of construction and earth disruption.

E. Period of Communicability

Despite excretion of *C. botulinum* toxin and organism at high levels (about 10^6 organisms/gram) in the feces of intestinal botulism patients weeks to months after onset of illness, no instance of person-to-person spread has ever been documented for botulism. Foodborne botulism patients typically excrete the toxin for shorter periods.

2) ACTIONS REQUIRED AND CONTROL MEASURES

A. Reporting Requirements

Botulism is physician reportable by telephone immediately on the day of recognition or strong suspicion to both the Connecticut Department of Public Health (DPH) and the local health department (LHD). A mailed report is also required within 12 hours. The director of any clinical laboratory must also report laboratory evidence of botulism to both the DPH and the LHD. See current lists of physician Reportable Diseases (Attachment A) and Laboratory Reportable Significant Findings (Attachment C).

B. Case Definition

Foodborne botulism:

- **Probable Case:** a clinically compatible case with an epidemiologic link (e.g., ingestion of a home-canned food within the previous 48 hours).

- **Confirmed Case:** a clinically compatible case that is laboratory confirmed by isolation of *C. botulinum* from stool or detection of botulinum toxin in serum, stool, or patient's food or that occurs among persons who ate the same food as persons who have laboratory-confirmed botulism.

Infant botulism:

- **Confirmed Case:** a clinically compatible case in a child aged less than 1 year that is laboratory confirmed by detection of botulism toxin in stool or serum or *C. botulinum* has been isolated from stool.

Wound botulism:

- **Confirmed Case:** a clinically compatible case that is laboratory confirmed by detection of botulism toxin in serum or isolation of *C. botulinum* from a wound, in a patient who has no suspected exposure to contaminated food and who has a history of a fresh, contaminated wound during the 2 weeks before onset of symptoms, or a history of injection drug use within the 2 weeks before onset of symptoms.

C. Case Investigation

- **DPH Responsibility:** Activities include ensuring that appropriate diagnostic evaluation is done, interviewing suspect cases for possible exposures, and coordinating shipment of antitoxins from CDC.

- **LHD Responsibility:** Provide information and educational materials describing the nature of the disease and preventive measures.

D. Control Measures

If a bioterrorist event is suspected, the DPH and other response authorities will work closely with local health departments on how to proceed.

Fact Sheet

What is botulism?
Botulism is a serious illness caused by a nerve toxin made by the bacterium, *Clostridium botulinum*. A toxin is a poison that is released by some bacteria and viruses. There are three types of botulism: foodborne, wound, and infant.

Where are *Clostridium botulinum* bacteria found?
These bacteria are commonly found in the soil and grow best in low oxygen conditions.

How do these bacteria spread?
Foodborne botulism occurs when person eats preformed toxin present in contaminated food. It often involves improperly processed home canned foods. Infant botulism occurs when children eat spores that grow and produce bacteria. These bacteria then reproduce in the gut and release toxin. Infant botulism has been associated with eating honey that contains the bacterial spores. Light and dark corn syrups have also been reported to contain the spores, although cases of infant botulism have not been linked to corn syrup. Would botulism, a rare disease, occurs when spores get into an open wound and reproduce in an anaerobic (no oxygen) environment.

Who gets botulism?
Anyone can get foodborne or wound botulism. Infant botulism occurs among children less than 1 year of age.

What are the symptoms of botulism?
Foodborne and wound botulism produce symptoms that affect the nervous system. Symptoms include blurred or double vision, dry mouth, and muscle paralysis that may affect breathing. About 15% of persons with foodborne botulism die. Infant botulism has a wide range of symptoms including constipation, loss of appetite, weakness, an altered cry, and a striking loss of head control. About 2% of the cases of infant botulism die.

How soon do symptoms appear?
Symptoms of foodborne botulism usually appear 12 to 36 hours after eating the food that contains the toxin. However, it is possible for symptoms to take several days to develop. The incubation period for infant botulism is unknown since the exact time of ingestion often cannot be determined. Symptoms of wound botulism may take up to 2 weeks to appear.

How long can an infected person carry *Clostridium botulinum*?
C. botulinum toxin and organism may be shed at high levels in the feces of infants with botulism weeks to months after onset of illness. However no instance of secondary person-to-person transmission has been documented. Foodborne botulism patients typically excrete the toxin for shorter periods.

Should an infected person be excluded from school or work?
No instance of person-to-person spread has ever been documented for botulism; most infected people may return to school or work when they have recovered from their illness.

What is the treatment for botulism?

The symptoms of botulism make hospitalization necessary. If diagnosed early, botulism can be treated with an antitoxin, which blocks the action of the toxin circulating in the blood. This can prevent patients from worsening, but recovery still takes many weeks. If left untreated, a patient may need to be on a breathing machine (ventilator) for weeks and would require intensive medical and nursing care. Infant botulism is treated with immune globulin (BabyBIG®, Botulism Immune Globulin Intravenous (Human) (BIG-IV)), which is similar to the antitoxin. Most cases of botulism recover with appropriate medical care.

How can botulism be prevented?

Honey and corn syrup should not be fed to infants less than 1 year old. All canned and preserved foods should be properly processed and prepared. Bulging containers should not be opened, and commercial cans with bulging lids should be returned unopened to the place of purchase. Goods with off-odors should not be eaten or even tasted. Home canned vegetables should be boiled, with stirring, for at least 3 minutes before eating.

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1) THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent

Campylobacter jejuni (*C. jejuni*) is the usual cause of campylobacteriosis; *C. coli*, *C. laridis,* and *C. fetus* ssp. *fetus* are less common causes of campylobacteriosis in humans.

B. Description of Illness

- ***General facts:*** *Campylobacter* is one of the most common bacterial causes of diarrheal illness in the United States. Infection occurs more frequently in summer months and is particularly likely to infect children less than 5 years old (especially infants) and young adults. It is also an important cause of traveler's diarrhea.
- ***Occurrence:*** It is estimated that 1.3 million persons are affected annually in the United States with most cases occurring as isolated, sporadic events, not as part of recognized outbreaks.
- ***Incubation period:*** Usually about 2 - 5 days after exposure (range 1 - 10 days).
- ***Common symptoms:*** Diarrhea (sometimes bloody), abdominal pain, malaise, fever, nausea, and sometimes vomiting may occur. Infection can cause a spectrum of disease ranging from mild, uncomplicated gastroenteritis to fulminant disease similar to acute appendicitis.
- ***Treatment:*** None generally indicated except rehydration and electrolyte replacement.

C. Reservoirs

Campylobacter bacteria are endemic in animals, most notably poultry and cattle. A very large percentage of raw poultry is contaminated with *C. jejuni*. Domestic animals (puppies, kittens, other pets), livestock (sheep, pigs), rodents, and birds may also be sources of human infection.

D. Modes of Transmission

The most common mode of transmission is ingestion of contaminated food or water. This includes raw and undercooked poultry or pork, raw milk and raw milk products, and inadequately treated water. Other foods may be cross-contaminated from poultry, especially through the use of common cutting boards. Common source outbreaks associated with undercooked chicken, unpasteurized milk, and non-chlorinated water have occurred. In addition, animal-to-person transmission can occur through contact with infected pets (e.g., puppies with diarrhea) and farm animals. Person-to-person spread occurs occasionally, particularly from very young children.

E. Period of Communicability

The disease is communicable for as long as the infected person excretes *Campylobacter* bacteria in their stool. This can occur for several days to several weeks after symptom onset.

2) ACTIONS REQUIRED AND CONTROL MEASURES

A. Reporting Requirements

Campylobacteriosis is physician reportable by mail within 12 hours of recognition or strong suspicion to both the Connecticut Department of Public Health (DPH) and the local health department (LHD). The director of any clinical laboratory must also report laboratory evidence of campylobacteriosis to both the DPH and the LHD. See current lists of physician Reportable Diseases (Attachment A) and Laboratory Reportable Significant Findings (Attachment C).

B. Case Definition

- **Confirmed Case:** Isolation of *Campylobacter* from any clinical specimen.

C. Case Investigation

- **DPH Responsibility:** DPH is available to the LHD for assistance, consultation, and guidance and to ensure that appropriate investigative and control actions are being taken.

- **LHD Responsibility:** Using the "General Enteric Diseases Interview Form" (Attachment F), interview case and identify individuals in high-risk occupations or settings (see below). Completed GEDIF forms should be entered directly into Maven or faxed to the DPH at 860-509-7910.

  Provide information and educational materials describing the nature of the disease and preventive measures. The importance of frequent and thorough hand washing should be stressed for all cases and contacts. Encourage a physician visit if symptoms persist.

D. Control Measures for Individuals in High-Risk Occupations or Settings

- **Food Handler:** Individuals with laboratory-confirmed infection should be excluded from direct food handling until they are asymptomatic. Exclusion of asymptomatic individuals is indicated only for those with questionable hygienic habits. Proper hand washing should be stressed.

- **Health Care Worker with Direct Patient Contact:** Individuals with laboratory-confirmed infection should be excluded from direct care of patients until they are asymptomatic. Exclusion of asymptomatic individuals is indicated only for those with questionable hygienic habits. Proper hand washing should be stressed.

- **Day Care Setting:** Symptomatic children should be excluded from day care. Improved sanitation and personal hygiene should be emphasized in day care settings. Proper hand washing by staff and children should be stressed, especially after using the toilet and/or handling soiled diapers, and prior to preparing or eating food.

- **Household Contacts:** Household contacts with diarrhea should be excluded from food handling and the care of children and/or patients until they are asymptomatic. Proper hand washing should be stressed.

Fact Sheet

What is campylobacteriosis?
Campylobacteriosis is an illness that is caused by the bacterium, *Campylobacter*. This bacterium affects the intestinal tract and rarely, the bloodstream. It is a common cause of diarrhea in the United States. Most cases are seen in the summer months and can occur as single cases or outbreaks.

Where are *Campylobacter* bacteria found?
Poultry, cattle, pigs, and sheep may carry these bacteria in their intestines. Most raw poultry meat is contaminated with *Campylobacter*. Puppies, kittens and other pets may also be sources of human infection.

How do these bacteria spread?
Campylobacter bacteria are generally spread by eating contaminated food, including unpasteurized milk and untreated water, or by direct contact with fecal material from infected animals. Person-to-person spread occurs occasionally, particularly from very young children.

Who gets campylobacteriosis?
Anyone can get campylobacteriosis.

What are the symptoms of campylobacteriosis?
Campylobacteriosis may cause mild or severe diarrhea, abdominal pain, fever, nausea, and vomiting. Traces of blood or mucus may be found in the liquid stool.

How soon do symptoms appear?
The symptoms generally appear 2 to 5 days after the exposure (range 1 – 10 days).

How long can an infected person carry *Campylobacter*?
Generally, infected people will pass the bacteria in their stool for a few days to a week or more.

Should an infected person be excluded from school or work?
Since the organism is passed in the stool, people with active diarrhea who are unable to control their bowel habits (infants, young children, adults with poor bowl control/hygiene) should be excluded from school or work. Most infected people may return to school or work when diarrhea has ended.

What is the treatment for campylobacteriosis?
Most people infected with *Campylobacter* will recover on their own. Serious cases may require fluids to prevent dehydration. Antibiotics are occasionally used to treat severe cases or to shorten the carrier phase, which may be important for food handlers, children in daycare, and health care workers. Since relapses occasionally occur, some physicians might treat mild cases with antibiotics to prevent a recurrence of symptoms.

How can campylobacteriosis be prevented?

Always treat raw poultry, beef, and pork as if they are contaminated and handle accordingly.

- Wrap fresh meat in plastic bags at the market to prevent blood from dripping on other foods.
- Refrigerate foods promptly; minimize holding at room temperature.
- Cutting boards, counters, and utensils used for preparation should be washed immediately after use to prevent cross contamination with other foods.
- Avoid eating raw or undercooked meats.
- Make sure the correct internal cooking temperature is reached for each type of meat, particularly when using a microwave.
- Avoid eating raw eggs, uncooked foods with raw egg (e.g., cookie dough), or undercooked foods containing raw eggs.
- Avoid using or drinking raw milk or products made from raw milk.
- Avoid using or drinking untreated water.
- Wash hands carefully before and after food preparation.
- Make sure children, particularly those who handle pets, wash their hands.

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1) THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent

Cholera is an acute diarrheal illness caused by enterotoxins produced by V*ibrio cholera* bacteria. Two serogroups, O1 and O139, are responsible for causing extensive epidemics of disease.

B. Description of Illness

- ***General facts:*** In the United States, cholera was prevalent in the 1800s but has been virtually eliminated by modern sewage and water treatment systems. Most cases in the United States occur among travelers returning from areas experiencing cholera epidemics.
- ***Occurrence:*** Pandemic cholera has appeared off and on in most parts of the world since the early 19th century. In 1991, an epidemic began in Peru that quickly spread to other countries in South America. In the United States, most cases occur among travelers returning from areas experiencing cholera epidemics. Sporadic cases have also occurred among persons eating inadequately cooked shellfish harvested from coastal waters along the Texas and Louisiana borders.
- ***Incubation period:*** Ranges from a few hours to 5 days (commonly 2 - 3 days).
- ***Common symptoms:*** Infection with *V. cholera* usually results in asymptomatic or mild illness involving only diarrhea. However, approximately 1 in 20 people infected will develop more severe illness characterized by profuse watery diarrhea, nausea, and some vomiting early in the illness. Because of rapid loss of body fluids, dehydration and shock can occur in most severe cases. Without rehydration therapy, death can result within hours. The case-fatality rate in severe untreated cases may exceed 50%; with proper treatment, the rate is less than 1%.
- ***Treatment:*** Oral or parenteral rehydration therapy to correct dehydration and electrolyte abnormalities is the most important modality of therapy and should be initiated as soon as the diagnosis is suspected. Antimicrobial therapy results in prompt eradication of vibrio, decreases the duration of diarrhea, and decreases requirements for fluid replacement. It should be considered for people who are moderately to severely ill.

C. Reservoirs

Humans are the primary reservoir although environmental reservoirs exist in polluted and non-polluted coastal and estuarine waters of the United States, Ecuador, Guam, Kiribati, Italy, and Portugal.

D. Modes of Transmission

V. cholera is usually transmitted by ingesting food or water contaminated directly or indirectly by feces or vomitus of infected persons (e.g., via sewage). Important vehicles include raw and/or undercooked seafood, beverages made with contaminated water or ice, and fruits/vegetables washed with contaminated water.

E. Period of Communicability

Although person-to-person spread has not been demonstrated, cholera is presumably transmitted as long as the stool tests positive, usually a few days after recovery from symptoms. Occasionally a carrier state may persist for several months; very rarely, adult chronic biliary infection results in periodic shedding in stool for years. Antibiotics effective against the bacteria shorten the period of communicability.

2) ACTIONS REQUIRED/CONTROL MEASURES

A. Reporting Requirements

Cholera is physician reportable immediately by telephone to the Connecticut Department of Public Health (DPH) and the local health department (LHD) on the day of recognition or strong suspicion of disease. A mailed report is also required within 12 hours. The director of any clinical laboratory must also report laboratory evidence of cholera to both the DPH and LHD. **Additional requirements:** Isolates of *V. cholera* must be submitted to the DPH State Laboratory for confirmation. See current lists of physician Reportable Diseases (Attachment A) and Laboratory Reportable Significant Findings (Attachment C).

B. Case Definition

- **Confirmed Case:**
  - Isolation of toxigenic (i.e., cholera toxin-producing) *Vibrio cholerae* 01 or 0139 from stool or vomitus, or
  - Serologic evidence of recent infection.

C. Case Investigation

- **DPH Responsibility:** DPH will contact the testing laboratory and the patient's physician to confirm the diagnosis of cholera and to make the physician aware that someone from the LHD will contact their patient to obtain additional follow-up information. The DPH will then notify the LHD of the above findings and provide additional recommendations regarding follow-up, if needed.

- **LHD Responsibility**: Complete the **"**CDC Cholera and Other *Vibrio* Illness Surveillance Report" form (Attachment G). Completed forms should be scanned and uploaded to Maven, or faxed to the DPH at 860-509-7910.

  In addition, interview case to identify individuals in high-risk occupations or settings (food handler, health care worker with direct patient contact, day care settings).

  Provide information and educational materials describing the nature of the disease and preventive measures. The importance of frequent and thorough hand washing should be stressed for all cases and contacts.

D. Control Measures

Recommendations on exclusion from high-risk occupations or settings should be made in consultation with DPH.

Fact Sheet

What is cholera?
Cholera is an illness caused by a bacterium called *Vibrio cholerae*. This bacterium affects the intestinal tract. Only a few cases are recognized in the United States each year.

Where are *V. cholerae* bacteria found?
V. cholerae can be found in people. The bacterium may also live in the environment in brackish (containing some salt) rivers and coastal waters. Shellfish eaten raw have been a source of cholera.

How do these bacteria spread?
Cholera bacteria are passed in stool and are spread by consuming contaminated food or water.

Who gets cholera?
Cholera is a rare disease in the United States. People traveling to foreign countries where outbreaks are occurring and people who consume raw or undercooked seafood from warm coastal waters subject to sewage contamination are at greatest risk.

What are the symptoms of cholera?
People infected with *V. cholerae* may experience mild to severe watery diarrhea, vomiting, and dehydration. In severe cases, shock and organ failure can occur. Without treatment, death can occur in more than 50% of cases within a few hours.

How soon do symptoms appear?
The symptoms generally appear 2 – 3 days after exposure (range 6 hours - 5 days).

How long can an infected person carry cholera?
Usually up to a few days after recovery; however, some people may carry it for several months.

What is the treatment for cholera?
Since severe diarrhea may cause rapid dehydration, replacement of fluids is critical. Antibiotics, such as tetracycline, are also used to shorten the duration of diarrhea and the shedding of cholera in stool. A vaccine is available and is sometimes recommended for travelers to certain foreign countries where cholera is occurring. However, the vaccine offers only partial protection (50%) for a short duration (2 to 6 months).

How can cholera be prevented?

The single most important preventive measure is to avoid consuming foods or water in foreign countries where cholera occurs, unless they are known to be safe or have been properly treated. All travelers to areas where cholera has occurred should observe the following recommendations:

- Drink only water that you have boiled or treated with chlorine or iodine. Other safe beverages include tea and coffee made with boiled water and carbonated, bottled beverages with no ice.
- Eat only foods that have been thoroughly cooked and are still hot, or fruit that you have peeled yourself.
- Avoid undercooked or raw fish or shellfish, including ceviche (a cold dish made with raw fish).
- Make sure all vegetables are cooked; avoid salads.
- Avoid foods and beverages from street vendors.
- Do not bring perishable seafood back to the United States.

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1) THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent

Cryptosporidium parvum is the species associated with human infection. It was recognized as a cause of human illness in 1976. The parasite can be transmitted in the form of oocysts, which are hardy and can survive in the environment for weeks or months. They are resistant to chemical disinfectants used to purify drinking water.

B. Description of Illness

- ***General facts:*** Cryptosporidiosis occurs worldwide and affects both humans and animals. It is among the most common cause of persistent diarrhea in patients with AIDS in the United States.
- ***Occurrence:*** In developed areas such as the United States and Europe, infection has been found in less than 1% - 4.5% of individuals surveyed by stool examination. People who are most likely to become infected with *Cryptosporidium* include the following: children who attend day care centers; child care workers; parents of infected children; international travelers; hikers and campers who drink unfiltered, untreated water; swimmers who swallow water while swimming in swimming pools, lakes, rivers, ponds, and streams; and people who drink from shallow, unprotected wells.
- ***Incubation period:*** 2 – 10 days is the likely range (average 7 days).
- ***Common symptoms:*** The most common symptom of cryptosporidiosis is profuse and watery diarrhea associated with abdominal pain. Other signs and symptoms include weight loss, stomach cramps, nausea, vomiting, and low-grade fever. In people with competent immune systems, symptoms may wax and wane but generally subside after approximately 30 days. Asymptomatic infections are common and serve as a source of infection for others.
- ***Treatment:*** No treatment other than rehydration, when indicated, has been proven to be effective.

C. Reservoirs

Humans, cattle, and other domestic animals are reservoirs.

D. Modes of Transmission

The most common mode of transmission is person-to-person. Infected animals and people excrete large numbers of oocysts in stool. Persons become infected by hand-to-mouth transfer of oocysts from the feces of an infected individual, especially in institutions and daycare centers. Zoonotic transmission can occur through contact with feces from infected animals (for livestock handlers, dairy farmers, veterinarians, etc.). Outbreaks have been associated with public drinking water supplies and recreational water use including waterslides, swimming pools, and lakes that are contaminated by human and animal feces. Outbreaks have also occurred from eating food contaminated with animal feces (e.g., unpasteurized apple cider that was contaminated with cow manure). An infected food worker could also be a source for foodborne transmission.

E. Period of Communicability

The disease is communicable for as long as the infected animal or person excretes oocysts in stool. This generally begins at the onset of symptoms and continues for several weeks after symptoms have resolved. Oocysts can remain infective outside the body in a moist environment for 2 - 6 months.

2) ACTIONS REQUIRED/CONTROL MEASURES

A. Reporting Requirements

Cryptosporidiosis is physician reportable by mail within 12 hours of recognition or strong suspicion to both the Connecticut Department of Public Health (DPH) and the local health department (LHD). The director of any clinical laboratory must also report laboratory evidence of cryptosporidiosis to both the DPH and the LHD. See current lists of physician Reportable Diseases (Attachment A) and Laboratory Reportable Significant Findings (Attachment C).

B. Case Definition

- **Confirmed Case:**
  - Evidence of *Cryptosporidium* organism or DNA in stool, intestinal fluid, tissue samples, biopsy specimens, or other biological sample by certain laboratory methods with a high positive predictive value (PPV), e.g.,
    - Direct fluorescent antibody [DFA] test,
    - Polymerase chain reaction [PCR],
    - Enzyme immunoassay [EIA], OR
    - Light microscopy of stained specimen.

  - The detection of *Cryptosporidium* antigen by a screening test method such as immunochromatographic card/rapid card test (e.g. enzyme-linked immunosorbent assay); or a laboratory test of unknown method.

C. Case Investigation

- **DPH Responsibility:** DPH is available to the LHD for assistance, consultation, and guidance and to ensure that appropriate investigative and control actions are being taken.

- **LHD Responsibility:** Using the "General Enteric Diseases Interview Form" (Attachment F), interview case and identify individuals in high-risk occupations or settings (see below). Completed GEDIF forms should be entered directly into Maven or faxed to the DPH at 860-509-7910.

  Provide information and educational materials describing the nature of the disease and preventive measures. The importance of frequent and thorough hand washing should be stressed for all cases and contacts. Encourage a physician visit if symptoms persist.

D. Control Measures

- **Food Handler:** Individuals with laboratory-confirmed infection should be excluded from direct food handling until they are asymptomatic. Exclusion of asymptomatic individuals is indicated only for those with questionable hygienic habits. Proper hand washing should be stressed.

- **Health Care Worker with Direct Patient Contact:** Individuals with laboratory-confirmed infection should be excluded from direct care of patients until they are asymptomatic.

Exclusion of asymptomatic individuals is indicated only for those with questionable hygienic habits. Proper hand washing should be stressed.

- **Day Care Setting:** Children or staff with laboratory-confirmed infections should be excluded until no longer symptomatic. Improved sanitation and personal hygiene should be emphasized. Proper hand washing by staff and children should be stressed, especially after using the toilet or handling soiled diapers.

- **Household Contacts:** Household contacts with diarrhea should be evaluated and tested for cryptosporidiosis and excluded from food handling and the care of children and/or patients until asymptomatic. Proper hand washing should be stressed.

Fact Sheet

What is cryptosporidiosis?
Cryptosporidiosis is an intestinal illness caused by a one-cell parasite called *Cryptosporidium parvum.*

Where are *Cryptosporidium* parasites found?
Cryptosporidium parasites live in the intestines of infected people, cattle, and other domestic animals (e.g., cats and dogs).

How does this parasite spread?
The *Cryptosporidium* parasite is passed in the stool of an infected person or animal as an oocyst (egg). Ingestion of only a few oocysts in contaminated food or water can make a person ill. Person-to-person and animal-to-person transmission can occur.

Who gets cryptosporidiosis?
People who are most likely to become infected with *Cryptosporidium* include the following: children who attend day care centers, including diaper-aged children; child care workers; parents of infected children; international travelers; backpackers, hikers, and campers who drink unfiltered, untreated water; swimmers who swallow water while swimming in swimming pools, lakes, rivers, ponds, and streams; people who drink from shallow, unprotected well; and people who swallow water from contaminated sources.

What are the symptoms of cryptosporidiosis?
Frequent, nonbloody, watery diarrhea is the most common symptom of cryptosporidiosis. The diarrhea is associated with cramping abdominal pain. Fever, loss of appetite, nausea, and vomiting occur less often. Some infected persons may not have any symptoms.

How soon do symptoms appear?
The symptoms may begin 2 - 10 days after exposure (average 7 days).

How long can an infected person carry *Cryptosporidium*?
Oocysts, the infectious stage, will appear in the stool at the onset of symptoms and can continue to be passed in the stool for several weeks after symptoms end.

What is the treatment for cryptosporidiosis?
There is no specific treatment. When indicated, rehydration has proven to be effective. It is a self-limiting illness in people with healthy immune systems.

What can be done to prevent the spread of cryptosporidiosis?
Some important preventive measures are:

- Thoroughly wash hands after toilet visits and before eating or handling food.
- Wash all fruits and vegetables thoroughly, especially those that will not be cooked.
- Avoid consuming improperly filtered water from rivers, lakes, water parks, or swimming pools.
- Wash hands after contact with calves and other animals with diarrhea.
- Immunocompromised persons may consider boiling drinking water for 1 minute or using a water filter. Only filters capable of removing particles 0.1-1.0 µm in diameter should be considered. Chemical disinfectants are not effective against oocysts.
- Persons at increased risk should avoid sexual practices that involve possible contact with stool.

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1) THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent

Cyclospora infection is caused by *Cyclospora cayetanensis*, a one-cell parasite first associated with human disease in 1979. Humans with cyclosporiasis shed the parasite in a non-infectious form that takes from several days to a couple of weeks to mature (sporulate) into its infectious form. The time required for maturation to the infectious form depends on factors such as temperature and moisture.

B. Description of Illness

- ***General facts:*** Historically, *Cyclospora* infection was usually found in people who lived or traveled in developing countries; however, the parasite seems to be widely distributed throughout the world. Outbreaks follow a seasonal pattern, with a predominant number of cases occurring during the warmer months.
- ***Occurrence:*** Individuals at all ages are at risk of infection. The largest documented outbreaks of cyclosporiasis in the United States and Canada occurred during the summers of 1996 and 1997 and were associated with consumption of imported raspberries.
- ***Incubation period:*** About 1 week after exposure.
- ***Common symptoms:*** Watery diarrhea with frequent (sometimes explosive) bowel movements. Other symptoms may include loss of appetite, weight loss, bloating, gas, stomach cramps, nausea, vomiting, muscle aches, low-grade fever, and fatigue. Occasionally, infected individuals may not have any symptoms. In people with competent immune systems, diarrhea is self-limiting but has been known to persist from 9 - 43 days. Immunodeficient persons may experience diarrhea for months. Untreated persons may have protracted, remitting, and relapsing symptoms, and weight loss can be significant.
- ***Treatment:*** Cyclosporiasis can be treated with a 7-day course of oral trimethoprim-sulfamethoxazole (for adults, 160 mg trimethoprim plus 800 mg sulfamethoxazole twice daily; for children, 5 mg/kg trimethoprim plus 25 mg/kg sulfamethoxazole twice daily). Treatment regimens for patients who cannot tolerate sulfa drugs have not been identified.

C. Reservoirs

Humans are the only known reservoir for *Cyclospora cayetanensis*.

D. Modes of Transmission

Current knowledge of cyclosporiasis suggests that it is not transmitted directly from person-to-person. The infective stage of the parasite is not present in freshly passed stool. After being shed in human stool, the parasite must undergo developmental changes (lasting days or weeks) before becoming infectious. Humans become infected by consuming food and water contaminated with human feces containing *Cyclospora*. Foodborne transmission has been indicated in outbreaks from consumption of contaminated produce (e.g., raspberries, basil, lettuce).

E. Period of Communicability

People who are actively ill may shed *Cyclospora* parasites for a few days to over one month. It is not known how long organisms are shed in stool once symptoms have stopped. A study of Peruvian children with cyclosporiasis indicated a mean duration of organism shedding was 23 days.

2) ACTIONS REQUIRED/CONTROL MEASURES

A. Reporting Requirements

Cyclosporiasis is physician reportable by mail within 12 hours of recognition or strong suspicion to both the Connecticut Department of Public Health (DPH) and the local health department (LHD). The director of any clinical laboratory must also report laboratory evidence of cyclosporiasis to both the DPH and the LHD. See current lists of physician Reportable Diseases (Attachment A) and Laboratory Reportable Significant Findings (Attachment C).

B. Case Definition

- **Confirmed Case:** Demonstration of *Cyclospora* oocysts (by morphologic criteria or by demonstration of sporulation) or *Cyclospora* DNA (by polymerase chain reaction) in stool, duodenal/jejunal aspirates or small-bowel biopsy specimens.

C. Case Investigation

- **DPH Responsibility:** DPH is available to the LHD for assistance, consultation, and guidance and to ensure that appropriate investigative and control actions are being taken.

  The DPH, through FoodNet/FoodCORE, will interview all cases. Interviews include food and travel histories in an attempt to identify a source of infection and to identify individuals in high-risk occupations or settings (food handler, health care worker with direct patient contact, day care settings).

- **LHD Responsibility:** If the case is in a high-risk occupation or setting, the LHD will implement control measures.

D. *Control Measures*

- **Food Handler:** Individuals with laboratory-confirmed infection should be excluded from direct food handling until they are asymptomatic. Exclusion of asymptomatic individuals is indicated only for those with questionable hygienic habits. Proper hand washing should be stressed.

- **Health Care Worker with Direct Patient Contact:** Individuals with laboratory-confirmed infection should be excluded from direct care of patients until they are asymptomatic. Exclusion of asymptomatic individuals is indicated only for those with questionable hygienic habits. Proper hand washing should be stressed.

- **Day Care Setting:** Children or staff with laboratory-confirmed infections should be excluded until no longer symptomatic. Improved sanitation and personal hygiene should be emphasized. Proper hand washing by staff and children should be stressed, especially after using the toilet or handling soiled diapers.

- **Household Contacts:** Household contacts with diarrhea should be evaluated and tested for cyclosporiasis and excluded from food handling and the care of children and/or patients until asymptomatic. Proper hand washing should be stressed.

Fact Sheet

What is cyclosporiasis?
Cyclosporiasis is an intestinal illness caused by *Cyclospora cayetanensis*, a one-cell parasite. The majority of cases are seen in the warmer months. In the last several years, outbreaks of the illness have been reported in the United States and Canada.

Where are *Cyclospora* parasites found?
Cyclospora is only known to be found in infected humans. The parasites are passed in the stool of an infected person.

How does this parasite spread?
Cyclospora is spread by people ingesting food or water that was contaminated with infected stool. Outbreaks of cyclosporiasis have been linked to various types of fresh produce. The parasite needs days or weeks after being shed in stool to become infectious, so it is unlikely that *Cyclospora* is passed directly from one person to another.

Who gets cyclosporiasis?
People of all ages are at risk for *Cyclospora* infection. In the past, cyclosporiasis was usually found in people who lived or traveled in developing countries. More recently, it is known that people can be infected worldwide, including the United States.

What are the symptoms of cyclosporiasis?
Cyclosporiasis infects the small intestine and usually causes watery diarrhea, with frequent (sometimes explosive) bowel movements. Other symptoms may include loss of appetite, weight loss, bloating, gas, stomach cramps, nausea, vomiting, muscle aches, low-grade fever, and fatigue. Some infected persons may not have any symptoms.

How soon do symptoms appear?
The symptoms generally appear about a week after becoming infected.

How long can an infected person carry *Cyclospora*?
Generally, infected people can pass the parasite in their stool for a few days to a month or longer.

What is the treatment for cyclosporiasis?
A combination of two antibiotics is used to treat cyclosporiasis. People who have diarrhea should rest and drink plenty of fluids.

How can cyclosporiasis be prevented?

- Thoroughly wash hands after toilet visits and before eating or handling food.
- Wash all fruits and vegetables thoroughly, especially those that will not be cooked; however, this practice may not completely eliminate the risk of *Cyclospora*.
- Avoid consuming improperly filtered water from rivers, lakes, water parks, or swimming pools.

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1) THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent

Giardia is the protozoan that causes giardiasis, an infection principally of the upper small intestine. *Giardia lamblia* is the most common cause of the disease in humans; *G. intestinalis* and *G. duodenalis* are rare.

B. Description of Illness

- ***General facts:*** Giardiasis is associated with drinking water from unfiltered surface water sources or shallow wells, swimming in bodies of fresh water, and having a young family member in day care. Concentrations of chlorine used in routine water treatment do not kill *Giardia* cysts, especially when water is cold. Infected persons may be treated with antimicrobial medications.
- ***Occurrence:*** During the past 2 decades, *Giardia* infection has become recognized as one of the most common causes of waterborne disease (found in both drinking and recreational water) in humans in the United States. It most commonly occurs July through October among children less than 5 years of age and adults 25 - 39 years old.
- ***Incubation period:*** From 1 – 2 weeks after exposure (average 7 days).
- ***Common symptoms*:** Diarrhea, abdominal cramps, bloating, excessive amounts of gas in the stomach, fatigue, and weight loss can occur. Asymptomatic infections also occur. Persons with AIDS may have more serious and prolonged infection.
- ***Treatment:*** 5-nitroimidazoles: one daily dose of 2 grams metronidazole (children 15 mg/kg) for 3 days, or tinidazole 2 grams in a single dose (children 50 - 75 mg/kg) are the drugs of choice. Furazolidone is available in pediatric suspension for young children and infants (2 mg/kg thrice daily for 7 – 10 days). Paramomycin can be used during pregnancy, but when disease is mild, delay of treatment till after delivery is recommended. Drug resistance and relapses may occur with any drug.

C. Reservoirs

Humans are the main reservoir, but beaver and other wild and domestic animals are possible reservoirs as well. Unfiltered stream and lake waters open to contamination by human and animal feces are a source of infection.

D. Modes of Transmission

Primarily fecal-oral transmission; person-to-person transmission (especially in institutions and day care settings) is the most likely cause of spread. Anal intercourse facilitates transmission. Ingestion of *Giardia* cysts via fecally contaminated drinking and recreational water, and less commonly food, may cause outbreaks.

E. Period of Communicability

Giardiasis is communicable throughout the course of infection, which is often months.

2) ACTIONS REQUIRED/CONTROL MEASURES

A. Reporting Requirements

Giardiasis is laboratory reportable by mail to both the Connecticut Department of Public Health (DPH) and the local health department (LHD). See current list of Laboratory Reportable Significant Findings (Attachment C).

B. Case Definition

- **Confirmed Case**
  - Detection of *Giardia* organisms, antigen, or DNA in stool, intestinal fluid, tissue samples, biopsy specimens or other biological sample.

C. Case Investigation

- **DPH Responsibility:** DPH is available to the LHD for assistance, consultation, and guidance and to ensure that appropriate investigative and control actions are being taken.

- **LHD Responsibility:** Using the "General Enteric Diseases Interview Form" (Attachment F), interview case and identify individuals in high-risk occupations or settings (see below).

  Provide information and educational materials describing the nature of the disease and preventive measures. The importance of frequent and thorough hand washing should be stressed for all cases and contacts. Encourage a physician visit if symptoms persist.

D. Control Measures

- **Food Handler:** Individuals with laboratory-confirmed infection should be excluded from direct food handling until they are asymptomatic. Exclusion of asymptomatic individuals is indicated only for those with questionable hygienic habits. Proper hand washing should be stressed.

- **Health Care Worker with Direct Patient Contact:** Individuals with laboratory-confirmed infection should be excluded from direct care of patients until they are asymptomatic. Exclusion of asymptomatic individuals is indicated only for those with questionable hygienic habits. Proper hand washing should be stressed.

- **Day Care Setting:** Children and staff with diarrhea should be excluded from day care until they are asymptomatic. Identify and culture other day care attendees and staff with diarrhea. Exclusion of asymptomatic carriers is not recommended; treatment of such carriers has not been demonstrated to be effective in outbreak control. **Improved sanitation and personal hygiene should be emphasized in day care settings.** Proper hand washing by staff and children should be stressed, especially before handling food or eating, and after using the toilet or handling soiled diapers.

- **Household Contacts:** Household contacts with diarrhea should be excluded from food handling and the care of children and/or patients until they are asymptomatic. Exclusion

of asymptomatic individuals is indicated only for those with questionable hygienic habits. Proper hand washing should be stressed.

Fact Sheet

What is giardiasis?
Giardiasis is an intestinal illness caused by a one-cell parasite called *Giardia lamblia*. It is a fairly common cause of diarrhea. Cases may occur as a single case, in clusters, or in outbreaks.

Where are *Giardia* parasites found?
Giardia parasites are found in infected people (with or without symptoms) and wild or domestic animals including pets such as dogs and cats. Beavers have gained attention as a potential source of *Giardia* contamination of lakes, reservoirs, and streams.

How does this parasite spread?
The *Giardia* parasite is passed in the stool of an infected person or animal and may contaminate water or food. Ingesting the parasite may cause illness. Person-to-person transmission may also occur in households, day care centers, or other settings where hand-washing practices are poor.

Who gets giardiasis?
Anyone can get giardiasis, but it tends to occur more often in people in institutional settings, people in day care centers, parents of infected children, foreign travelers, and individuals who consume improperly treated surface water

What are the symptoms of giardiasis?
People exposed to *Giardia* may experience mild or severe diarrhea, cramps, bloating, excessive amounts of gas in the stomach; in some instances no symptoms may be present. Occasionally, some people will have chronic diarrhea over several weeks or months, with significant weight loss. Fever is rarely present.

How soon do symptoms appear?
The symptoms appear 1 – 2 weeks after exposure (average 7 days).

How long can an infected person carry the *Giardia* parasite?
A person can shed the parasite in stool throughout the entire period of infection, from weeks to months.

Should an infected person be excluded from work or school?
People with active diarrhea (e.g., infants, young children, individuals with bowel control/hygiene issues) may need to be excluded from settings such as day care, and occupations such as food handling or direct patient care, until they no longer have diarrhea.

What is the treatment for giardiasis?
Several prescription drugs are available to treat a *Giardia* infection. Treatment of carriers without symptoms is generally not recommended. Some individuals may recover on their own, without medication.

How can giardiasis be prevented?
Some important preventive measures include:

- Carefully wash hands thoroughly after toilet visits and before eating or handling food.
- Wash hands after every diaper change, especially if you work with diaper-aged children, even if you are wearing gloves.
- Avoid consuming water from recreational use areas (e.g., rivers, lakes, ponds) and improperly treated drinking water.
- Avoid sexual practices that involve possible contact with stool.

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Hemolytic uremic syndrome

(see also Shiga toxin-producing *Escherichia coli*)

1) THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent

Hemolytic uremic syndrome (HUS) is a serious illness involving the kidneys and blood clotting mechanisms. The most common cause of HUS is infection with *E. coli* O157:H7 bacteria. Less commonly, infection with other Shiga toxin-producing *E. coli* and *Shigella dysenteriae* may cause HUS.

B. Description of Illness

- ***General facts:*** HUS is a rare but serious disease that often requires prolonged hospitalization. Diagnosis is based on several laboratory tests and medical evaluation. Supportive treatment (e.g., dialysis, transfusions) is often necessary for severe cases.
- ***Occurrence:*** HUS is most common in children less than 10 years old, where it occurs in about 5 - 10% of *E. coli* O157:H7 infections. Children less than 5 years of age are at greatest risk of developing HUS.
- ***Incubation period:*** Usually about 3 to 10 days after the onset of diarrhea. Diarrhea may have resolved, and the case may appear to be improving when the onset of HUS occurs.
- ***Common symptoms*:** Most cases of HUS follow an acute diarrheal illness and are characterized by acute renal failure, low platelet count, and hemolytic anemia. Most people recover completely with kidney function returning to normal.
- ***Treatment:*** There is no known medical treatment that will prevent the development of HUS. Supportive treatment is provided for kidney function (dialysis) and blood clotting (transfusions).

C. Reservoirs

See Shiga toxin-producing *Escherichia coli*.

D. Modes of Transmission

See Shiga toxin-producing *Escherichia coli*.

E. Period of Communicability

See Shiga toxin-producing *Escherichia coli.*

2) ACTIONS REQUIRED/CONTROL MEASURES

A. Reporting Requirements

HUS is physician reportable by mail within 12 hours of recognition or strong suspicion to both the Connecticut Department of Public Health (DPH) and the local health department (LHD). See current list of physician Reportable Diseases (Attachment A) and Laboratory Reportable Significant Findings (Attachment C).

B. Case Definition

- **Confirmed Case:** An acute illness diagnosed as HUS or thrombotic thrombocytopenic purpura that meets the following laboratory criteria and began within 3 weeks after onset of an episode of acute or bloody diarrhea:

  acute onset of anemia with microangiopathic changes (i.e., schistocytes, burr cells, or helmut cells) on peripheral blood smear and acute onset of renal injury evidence by either hematuria, proteinuria, or elevated creatinine level (i.e., > 1.0 mg/dL in a child < 13 years or > 1.5 mg/dL in a person aged > 13 years, or > 50% increase over baseline).

C. Case Investigation

- **DPH Responsibility:** The DPH, through FoodNet/FoodCORE, will obtain epidemiological, clinical, and laboratory information from the hospital and/or through patient interview. The DPH will notify the LHD if the person is in a high-risk setting.

- **LHD Responsibility:** If the person is in a high-risk setting, the LHD will work with DPH to implement control measures (see below).

D. Control Measures

- **Food Handler:** Individuals should be excluded from direct food handling until two consecutive negative stool cultures spaced at least 24 hours apart are obtained. If the person was treated with antibiotics, cultures should be collected at least 48 hours after last dose. Assess other food handlers working in the establishment for any gastrointestinal symptoms. Those with any symptoms should submit a stool specimen for testing and be excluded from work until results return negative. The importance of proper hand washing should be stressed.

- **Health Care Worker with Direct Patient Contact:** Individuals should be restricted from direct patient care until diarrhea ceases and two consecutive negative stool cultures spaced at least 24 hours apart are obtained. If person was treated with antibiotics, cultures should be collected at least 48 hours after last dose.

- **Day Care Setting:** Children and/or staff should be excluded from day care until diarrhea ceases and two consecutive negative stool cultures spaced at least 24 hours apart are obtained. If the person was treated with antibiotics, cultures should be collected at least

48 hours after last dose. Any other daycare attendees and/or staff with diarrhea should be identified and cultured.

Improved sanitation and personal hygiene should be emphasized in day care settings**.** Proper hand washing by staff and children should be stressed, especially after using the toilet or handling soiled diapers.

- **Household Contacts:** Household contacts with diarrhea should be excluded from food handling and care of children and/or patients until diarrhea ceases and two (2) consecutive negative stool cultures taken at least 24 hours apart are obtained. Asymptomatic household contacts involved in food handling or care of children and/or patients should have at least one stool specimen cultured. Stress good hand washing technique. Asymptomatic household contacts should not be restricted from work pending culture results.

Hemolytic uremic syndrome

(see also Shiga toxin-producing *Escherichia coli*)

Fact Sheet

What is hemolytic uremic syndrome?
Hemolytic uremic syndrome (HUS) is a rare but serious illness that affects the kidneys and blood clotting system. It is more common in children than in adults and may be mild or severe. In severe cases, kidney function is greatly reduced, and dialysis may be necessary. Abnormalities of the blood clotting system can cause a tendency to bleed, and the red blood count may be low (anemia). Transfusions are often needed in severe cases. Fortunately, most people with HUS recover completely, and kidney function returns to normal. However, a prolonged hospital stay is often required.

What causes HUS?
In most cases, HUS is a serious complication of an intestinal Shiga toxin-producing *E. coli* infection (STEC), especially with *E. coli* O157:H7.

How soon do symptoms appear?
Symptoms usually appear about 3 to 10 days after the onset of diarrhea. Diarrhea may have resolved, and the case may appear to be improving when the onset of HUS occurs.

How is HUS infection diagnosed?
HUS cannot be diagnosed with a single laboratory test. Physicians use the results of several tests and their medical evaluation to determine if a person has HUS. These include tests of kidney function, blood clotting factors, and blood counts.

What is the treatment for HUS?
There is no known medical treatment that will prevent the development of HUS. Fortunately, the majority of children will not develop this complication. For those that do, supportive treatment is provided for kidney function (dialysis) and blood clotting (transfusions).

How can HUS be prevented?

- Since hamburger and ground beef may be contaminated with STEC known to cause HUS, cook ground beef thoroughly. Ground beef should be cooked to a temperature of 160 degrees F. If a thermometer is not used, the beef should be cooked until the meat is no longer pink, and juices run clear.
- Do not consume raw milk or unpasteurized dairy products.
- Avoid unpasteruized juices.
- Wash your hands after using the bathroom or changing diapers and before preparing or eating food.
- Do not drink or swallow water in lakes, ponds, or streams.
- Prevent cross contamination in food preparation areas by thoroughly washing hands, counters, cutting boards, and utensils after they touch raw meat. Never place cooked

hamburgers or ground beef on the unwashed plate that held raw patties. Wash meat thermometers in between tests of patties that require further cooking.

- Wash all fruits and vegetables thoroughly, especially those that will not be cooked – even if they will be peeled.
- Wash your hands immediately after contact with animals (especially cattle) or their environment when visiting farms or petting zoos.

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1) THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent

Hepatitis A virus (HAV) is an RNA virus that causes illness of variable severity. It can cause liver disease and has a relatively low case-fatality rate. The diagnosis is confirmed by the demonstration of IgM antibodies against HAV in the serum of acutely or recently ill persons.

B. Description of Illness

- ***General facts:*** In the United States, 33% of the general population will test positive for prior HAV infection. In outbreak situations, day care attendees and employees, men who have sex with men, and injecting drug users may be at higher risk than the general population. Severity of illness increases with age, but complete recovery with no recurrence or long-lasting effects is most common. Convalescence is often prolonged, but no chronic infection is known to occur.
- ***Occurrence:*** Worldwide (epidemic and sporadic), with tendency for cyclic recurrences.
- ***Incubation period:*** From 15 - 50 days (average 28 - 30 days).
- ***Common symptoms:*** Abrupt onset of fever, fatigue, anorexia, diarrhea, dark urine, abdominal discomfort; often followed within a few days by jaundice. HAV co-infection increases severity of liver complications (e.g., fulminant hepatitis) in case-patients with chronic liver disease caused by hepatitis B or hepatitis C (HBV or HCV) virus infection. HAV has a low case fatality rate (0.1 - 0.3%), but elevated (1.8%) for adults 50 years and older, and persons with chronic liver disease have increased risk of death.
- ***Treatment:*** There is no specific treatment for HAV infection. Post exposure prophylaxis (HAV vaccine or immune globulin, depending on a person's age and other medical factors) may prevent infection in persons exposed to HAV, and should be given as soon as possible. The efficacy of immune globulin or vaccine when administered more than 2 weeks after exposure has not been established.

C. Reservoirs

Humans are the main reservoir for HAV. Chimpanzees and other non-human primates rarely serve as reservoirs. No source of infection is identified in almost half of all cases.

D. Modes of Transmission

Person-to-person via the fecal-oral route is the most common mode of transmission. Transmission is common among close contacts of acute cases, and occurs sporadically in and among day care settings with diapered children, injecting and non-injecting drug users, and men who have sex with men. Common-source outbreaks have been linked to:

- Contaminated water
- Raw/undercooked mollusks from contaminated waters
- Food contaminated by infected food handlers
- Contaminated produce (e.g., lettuce, strawberries)
- Injecting and non-injecting drug use
- Rarely by transfusion of blood or clotting factor concentrates

E. Period of Communicability

Case-patients are most infectious 1 - 2 weeks before onset of symptoms to several days after onset of jaundice. Prolonged viral excretion in feces (up to 6 months) has been documented in some infants and children. Chronic shedding of HAV is not known to occur.

2) ACTIONS REQUIRED/CONTROL MEASURES

A. Reporting Requirements

Hepatitis A infection is physician reportable by mail within 12 hours of recognition or strong suspicion to both the Connecticut Department of Public Health (DPH) and the local health department (LHD). The director of any clinical laboratory must also report laboratory evidence of hepatitis A infection to both the DPH and LHD. Effective January 2006, laboratories are also required to send at least 0.5 mL of residual serum from positive hepatitis A IgM anti-HAV tests to the DPH Laboratory for subtyping. See current lists of physician Reportable Diseases (Attachment A) and Laboratory Report of Significant Findings (Attachment C).

B. Case Definition

- **Confirmed Case:** An acute illness with a) discrete onset of symptoms and b) jaundice or elevated serum aminotransferase levels and immunoglobulin M (IgM) antibody to hepatitis A virus (anti-HAV) positive.

C. Case Investigation

- **DPH Responsibility:** In order to screen out asymptomatic individuals with positive laboratory reports, DPH will contact the ordering physician to confirm that the patient has signs and symptoms of acute hepatitis and to make them aware that someone from the LHD will be contacting their patient for further follow-up. DPH will then notify the LHD of the above findings and provide additional recommendations for follow up, if needed.

  The DPH is available to the LHD for assistance, consultation, guidance, and to ensure that appropriate investigative and control actions are being taken.

- **LHD Responsibility:** Interview the case to collect clinical and risk factor information and identify individuals in high-risk occupations or settings (see below). Complete the "*Viral Hepatitis A Case Report*" form (Attachment H), and the "*Case and Contact Management*" form (Attachment I). Completed forms should be scanned and uploaded to Maven or faxed to the DPH at 860-509-7910. Provide educational materials describing the nature of the disease and preventive measures. Encourage close contacts to see a physician for prophylaxis as indicated below.

D. Control Measures

- **Food Handler:** Individuals with laboratory-confirmed infection should be excluded from handling any food until 7 days after onset of jaundice or 10 days after onset of symptoms (if jaundice is absent) and providing all symptoms have subsided. Identify any other establishments where the case is a food handler.

  Follow up with food establishment. Interview all food handlers to evaluate and identify any further illness. Also focus on the availability of hand washing and bathroom facilities, on foods prepared and handled by the case, and on storage and distribution of prepared food. Post exposure prophylaxis (PEP) (see Box) is recommended for all other food handlers of the food establishment. Food establishment employees should be educated

on HAV (symptoms, mode of transmission, prevention). Stress that thorough hand washing is the most important measure in preventing transmission of the virus. All employees should be closely monitored for hepatitis-like symptoms. If symptoms develop, employees should be referred to a physician for evaluation and specific testing for HAV IgM antibody.

PEP should be considered for patrons if: a) the infected food handler is involved in the preparation of foods that were not subsequently heated; and b) deficiencies in personal hygiene of the infected individual are noted OR s/he has worked while ill with diarrhea; and c) PEP can be provided within 2 weeks after last exposure(s).

- **Health Care Worker with Direct Patient Care Duties:** Exclude individuals with laboratory-confirmed infection from direct patient care until 7 days after onset of jaundice or 10 days after onset of symptoms (if jaundice is absent) and providing all symptoms have subsided. Consider the possibility of PEP for patients who may have received dental/oral/mouth care from the infected individual, and PEP can be given within 2 weeks of last exposure.

- **Day Care Setting**

  In a day care setting where all children are not toilet trained: PEP is recommended for employees and children in the facility when HAV infection is identified in any employee or child or in the household members of two or more of the enrolled children. During the 6 weeks after the last case is identified, new employees and children should also receive PEP.

  In a day care setting where all children are toilet trained: If HAV is identified in an employee or child, PEP is recommended for employees in contact with the case-patient and children in the same room as the case-patient.

  If recognition of an outbreak in a day care setting is delayed by 3 or more weeks from the onset of the index case, or if illness has occurred in 3 or more families: HAV is likely to have already spread widely. In this situation, PEP should be considered for the household contacts of day care attendees.

- **Close Contacts:** Close personal contacts (e.g., household members, sexual partners) of HAV case-patients should receive PEP within 2 weeks of last exposure. Testing of contacts for immunity to hepatitis A is not recommended because it adds unnecessary cost and may delay PEP.

Box. Post exposure prophylaxis (PEP): summary of updated recommendations

PEP should be given as soon as possible, within 2 weeks of exposure. The efficacy of PEP given more than 2 weeks after exposure has not been established.

Group	Recommended PEP
Healthy persons aged 12 months – 40 years	Single-antigen hepatitis A vaccine
Persons aged > 40 years	Immune globulin (IG); vaccine can be used if IG cannot be obtained
Children aged < 12 months, immunocompromised persons, persons who have chronic liver disease diagnosed, and persons for whom vaccine in contraindicated	Immune globulin (IG)

(Reference: http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5641a3.htm)

Fact Sheet

What is hepatitis A?
Hepatitis A is a liver disease caused by the hepatitis A virus.

Where is the hepatitis A virus found?
Hepatitis A is found in the stool of persons infected with hepatitis A.

How does this virus spread?
It is usually spread by putting something in the mouth that is contaminated with the virus. Hepatitis A can be carried on an infected person's hands and spread by person-to-person contact or by contaminated food or drink.

Who gets hepatitis A?
Anyone can become infected with hepatitis A; however, infection occurs more frequently in school-aged children and young adults.

What are the symptoms of hepatitis A?
Symptoms of hepatitis A infection may include fever, fatigue, poor appetite, diarrhea, and abdominal discomfort. Urine may become darker in color, and jaundice (yellowing of the skin and whites of the eyes) may occur. The disease is rarely fatal. Infants and young children tend to have very mild symptoms and are less likely to develop jaundice than older children and adults. There is no chronic infection with hepatitis A.

How soon do symptoms appear?
The symptoms may appear 15 – 50 days after exposure (average 28 – 30 days).

How long is an infected person able to spread the virus?
The contagious period begins approximately 2 weeks before the symptoms appear and continues for approximately 1 week after the onset of symptoms. Prolonged excretion of virus (up to 6 months) in children and infants has been documented.

What is the treatment for hepatitis A?
There is no specific treatment for hepatitis A. However, people who have been exposed to the hepatitis A virus should receive a shot of hepatitis A vaccine or immune globulin (IG), depending on their age and other medical factors. This treatment may provide protection and minimize symptoms of hepatitis A infection if a person receives it within 2 weeks after exposure to the virus.

How can hepatitis A be prevented?

- Always wash hands after using the bathroom or changing diapers and before preparing or eating food.

- Hepatitis A vaccine is the best protection and is recommended for all children 12 months of age and older in the United States. The vaccine is also recommended (before exposure to hepatitis A virus) for the following persons who are more likely to get hepatitis A virus infection or more likely to get seriously ill if they do get hepatitis A.

  - Travelers to countries with increased rates of hepatitis A (check with your doctor).
  - Men who have sex with men.
  - Injecting drug users.
  - Persons with chronic liver disease.
  - Persons with clotting factor disorders (such as hemophilia).

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1) THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent

Listeria monocytogenes is a gram-positive, rod-shaped bacterium that causes listeriosis; human infections are usually caused by serovars 1/2a, 1/2b and 4b.

B. Description of Illness

- ***General facts:*** Listeriosis is an important public health problem in the United States. Diagnosis of listeriosis is best made by routine bacterial culture of specimens from usually sterile sites such as blood or cerebrospinal fluid. Stool culture is not reliable because many persons have enteric colonization with *L. monocytogenes* without invasive disease.
- ***Occurrence:*** In the United States, an estimated 2,500 persons become seriously ill with listeriosis each year. Of these, 500 die. At increased risk are the following: pregnant women; newborns; persons with weakened immune systems; persons with cancer, diabetes or kidney disease; persons with AIDS; persons who take glucocorticosteriod medications; and the elderly. Healthy adults and children occasionally get infected with *Listeria*, but they rarely become seriously ill.
- ***Incubation period:*** Variable; outbreak cases have occurred 3 - 70 days following a single exposure to an implicated product (median incubation is estimated at 3 weeks).
- ***Common symptoms:*** A person with listeriosis has fever, muscle aches, and sometimes gastrointestinal symptoms such as nausea or diarrhea. If infection spreads to the nervous system, symptoms such as headache, stiff neck, confusion, loss of balance, or convulsions can occur. Infected pregnant women may experience only a mild, flu-like illness; however, infections during pregnancy can lead to miscarriage or stillbirth, premature delivery, or infection of the newborn.
- ***Treatment***: Penicillin or ampicillin alone or together with aminoglycosides. For penicillin-allergic patients, trimethoprim-sulfamethoxazole or erythromycin is preferred. Cephalosporins, including third-generation cephalosporins, are not effective in the treatment of clinical listeriosis.

C. Reservoirs

Soil is the main reservoir, as well as forage, water, mud, and silage. Other reservoirs include infected domestic and wild animals, fowl, and humans. Up to 10% of humans may have asymptomatic fecal carriage, and rates may be higher in slaughterhouse workers and in laboratory workers handling *L. monocytogenes.*

D. Modes of Transmission

Outbreaks have been associated with ingestion of raw or contaminated milk, soft cheeses, vegetables, hot dogs, and ready-to-eat meats; sporadic cases can result from foodborne transmission as well. Transmission can also occur from mother to fetus in utero or during birth.

E. Period of Communicability

Infected persons can shed organisms in stool for several months, although person-to-person transmission is rare. Mothers of infected newborns may also shed in vaginal discharges and urine for 7-10 days after delivery, but rarely longer.

2) ACTIONS REQUIRED/CONTROL MEASURES

A. Reporting Requirements

Listeriosis is physician reportable by mail within 12 hours of recognition or strong suspicion to both the Connecticut Department of Public Health (DPH) and the local health department (LHD). The director of any clinical laboratory must also report laboratory evidence of listeriosis to both the DPH and the LHD. **Additional requirements:** Isolates of *L. monocytogenes* must be submitted to the DPH State Laboratory for confirmation. See current lists of physician Reportable Diseases (Attachment A) and Laboratory Reportable Significant Findings (Attachment C).

B. Case Definition

- **Confirmed Case:** Isolation of *L. monocytogenes* from a normally sterile site (e.g., blood or cerebral spinal fluid, or, less commonly, joint, pleural, or pericardial fluid).

C. Case Investigation

- **DPH Responsibility:** The DPH, through FoodNet/FoodCORE, will interview all cases of listeriosis.
- **LHD Responsibility:** If a cluster/outbreak situation is identified, the LHD will work with DPH to investigate and identify a common source of infection (e.g., raw or contaminated milk, soft cheeses, contaminated vegetables, ready-to-eat meats) and to implement control measures to prevent further exposure to that source.

Fact Sheet

What is listeriosis?
Listeriosis is a serious illness caused by a bacterium called *Listeria monocytogenes*.

Where are the bacteria found?
The bacteria are found in soil and water. Animals can carry the bacteria without appearing ill.

How do these bacteria spread?
Humans may become infected by eating contaminated foods. Vegetables can become contaminated from the soil or from manure used as fertilizer. Animals can contaminate foods of animal origin such as meats and dairy products. The bacteria have been found in raw foods, such as uncooked meats and vegetables, and in foods that become contaminated after processing, such as soft cheese and cold cuts at the deli counter. Unpasteurized (raw) milk or foods made from unpasteurized milk may contain the bacteria. Babies can be born with listeriosis if their mothers eat contaminated food during pregnancy.

Who gets listeriosis?
The disease affects primarily pregnant women, newborns, the elderly, persons with weakened immune systems, cancer, diabetes, kidney disease, AIDS, and persons who take corticosteroid medications. Healthy adults and children occasionally get infected with *Listeria*, but they rarely become seriously ill.

What are the symptoms of listeriosis?
Persons infected with *Listeria* may have fever, muscle aches, and sometimes nausea and diarrhea. Symptoms such as headache, stiff neck, confusion, loss of balance, or convulsions can also occur. Infected pregnant women may experience only a mild illness; however, infection during pregnancy can lead to premature delivery, infection of the newborn, or even stillbirth.

How soon do symptoms appear?
The symptoms can appear from 3 - 70 days after exposure. In most cases, symptoms develop 3 weeks after exposure.

What is the treatment for listeriosis?
When infection occurs during pregnancy, antibiotics given promptly to the pregnant woman can often prevent infection of the fetus or newborn. Babies with listeriosis receive the same antibiotics as adults, although a combination of antibiotics is often used until physicians are certain of the diagnosis. Even with prompt treatment, some infections result in death. This is particularly likely in the elderly and in persons with other serious medical problems.

How can listeriosis be prevented?
General recommendations include the following:

- Thoroughly cook raw food from animal sources, such as beef, pork, or poultry.
- Wash raw vegetables thoroughly before eating.
- Keep uncooked meats separate from vegetables, cooked foods, and ready-to-eat foods.
- Avoid raw (unpasteurized) milk or foods made from raw milk.
- Wash hands, knives, and cutting boards after handling uncooked foods.

Recommendations for persons at high risk, such as pregnant women and persons with weakened immune systems, in addition to the recommendations listed above:

- Do not eat soft cheeses such as feta, Brie, Camembert, blue-veined cheeses, or Mexican-style cheeses such as queso blanco, queso fresco, and Panela, unless they have labels that clearly state they are made from pasteurized milk.
- Do not eat hot dogs, luncheon meats, or deli meats, unless they are reheated until steaming hot.

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1) THE DISEASE AND ITS EPIDEMIOLGY

A. Etiologic Agent

Salmonella is a gram-negative bacterium that causes illness in animals and in humans. The *Salmonella enterica* species affects humans. While there are approximately 200 different serotypes of *S. enterica* identified in the United States each year, *S.* Enteritidis and *S.* Typhimurium are the most common. (For information on *S. typhi* and *S. paratyphi*, see "Typhoid Fever".)

B. Description of Illness

- ***General facts:*** While many sources of infection are possible, temperature abuse of food during preparation and cross contamination during food handling are the most important risk factors for salmonellosis. A temporary carrier state may last for months, especially in infants. Antibiotics may not eliminate the carrier state and may lead to resistant strains or even more severe illness.
- ***Occurrence:*** About 5 million cases of salmonellosis occur in the United States annually. The incidence rate is highest in infants and young children. The majority of cases occur sporadically, but large outbreaks in health care facilities, day care centers, and restaurants have occurred, usually from contaminated food.
- ***Incubation period:*** Usually about 12 – 36 hours (ranges from 6 - 72 hours).
- ***Common symptoms:*** Diarrhea, nausea, headache, abdominal pain, fever, sometimes loss of appetite and vomiting. Death is rare except for the very young, very old, debilitated, or immunosuppressed.
- ***Treatment:*** For uncomplicated enterocolitis, none generally indicated except rehydration and electrolyte replacement with oral rehydration solution.

C. Reservoirs

Domestic and wild animals are reservoirs, including livestock (e.g., cattle, poultry, swine) and pets such as baby chicks and ducklings, dogs, cats, birds (including pet birds), and reptiles (e.g., lizards, snakes, and turtles). Humans may serve as a reservoir, especially in mild and unrecognized cases as well as patients and convalescent carriers. Chronic carriers are rare in humans but prevalent in animals and birds.

D. Modes of Transmission

Salmonella are usually transmitted to humans by eating foods contaminated with animal feces (e.g., beef, poultry, milk, or eggs), but all foods, including vegetables may become contaminated. Recent outbreaks have been traced to raw fruits and vegetables contaminated during slicing. Fecal-oral transmission is also important especially when diarrhea is present. Food may also become contaminated by the unwashed hands of an infected food handler, who forgot to wash his/her hands with soap after using the bathroom. Pets are also potential sources.

E. Period of Communicability

Persons may shed *Salmonella* throughout the course of infection (several days to weeks). Depending on serotypes, about 1% of infected adults and 5% of infected children under 5 years old may excrete the organism for over a year.

2) ACTIONS REQUIRED/CONTROL MEASURES

A. Reporting Requirements

Salmonellosis is physician reportable by mail within 12 hours of recognition or strong suspicion to both the Connecticut Department of Public Health (DPH) and the local health department (LHD). The director of any clinical laboratory must also report laboratory evidence of salmonellosis to both the DPH and the LHD. **Additional requirements:** Isolates must be submitted to the DPH State Laboratory for confirmation and serotyping. See current lists of physician Reportable Diseases (Attachment A) and Laboratory Reportable Significant Findings (Attachment C).

B. Case Definition

- **Confirmed Case:** Isolation of *Salmonella* from any clinical specimen.

C. Case Investigation

- **DPH Responsibility:** DPH is available to the LHD for assistance, consultation, and guidance and to ensure that appropriate investigative and control actions are being taken.

- **LHD Responsibility:** Using the "General Enteric Diseases Interview Form" (Attachment F), FoodCORE will interview the case (for LHDs that have deferred interviews) and identify individuals in high-risk occupations or settings (see below). Completed GEDIF forms will be/should be entered directly into Maven or faxed to the DPH at 860-509-7910.

  Provide information and educational materials describing the nature of the disease and preventive measures. The importance of frequent and thorough hand washing should be stressed for all cases and contacts. Encourage a physician visit if symptoms persist.

D. Control Measures

- **Food Handler:** Individuals with laboratory-confirmed infection should be excluded from direct food handling until two consecutive negative stool cultures spaced at least 24 hours apart are obtained. If treated with antibiotics, cultures should be collected at least 48 hours after last dose.

  Follow up with food establishment: Assess other food handlers working in the establishment for any gastrointestinal symptoms. Those with gastrointestinal symptoms should submit a stool specimen for testing and be excluded from work until results return negative. The importance of proper hand washing should be stressed.

- **Health Care Worker with Direct Patient Contact:** Symptomatic individuals with laboratory-confirmed infection should be excluded from direct patient care until asymptomatic. Exclusion of asymptomatic cases is indicated for those with questionable hygienic habits. When exclusion is necessary, release to return to work generally requires two consecutive negative stool cultures spaced at least 24 hours apart. If treated with antibiotics, cultures should be collected at least 48 hours after the last dose.

- **Day Care Setting:** Exclude symptomatic children and employees with laboratory-confirmed infection until symptoms subside. Other children and employees with gastrointestinal symptoms should be identified and cultured. **Improved sanitation and personal hygiene should be emphasized in day care settings.** Proper hand washing by staff and children should be stressed, especially after using the toilet or handling soiled diapers.

- **Household Contacts:** Close contacts with gastrointestinal symptoms should be excluded from food handling until diarrhea ceases and two consecutive negative stool cultures taken at least 24 hours apart are obtained. Asymptomatic household contacts involved in food handling should have at least one negative stool culture. Stress good hand washing technique. Asymptomatic household contacts should not be excluded from work pending culture results.

  Close contacts with gastrointestinal symptoms should be excluded from day care and care of patients until diarrhea ceases. Exclusion of asymptomatic contacts is indicated for those with questionable hygienic habits.

Fact Sheet

What is salmonellosis?
Salmonellosis is an illness that is caused by a bacterium called *Salmonella.* It is a common cause of diarrhea in the United States and one of the most common causes of food poisoning.

Where are *Salmonella* bacteria found?
Salmonella bacteria may be present in certain food products such as raw meats, raw poultry, unpasteurized milk and cheese products, raw eggs, and in stool of infected persons. Other sources of exposure may include contact with infected reptiles (e.g., snakes, lizards, turtles), pet chicks, dogs, and cats.

How do these bacteria spread?
Salmonella bacteria are spread by eating or drinking contaminated food or water and less often by contact with infected people or animals.

Who gets salmonellosis?
Anyone can get salmonellosis, but it is recognized more often in infants and children.

What are the symptoms of salmonellosis?
People infected with *Salmonella* may experience mild or severe diarrhea, fever, and occasionally vomiting.

How soon do symptoms appear?
The symptoms generally appear from 12 - 36 hours after exposure (range 6 – 72 hours).

How long can an infected person carry *Salmonella*?
An infected person can have *Salmonella* bacteria in the stool for several days to many months. Infants and people who have been treated with oral antibiotics tend to carry the germ longer than others.

Should an infected person be excluded from work or school?
Since *Salmonella* bacteria are in the stool, people with active diarrhea who are unable to control their bowel habits (e.g., infants, young children, certain handicapped individuals) need to be isolated. Most infected people may return to work or school once diarrhea has stopped, provided they carefully wash their hands after toilet visits. Food handlers should have two negative stools, obtained at least 24 hours apart, before returning to their routine activities.

What is the treatment for salmonellosis?
Most people infected with *Salmonella* will recover on their own; however, some may require fluids to prevent dehydration. Antibiotics and antidiarrheal drugs are generally not recommended for typical cases.

How can salmonellosis be prevented?

- Always treat raw poultry, beef, and pork as if they are contaminated:
  - Wrap fresh meats in plastic bags at the market to prevent blood from dripping on other foods.
  - Refrigerate foods promptly; minimize holding at room temperature.
  - Cutting boards and counters used for preparation should be washed well immediately after use to prevent cross contamination with other foods.
  - Ensure that the correct internal cooking temperature is reached – particularly when using a microwave.
- Avoid eating raw or undercooked meats.
- Avoid drinking or using raw milk.
- Avoid eating raw eggs, uncooked foods with raw eggs (i.e. cookie dough), or undercooked foods containing raw eggs.
- Encourage careful hand washing before and after food preparation.
- Make sure children, particularly those who handle pets, carefully wash their hands.
- Reptiles, or objects from reptile tanks, should not have contact with food preparation surfaces or play areas for young children.

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Shiga toxin-producing *Escherichia coli*

1) THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent

Escherichia coli is a gram-negative bacterium. Although most strains are harmless and live in the intestines of healthy humans and animals, some produce a powerful toxin that can cause severe illness; these strains are called Shiga toxin-producing *E. coli* (STEC).

B. Description of Illness

- ***General facts:*** While the most common STEC in North America are strains of the serotype O157:H7, other serotypes such as O26:H11, O111:H8, and O103:H2 have also been implicated in human illness. The infectious dose is very low.
- ***Occurrence:*** Infection is now recognized as an important problem in North America, South America, and Europe. An estimated 73,000 cases of infection and 61 deaths occur in the United States each year.
- ***Incubation period:*** Usually about 3 - 4 days after exposure (range 2 – 8 days).
- ***Common symptoms*:** Abdominal cramps, diarrhea (often bloody), sometimes vomiting, and a low-grade fever may occur. Asymptomatic infections can also occur. In young children and the elderly, the infection can cause a serious complication called hemolytic uremic syndrome (HUS), leading to kidney failure, or a condition called thrombotic thrombocytopenic purpura (TTP). Symptoms of uncomplicated infection usually resolve within 5 - 10 days. There is no evidence to suggest that treatment with antibiotics is helpful.
- ***Treatment:*** Reasonable concern exists that some antimicrobial agents increase the risk of HUS, although proof is lacking. Fluid replacement is the cornerstone of treatment for enterohemorrhagic *E. coli* diarrhea.

C. Reservoirs

Cattle are the most important reservoir; however, other animals, such a deer, may carry STEC. Humans may serve as a reservoir for person-to-person transmission.

D. Modes of Transmission

Transmission occurs most often through ingestion of food contaminated with fecal matter, such as raw and/or undercooked beef (especially ground beef), raw (unpasteurized) milk and juice, and produce (sprouts, etc.). Waterborne transmission has occurred (swimming in or drinking contaminated water). Transmission from person-to-person is important in families, day care settings and institutional settings, especially when diarrhea is present.

E. Period of Communicability

Infectious organisms are excreted throughout the course of infection, which is generally one week or less in adults, but a third of children can excrete organisms for 3 weeks. Prolonged asymptomatic carrier state is uncommon.

2) ACTIONS REQUIRED/CONTROL MEASURES

A. Reporting Requirements

O157:H7 infection and Shiga toxin-related disease are reportable by mail within 12 hours of recognition or strong suspicion to both the Connecticut Department of Public Health (DPH) and the local health department (LHD). The director of any clinical laboratory must also report laboratory evidence of O157:H7 infection and Shiga toxin-related disease to both the DPH and the LHD. **Additional requirements:** O157 isolates and broth that yielded the positive Shiga toxin test must be submitted to the DPH State Laboratory for confirmation. See current lists of physician Reportable Diseases (Attachment A) and Laboratory Reportable Significant Findings (Attachment C).

B. Case Definition

- **Confirmed Case:**
  - Isolation of E. coli O157:H7 from a clinical specimen,
  - Isolation of Shiga toxin-producing E. coli O157:NM from a clinical specimen,
  - Isolation of Shiga-toxin producing E. coli of any serotype from the broth of a stool specimen directly testing positive for Shiga-toxin.

C. Investigation

- **DPH Responsibility:** The DPH, through FoodNet/FoodCORE, will interview all cases of STEC infection and will notify the LHD if a person is in a high-risk setting.

- **LHD Responsibility:** If a person in a high-risk setting, the LHD will work with DPH to implement control measures and/or investigate and identify a common source of infection.

D. Control Measures

- **Food Handler:** Individuals with laboratory-confirmed infection should be excluded from direct food handling until two consecutive negative stool cultures spaced at least 24 hours apart are obtained. If the person was treated with antibiotics, cultures should be collected at least 48 hours after last dose. Assess other food handlers working in the establishment for any gastrointestinal symptoms. Those with any symptoms should submit a stool specimen for testing and be excluded from work until results return negative. The importance of proper hand washing should be stressed.

- **Health Care Worker with Direct Patient Contact:** Individuals with laboratory-confirmed infection should be restricted from direct patient care until diarrhea ceases and two consecutive negative stool cultures spaced at least 24 hours apart are obtained. If person was treated with antibiotics, cultures should be collected at least 48 hours after last dose.

- **Day Care Setting:** Symptomatic children and/or staff with laboratory-confirmed infection should be excluded from day care until diarrhea ceases and two consecutive negative

stool cultures spaced at least 24 hours apart are obtained. If the person was treated with antibiotics, cultures should be collected at least 48 hours after last dose. Any other daycare attendees and/or staff with diarrhea should be identified and cultured.

Improved sanitation and personal hygiene should be emphasized in day care settings**.** Proper hand washing by staff and children should be stressed, especially after using the toilet or handling soiled diapers.

- **Household Contacts:** Household contacts with diarrhea should be excluded from food handling, day care, and care of patients until diarrhea ceases and two (2) consecutive negative stool cultures taken at least 24 hours apart are obtained. Asymptomatic household contacts involved in food handling, day care, or care of patients should have at least one stool specimen cultured. Stress good hand washing technique. Asymptomatic household contacts should not be restricted from work pending culture results.

Shiga toxin-producing *Escherichia coli*

Fact Sheet

What are Shiga toxin-producing strains of *Escherichia coli*?
Escherichia coli (E. coli) is a bacterium. Although most strains of this bacterium are harmless, some strains produce a powerful toxin that can cause illness. These strains are called Shiga toxin-producing *E. coli* (STEC). The most common STEC strain in North America is *E. coli* O157:H7.

Where are STEC bacteria found?
STEC bacteria are normally found in the intestines of cattle; however, other animals such as deer may also carry STEC.

How do these bacteria spread?
Because these bacteria are normally found in cattle, contamination of meat (especially ground beef) may occur during the slaughtering process. Eating contaminated meat that has not been thoroughly cooked can cause illness. In addition, outbreaks have been associated with consuming raw milk, unpasteurized apple cider, contaminated water, sprouts, lettuce, salami, and venison. Transmission also occurs directly from person-to-person, especially in families and in high-risk settings like daycare centers.

Who gets STEC infections?
Although anyone can get infected, the highest infection rates are in children less than 5 years of age. The elderly are also at increased risk for infection.

What are the symptoms?
Typical symptoms can include abdominal cramping, watery diarrhea, frequently bloody, vomiting, and a low-grade fever. Symptoms usually resolve over several days. Some individuals may experience no symptoms at all. The infection can cause a serious complication known as hemolytic uremic syndrome (HUS), especially in young children, in which the red blood cells are destroyed and the kidneys fail. Adults may also develop a similar complication along with neurologic symptoms, known as thrombotic thrombocytopenic purpura (TTP). These complications can occur in up to 10% of cases.

How soon do symptoms appear?
The symptoms generally appear 3 to 4 days after the exposure (range 2 – 8 days).

Should an infected person be excluded from school or work?
Young children in day-care settings known to have STEC should be removed from the day-care facility until two consecutive stool specimens have tested negative. School-aged children who have recovered from their illness may attend school. Persons who are employed as food handlers, health care workers, or childcare providers should also be excluded until they have two negative stool specimens.

What is the treatment for STEC?

Most people recover without any specific treatment. There is no evidence that antibiotic treatment is helpful. Antidiarrheal agents are also not recommended. Severe complications, such as HUS, usually require hospitalization.

How can STEC infections be prevented?

- Cook ground beef thoroughly. Ground beef should be cooked to a temperature of 160 degrees F. If a thermometer is not used, the beef should be cooked until the meat is no longer pink and juices run clear.
- Do not consume raw milk or unpasteurized dairy products.
- Avoid unpasteruized juices.
- Wash your hands after using the bathroom or changing diapers and before preparing or eating food.
- Do not drink or swallow water in lakes, ponds, or streams.
- Prevent cross contamination in food preparation areas by thoroughly washing hands, counters, cutting boards, and utensils after they touch raw meat. Never place cooked hamburgers or ground beef on the unwashed plate that held raw patties. Wash meat thermometers in between tests of patties that require further cooking.
- Wash all fruits and vegetables thoroughly, especially those that will not be cooked – even if they will be peeled.
- Wash your hands immediately after contact with animals (especially cattle) or their environment when visiting farms or petting zoos.

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1) THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent

Shigella species are gram-negative bacilli. Infection may occur after the ingestion of very few (10-100) organisms. Four species have been identified. Among *Shigella* isolates reported in the United States from 1989 to 2000, 78% were *S. sonnei*, 19% were *S. flexneri*, 2% were *S. boydii*, and 1% were *S. dysenteriae.*

B. Description of Illness

- ***General facts:*** Every year, about 18,000 cases of shigellosis are reported in the United States. Shigellosis is particularly common and causes recurrent problems in settings where hygiene is poor and can sometimes sweep through entire communities.
- ***Occurrence:*** Occurs worldwide; incidence is highest in young children. Secondary attack rates in households can be as high as 40%. Outbreaks usually occur in men who have sex with men, in over-crowded conditions, and in places where personal hygiene is poor (e.g., day care centers, jails). Shigellosis is more common in summer than winter.
- ***Incubation Period:*** Symptoms may appear 12 – 96 hours after exposure; usually within 1 – 3 days; up to 1 week for *S. dysenteriae*.
- ***Common Symptoms:*** Common symptoms include diarrhea (may contain blood and/or mucous, or may be watery), fever, and nausea.
- ***Treatment:*** Fluid and electrolyte replacement is important when diarrhea is watery or there are signs of dehydration. Antibiotics shorten the duration and severity of illness and the duration of pathogen excretion. They should be used in individual cases if warranted by the severity of illness or to protect contacts (e.g., in day care centers or institutions) when epidemiologically indicated. Multidrug resistance to most of the low-cost antibiotics is common, and the choice of specific agents will depend on the antibiogram of the isolated strain.

C. Reservoirs

Humans are the significant reservoir; outbreaks have occurred in primate colonies as well.

D. Modes of Transmission

Transmission is person-to-person through direct or indirect fecal-oral contact from a symptomatic patient or a short-term asymptomatic carrier. Secondary transmission in households is of concern and can reach 40%. Individuals primarily responsible for transmission are those who fail to use proper hand washing techniques (especially after using the bathroom) and transmit organisms to others directly by physical contact or indirectly by contaminating food.

E. Period of Communicability

Shigellosis is communicable during the acute infection and until the infectious agent is no longer present in feces, usually within 4 weeks after illness. Asymptomatic carriers may transmit infection; rarely the carrier state may persist for months. Antibiotic treatment usually reduces duration of carriage to a few days. Secondary attack rates in households are common if precautions are not followed.

2) ACTIONS REQUIRED/CONTROL MEASURES

A. Reporting Requirements

Shigellosis is physician reportable by mail within 12 hours of recognition or strong suspicion to both the Connecticut Department of Public Health (DPH) and the local health department (LHD). The director of any clinical laboratory must also report laboratory evidence of shigellosis to both the DPH and the LHD. **Additional requirements:** Isolates of Shigella must be submitted to the DPH State Laboratory for confirmation. See current lists of physician Reportable Diseases (Attachment A) and Laboratory Reportable Significant Findings (Attachment C).

B. Case Definition

- **Confirmed Case:** Isolation of *Shigella* from any clinical specimen.

C. Case Investigation

- **DPH Responsibility:** DPH is available to the LHD for assistance, consultation, and guidance and to ensure that appropriate investigative and control actions are being taken.

- **LHD Responsibility:** Using the "General Enteric Diseases Interview Form" (Attachment F), interview the case and identify individuals in high-risk occupations or settings (see below). Completed GEDIF forms should be entered directly into Maven or faxed to the DPH at 860-509-7910.

  Provide information and educational materials describing the nature of the disease and preventive measures. The importance of frequent and thorough hand washing should be stressed for all cases and contacts. Encourage a physician visit if symptoms persist.

D. Control Measures

- **Food Handler:** Individuals with laboratory-confirmed infection should be excluded from direct food handling until two consecutive negative stool cultures spaced at least 24 hours apart are obtained. If treated with antibiotics, cultures should be collected at least 48 hours after last dose. Follow up with the food establishment and assess other food handlers working in the establishment for any gastrointestinal symptoms. Those with gastrointestinal symptoms should submit a stool specimen for testing and be excluded from work until results return negative. The importance of proper hand washing should be stressed.

- **Health Care Worker with Direct Patient Contact:** Individuals with laboratory-confirmed infection should be restricted from direct patient care until diarrhea ceases and two consecutive negative stool cultures spaced at least 24 hours apart are obtained. If the person was treated with antibiotics, cultures should be collected at least 48 hours after last dose.

- **Day Care Setting:** Symptomatic attendees and/or staff with laboratory-confirmed infection should be excluded from day care until diarrhea ceases and two consecutive negative stool cultures spaced at least 24 hours apart are obtained. If treated with

antibiotics, cultures should be collected at least 48 hours after last dose. Any other day care attendees and/or staff with diarrhea should be identified and cultured. **Improved sanitation and personal hygiene should be emphasized in day care settings.** Proper hand washing by staff and children (especially after using the toilet or handling soiled diapers) should be stressed, as hand hygiene is the most important measure to decrease transmission.

- **Household Contacts:** Household contacts with diarrhea should be excluded from food handling, day care, and care of patients until diarrhea ceases and two consecutive negative stool cultures taken at least 24 hours apart are obtained. Asymptomatic household contacts involved in food handling, day care, or care of patients should have at least one stool specimen cultured; stress good hand washing technique and recommend glove use. Asymptomatic household contacts should not be restricted from work pending culture results.

Fact Sheet

What is shigellosis?
Shigellosis is a fairly common illness affecting the intestinal tract. It is caused by a bacterium called *Shigella*. Most cases are seen in the summer and early fall and occur as single cases or outbreaks.

Where are *Shigella* bacteria found?
Shigella can be found in the intestinal tract of infected people who in turn may contaminate food or water.

How do these bacteria spread?
Shigella bacteria are spread by eating or drinking contaminated food or water or by direct contact with an infected person. Infection may occur after ingestion of very few (10-100) organisms.

Who gets shigellosis?
Anyone can get shigellosis, but it is recognized more often in young children. Those who may be at greater risk include children in day care centers, foreign travelers to certain countries, institutionalized people, and active homosexuals.

What are the symptoms of shigellosis?
People infected with *Shigella* may experience mild or severe diarrhea often with fever, nausea, and sometimes cramps and vomiting. Traces of blood or mucous in the stool can be found in typical cases. Some infected people may show mild illness or no symptoms.

How soon do symptoms appear?
The symptoms usually appear 1 – 3 days after exposure (range 12 – 96 hours).

How long can an infected person carry *Shigella*?
People can pass *Shigella* in their stool for up to 4 weeks. Certain antibiotics may shorten the carrier phase.

Should an infected person be excluded from school or work?
Since *Shigella* is passed in the stool of an infected person, those with active diarrhea or those who are unable to control their bowel habits should be excluded from work or school. Most infected people may return to work or school after the diarrhea ends, provided they carefully wash their hands after toilet visits. Because of the extremely small infective dose, food handlers and persons who provide direct patient care should have two consecutive negative stool samples before returning to regular work activities. Day care attendees should receive antimicrobial therapy and should not return to the day care center until the diarrhea has ceased and two consecutive stool samples are negative for *Shigella*.

What is the treatment for shigellosis?

Most people with shigellosis will recover on their own. Some may require fluids to prevent dehydration. Antibiotics are occasionally used to treat severe cases or to shorten the carrier phase which may be important for food handlers, children in day care, or institutionalized individuals.

How can shigellosis be prevented?

- Wash hands with soap and water carefully and frequently, especially after going to the bathroom, after changing diapers, and before preparing foods or beverages.
- Dispose of soiled diapers properly; disinfect diaper-changing areas after using them.
- Keep children with diarrhea out of child care settings.
- Persons with diarrhea should not prepare food for others.
- Avoid sexual practices that result in contact with feces.

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1) THE DISEASE AND ITS EPDEMIOLOGY

A. Etiologic Agent

Trichinosis is a parasitic disease caused by intestinal round worms whose larvae migrate to and become encapsulated in the muscles. Of the several *Trichinella* species identified, *T. spiralis* is the most common cause of human infection.

B. Description of Illness

- ***General facts*:** Severity of illness is highly variable and depends on the amount of larvae ingested. Clinical spectrum of disease ranges from unapparent infection (most common) to fulminating, fatal disease. Specific drug treatments are effective in the intestinal and muscular stage.
- ***Occurrence*:** Worldwide; incidence varies. Cases are usually sporadic and outbreaks localized.
- ***Incubation period*:** Usually 1 – 2 weeks. Gastrointestinal symptoms may appear within a few days. Systemic symptoms appear about 8-15 days after ingestion of infected meat, but can vary between 5 and 45 days depending on number of parasites.
- ***Common symptoms*:** Nausea, diarrhea, vomiting, fatigue, and abdominal discomfort may precede headache, fever, joint pain and muscle soreness, hives, light sensitivity, swelling of the eyelids, and constipation. Rarely, due to heavy infection, cardiac and/or neurologic complications could appear weeks into the infection; in severe cases, death by myocardial failure may occur.
- ***Treatment:*** Albendazole or mebendazole are effective in the intestinal stage and in the muscular stage. Corticosteroids are indicated only in severe cases to alleviate symptoms of inflammatory reaction when the central nervous system or heart is involved; however, they delay elimination of adult worms from the intestine.

C. Reservoirs

A number of animals serve as reservoirs for *Trichinella*, including swine, dogs, cats, horses, rats, and many wild animal species (such as wolf, bear, fox, wild boar, and marine mammals).

D. Modes of Transmission

Transmission is foodborne and occurs through ingestion of raw or insufficiently cooked flesh of animals containing encysted *Trichinella* larvae; chiefly pork, pork products and beef products (such as hamburgers mixed with raw pork). As many as 30% of domestic cases may be attributed to ingestion of wild game meat.

E. Period of Communicability

Not transmitted directly person-to-person. Animal hosts remain infective for months, and meat from such animals stays infective for long periods of time unless cooked, frozen, or irradiated to kill the larvae.

2) ACTIONS REQUIRED/CONTROL MEASURES

A. Reporting Requirements

Trichinosis is physician reportable by mail within 12 hours of recognition or strong suspicion to both the Connecticut Department of Public Health (DPH) and the local health department (LHD). The director of any clinical laboratory must also report laboratory evidence of trichinosis to both the DPH and the LHD. See current lists of physician Reportable Diseases (Attachment A) and Laboratory Reportable Significant Findings (Attachment C).

B. Case Definition

- **Confirmed Case:**
  - Demonstration of *Trichinella* larvae in tissue obtained by muscle biopsy or
  - Positive serologic test for Trichinella.

C. Case Investigation

- **DPH Responsibility:** The DPH will conduct the following activities: contact the testing laboratory and the patient's physician to confirm the diagnosis of trichinosis; interview the patient to collect food history during incubation period (5 – 45 days before symptom onset); specifically inquire about consumption of pork and pork products, other high-risk foods such as wild game meat and dried jerky, and methods of preparation; assess other household members and persons who have eaten suspected meat (if any) for evidence of infection; and confiscate any remaining suspected food and consult CDC about testing.

- **LHD Responsibility:** If a cluster/outbreak is identified, the LHD will work with the DPH to implement control measures. Provide information and educational materials describing the nature of the disease and preventive measures.

Fact Sheet

What is trichinosis?
Trichinosis is an illness caused by a very small parasite called *Trichinella spiralis.*

Where is the parasite found?
Animals such as pigs, dogs, cats, horses, rats, and many wild animals including, wolf, bear, fox, and some sea mammals such as walrus carry the parasite.

How does the parasite spread?
The usual source of human infection is eating raw or undercooked meats, particularly pork, but horsemeat and wild animal meat can also be sources. The disease does not spread from person-to-person.

Who gets trichinosis?
Anyone who eats undercooked meat of infected animals can develop trichinosis.

What are the symptoms of trichinosis?
Nausea, diarrhea, vomiting, fatigue, and abdominal discomfort are the first symptoms of trichinosis. Headache, fever, chills, cough, eye swelling, aching joints and muscle pains, itchy skin, or constipation follow the first symptoms. If the infection is severe, patients may experience difficulty coordinating movements, and have heart and breathing problems.

How soon do symptoms appear?
Abdominal symptoms can occur 1 - 2 days after infection. Further symptoms usually occur 8-15 days after eating contaminated meat.

What is the treatment for trichinosis?
Several safe and effective prescription drugs are available to treat trichinosis.

How can trichinosis be prevented?

- Cook all fresh pork, pork products, and meat from wild animals at a temperature and for a time sufficient to allow all parts to reach at least 160°F.
- Freeze pork less than 6 inches thick for 20 days at 5°F to kill any parasites. Freezing wild game meats, unlike freezing pork products, even for long periods of time, may not kill all parasites.
- Cook all meat fed to pigs or other wild animals.
- Do not allow pigs to eat uncooked carcasses of other animals, including rats, which may be infected with parasites.
- Clean meat grinders thoroughly if you prepare your own ground meats.
- Curing (salting), drying, smoking, or microwaving meat does not always kill the parasites.

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1) THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent

Salmonella enterica serotype Typhi (abbreviated *S. typhi*) is a gram-negative bacillus that causes typhoid fever, a systemic bacterial disease. *Salmonella enterica* serotypes Paratyphi A, Paratyphi B, and Paratyphi C cause a similar illness called paratyphoid fever, but this illness tends to be milder and has a lower case-fatality rate than typhoid fever.

B. Description of Illness

- ***General facts:*** In the United States, about 400 cases occur each year, and 70% of these are acquired while traveling internationally. Typhoid fever is still common in the developing world, where it affects about 12.5 million persons each year. Travelers to countries where typhoid is common should consider being vaccinated against typhoid.
- ***Occurrence:*** Worldwide. Susceptibility to invasive infections is increased in infants, the elderly, and individuals who are immunocompromised. In the United States, infection with *S. typhi* implies direct contact with an infected person or with an item contaminated by a carrier.
- ***Incubation period:*** Depends on size of the infecting dose, symptoms generally appear from 8 – 14 days after exposure (range 3 days to 1 month); for paratyphoid fever (range 1 - 10 days).
- ***Common symptoms*:** Persons with typhoid fever usually have a sustained fever as high as 103° to 104° F. They may also feel weak, or have stomach pains, headache, or loss of appetite. In some cases, patients have a rash of flat, rose-colored spots. Relapses are common. Fatalities are less than 1 percent with antibiotic treatment.
- ***Treatment:*** Three commonly prescribed antibiotics are ampicillin, trimethoprim-sulfamethoxazole, and ciprofloxacin. Persons given antibiotics usually begin to feel better within 2 to 3 days, and deaths rarely occur.

C. Reservoirs

Humans are the only known reservoir for S. typhi; for paratyphoid, reservoirs include humans and rarely domestic animals. The human carrier state may follow acute illness as well as mild or subclinical infections. The chronic carrier state is most common among persons infected during middle age, especially women.

D. Modes of Transmission

Infection occurs by eating food and/or water contaminated by feces and/or urine of cases and carriers. Important vehicles in some countries include shellfish taken from sewage-contaminated beds (particularly oysters), raw fruits and vegetables, and contaminated milk and milk products. Flies may infect food in which the organism then multiplies to achieve an infective dose.

E. Period of Communicability

The disease is communicable for as long as the bacilli appear in stool, usually from the first week of infection throughout convalescence; variable thereafter (usually 1-2 weeks for paratyphoid). About 10% of untreated typhoid fever cases discharge bacilli for 3 months after onset of symptoms, and 2% - 5% become permanent carriers, with fewer paratyphoid than typhoid case-patients becoming permanent gallbladder carriers.

2) ACTIONS REQUIRED/CONTROL MEASURES

A. Reporting Requirements

Typhoid fever is physician reportable by mail within 12 hours of recognition or strong suspicion to both the Connecticut Department of Public Health (DPH) and the local health department (LHD). **Additional requirements:** Isolates of Salmonella must be submitted to the DPH State Laboratory for confirmation. See current lists of physician Reportable Diseases (Attachment A) and Laboratory Reportable Significant Findings (Attachment C).

B. Case Definition

- **Confirmed Case:** Isolation of *S. typhi* or *S. paratyphi* from blood, stool, or other clinical specimen.

C. Case Investigation

- **DPH Responsibility:** DPH is available to the LHD for assistance, consultation, and guidance and to ensure that appropriate investigative and control actions are being taken.

- **LHD Responsibility:** Complete the CDC "*Typhoid and Paratyphoid Fever Surveillance Report*" (Attachment K). Completed forms should be scanned and uploaded to Maven or faxed to the DPH at 860-509-7910. In addition, interview the case and identify individuals in high-risk occupations or settings (see below). Provide information and educational materials that describe the nature of the disease and preventive measures. Proper hand washing should be stressed for all cases and contacts. Encourage a physician visit if symptoms persist.

D. Control Measures

- **Food Handler, health care provider, day care attendee or staff member:**
  Exclude from food handling, patient care, or day care center until the following are met:

  Three consecutive negative stool cultures that are:
  - taken not earlier than 1 month after onset, and
  - taken at least 24 hours apart, and
  - taken at least 48 hours after any antibiotic treatment.

When S. Typhi infection is identified in a symptomatic child care attendee or staff member, stool cultures should be collected from other attendees and staff members, and all infected people should be excluded.

Comment: *Even with antibiotic treatment, infected persons may continue to shed the infectious organism. Shedding is highest during the month following onset of illness; thus, it is recommended to begin culturing one month following onset of illness.*

- **Household contact that is a food handler, health care provider, or day care attendee or staff member:**
  Exclude from food handling, patient care, and day care center until the following are met**:**

*Two consecutive negative stool cultures that are***:**
- Taken at least 24 hours apart, and
- Taken at least 48 hours after any antibiotic treatment.

- **Typhoid carrier who is a food handler or health care provider**

  Exclude typhoid carriers from handling food and from providing patient care until the following are met:

  Three consecutive negative stool cultures that are:
  - taken at least **1 month apart**, and
  - taken at least 48 hours after any antibiotic treatment.

- **Culturing of household contacts**

  Ideally, all household contacts should be cultured to identify additional cases or carriers. If this is not possible, then culture household contacts meeting the following criteria:
  - persons who traveled with the confirmed case, or
  - persons who are in high-risk occupations (food handlers, health care providers, day care attendee or staff member).

Fact Sheet

What is typhoid fever?
Typhoid fever is a bacterial illness caused by a unique strain of *Salmonella* called *Salmonella typhi (S. typhi)*. This bacterium affects the intestinal tract and occasionally the bloodstream. Most cases reported in the United States are acquired during foreign travel to underdeveloped countries.

Where are *S. typhi* bacteria found?
S. typhi can be found in people.

How do these bacteria spread?
S. typhi bacteria are passed in the stool and, to some extent, the urine of infected people. The bacteria are spread by eating or drinking water or foods contaminated by stool from an infected individual.

Who gets typhoid fever?
Anyone can get typhoid fever but the greatest risk exists to travelers visiting countries where the disease is common. Occasionally, local cases can be traced to exposure to a person who is a chronic carrier.

What are the symptoms of typhoid fever?
Persons with typhoid fever usually have a sustained fever as high as 103° to 104° F. They may also feel weak, or have stomach pains, headache, or loss of appetite. In some cases, patients have a rash of flat, rose-colored spots. Relapses are common. Fatalities are less than 1 percent with antibiotic treatment.

How soon do symptoms appear?
Depending on the size of the infecting dose, symptoms generally appear from 8 – 14 days after exposure (range 3 days to 1 month).

How long can an infected person carry the typhoid bacteria?
The carrier stage varies from a number of days to years. Only about 3% of cases become lifelong carriers of the bacteria, and this tends to occur more often in adults than in children.

Should an infected person be excluded from work or school?
Except for people in high-risk occupations/settings (food workers, health care providers, day care attendees), most infected people may return to work or school when they have recovered, provided that they carefully wash hands after toilet visits.

How is typhoid fever treated?
Specific antibiotics are often used to treat cases of typhoid fever.

What can be done to prevent the spread of typhoid fever?
A vaccine is available; however, it is generally reserved for people traveling to underdeveloped countries where significant exposure may occur. Strict attention to food

and water precautions while traveling to such countries is the most effective prevention method.

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1) THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent

Like *Vibrio cholerae*, noncholera *Vibrio* are gram-negative bacilli. These *Vibrio* species (including *V. parahaemolyticus*, *V. vulnificus* and others) are associated with diarrhea, septicemia, and/or wound infections.

B. Description of Illness

- ***General facts:*** Noncholera *Vibrio* are bacteria in the same family as those that cause cholera. They live in seawater and are part of a group of *Vibrio* organisms that are called "halophilic" because they require salt.
- ***Occurrence:*** Most infections occur in warmer months. Sporadic cases and common source outbreaks of *V. parahaemolyticus* (with undercooked seafood as the food vehicle) occur worldwide. Although the annual incidence of *V. vulnificus* is < 0.5 per 100,000 population, it is the most common agent of serious *Vibrio* infections in the United States.
- ***Incubation period:*** When ingested, noncholera *Vibrio* species cause symptoms within 5 – 92 hours (median 23 hours).
- ***Common symptoms*:** When ingested, noncholera *Vibrio* species can cause diarrhea often with abdominal cramping, nausea, vomiting, fever, and chills. Severe disease is uncommon and occurs more frequently in persons with weakened immune systems. These *Vibrios* can also cause bloodstream infections of the skin when an open wound is exposed to seawater.

C. Reservoirs

Noncholera *Vibrio* species can be found free in estuarine or costal marine waters, and in fish and shellfish (especially oysters) in these environments.

D. Modes of Transmission

Infection occurs through consumption of raw or undercooked seafood (or food contaminated by raw seafood), by rinsing food with contaminated water. Wound infections commonly result from exposure from abrasions exposed to contaminated seawater or from punctures resulting from handling contaminated shellfish.

E. Period of Communicability

Noncholera *Vibrio* infections are not considered to be communicable from person to person, but can be transmitted through ingestion of food or water contaminated directly or indirectly with feces or vomitus of infected persons.

2) ACTIONS REQUIRED/CONTROL MEASURES

A. Reporting Requirements

Noncholera *Vibrio* infections are laboratory reportable, and *V. parahaemolyticus* and *V. vulnificus* are also physician reportable by mail to both the Connecticut Department of Public Health (DPH) and the local health department (LHD). **Additional requirements:** All *Vibrio* isolates must be submitted to the DPH State Laboratory for confirmation. See current lists of physician Reportable Diseases (Attachment A) and Laboratory Report of Significant Findings (Attachment C).

B. Case Definition

- **Confirmed Case:** Isolation of *Vibrio spp.* other than *Vibrio cholerae* O1 or O139 from a clinical specimen.

C. Case Investigation

- **DPH Responsibility:** DPH is available to the LHD for assistance, consultation, and guidance and to ensure that appropriate investigative and control actions are being taken.

- **LHD Responsibility:** Complete the CDC "*Cholera and Other Vibrio Illness Surveillance Report*" form (Attachment G). Completed forms should be scanned and uploaded to Maven or faxed to the DPH at 860-509-7910.

  Provide information and educational materials describing the nature of the disease and preventive measures. Stress the importance of thoroughly cooking seafood and handling uncooked seafood with care.

D. Control Measures

Recommendations on exclusion from high-risk occupations or settings should be made in conjunction with DPH.

Fact Sheet

What are noncholera *Vibrio*?
Noncholera *Vibrio* are bacteria in the same family as those that cause cholera.

Where are noncholera *Vibrio* bacteria found?
Noncholera *Vibrio* bacteria live in saltwater and are commonly found in marine environments and estuaries. These bacteria are frequently isolated from oysters and other shellfish during the summer months.

How does this bacteria spread?
Noncholera *Vibrio* can cause disease in people who eat contaminated seafood or have an open wound that is exposed to seawater. There is no evidence for person-to-person transmission of noncholera *Vibrio*.

Who gets infected with noncholera *Vibrio*?
Persons who are immunocompromised, especially those with chronic liver disease, are at risk for noncholera *Vibrio* infection when they eat raw seafood, particularly oysters. Since noncholera *Vibrio* are naturally found in warm marine waters, people with open wounds can be exposed to noncholera *Vibrio* through direct contact with seawater.

What are the symptoms of noncholera *Vibrio* infection?
Among healthy people, ingestion of noncholera *Vibrio* can cause vomiting, diarrhea, and abdominal pain. In immunocompromised persons, particularly those with chronic liver disease, noncholera *Vibrio* can infect the bloodstream, causing a severe and life-threatening illness.

Noncholera *Vibrio* can also cause an infection of the skin when open wounds are exposed to warm seawater. These infections may lead to skin breakdown and ulceration.

How soon do symptoms appear?
Symptoms usually occur within 24 hours of eating contaminated food or within 12 to 72 hours after exposure to contaminated seawater.

What is the treatment for noncholera *Vibrio* infection?
Patients with diarrhea should drink plenty of liquids to replace lost fluids. In severe illnesses, (e.g., bloodstream or wound infection) antibiotics may be used.

How can this infection be prevented?

Some tips for preventing noncholera *Vibrio* infections, particularly among immunocompromised patients, including those with underlying liver disease:

1. Do not eat raw oysters or other raw shellfish.
2. Cook shellfish (oysters, clams, mussels) thoroughly:
   - For shellfish in the shell, either a) boil until the shells open and continue boiling for 5 more minutes, or b) steam until the shells open and then continue cooking for 9 more minutes. Do not eat those shellfish that do not open during cooking.
   - Boil shucked oysters at least 3 minutes or fry them in oil at least 10 minutes at 375°F.
3. Avoid cross-contamination of cooked seafood and other foods with raw seafood and juices from raw seafood.
4. Eat shellfish promptly after cooking and refrigerate leftovers.
5. Avoid exposure of open wounds or broken skin to warm salt or brackish water and raw shellfish harvested from such waters.
6. Wear protective clothing (e.g., gloves) when handling raw shellfish.

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1) THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent

Yersiniosis is an enteric bacterial illness caused by *Yersinia enterocolitica* or *Yersinia pseudotuberculosis*, which are gram-negative bacilli. These bacteria cause a number of age-specific syndromes and a variety of uncommon presentations.

B. Description of Illness

- ***General facts*:** Most reported cases of yersiniosis are caused by *Y. enterocolitica*, which responds to treatment with antibiotics. Unlike many foodborne pathogens, *Yersinia* multiplies in cooler temperatures with little air (e.g., refrigeration).
- ***Occurrence*:** Worldwide, with the highest rates reported during the cold season in temperate climates such as North America and northern Europe. About 2/3 of *Y. enterocolitica* cases occur in infants and children, and 3/4 of *Y. pseudotuberculosis* cases occur in persons 5 - 20 years old.
- ***Incubation period*:** Usually 4-7 days after exposure.
- ***Common symptoms*:** Intestinal inflammation with fever and diarrhea, often with blood or mucus in stool, is most common for *Y. enterocolitica* infection in young children. Less commonly, post-infectious arthritis and systemic infection may occur. Infections in older children and adults can mimic acute appendicitis with fever, abdominal pain, and tenderness of the abdomen; outbreaks may be recognized by local increases in appendectomies. Fever, rash, and abdominal pain are common symptoms of *Y. pseudotuberculosis* infection; diarrhea and less commonly septicemia may occur. Prolonged asymptomatic carriage is possible.
- ***Treatment:*** Organisms are sensitive to many antibiotics, but are generally resistant to penicillin and its semi-synthetic derivatives. Treatment may be helpful for gastrointestinal symptoms; definitely indicated for septicemia and other invasive disease. Agents of choice against *Y. enterocolitica* are the aminoglycosides (septicemia only) and trimethoprim-sufamethoxazole. Newer quinolones such as ciprofloxacin are highly effective. Both *Y. enterocolitica* and *Y. pseudotuberculosis* are usually sensitive to tetracyclines.

C. Reservoirs

Animals, with swine as the principal reservoir for *Y. enterocolitica*; asymptomatic carriage of the bacteria is common in pigs, especially in winter. *Y. pseudotuberculosis* is primarily a zoonotic disease of wild and domesticated birds and mammals (particularly rodents and other small mammals), with humans as an incidental host.

D. Modes of Transmission

Transmission is through the fecal-oral route, with infections occurring with the consumption of food and/or water contaminated by contact with infected people or animals. *Y. enterocolitica* is most commonly associated with raw or undercooked pork and pork products (especially pork intestines, or chitterlings, in the United States). Human cases have been reported in association with disease in household pets, particularly sick puppies and kittens.

E. Period of Communicability

Secondary transmission is thought to be rare; however, an infected person excretes the organism in stool for at least as long as symptoms exist (approximately 2-3 weeks). Untreated cases may shed for as long as 2-3 months. Both children and adults have been reported with prolonged asymptomatic carriage.

2) ACTIONS REQUIRED/CONTROL MEASURES

A. Reporting Requirements

Yersiniosis is laboratory reportable by mail to both the Connecticut Department of Public Health (DPH) and the local health department (LHD). See current list of Laboratory Reportable Significant Findings (Attachment C).

B. Case Definition

- **Confirmed Case:** Isolation of *Yersinia* from any clinical specimen.

C. Case Investigation

- **DPH Responsibility:** DPH is available to the LHD for assistance, consultation, and guidance and to ensure that appropriate investigative and control actions are being taken.

- **LHD Responsibility:** Using the "General Enteric Diseases Interview Form" (Attachment F), interview case and identify individuals in high-risk occupations or settings (see below). Completed GEDIF forms should be entered directly into Maven or faxed to the DPH at 860-509-7910.

  Provide information and educational materials describing the nature of the disease and preventive measures. The importance of frequent and thorough hand washing should be stressed for all cases and contacts. Encourage a physician visit if symptoms persist.

D. Control Measures for Individuals in High-Risk Occupations or Settings

- **Food Handler:** Individuals with laboratory-confirmed infection should be excluded from direct food handling until they are asymptomatic. Exclusion of asymptomatic individuals is indicated only for those with questionable hygienic habits. Proper hand washing should be stressed.

- **Health Care Worker with Direct Patient Contact:** Individuals with laboratory-confirmed infection should be excluded from direct care of patients until they are asymptomatic. Exclusion of asymptomatic individuals is indicated only for those with questionable hygienic habits. Proper hand washing should be stressed.

- **Day Care Setting:** Symptomatic children in diapers should be excluded from day care. Improved sanitation and personal hygiene should be emphasized in day care settings. Proper hand washing by staff and children should be stressed, especially after using the toilet and/or handling soiled diapers, and prior to preparing or eating food.

- **Household Contacts:** Household contacts with diarrhea should be excluded from food handling and the care of children and/or patients until they are asymptomatic. Proper hand washing should be stressed.

Fact Sheet

What is yersiniosis?
Yersiniosis is an illness that is caused by the bacterium called *Yersinia enterocolitica*. It generally affects the intestinal tract. It is a relatively uncommon illness and usually occurs as a single isolated case. Occasional outbreaks have been reported due to a common exposure.

Where are *Yersinia* bacteria found?
Animals, especially pigs, are the main source of *Yersinia*. Fecal wastes from animals may contaminate water, milk, and foods and become a source of infection for people or other animals

How do these bacteria spread?
Yersinia bacteria are spread by eating contaminated food, especially raw or undercooked pork products. The preparation of raw pork intestines (chitterlings) may be particularly risky. Infants can be infected if their caretakers handle raw chitterlings and then do not adequately clean their hands before handling the infant or the infant's toys, bottles, or pacifiers. Drinking contaminated unpasteurized milk or untreated water can also transmit the infection. On rare occasions, it can be transmitted as a result of the bacterium passing from the stools or soiled fingers of one person to the mouth of another person.

Who gets yersiniosis?
Any person can get yersiniosis, but it occurs more often in children.

What are the symptoms?
Infected people may experience mild or severe diarrhea, fever, and abdominal cramps. Sometimes, *Yersinia* infection may mimic appendicitis.

How soon do symptoms appear?
Symptoms generally appear 4 to 7 days after exposure.

How long can an infected person carry the germ?
The bacteria are passed in the feces during the time the person is experiencing diarrhea and in some cases for a few weeks or months afterward.

How is yersiniosis treated?
Most cases recover without treatment. Those with severe symptoms or bloodstream infections are generally treated with antibiotics.

How can yersiniosis be prevented?

- Avoid eating raw or undercooked pork.
- Drink only pasteurized milk or milk products.
- Wash hands with soap and water before eating and preparing food, after handling raw meat, and after contact with animals.
- After handling raw chitterlings, clean hands and fingernails with soap and water before touching infants or their toys, bottles, or pacifiers.
- Carefully clean all cutting boards, counter tops, and utensils with soap and hot water after preparing raw meat.

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Sexually transmitted disease information is not available in this manual at this time. Please contact the STD Control Program for additional information at 860-509-7920.

1) THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent

Diphtheria is an acute bacterial disease caused by *Corynebacterium diphtheriae.*

B. Description of Illness

- ***General facts:*** Diphtheria is an acute bacterial disease primarily involving the tonsils, pharynx, larynx, nose, occasionally other mucus membranes or skin, and sometimes conjunctivae or vagina. Diphtheria was one of the most common causes of death among children in the pre-vaccine era. Since the introduction of the vaccine, diphtheria has been well controlled in the United States. Approximately 5% of people who develop diphtheria die from the disease, and many more suffer permanent damage.
- ***Occurrence:*** Diphtheria occurs worldwide, but clinical cases are more prevalent in temperate zones. In the United States during the pretoxoid era, the highest incidence was in the Southeast during the winter. More recently, highest incidence rates have been in states with significant populations of Native Americans. No geographic concentration of cases is currently observed in the United States. The diphtheria vaccine offers the greatest protection against this disease. The fully immunized person who is exposed can become a carrier of infection, may only develop a mild case, or may not get sick at all. But if not fully vaccinated, the risk of getting severely ill is 30 times higher.
- ***Incubation period:*** Usually about 2 – 5 days (range 1 – 10 days).
- ***Common symptoms*:** There are 2 types of diphtheria causing different symptoms:

  Cutaneous diphtheria – Usually mild, typically consisting of non-distinctive sores or shallow ulcers and only rarely involves toxic complications.

  Respiratory diphtheria – May include nasal, pharyngeal, tonsillar, and laryngeal. Generally presents as a sore throat with low-grade fever; a characteristic grayish membrane is found on the tonsils, pharynx, or nose. This membrane may cause an upper airway obstruction, and neck swelling is usually present in severe disease. The bacteria can release a toxin that spreads through the bloodstream and may cause muscle paralysis, heart and kidney failure, and death. Respiratory diphtheria usually lasts several days; complications can persist for months.
- ***Treatment:*** Persons with suspected diphtheria should be given antibiotics and antitoxin in adequate dosage and placed in isolation after a provisional clinical diagnosis is made, and appropriate cultures are obtained. Respiratory support and airway maintenance should be administered as needed. Antibiotic treatment is with erythromycin orally or by injection (40 mg/kg/day; maximum, 2 gm/day) for 14 days, or procaine penicillin G daily, intramuscularly (300,000 U/day for those weighing 10 kg or less and 600,000 U/day for those weighing more than 10 kg) for 14 days. The disease is usually not contagious 48 hours after antibiotics are instituted. Elimination of the organism should be documented by 2 consecutive negative cultures after therapy is completed.
- ***Preventive Measures***: For close contacts, especially household contacts, a diphtheria booster, appropriate for age, should be given. Contacts should also receive antibiotics – benzathine penicillin G (600,000 units for persons younger than 6 years

old and 1,200,000 units for those 6 years old and older) or a 7 to 10-day course of oral erythromycin, (40 mg/kg/day for children and 1 g/day for adults). For compliance reasons, if surveillance of contacts cannot be maintained, they should receive benzathine penicillin G. Identified carriers in the community should also receive antibiotics. Maintain close surveillance and begin antitoxin at the first signs of illness.

C. Reservoirs

Humans, which are the only known source of infection, are usually asymptomatic. In outbreaks, high percentages of children are found to be transient carriers.

D. Modes of Transmission

Transmission is most often person-to-person spread via the respiratory tract. Rarely, transmission may occur from skin lesions or articles soiled with discharges from lesions of infected persons (fomites). Raw milk has served as a vehicle.

E. Period of Communicability

Transmission can occur as long as the organisms are present in discharge and lesions. Although it can vary, organisms usually persist for less than 2 weeks and seldom more than 4 weeks. The rare chronic carrier may shed organisms for 6 months or more. The disease is usually not contagious 48 hours after antibiotics are instituted.

2) ACTIONS REQUIRED/CONTROL MEASURES

A. Reporting Requirements

Diphtheria is physician reportable by telephone immediately on the day of recognition or strong suspicion to both the Connecticut Department of Public Health (DPH) and the local health department (LHD). A mailed report is also required within 12 hours. The director of any clinical laboratory must also report laboratory evidence of diphtheria to both the DPH and the LHD.

Additional requirements: Isolates must be submitted to the DPH State Laboratory for confirmation. See current lists of physician Reportable Diseases (Attachment A and Laboratory Reportable Significant Findings (Attachment C).

B. Case Classification

- **Laboratory criteria for diagnosis**:
  - Isolation of *Corynebacterium diphtheriae* from the nose or throat; **OR**
  - Histopathologic diagnosis of diphtheria
- **Probable Case**

  In the absence of a more likely diagnosis, an upper respiratory tract illness with:
  - An adherent membrane of the nose, pharynx, tonsils, or larynx; **AND**
  - Absence of laboratory confirmation; **AND**
  - Lack of epidemiologic linkage to a laboratory-confirmed case of diphtheria.
- **Confirmed Case**

  An upper respiratory tract illness with an adherent membrane of the nose, pharynx, tonsils, or larynx; and any of the following:
  - Isolation of *Corynebacterium diphtheriae* from the nose or throat; **OR**
  - Histopathologic diagnosis of diphtheria; **OR**
  - Epidemiologic linkage to a laboratory-confirmed case of diphtheria.
- **Comment:** Cutaneous diphtheria should not be reported. Respiratory disease caused by nontoxigenic *C. diphtheriae* should be reported as diphtheria.

C. Case Investigation

- **DPH Responsibility:** The DPH Immunization Program ensures that the appropriate diagnostic work has been completed and works in collaboration with LHD to ensure that contacts of each case-patient have been identified, and appropriate recommendations (e.g., vaccination, exclusion) have been made.
- **LHD Responsibility:** The LHD is involved with case investigations and control measures under DPH guidance as necessary.

D. Control Measures

The DPH immunization Program should be contacted (860-509-7929) for guidance on measures and further action, if necessary.

Fact Sheet

What causes diphtheria?

Diphtheria is caused by a bacterium, *Corynebacterium diphtheriae.* The actual disease is caused when the bacteria release a toxin, or poison, into a person's body.

How does diphtheria spread?

Diphtheria bacteria live in the mouth, throat, and nose of an infected person and can be passed to others by coughing or sneezing. Occasionally, transmission occurs from skin sores or through articles soiled with oozing from sores of infected people.

How long does it take to show signs of diphtheria after being exposed?

The incubation period is short: 2–5 days, with a range of 1–10 days.

What are the symptoms of diphtheria?

Early symptoms of diphtheria may mimic a cold with a sore throat, mild fever, and chills. Usually, the disease causes a thick coating at the back of the throat, which can make it difficult to breathe or swallow. Other body sites besides the throat can also be affected, including the nose, larynx, eye, vagina, and skin.

How serious is diphtheria?

Diphtheria is a serious disease: 5%–10% of all people with diphtheria die. Up to 20% of cases lead to death in certain age groups of individuals (e.g., children younger than age 5 years and adults older than age 40 years).

What are possible complications from diphtheria?

Most complications of diphtheria are due to the release of the toxin, or poison. The most common complications are inflammation of the heart leading to abnormal heart rhythms, and inflammation of the nerves which may cause temporary paralysis of some muscles. If the paralysis affects the diaphragm (the major muscle for breathing), the patient may develop pneumonia or respiratory failure. The thick membrane coating at the back of the throat may cause serious breathing problems, including suffocation.

How do I know if someone has diphtheria?

The diagnosis of diphtheria can only be confirmed after a physician takes a small sample of infected material from the patient's throat (or other site) and has the sample tested in a laboratory. But because this disease progresses quickly, treatment usually should begin based on the health professional's assessment of the patient.

Is there a treatment for diphtheria?

Diphtheria is treated with both antibiotics and with diphtheria antitoxin. Diphtheria antitoxin is produced in horses and was first used in the United States in 1891. Antitoxin does not get rid of toxin that is already attached to the body's tissues, but will neutralize any circulating poison and will prevent the disease from getting worse. The patient should be tested for sensitivity to this antitoxin before it is given.

How common is diphtheria in the United States?

Diphtheria was once a greatly feared illness in the United States. In the 1920s, there were between 100,000 and 200,000 cases of diphtheria each year with 13,000–15,000 deaths. Because of widespread immunization and better living conditions, diphtheria is now rare in the United States (during 1998– 2009, seven cases of respiratory diphtheria were reported to CDC).

Recent surveys have found that immunity decreases with age, and only 30% of U.S. adults age 60–69 years are vaccinated against diphtheria. This is a concern because the disease continues to occur in other parts of the world. For example, after the breakup of the former Soviet Union, their vaccination rates fell, and large outbreaks of diphtheria began in 1990 in the Newly

Independent States. From 1990 to 1998, more than 150,000 people got sick from diphtheria and more than 5,000 people died. This situation, and other outbreaks around the world, illustrates what can happen when vaccination levels fall. Outbreaks in other countries also increase the risk of diphtheria importation into the United States.

Can you get diphtheria more than once?
Yes. Even individuals recovering from diphtheria should be immunized against the disease as soon as possible.

When did vaccine first become available for diphtheria, tetanus, and pertussis?
The first inactivated toxin, or toxoid, against diphtheria was developed around 1921, but it was not widely used until the 1930s. In 1924, the first tetanus toxoid (inactivated toxin) was produced and was used successfully to prevent tetanus in the armed services during World War II. The first pertussis vaccine was developed in the 1930s and was in widespread use by the mid-1940s, when pertussis vaccine was combined with diphtheria and tetanus toxoids to make the combination DTP vaccine. A series of 4 doses of whole-cell DTP vaccine was quite (70–90%) effective in preventing serious pertussis disease; however, up to half of the children who received the vaccine developed local reactions such as redness, swelling, and pain at the injection site. In 1991, concerns about safety led to the development of more purified (acellular) pertussis vaccines that are associated with fewer side effects. These acellular pertussis vaccines have replaced the whole cell DTP vaccines in the U.S.

In 2005, two new vaccine products were licensed for use in adolescents and adults that combine the tetanus and diphtheria toxoids with acellular pertussis (Tdap) vaccine. These vaccines are the first acellular pertussis-containing vaccines that make it possible to vaccinate adolescents and adults against pertussis.

How are vaccines made that prevent diphtheria, tetanus and pertussis?
These vaccines are made by chemically treating the diphtheria, tetanus, and pertussis toxins to render them nontoxic yet still capable of eliciting an immune response in the vaccinated person. They are known as “inactivated” vaccines because they do not contain live bacteria and cannot replicate themselves, which is why multiple doses are needed to produce immunity.

What’s the difference between all the vaccines containing diphtheria and tetanus toxoids and pertussis vaccine?
It’s like alphabet soup! Here is a listing of the various products:

- DTaP: Diphtheria and tetanus toxoids and acellular pertussis vaccine; given to infants and children ages 6 weeks through 6 years. In addition, three childhood combination vaccines include DTaP as a component.
- DT: Diphtheria and tetanus toxoids, without the pertussis component; given to infants and children ages 6 weeks through 6 years who have a contraindication to the pertussis component.
- Tdap: Tetanus and diphtheria toxoids with acellular pertussis vaccine; given to adolescents and adults, usually as a single dose; the exception is pregnant women who should receive Tdap during each pregnancy.
- Td: Tetanus and diphtheria toxoids; given to children and adults ages 7 years and older. Note the small “d” which indicates a much smaller quantity of diphtheria toxoid than in the pediatric DTaP formulation.

How are these vaccines given?
The DTaP and DT preparations are all given as an injection in the anterolateral thigh muscle (for infants and young toddlers) or in the deltoid muscle (for older children and adults). Tdap and Td are given in the deltoid muscle for children and adults age 7 years and older.

Who should get these vaccines?
All children, beginning at age 2 months, and adults need protection against these three diseases—diphtheria, tetanus, and pertussis (whooping cough). Routine booster doses are also needed throughout life.

How many doses of vaccine are needed?
The usual schedule for infants is a series of four doses of DTaP given at 2, 4, 6, and 15–18 months of age. A fifth shot, or booster dose, is recommended between age 4 and 6 years, unless the fourth dose was given late (after the fourth birthday).

For people who were never vaccinated or who may have started but not completed a series of shots, a 3-dose series of Td should be given with 1 to 2 months between dose #1 and #2, and 6 to 12 months between dose #2 and #3. One of the doses, preferably the first, should also contain the pertussis component in the form of Tdap.

Because immunity to diphtheria and tetanus wanes with time, boosters of Td are needed every ten years.

When adolescents and adults are scheduled for their routine tetanus and diphtheria booster, should they get vaccinated with Td or Tdap?
Immunization experts recommend that the first dose of Tdap be given to all adolescents at age 11–12 years as a booster during the routine adolescent immunization visit if the adolescent has finished the childhood DTaP schedule and has not already received a dose of Td or Tdap. If a child age 7–10 years did not complete a primary series in childhood, a dose of Tdap may be given earlier as part of the catch-up vaccinations.

All adults should receive a single dose of Tdap as soon as feasible. Then, subsequent booster doses of Td should be given every ten years. Pregnant teens and women should receive Tdap during each pregnancy. Adolescents and adults who have recently received Td vaccine can be given Tdap without any waiting period.

If someone experiences a deep or puncture wound, or a wound contaminated with dirt, an additional booster dose may be given if the last dose was more than five years ago. This could be a dose of Td or Tdap, depending on the person's vaccination history. It is important to keep an up-to-date record of all immunizations so that repeat doses don't become necessary. Although it is vital to be adequately protected, receiving more doses than recommended can lead to increased local reactions, such as painful swelling of the arm.

Who recommends the use of these vaccines?
The Centers for Disease Control and Prevention (CDC), the American Academy of Pediatrics (AAP), the American Academy of Family Physicians (AAFP), and the American College of Physicians (ACP) all recommend this vaccine.

What side effects have been reported with these vaccines?
Local reactions, such as fever, redness and swelling at the injection site, and soreness and tenderness where the shot was given, are not uncommon in children and adults. These minor local and systemic adverse reactions are much less common with acellular DTaP vaccine; however, a determination of more rare adverse effects can only be made when additional data are available following extended use of DTaP.

Side effects following Td or Tdap in older children and adults include redness and swelling at the injection site (following Td) and generalized body aches, and tiredness (following Tdap). Older children and adults who received more than the recommended doses of Td/Tdap vaccine can experience increased local reactions, such as painful swelling of the arm. This is due to the high levels of tetanus antibody in their blood.

How effective are these vaccines?

After a properly spaced primary series of DTaP or Td/ Tdap, approximately 95% of people will have protective levels of diphtheria antitoxin and 100% will have protective levels of tetanus antitoxin in their blood. However, antitoxin levels decrease with time so routine boosters with tetanus and diphtheria toxoids are recommended every 10 years. Estimates of acellular pertussis vaccine efficacy range from 80% to 85%—a level believed to be far more efficacious than the previously-used whole cell pertussis vaccine.

Can a pregnant woman receive Tdap vaccine?

Yes. All pregnant women should receive Tdap during each pregnancy, preferably between 27 and 36 weeks' gestation. Because infants are not adequately protected against pertussis until they have received at least 3 doses of DTaP, it is especially important that all contacts (family members, caregivers) of infants younger than age 12 months are vaccinated with Tdap. If a new mother hasn't been vaccinated with Tdap, she should receive it before hospital discharge, even if she is breastfeeding.

Who should not receive these vaccines?

Generally, any person who has had a serious allergic reaction to a vaccine component or a prior dose of the vaccine should not receive another dose of the same vaccine. People who had a serious allergic reaction to a previous dose of DTaP or Tdap vaccine should not receive another dose.

Certain rare adverse events following pertussis vaccination usually serve as a precaution against receiving further doses. Such events include a temperature of 105°F or higher within two days, collapse or shock-like state within two days, persistent crying for more than three hours within two days, or convulsions within three days. Even if one of these precautions exists, there may be occasions when the benefit of immunization outweighs the risk (for example, during a community-wide outbreak of pertussis). A person who developed one of these adverse events after pediatric DTaP vaccine may receive Tdap as an adolescent or adult.

A person with a recognized, possible, or potential neurologic condition should delay receiving DTaP or Tdap vaccine until the condition is evaluated, treated, and/or stabilized. Although DTaP vaccine does not cause neurological disorders, receiving the vaccine can cause an already-present underlying condition to show itself.

Can the vaccine cause the disease?

No.

Immunization Action Coalition

Technically reviewed by the Centers for Disease Control and Prevention, July 2013.

1) THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent

Haemophilus influenzae invasive disease is caused by the bacterium *Haemophilus influenzae. H. influenzae* may be either encapsulated (typeable) or unencapsulated (nontypeable). The encapsulated strains are further classified into serotypes *a* through *f*, based on the antigenic characteristics of their polysaccharide capsules. *H. influenzae* serotype b (Hib) is the most pathogenic.

B. Description of Illness

- ***General facts:*** Before the introduction of effective vaccines, Hib accounted for 95% of all strains that caused invasive disease and was the most common cause of bacterial meningitis in children in the United States. Invasive Hib disease now occurs primarily in under immunized children and among infants too young to have completed the primary immunization series. The epidemiology of invasive *Haemophilus influenzae* disease in the United States has shifted in the post-Hib vaccination era. Nontypable *Haemophilus influenzae* now causes the majority of invasive disease in all age groups, with the greatest burden of disease among the youngest and oldest age groups.
- ***Occurrence:*** Due to routine use of the Hib conjugate vaccine since 1990, the incidence of Hib disease in infants and young children has decreased by 99% to less than 1 case per 100,000 in children less than 5 years of age. In developing countries, where routine vaccination with Hib vaccine is not widely available, Hib remains a major cause of lower respiratory tract infections in infants and children. From 1999 through 2008, the annual incidence of invasive nontypable *Haemophilus influenzae* disease was 1.7 cases per 100,000 in children younger than 5 years of age and 4 cases per 100,000 in adults ≥65 years of age.
- ***Incubation period:*** Unknown, probably short 2 – 4 days. Most individuals who acquire Hib infections are asymptomatically colonized.
- ***Common symptoms*:** The most common types of invasive disease are pneumonia, occult febrile bacteremia, meningitis, epiglottitis, septic arthritis, cellulitis, otitis media, purulent pericarditis, and other less common infections such as endocarditis and osteomyelitis. Invasive *Haemophilus influenzae* is associated with severe outcomes, especially in older adults; among ≥65 year-olds the overall case fatality ratio (CFR) is estimated to be 19.5% and increases with age, ranging from 10.2% to 27.5%.
- ***Treatment:*** Hib disease is treated with antibiotics for 10 – 14 days. Most cases require hospitalization. Even with antibiotic treatment, about 5% of all children with Hib meningitis die from the disease.

C. Reservoirs

Humans are the only known reservoir.

D. Modes of Transmission

Transmission occurs from person to person by respiratory droplets or direct contact with nasopharyngeal secretions of a carrier or an infected person. It is not highly infectious.

E. Period of Communicability

H. influenzae may be transmitted as long as it is present in throat or nasal discharge,

which may be for a prolonged period. Communicability ends within 24 – 48 hours of effective antibiotic therapy. The contagious potential of invasive *H. influenzae* disease is considered to be limited. However, certain circumstances, particularly close contact with a case (*e.g.,* in a household, daycare center, or institutional setting), can lead to outbreaks of Hib or direct secondary transmission of the disease. Asymptomatic carriage is known to occur.

2) ACTIONS REQUIRED/CONTROL MEASURES

A. Reporting Requirements

Invasive *H. influenzae* infection is physician reportable by mail within 12 hours of recognition or strong suspicion to both the Connecticut Department of Public Health (DPH) and the local health department (LHD). The director of any clinical laboratory must also report laboratory evidence of invasive *H. influenzae* infection to both the DPH and LHD.

Additional requirements: All isolates yielding *H. influenzae* from invasive sterile sites must be submitted to the DPH State Laboratory for confirmation. See current list of Physician Reportable Diseases (Attachment A) and Laboratory Report of Significant Findings (Attachment C).

B. Case Definition

- **Clinical description:** Invasive disease caused by *H. influenzae* may produce any of several clinical syndromes, including meningitis, bacteremia, epiglottitis, or pneumonia.
- **Probable Case:** A meningitis case with detection of *H. influenzae* type b antigen in CSF.
- **Confirmed Case:**
    - Isolation of *H. influenzae* from a normally sterile site (e.g., blood or cerebrospinal fluid, or less commonly, joint, pleural, or pericardial fluid); OR
    - Detection of *H. influenzae* in a specimen obtained from a normally sterile body site using a validated PCR (polymerase chain reaction) assay.

C. Case Investigation

- **DPH Responsibility:** The DPH Epidemiology and Emerging Infections Program obtains additional case data by completing a detailed report through medical chart review. Information is forwarded to the Centers for Disease Control and Prevention.

  The DPH is available to the LHD for assistance, consultation, guidance, and to ensure that appropriate investigative and control actions are being taken.
- **LHD Responsibility:** For invasive Hib disease, contact case to identify close contacts (see Control Measures) and ensure they are provided antibiotic prophylaxis. Provide educational materials describing the nature of disease and preventive measures. No follow-up is required for other serotypes.

D. Control Measures

- **Household contacts:** Chemoprophylaxis is recommended for all household contacts of Hib cases in the following circumstances:
    - Household with at last 1 contact younger than 4 years of age who is unimmunized or incompletely immunized;
    - Household with a child younger than 12 months of age who has not received the primary series;

  - Household with a contact who is an immunocompromised child, regardless of that child's Hib immunization status.

- **Daycare contacts:** Chemoprophylaxis is recommended for nursery school and daycare center contacts when 2 or more cases of Hib invasive disease have occurred within 60 days.
- **Index case:** If the Hib index case is younger than 2 years of age or member of a household with a susceptible contact and treated with a regimen other than cefotaxime or ceftriaxone, chemoprophylaxis usually is provided just before discharge from hospital.

Haemophilus influenzae type B

Fact Sheet

What causes Hib disease?

Hib disease is caused by a bacterium, *Haemophilus influenzae* type b. There are six different types of these bacteria (a through f). Type b organisms account for 95% of all strains that cause invasive disease, and this is the type against which the Hib vaccine protects.

How does Hib disease spread?

Hib disease is spread person-to-person by direct contact or through respiratory droplets. Usually the organisms remain in the nose and throat, but occasionally the bacteria spread to the lungs or bloodstream and cause a serious infection in the individual.

How long does it take to show signs of Hib disease after being exposed?

The incubation period of Hib disease is not certain, but could be as short as a few days.

What are the symptoms of Hib disease?

A person with invasive Hib disease can have different symptoms depending on what body systems are affected. (See next question.)

How serious is Hib disease?

Hib disease can be very serious. The most common type of invasive Hib disease is meningitis, an infection of the membranes covering the brain (50%–65% of cases). Symptoms of Hib meningitis include fever, decreased mental status, and stiff neck. The mortality rate is 2%–5%. In addition, 15%–30% of survivors suffer some permanent neurologic damage, including blindness, deafness, and mental retardation.

Another 17% of invasive Hib cases results in epiglottitis, an infection and swelling in the throat that can lead to life-threatening airway blockage. Other forms of invasive Hib disease include joint infection (8%), skin infection (6%), pneumonia (15%), and bone infection (2%).

Two tragic incidents showing the seriousness of Hib were reported from both Minnesota and Pennsylvania in early 2009. Minnesota reported a total of five cases of invasive Hib disease in children younger than 5 years from 2008, the largest number since 1992. Three of the children had not been vaccinated because of parent/guardian deferral or refusal. One of these children died. In Pennsylvania, seven cases were reported for the six-month period from October 2008–March 2009. Only one child had received any vaccine (1 dose) and 3 of the children died.

How do I know if my child has Hib disease?

The diagnosis of Hib disease is usually made based on one or more laboratory tests using a sample of infected body fluid, such as blood or spinal fluid.

Is there a treatment for Hib disease?

Hib disease is treated with antibiotics. Most people with Hib disease require hospitalization. Even with antibiotic treatment, 3%–6% of all children with Hib meningitis die from the disease.

How common is Hib disease in the United States?

Before the introduction of a Hib vaccine, *H. influenzae* type b (Hib) was the leading cause of bacterial meningitis among children younger than age five years in the United States. Every year about 20,000 children younger than age five years got severe Hib disease and about 1,000 children died. More than half of children who developed severe Hib disease were younger than age 12 months.

From 1996 through 2000, an average of 68 reported cases of Hib disease occurred in children younger than age 5 years each year. By 2008, this number had dropped to just 30 cases and, although some of the 163 cases with unknown serotype could have been due to Hib, the significant decline in incidence (>99%) since the pre-vaccine era is truly remarkable.

Can you get Hib disease more than once?
Yes. A child with Hib disease may not develop protective levels of antibodies. Children younger than age 24 months who have recovered from invasive Hib disease should be considered unprotected and receive the Hib vaccine as soon as possible.

When did Hib vaccine become available?
The first Hib vaccine was licensed in the United States in 1985; however, it was not very effective in children age 18 months and younger. The first improved Hib vaccine, a conjugate vaccine, was licensed in December 1987.

What type of vaccine is it?
The Hib conjugate vaccine is an inactivated vaccine. It is made by chemically bonding a polysaccharide (sugar) to a protein. This long chain of sugar molecules makes up the surface capsule of the bacterium.

How is this vaccine given?
The Hib vaccine is given as an injection into the anterolateral thigh muscle (in infants and toddlers) or in the deltoid muscle of older children.

Is there more than one brand of Hib vaccine?
There are several formulations of Hib vaccine, including several that are combined with other vaccines. The number of doses needed depends on the brand of vaccine given.

All conjugate Hib vaccines may be given interchangeably if the original brand is unknown or unavailable.

Who should get this vaccine?
All infants should receive doses of Hib vaccine as part of their routine immunization (unless they have a medical reason not to) beginning at 2 months of age. The 3 or 4 dose series of Hib vaccine should be completed by 15 months of age. However, unvaccinated children 15 through 59 months of age should receive 1 dose of Hib vaccine. As Hib disease is rare in children older than age five years, Hib vaccine is not routinely recommended for healthy people age five years or older.

Is Hib vaccine recommended for anyone age five years or older?
Older children and adults who are at increased risk for invasive Hib disease should be vaccinated. High-risk children include those with asplenia (such as sickle cell disease, or having the spleen surgically removed) and HIV infection. A previously unvaccinated child with one of these high-risk conditions should be given one dose of any licensed Hib vaccine. Previously unvaccinated adults age 19 years and older with asplenia are at increased risk of Hib disease and should receive 1 dose of Hib vaccine. Recipients of hematopoietic stem cell (bone marrow) transplant of all ages should be revaccinated regardless of their previous Hib vaccination history. Note: People older than age 59 months with immunoglobulin or complement component deficiency and chemotherapy are not addressed in the 2014 CDC recommendations.

How many doses of Hib vaccine are required for the childhood series?
Children who begin their vaccination series in infancy need three to four doses, depending on the brand of Hib vaccine used. Children should get Hib vaccine at age two months, four months, six months (depending on the brand of vaccine), and 12–15 months of age. Hib vaccine should never be given to a child younger than six weeks of age, as this might reduce his/her ability to respond to subsequent doses.

My 18-month-old toddler has never received Hib vaccine. Does she still need to get the series?
All unvaccinated children ages 15 through 59 months should receive one dose of Hib vaccine.

Will receiving the Hib shot protect my baby from ever getting meningitis?
No. Meningitis can also be caused by other viruses and bacteria. Hib vaccine will only protect against meningitis caused by Hib.

Who recommends this vaccine?
The Centers for Disease Control and Prevention (CDC), the American Academy of Pediatrics (AAP), and the American Academy of Family Physicians (AAFP) all recommend this vaccine.

How safe is this vaccine?
Adverse events following receipt of Hib conjugate vaccine are uncommon. The most common reactions are local reactions at the injection site, such as warmth, redness, and swelling, occurring in 5%–30% of recipients. Up to one out of 20 children may develop a fever over 101°F.

How effective is this vaccine?
All the Hib vaccines licensed for use are good at producing immunity to invasive Hib disease. More than 95% of infants will be protected after two or three doses.

Who should NOT receive Hib disease vaccine?
Anyone who has ever had a life-threatening allergic reaction to a previous dose of Hib vaccine or to an ingredient in the vaccine (such as latex, which is present in the vial stopper of some brands of Hib vaccine) should not get another dose.

Children younger than six weeks of age should not get Hib vaccine because a dose given at this time may reduce the infant's response to subsequent doses.

People with a moderate or severe acute illness should postpone receiving the vaccine until their condition has improved.

Can the vaccine cause Hib disease?
No. Only the entire Hib bacterium can cause Hib disease. Hib vaccine is a fractional vaccine, containing only part of the Hib microbe.

Immunization Action Coalition

Technically reviewed by the Centers for Disease Control and Prevention, April 2015.

1) THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent

Hepatitis B virus (HBV) is a DNA virus. There are four major subtypes.

B. Description of Illness

- ***General facts:*** HBV can cause severe illness and chronic infection with potentially serious consequences including cirrhosis, liver failure, and hepatocellular carcinoma. Individuals may be symptomatic or asymptomatic. After acute infection, the risk of developing chronic infection varies with age: 90% of infants infected at birth, 20-50% of children infected at 1-5 years of age, and about 1-10% in older children and adults.
- ***Occurrence:*** It is estimated that 17,000 Connecticut residents are chronically infected. In the United States, it is estimated that 1.25 million individuals are infected with HBV, of whom 20-30% acquired their infection in childhood. HBV is endemic in some countries.
- ***Incubation period:*** Ranges from 60-50 days, with an average of 90 days.
- ***Common symptoms*:** Fatigue, abdominal pain, loss of appetite, nausea, and joint pain. Jaundice or dark urine may also be observed. It is estimated that 30 - 50% of persons have signs or symptoms during initial infection. Signs and symptoms are less common in children than adults.
- ***Treatment:*** No specific therapy for acute HBV infection is available. Medications for treatment of chronic HBV are available. Treatment outcome is highly variable depending on viral strain and patient factors. Patients should be referred to specialized care for evaluation of treatment options.

C. Reservoirs

Humans are the only known reservoir for HBV.

D. Modes of Transmission

- Person-to-person via blood or body fluids (e.g., wound exudates, semen, cervical secretions). Blood and serum contain the highest concentrations of virus. Common modes of transmission include sharing contaminated needles or "works" (equipment or materials used in preparing drugs for injection), sex with an infected person, contact with blood or open sores of infected person, and mother-to-child.
- Occupational exposure to blood has historically been a risk factor, but HBV vaccination has reduced that risk. The virus can exist in the environment for at least 7 days but is inactivated by common disinfectants. Environmental contamination can be a source of infection.
- Hepatitis B is <u>not</u> transmitted through food or water, sharing eating utensils, breastfeeding, hugging, kissing, hand holding, coughing, or sneezing. There is no exclusion of food handlers.

E. Period of Communicability

Hepatitis B surface antigen (HBsAg) is a protein found on the surface of the virus. All HBsAg positive (HBsAg+) persons should be considered infectious. Antigen can be detected in blood from 1 - 9 weeks after infection, with an average of 4 weeks. Acutely

infected persons can transmit HBV many weeks before the onset of symptoms. Infectiousness of chronic carriers can vary, with hepatitis B e antigen positive (HBeAg+) persons being highly infectious.

2) ACTIONS REQUIRED/CONTROL MEASURES

A. Reporting Requirements

Acute HBV infection is physician reportable by mail within 12 hours of recognition or strong suspicion to both the Connecticut Department of Public Health (DPH) and the local health department (LHD). The director of any clinical laboratory must also report laboratory evidence of HBV infection to both the DPH and LHD.

- HBsAg+ and IgM anti-HBc+ are laboratory reportable.
- Acute infection (per the CDC case definition) and HBsAg+ in a pregnant woman is physician reportable.

B. Case Definition

- **Acute Case**
  - Clinical Description: an acute illness with a discrete onset of any sign or symptom* consistent with acute viral hepatitis (e.g., fever, headache, malaise, anorexia, nausea, vomiting, diarrhea, and abdominal pain), and either a) jaundice, or b) elevated serum alanine aminotransferase (ALT) levels >100 IU/L.
  - Laboratory Criteria for Diagnosis
    - HBsAg positive, **AND**
    - Immunoglobulin M (IgM) antibody to hepatitis B core antigen (IgM anti-HBc) positive (if done)

  *A documented negative hepatitis B surface antigen (HBsAg) laboratory test result within 6 months prior to a positive test (either HBsAg, hepatitis B "e" antigen (HBeAg), or hepatitis B virus nucleic acid testing (HBV NAT) including genotype) result does not require an acute clinical presentation to meet the surveillance case definition.

- **Chronic Case**
  - Clinical Description: no symptoms are required. Persons with chronic hepatitis B virus (HBV) infection may have no evidence of liver disease or may have a spectrum of disease ranging from chronic hepatitis to cirrhosis or liver cancer.
  - Laboratory Criteria for Diagnosis
    - Immunoglobulin M (IgM) antibodies to hepatitis B core antigen (IgM anti-HBc) negative AND a positive result on one of the following tests: hepatitis B surface antigen (HBsAg), hepatitis B e antigen (HBeAg), or nucleic acid test for hepatitis B virus DNA (including qualitative, quantitative and genotype testing), **OR**
    - HBsAg positive or nucleic acid test for HBV DNA positive (including qualitative, quantitative and genotype testing) or HBeAg positive two times at least 6 months apart (Any combination of these tests performed 6 months apart is acceptable).
  - **Probable**
    - A person with a single HBsAg positive or HBV DNA positive (including qualitative, quantitative and genotype testing) or HBeAg positive lab result and does not meet the case definition for acute hepatitis B.

- **Confirmed**
  - A person who meets either of the above laboratory criteria for diagnosis.

Comments: multiple laboratory tests indicative of chronic HBV infection may be performed simultaneously on the same patient specimen as part of a "hepatitis panel." Testing performed in this manner may lead to seemingly discordant results, e.g., HBsAg-negative AND HBV DNA-positive. For the purposes of this case definition, any positive result among the three laboratory tests mentioned above is acceptable, regardless of other testing results. Negative HBeAg results and HBV DNA levels below positive cutoff level do not confirm the absence of HBV infection.

C. Case Investigation

- **DPH Responsibility:**
  - DPH maintains a statewide HBV registry of laboratory reports (positive IgM and HBsAg results). The DPH database registers acute cases of HBV. DPH does not monitor changes in patient residence from one local health jurisdiction to another.
  - DPH conducts statewide follow-up on all new HBsAg+ and IgM anti-HBc+ reports with the ordering physician. The purpose of follow-up is to ascertain acute versus chronic case status, reasons for testing, risk factors, and pregnancy status.
  - DPH investigates all cases that meet the acute HBV case definition with the attending physicians to determine if the patients are aware of their diagnoses. DPH will interview all cases to provide education and determine risk factors.
  - DPH conducts statewide follow-up for all pregnant women reported with HBsAg+ and their newborns to assure that perinatal prevention recommendations are followed. To report a case, contact DPH at (860) 509-7900.
- **Local Health Department Responsibility:**
  - Control measures as described below.
  - Staff conducting follow-up should be familiar with CDC HBV recommendations.

D. Control Measures

The DPH immunization Program should be contacted (860-509-7929) for guidance on measures and further action, if necessary. Working in conjunction with DPH, the following HBV control measures are recommended:

- Follow-up activities: LHDs should provide services that include the following:
  - Education: Inform patients about the implications of HBV infection (avoidance of alcohol and the need to discuss medications (even over-the-counter medications) with their physician). LHDs should maintain a list of locally available medical care providers where patients can receive ongoing evaluation, additional testing, and vaccination for contacts.
  - Prevention counseling: Caution about not sharing needles, limiting blood exposure to household contacts, and use of condoms to reduce the risk of sexual transmission. Offer to send a fact sheet (available from DPH). Needle, sex, and/or household contacts may need to be tested for HBV and vaccinated as necessary.

- Additional testing: Persons in risk groups for HIV or HCV should be referred for testing, if not already done.
- Vaccination:
  - Sex partners of persons with HBV should be tested, and if susceptible should be vaccinated against HBV. Household members of persons with chronic HBV should also be tested and vaccinated if applicable.
  - Recommendations for post-exposure use of vaccine/HBIG are provided in MMWR 55 (RR-16), Dec 2006.
  - HAV vaccination is recommended for chronically infected persons who have been diagnosed with chronic liver disease

Fact Sheet

What causes hepatitis B?

Hepatitis B is a liver disease caused by the hepatitis B virus.

How does hepatitis B virus spread?

The virus is found in the blood or certain body fluids and is spread when blood or body fluid from an infected person enters the body of a person who is not infected. This can occur in a variety of ways including:

- Unprotected sexual contact
- Sharing drugs, needles, or "works" when using drugs
- Poor infection control practices in medical settings, particularly with equipment to test blood sugar
- Needle sticks or sharps exposures on the job
- From mother to baby during birth
- Contact with wounds or skin sores
- When an infected person bites another person
- Pre-chewing food for babies
- Sharing personal-care items, such as razors or toothbrushes

Hepatitis B virus particles can be found on objects, even in the absence of visible blood. The virus can remain infectious and capable of spreading infection for at least seven days outside the human body.

Hepatitis B is not spread through food or water, sharing eating utensils, hugging, kissing, coughing, and sneezing or by casual contact, such as in an office or factory setting.

What are the symptoms of hepatitis B?

About 7 out of 10 adults who become infected with hepatitis B develop symptoms. Children under age 5 years rarely have symptoms. When people have symptoms, they usually appear between 60 and 150 days after onset of infection. People who have symptoms generally feel quite ill and might need to be hospitalized.

Symptoms of hepatitis B might include the following:

- Yellowing of skin and whites of eyes
- Dark-colored urine
- Loss of appetite or nausea
- Bloated and tender belly
- Extreme tiredness
- Fever
- Pain in joints

Do people fully recover?

Most people who get infected as adults will fully recover. However, about 2 of 100 adults, 30 of 100 children age 1–5 years, and up to 90 of 100 infants will remain infectious and carry hepatitis B virus in their bodies for life. This is called chronic (life-long) infection. People with chronic

hepatitis B virus infection should not be excluded from work, school, play, childcare, or other settings.

The majority of people with chronic hepatitis B infection feel healthy and do not develop serious problems related to the infection; however, about 25% will develop cirrhosis (scarring of the liver), liver failure, and liver cancer later in life.

How serious is infection with hepatitis B?
Hepatitis B can be very serious. Infection with this virus can cause chronic infection that can lead to cirrhosis and liver cancer. Many people in the United States die every year from hepatitis B-related liver disease. Fortunately, there is a vaccine to prevent acute (recently acquired) hepatitis B.

How common is hepatitis B in the United States?
About 3,000 to 4,000 cases of acute hepatitis B are reported annually to the Centers for Disease Control and Prevention; however, the number of new infections is estimated to be much higher.

Since the introduction of routine vaccination against hepatitis B virus infection, there has been a significant decline in U.S. cases among children and adolescents, the group with the largest increase in hepatitis B vaccination coverage.

However, chronic hepatitis B virus infection remains a major problem. An estimated 800,000 to 1.4 million people are chronically infected with hepatitis B in the United States. Many people chronically infected with hepatitis B virus do not know they are infected. Most cases of chronic hepatitis B virus infection in the United States are found in immigrants or refugees from Asia, Africa, the Pacific Islands, and Eastern Europe. Worldwide, more than 350 million people are chronically infected with hepatitis B virus and more than 1 million of these people die each year from cirrhosis leading to liver failure or liver cancer.

How do people know if they have hepatitis B infection?
Only blood tests can tell whether or not a person is currently infected and whether or not a person has been infected in the past. If the blood tests indicate a person has been infected in the past, testing will also determine whether the person has developed protective antibodies to the virus or whether they still have virus in their blood and could have chronic hepatitis B virus infection.

Who should be tested?
People who are recommended to have screening blood tests to determine if they are infected with hepatitis B virus are:

- All pregnant women
- People born in regions of the world with medium to high rates of hepatitis B (see a map of these countries at http://wwwnc.cdc.gov/travel/yellowbook/2016/infectious-diseases-related-to-travel/hepatitis-b)
- U.S.-born people not vaccinated as infants whose parents were born in these same regions
- Infants born to HBV-infected mothers
- Household, needle-sharing, or sex contacts of HBV-infected people
- Men who have sex with men
- Injection drug users
- Patients with elevated liver enzymes of an unknown cause
- Hemodialysis patients
- People needing immunosuppressive therapy or chemotherapy

- People infected with HIV
- Donors of blood, plasma, organs, tissues, or semen

Is there a medication to treat hepatitis B?
There are several FDA-approved medications that might help a person who has chronic hepatitis B virus infection. These medications don't usually get rid of the virus, but they might decrease the chance of the infected person developing severe liver disease. Not every infected person is a candidate for these medications. Researchers continue to seek additional treatments for hepatitis B. There is no treatment (other than supportive care) for people with acute hepatitis B.

What should you do if you have been exposed to hepatitis B virus?
If you think you've been exposed to the virus, contact your doctor or clinic without delay. If you have not been vaccinated, it is recommended that you receive treatment with hepatitis B immune globulin, often called HBIG, a blood product containing protective hepatitis B virus antibodies. You should also get the first dose of hepatitis B vaccine as soon as possible, preferably at the same time as the HBIG is given. Following this, you will need to complete the full hepatitis B vaccine series.

Can you get hepatitis B more than once?
No.

When did hepatitis B vaccine become available?
The first hepatitis B vaccine became commercially available in the United States in 1982. In 1986, a hepatitis B vaccine produced by recombinant DNA technology was licensed, and a second recombinant-type hepatitis B vaccine was licensed in 1989. The two recombinant DNA vaccines (Recombivax HB and Engerix-B) are the only hepatitis B vaccine preparations currently used in the United States. (There are additional products licensed in the United States that contain these vaccines in combination with other vaccines.)

Who should get this vaccine?
Hepatitis B vaccine, usually a three-dose series, is recommended for all children 0 through 18 years of age. It is recommended for infants beginning at birth in the hospital. All older children who did not get all the recommended doses of hepatitis B vaccine as an infant should complete their vaccine series as soon as possible. Most states require hepatitis B vaccine for school entry. Adolescents who are just starting their series will need two or three doses, depending on their age and the brand of vaccine used. Adults at increased risk of acquiring hepatitis B infection should also be vaccinated. In addition, the vaccine can be given to any person who desires protection from hepatitis B.

Who is at increased risk of hepatitis B infection?
Any adult who wishes to be protected from hepatitis B infection should be vaccinated (without having to acknowledge a specific risk factor or reason).Those who are at increased risk of infection include:

- Healthcare workers and public safety workers with reasonably anticipated risk for exposure to blood or blood-contaminated body fluids
- People with diabetes
- Men who have sex with men
- People with HIV infection
- Sexually active people who are not in long-term, mutually monogamous relationships
- People seeking evaluation or treatment for a sexually transmitted disease

- Current or recent injection drug users
- Inmates of long-term correctional facilities
- People with end-stage kidney disease, including pre-dialysis, hemodialysis, peritoneal dialysis, and home dialysis patients
- People with chronic liver disease
- Staff and residents of institutions or group homes for the developmentally challenged
- Household members and sex partners of people with chronic hepatitis B virus infection
- Susceptible (non-infected and non-vaccinated) people from United States populations known to previously or currently have high rates of childhood hepatitis B infection, including Alaska Natives, Pacific Islanders, and immigrants or refugees from countries with intermediate or high rates of chronic hepatitis B virus infection; (see a map of these countries at http://wwwnc.cdc.gov/travel/yellowbook/2016/infectious-diseases-related-to-travel/hepatitis-b)
- Travelers to regions with high or intermediate rates of hepatitis B virus infection; (see a map of these countries at http://wwwnc.cdc.gov/travel/yellowbook/2016/infectious-diseases-related-to-travel/hepatitis-b).

Who recommends this vaccine?
The Centers for Disease Control and Prevention (CDC), the American Academy of Pediatrics (AAP), the American Academy of Family Physicians (AAFP), the American College of Physicians (ACP), and American College of Obstetricians and Gynecologists (ACOG) recommend this vaccine.

Is hepatitis B vaccine safe?
Yes. Hepatitis B vaccines have been demonstrated to be safe when administered to infants, children, adolescents, and adults. Since 1982, more than an estimated 70 million adolescents and adults and more than 50 million infants and children have received at least one dose of hepatitis B vaccine in the United States. The majority of children who receive this vaccine have no side effects. Serious reactions are rare.

What side effects have been reported with this vaccine?
Of those children experiencing a side effect, most will have only a very mild reaction, such as soreness at the injection site (fewer than one out of three children) or low-grade fever. Adults are slightly more likely to experience such mild symptoms. Serious allergic reactions following hepatitis B vaccination are rare.

How effective is this vaccine?
After three properly administered doses of vaccine, at least 9 of 10 healthy young adults and more than 9 of 10 infants, children, and adolescents develop protective antibodies and subsequent immunity to hepatitis B virus infection.

Why is this vaccine recommended for all babies when most of them won't be exposed to hepatitis B virus for many years, if then?
There are four reasons for recommending that all infants receive hepatitis B vaccine, starting at birth. First, people have a very high risk for developing chronic hepatitis B virus infection if they become infected at birth or during childhood, with an increased risk of dying prematurely from liver cancer or cirrhosis.

Second, hepatitis B infection in infants and young children usually produces no symptoms, so these individuals can spread the infection to others without knowing it.

Third, most early childhood spread of hepatitis B occurs in households where a person has chronic hepatitis B virus infection, but the spread of the virus has also been recognized in daycare centers and schools.

Fourth, long-term protection following infant vaccination is expected to last for decades and will ultimately protect against acquiring infection at any age.

Should I be tested before I get the vaccine to see if I'm already infected or immune?
Blood testing before vaccination is not recommended for the routine vaccination of infants, children, and adolescents. However, children born in countries where hepatitis B is moderate or highly endemic (see a map of these countries at http://wwwnc.cdc.gov/travel/yellowbook/2016/infectious-diseases-related-to-travel/hepatitis-b) should be tested to be sure they are not already infected. Testing can be done at the same visit when the first dose of hepatitis B vaccine is given. Vaccinating a person already immune to or infected with this virus will not help or harm the person. The main reason for testing people at increased risk for hepatitis B is to determine if they are infected in order to refer them for medical care.

Should I get my blood tested after getting the vaccine series to make sure it worked?
Testing after vaccination is not recommended routinely. Testing after vaccination is recommended only for people whose medical care depends on knowledge of their response to the vaccine. This includes infants born to hepatitis B-infected mothers; health care and public safety workers at reasonable risk of exposure to blood on the job; immunocompromised people (e.g., people with AIDS or on hemodialysis); and sex and needle-sharing partners of people with chronic hepatitis B virus infection.

Who should NOT receive hepatitis B vaccine?
People who had a serious allergic reaction to one dose of hepatitis B vaccine should not have another dose of hepatitis B vaccine. People with a history of hypersensitivity to yeast should not receive this vaccine. People with a moderate or severe acute illness should postpone receiving the vaccine until their condition is improved.

Can I get this vaccine when I am pregnant?
Yes.

I'm an adult who wants hepatitis B vaccination. How can I pay for the shots?
If you have insurance, the cost of hepatitis B vaccination might be covered. If not, these shots are often available at low cost through special programs or from health departments. Call your local health department for details.

Will hepatitis B vaccination protect me from hepatitis A or hepatitis C?
No. Hepatitis A and hepatitis C are different diseases caused by different viruses. There is a vaccine to prevent hepatitis A, but there is no vaccine for hepatitis C.

Immunization Action Coalition

Technically reviewed by the Centers for Disease Control and Prevention, August 2013.

1) THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent

Three types of influenza virus are recognized: A, B, and C. Type A includes three subtypes (H1N1, H2N2, and H3N2) that have been associated with widespread epidemics and pandemics; type B has been infrequently associated with regional and widespread epidemics; type C has been associated with sporadic cases and minor localized outbreaks.

B. Description of Illness

- ***General facts:*** Influenza derives its importance from the rapidity with which epidemics evolve, the widespread morbidity, and the seriousness of complications, notably viral and bacterial pneumonias. During major epidemics, severe illness and death occur, primarily among the elderly and those debilitated by chronic cardiac, pulmonary, renal or metabolic disease, anemia or immunosuppression.
- ***Occurrence:*** Influenza occurs as pandemics, epidemics, localized outbreaks, and as sporadic cases. Epidemics of influenza occur in the United States almost every year (seasonal influenza); they may be caused by type A viruses, occasionally by influenza B viruses or by both.
- ***Incubation period:*** The typical incubation period ranges from 1 – 4 days (average 2 days) although some strains may have longer incubation periods.
- ***Common symptoms*:** An acute viral disease of the respiratory tract characterized by abrupt onset of fever, headache, myalgia, prostration, coryza, sore throat and cough. Cough is often severe and protracted, but other manifestations are usually self-limited, with recovery in 2 – 7 days. Additional symptoms may include runny nose, headache, a burning sensation in the chest, and eye pain and sensitivity to light. Someone who has been previously exposed to similar virus strains (through natural infection or immunization) is less likely to develop serious clinical illness.
- ***Treatment:*** There are several antiviral agents approved for preventing or treating influenza in some patients. Their use is generally limited to situations where an outbreak is underway and immediate protection of vulnerable, unvaccinated persons is critical (e.g., nursing home residents) or in persons who are expected to have an inadequate antibody response to the vaccine (e.g., persons with HIV) or who could not otherwise be vaccinated (e.g., persons with severe egg allergies).

C. Reservoirs

Humans are the primary reservoir for human infections; however, reservoirs such as swine and birds are likely sources of new human subtypes thought to emerge through genetic reassortment.

D. Modes of Transmission

Airborne transmission predominates among crowded populations in enclosed spaces; transmission may also occur by direct contact, since the influenza virus may persist for hours, particularly in cold and in low humidity.

E. Period of Communicability

The period of communicability ranges 1 – 2 days before the onset of symptoms to 4 – 5 days after onset. Children may be able to transmit the virus for 7 days or longer following onset of symptoms.

2) ACTIONS REQUIRED/CONTROL MEASURES

A. Reporting Requirements

Influenza-associated deaths and hospitalizations are physician reportable by mail to both the Connecticut Department of Public Health (DPH) and the local health department (LHD). The director of any clinical laboratory must also report laboratory evidence of influenza infection in all persons to both the DPH and LHD. See current lists of physician Reportable Diseases (Attachment A) and Laboratory Reportable Significant Findings (Attachment C).

B. Case Definition

Influenza-associated mortality

- Clinical Description: an influenza-associated death is defined for surveillance purposes as a death resulting from a clinically compatible illness that was confirmed to be influenza by an appropriate laboratory or rapid diagnostic test. There should be no period of complete recovery between the illness and death. Influenza-associated deaths in all persons should be reported.

  A death should not be reported if:

  1. There is no laboratory confirmation of influenza virus infection.
  2. The influenza illness is followed by full recovery to baseline health status prior to death.

- Laboratory Criteria for Diagnosis

  Laboratory testing for influenza virus infection may be done on pre- or post-mortem clinical specimens, and include identification of influenza A or B virus infections by a positive result by at least one of the following:

  - Influenza virus isolation in tissue cell culture from respiratory specimens;
  - Reverse-transcriptase polymerase chain reaction (RT-PCR) testing of respiratory specimens;
  - Immunofluorescent antibody staining (direct or indirect) of respiratory specimens;
  - Rapid influenza diagnostic testing of respiratory specimens;
  - Immunohistochemical (IHC) staining for influenza viral antigens in respiratory tract tissue from autopsy specimens;
  - Four-fold rise in influenza hemagglutination inhibition (HI) antibody titer in paired acute and convalescent sera*.

- **Confirmed Case**

  - A death meeting the clinical definition that is laboratory confirmed.
  - Laboratory or rapid diagnostic test confirmation is required as part of the case definition; therefore, all reported deaths will be classified as confirmed.

  *Serologic testing for influenza is available in a limited number of laboratories, and should only be considered as evidence of recent infection if a four-fold rise in influenza (HI) antibody titer is demonstrated in paired sera. Single serum samples are not interpretable.

Influenza-Associated Hospitalizations

- Clinical Criteria
  - Hospital admission date 14 days or less after a positive influenza test, **OR**
  - Hospital admission date 3 days or less before a positive influenza test
- Laboratory Criteria for Diagnosis

  Evidence of a positive influenza test by at least one of the following methods:
  - Positive viral culture for influenza
  - Positive immunofluorescence antibody staining (Direct [DFA] or indirect [IFA]) for influenza
  - Reverse transcriptase polymerase chain reaction (RT-PCR) positive for influenza
  - Serologic testing positive for influenza
  - A positive, unspecified influenza test noted in the medical chart (e.g., a written note in the admission H&P or discharge summary)
  - A positive commercially available rapid diagnostic test for influenza
- **Confirmed**
  - A case that meets the clinical and laboratory evidence criteria.

C. Case Investigation

- **DPH Responsibility:** The DPH Epidemiology and Emerging Infections Program collects epidemiological, clinical, and laboratory information on all influenza-associated deaths.
- **LHD Responsibility:** The LHD is involved with case investigations and control measures under DPH guidance as necessary.

D. Control Measures

The DPH Epidemiology Program (860-509-7995) or Immunization Program (860-509-7929) should be contacted for guidance on control measures and further action, if necessary.

Fact Sheet

What causes influenza?

Viruses cause influenza. There are two basic types, A and B, which can cause clinical illness in humans. Their genetic material differentiates them. Influenza A can cause moderate to severe illness in all age groups and infects humans and other animals. Influenza B causes milder disease and affects only humans, primarily children.

Subtypes of the type A influenza virus are identified by two antigens (proteins involved in the immune reaction) on the surface of the virus. These antigens can change, or mutate, over time. An antigen "shift" (major change) creates a new influenza virus and an epidemic is likely among the unprotected population. This happened when the novel H1N1 influenza virus appeared in March 2009 and led to a major pandemic, lasting until the summer of 2010.

How does influenza spread?

Influenza is transmitted through the air from the respiratory tract of an infected person. It can also be transmitted by direct contact with respiratory droplets.

How long does it take to develop symptoms of influenza after being exposed?

The incubation period of influenza is usually two days but can range from one to four days.

What are the symptoms of influenza?

Typical influenza disease is characterized by abrupt onset of fever, aching muscles, sore throat, and non-productive cough. Additional symptoms may include runny nose, headache, a burning sensation in the chest, and eye pain and sensitivity to light. Typical influenza disease does not occur in every infected person. Someone who has been previously exposed to similar virus strains (through natural infection or vaccination) is less likely to develop serious clinical illness.

How serious is influenza?

Although many people think of influenza as just a common cold, it is really a specific and serious respiratory infection that can result in hospitalization and death. In the United States, the number of influenza-associated deaths has increased since 1990. This increase is due in part to the substantial increase in the number of people age 65 years or older who are at increased risk for death from influenza complications. The Centers for Disease Control and Prevention (CDC) estimates that from the 1976–77 influenza season to the 2006–07 season, influenza-associated deaths ranged from a low of about 3,000 to a high of about 49,000 each year. It is estimated that approximately 43–89 million people became ill with 2009 pandemic H1N1 in the U.S. from April 2009 to April 2010.

Influenza disease can occur among people of all ages; however, the risks for complications, hospitalizations, and deaths are higher among people age 65 years or older, young children, and people of any age who have certain medical conditions. Pregnancy also increases the risk for serious medical complications from influenza.

During an outbreak in a long-term-care facility, up to 60% of residents may become infected, with up to a 30% fatality rate in the infected people. Risk for influenza-associated death is highest among the oldest of the elderly: people age 85 years and older are 16 times more likely to die from an influenza-associated illness than people age 65–69 years.

Hospitalization from influenza-related complications is also high among children age 24 months and younger—comparable to rates for people age 65 and older. There were 107 laboratory-confirmed influenza-related pediatric deaths reported during the 2013-2014 influenza season. During the H1N1 pandemic (April 2009 through September 2010), 348 influenza-related deaths in children were reported.

What are possible complications from influenza?
The most frequent complication of influenza is bacterial pneumonia. Viral pneumonia is a less common complication but has a high fatality rate. Other complications include inflammation of the heart and worsening of pulmonary diseases (e.g., bronchitis).

Reye's syndrome is a complication that occurs almost exclusively in children—patients suffer from severe vomiting and confusion, which may progress to coma because of swelling of the brain. To decrease the chance of developing Reye's syndrome, infants, children, and teenagers should not be given aspirin for fever reduction or pain relief.

What is the best way to prevent influenza?
The best way to prevent influenza is with annual vaccination.

Is there an alternative to vaccination in preventing influenza?
Vaccination is the principal means of preventing influenza and its complications. Here are some additional steps that may help prevent the spread of respiratory illnesses like influenza:

1. Cover your nose and mouth with your sleeve or a tissue when you cough or sneeze—throw the tissue away after you use it.
2. Wash your hands often with soap and water, especially after you cough or sneeze. If you are not near water, use an alcohol-based hand cleaner.
3. Stay away as much as you can from people who are sick.
4. If you get influenza, stay home from work or school for at least 24 hours after the fever has ended. If you are sick, don't go near other people to avoid infecting them.
5. Try not to touch your eyes, nose, or mouth. Germs often spread this way.

Are any drugs available to prevent or treat influenza?
There are four antiviral agents approved for preventing or treating influenza in selected patients. Only two, oseltamivir and zanamivir, will offer protection against both A and B viruses; the other two, amantadine and rimantadine, protect only against the A viruses. Their use is generally limited to situations where an outbreak is underway and immediate protection of vulnerable, unvaccinated people is critical (e.g., nursing home residents) or in people who are expected to have an inadequate antibody response to the vaccine (e.g., people with cancer or being treated for cancer) or who could not otherwise be vaccinated (e.g., people with severe egg allergies). Antiviral agents are not a substitute for vaccination. Recent evidence indicates that a high proportion of currently circulating influenza A viruses in the United States have developed resistance to amantadine and rimantadine and researchers are watching for additional antiviral resistance to any of these four agents that might develop in the future.

If I contract influenza, what should I do?
Call your healthcare provider to discuss your particular situation. You will need to get plenty of rest and drink a lot of liquids. You can take medications to relieve the symptoms of influenza (but never give aspirin to children or teenagers who have influenza-like symptoms, particularly fever). If you are at high risk of developing complications from influenza, you should consult your healthcare provider immediately if you develop influenza-like symptoms. For purposes of treatment and prevention, antiviral medicines are prioritized for people at high risk for influenza-related complications, such as people 65 years or older, people with chronic medical conditions, pregnant women, and young children.

When is a person with influenza contagious?
A person is most likely to pass on the virus during the period beginning one to two days before the onset of symptoms and ending four to five days after the onset.

Can you get influenza more than once?
Yes. Influenza viruses change frequently and infection with one strain does not provide protection against all strains.

When did influenza vaccine first become available?
The first influenza vaccine in the United States became available in 1945.

What kind of vaccine is it?
The most common influenza vaccine is made from inactivated (killed) viruses. A vaccine containing live viruses that have been weakened (attenuated) is also available. Most influenza vaccine contains 3 strains of influenza virus. For the 2015–2016 influenza season some vaccine will contain 4 strains of influenza virus.

How are the vaccines made?
Every year, researchers and manufacturers develop a vaccine that contains virus strains they believe will be circulating in the upcoming influenza season. Influenza vaccine typically contains both type A and type B viruses.

For the inactivated (injectable) vaccine, the viruses are inactivated (killed), purified, and packaged in vials or syringes. Live virus vaccine is packaged in a special nasal sprayer. About six months are required to produce influenza vaccine each year.

How is the vaccine given?
The inactivated vaccine is generally given as an intramuscular injection; one inactivated vaccine can be given as an intradermal injection with a micro needle into the skin of the arm for persons ages 18 through 64 years. The live attenuated vaccine is sprayed into the nose.

Is the vaccine that contains 4 viruses preferred over the vaccine that contains 3 viruses?
Vaccines that contain four strains of influenza virus may eventually replace 3-virus vaccines. CDC and other groups do not have a preference for use of the 4-virus vaccine over the 3-virus vaccine.

Who should get influenza vaccine?
Annual influenza vaccination is recommended for all people ages 6 months and older who do not have a contraindication to the vaccine.

What are the unique features of giving influenza vaccine to children compared with adults?
Children ages 6 months through 8 years should receive two doses of influenza vaccine the first time they receive this vaccine, separated by at least 4 weeks. Some other children 6 months through 8 years who have previously received influenza vaccine may also be recommended to receive two doses for the coming season. Your doctor or other healthcare professional should be able to tell you if your child needs a second dose.

Beginning in influenza season 2014–2015 the nasal spray influenza vaccine (LAIV) is preferred for healthy children ages 2 through 8 years who do not have a contraindication or precaution to LAIV, a history of egg allergy, or have taken influenza antiviral medication within the previous 48 hours. This preference is because studies have shown LAIV to be more effective than inactivated influenza vaccine in preventing influenza in this age group. However, both LAIV and IIV are safe and effective in this age group. If LAIV is not immediately available, the inactivated vaccine should be used.

Who recommends the influenza vaccine?
The Centers for Disease Control and Prevention (CDC), the American Academy of Pediatrics (AAP), the American Academy of Family Physicians (AAFP), the American College of Physicians (ACP), and the American College of Obstetricians and Gynecologists (ACOG) all recommend this vaccine.

How often should this vaccine be given?

Influenza vaccine is given each year because immunity decreases after a year and because each year's vaccine is formulated to prevent only that year's anticipated influenza viruses. An annual vaccination is recommended even if the strains included in the vaccine are not changed from one year to the next (as is the case for the 2014–2015 vaccine).

When should people be vaccinated?

Health experts recommend that patients should be vaccinated as soon as vaccine is available in their clinic, which can be as early as August or September. Vaccination should continue into the winter and spring, even until April or May. Travelers should be aware that the influenza season typically occurs from April to September in the Southern Hemisphere and throughout the year in the tropics. If they missed vaccination in the previous season, they should still be vaccinated before they travel, even if it's in the following spring or summer.

Are there recommendations for the prevention of influenza outbreaks in institutions?

The most important factor in preventing outbreaks is annual vaccination of all occupants of the facility and all people working or volunteering in the facility who share the same air as the high-risk occupants. Groups that should be targeted include physicians, nurses, and all other personnel in hospitals, long-term care facilities, other care facilities, and outpatient settings who have contact with high-risk patients in all age groups.

Should siblings of a person with a chronic illness receive influenza vaccine even though the chronically ill person has been vaccinated?

Yes. Vaccination is recommended for all people ages 6 months and older. This includes all household contacts of people with "high-risk" conditions. Either inactivated or live virus vaccine may be used; it is preferred that the inactivated vaccine be used for household contacts and caregivers of people with severe immunosuppression that must be in protective isolation.

Should siblings of a healthy child who is younger than age 6 months be vaccinated?

Yes, it is especially important that all household contacts of children too young to be vaccinated against influenza (i.e., younger than age 6 months) receive annual influenza vaccination to protect the infant from serious infection. This is very important because these infants are too young to be vaccinated and are most vulnerable to complications from influenza.

Why is a higher dose influenza vaccine (Fluzone High-Dose) available for adults 65 and older?

Aging decreases the body's ability to develop a good immune response after getting influenza vaccine, which places older people at greater risk of severe illness from influenza. A higher dose of antigen in the vaccine gives older people a better immune response and provides better protection against influenza. Data from clinical trials comparing regular Fluzone to Fluzone High-Dose among people age 65 and older indicate that higher antibody levels occur after vaccination with Fluzone High-Dose. Compared to standard Fluzone the high dose formulation reduced laboratory-confirmed influenza by about 24% and reduced the risk of pneumonia and hospitalization.

CDC has stated no preference for using high-dose influenza vaccine or standard-dose influenza vaccine when vaccinating people age 65 and older. CDC stresses that vaccination is the first and most important step in protecting against influenza. But it is reasonable for a person age 65 years or older to receive Fluzone High Dose if it is readily available. However, influenza vaccination should not be deferred if the high dose formulation is not immediately available. Standard dose vaccine should be given.

If a patient is undergoing treatment for cancer, is it safe to vaccinate her or him against influenza?

People with cancer need to be protected from influenza. Cancer patients and survivors are at higher risk for complications from influenza, including hospitalization and death. They can and should receive injectable (inactivated) influenza vaccine (not the nasal spray vaccine) even if they are being treated for cancer. Here is a helpful CDC web page on cancer and influenza for patients: http://www.cdc.gov/cancer/flu.

Is it safe for pregnant women to get influenza vaccine?

Yes. In fact, vaccination with the inactivated vaccine is recommended for women who will be pregnant during the influenza season. Pregnant women are at increased risk for serious medical complications from influenza. One recent study found that the risk of influenza-related hospitalization was four times higher in healthy pregnant women in the fourteenth week of pregnancy or later than in non-pregnant women. An increased risk of severe influenza infections was also observed in postpartum women (those who delivered within the previous 2 weeks) during the 2009–2010 H1N1 pandemic. In addition, vaccination of the mother will provide some protection for her newborn infant. The live intranasal vaccine is not licensed for use in pregnant women. However, pregnant women do not need to avoid contact with people recently vaccinated with this vaccine.

Vaccination is especially important for all people who are contacts of infants or children from birth through age 59 months because infants and young children are at higher risk for influenza complications and are more likely to require medical care or hospitalization if infected. Women who are breastfeeding may receive either type of influenza vaccine unless the vaccine is not appropriate because of other medical conditions.

How safe is this vaccine?

Influenza vaccine is very safe. The most common side effects of the injectable (inactivated) influenza vaccine include soreness, redness, or swelling at the site of the injection. These reactions are temporary and occur in 15%–20% of recipients. Less than 1% of vaccine recipients develop symptoms such as fever, chills, and muscle aches for 1 to 2 days following the vaccination. Experiencing these non-specific side effects does not mean that you are getting influenza.

Healthy children ages 2 through 4 years who received the live attenuated virus (nasal spray) vaccine during clinical trials appeared to have an increased chance of wheezing. Consequently, children with a history of recurrent wheezing or have had a wheezing episode within the past 12 months are not recommended to receive the live nasal spray vaccine; instead, they should be given the inactivated (injectable) vaccine. Healthy adults receiving the live influenza vaccine reported symptoms such as cough, runny nose, sore throat, chills, and tiredness at a rate 3%–18% higher than for placebo recipients.

Serious adverse reactions to either vaccine are very rare. Such reactions are most likely the result of an allergy to a vaccine component, such as the egg protein left in the vaccine after growing the virus. In 1976, the swine flu (injectable) vaccine was associated with a severe illness called Guillain-Barré syndrome (GBS), a nerve condition that can result in temporary paralysis. Injectable influenza vaccines since then have not been clearly linked with GBS, because the disease is so rare it is difficult to obtain a precise estimate of any increase in risk. However, as a precaution, any person without a high risk medical condition who previously experienced GBS within 6 weeks of an influenza vaccination should generally not be vaccinated. Instead, their physician may consider using antiviral drugs during the time of potential exposure to influenza.

What can you tell me about the preservative thimerosal that is in some injectable influenza vaccines and the claim that it might be associated with the development of autism?

Thimerosal is a very effective preservative that has been used to prevent bacterial contamination in vaccines for more than 50 years. It is comprised of a type of mercury known as ethylmercury. It is different from methylmercury, which is the form that is in fish and seafood. At very high levels, methylmercury can be toxic to people, especially to the neurological development of infants.

In recent years, several large scientific studies have determined that thimerosal in vaccines does not lead to serious neurologic problems, including autism. However, because we generally try to reduce people's exposure to mercury if at all possible, the vaccine manufacturers have voluntarily changed their production methods to produce vaccines that are now free of thimerosal or have only trace amounts. They have done this because it is possible to do, not because there was any evidence that the thimerosal was harmful.

How effective is influenza vaccine?

Protection from influenza vaccine varies by the similarity of the vaccine strain(s) to the circulating strains, and the age and health of the recipient. Healthy people younger than age 65 years are more likely to have protection from their influenza vaccination than are older, frail individuals. It is important to understand that although the vaccine is not as effective in preventing influenza disease among the elderly, it is effective in preventing complications and death. In general, the immunity following influenza vaccination rarely lasts longer than a year.

When the "match" between vaccine and circulating strains is close, the injectable (inactivated) vaccine prevents influenza in about 50%–70% of healthy people younger than age 65 years. Among elderly nursing home residents, the shot is most effective in preventing severe illness, secondary complications, and deaths related to influenza. In one large study among children ages 15–85 months, the live, attenuated (nasal-spray) influenza vaccine reduced the chance of influenza illness by 92% compared with the placebo.

Can the vaccine cause influenza?

No. Neither the injectable (inactivated) vaccine nor the live attenuated (nasal spray) vaccine can cause influenza. The injectable influenza vaccine contains only killed viruses and cannot cause influenza disease. Fewer than 1% of people who are vaccinated develop influenza-like symptoms, such as mild fever and muscle aches, after vaccination. These side effects are not the same as having the actual disease. The nasal spray influenza vaccine contains live attenuated (weakened) viruses that can produce mild symptoms similar to a cold. While the viruses are able to grow in the nose and throat tissue and produce protective immunity, they are weakened and do not grow effectively in the lung. Consequently, they cannot produce influenza disease.

Protective immunity develops 1 to 2 weeks after vaccination. It is always possible that a recently vaccinated person can be exposed to influenza disease before their antibodies are formed and consequently develop disease. This can result in someone erroneously believing they developed the disease from the vaccination.

Also, to many people "the flu" is any illness with fever and cold symptoms. If they get any viral illness, they may blame it on the influenza vaccination or think they got "the flu" despite being vaccinated. Influenza vaccine only protects against certain influenza viruses, not all viruses.

Who should NOT receive influenza vaccine?

In general, the inactivated (injectable) influenza vaccine can be given to most everyone except children younger than age 6 months, people with a history of a severe allergic reaction to eggs, or to a previous dose of influenza vaccine (see next question). The live, attenuated (nasal spray) influenza vaccine is licensed for use only in healthy, non-pregnant individuals ages 2 through 49 years.

The following people should not be vaccinated with the live, attenuated virus (nasal spray) influenza vaccine; however, most (except infants younger than 6 months) can be vaccinated with the injectable vaccine:

- People younger than age 2 years
- People age 50 years or older
- Immunosuppressed persons
- Children ages 2 through 4 years with a history of recurrent wheezing or who have had a wheezing episode in the last 12 months
- Children 2 through 17 years who are receiving aspirin or aspirin-containing products
- Pregnant women (adolescents or adults)
- People with a history of egg allergy
- People with severe allergic reaction following a previous dose of nasal spray vaccine
- People who have taken influenza antiviral medication within the previous 48 hours

Healthcare workers, household members, and others who have close contact with severely immunocompromised individuals during the periods in which the immunosuppressed person requires care in protective isolation should preferably receive the injectable vaccine over the live (nasal spray) vaccine.

In addition, the following conditions are considered precautions to LAIV:

- Moderate or severe acute illness
- Chronic pulmonary conditions
- Asthma is someone 5 years old or older
- Cardiovascular (except isolated hypertension) conditions
- Renal conditions
- Hepatic conditions
- Neurologic conditions
- Hematologic conditions
- Metabolic conditions (including diabetes mellitus)

As a general rule people with a precaution should not receive LAIV, but there may be situations when the clinician may decide to administer it.

People with a history of Guillain-Barré syndrome should also consult with their physician before receiving this vaccine, so that the potential risks and benefits of influenza immunization can be weighed. People who are moderately or severely ill at the time of their influenza vaccination appointment should usually wait until their symptoms are improved before getting the vaccine.

Some people believe they are allergic to thimerosal, the preservative used in some brands of influenza vaccine supplied in multi-dose vials, because in the past they developed eye irritation after using eye drops containing thimerosal. Past eye irritation is not a valid reason to avoid getting influenza vaccine. Only serious, life-threatening allergies to thimerosal are reasons not to be vaccinated with an influenza vaccine containing thimerosal.

Some brands of influenza vaccine are packaged in vials or syringes that contain natural rubber or latex. People with a severe allergy to latex generally should not receive vaccine packaged in these vials or syringes.

I heard there was a new influenza vaccine that can be given to people with severe egg allergy. Is that true?

In January 2013 the U.S. Food and Drug Administration (FDA) licensed Flublok, the first influenza vaccine available in the United States that is completely egg-free. Unlike current production methods for other influenza vaccines, production of Flublok does not use the whole influenza virus or chicken eggs in its manufacturing process. It is licensed for persons 18 through 49 years of age.

If the severe allergy to eggs is diagnosed as anaphylactic allergy, and the person is age 18 through 49 years, then the provider can consider using Flublok. Flublok is not currently licensed for children younger than 18 years or persons older than 49 years. If Flublok is not available, or the person is younger than 18 years or older than 49 years, inactivated influenza vaccine should be administered by a physician with experience in the recognition and management of severe allergic conditions.

Immunization Action Coalition

Technical content reviewed by the Centers for Disease Control and Prevention, October 2014.

1) THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent

Measles virus is an RNA virus, classified as a member of the genus *Morbillivirus* in the Paramyxovirus family.

B. Description of Illness

- ***General facts:*** Measles is a vaccine-preventable disease. The current measles vaccine is incorporated with mumps and rubella vaccine as a combined vaccine called MMR. It is a live attenuated virus vaccine that confers lifelong immunity and is given in 2 doses separated by at least 4 weeks.
- ***Occurrence:*** Measles occurs throughout the world. However, interruption of indigenous transmission of measles has been achieved in the United States and other parts of the Western hemisphere. In temperate areas, measles disease occurs primarily in the late winter and spring.
- ***Incubation period:*** Time from exposure to prodrome (first symptoms) averages 10 – 12 days. Time from exposure to rash onset averages 14 days (range 7 – 18 days).
- ***Common symptoms*:** Measles is an acute, highly communicable viral disease with prodromal fever, conjunctivitis, runny nose, cough, and small spots with white or bluish centers on an erythematous base on the buccal (cheek of mouth) mucosa (Koplik spots). The rash appears as a maculopapular eruption with a characteristic red blotchy rash appearing on the third to seventh day. The rash begins on the face, then becomes generalized, lasts 4 – 7 days, and sometimes ends in brawny (hardening) desquamation (shedding of the epidermis). An abnormal decrease in white blood cells is common. The disease is most severe in infants and adults rather than in children.
- ***Treatment:*** There is no specific treatment for measles. People with measles need bed rest, fluids, and control of fever. Patients with complications may need treatment specific to their problem.

C. Reservoirs

Humans are the only source of infection.

D. Modes of Transmission

Measles is a highly infectious disease, with >90% secondary attack rates among susceptible persons. Transmission is primarily person-to-person via large respiratory droplets; occurs by airborne, droplet spread, or direct contact with nasal or throat secretions of an infected person when one coughs or sneezes. Measles is less commonly transmitted by articles freshly soiled with nose and throat secretions.

E. Period of Communicability

The measles virus may be transmitted approximately 4 days before rash onset to 4 days after appearance of the rash; transmission is minimal after the second day of the rash.

2) ACTIONS REQUIRED/CONTROL MEASURES

A. Reporting Requirements

Measles is physician reportable by telephone immediately on the day of recognition or strong suspicion to both the Connecticut Department of Public Health (DPH) and the local health department (LHD). A mailed report is also required within 12 hours. The director of any clinical laboratory must also report laboratory evidence of measles to both the DPH and the LHD. See current lists of physician Reportable Diseases (Attachment A) and Laboratory Reportable Significant Findings (Attachment C).

B. Case Definition

- Clinical Description

  An acute illness characterized by:

  - Generalized, maculopapular rash lasting ≥3 days; **and**
  - Temperature ≥101°F or 38.3°C; **and**
  - Cough, coryza, or conjunctivitis.

Case Classification

- **Probable**
  - In the absence of a more likely diagnosis, an illness that meets the clinical description with:
  - No epidemiologic linkage to a laboratory-confirmed measles case; **and**
  - Noncontributory or no measles laboratory testing.
- **Confirmed**
  - An acute febrile rash illness† with:
  - Isolation of measles virus‡ from a clinical specimen; **or**
  - Detection of measles-virus specific nucleic acid‡ from a clinical specimen using polymerase chain reaction; **or**
  - IgG seroconversion‡ or a significant rise in measles immunoglobulin G antibody‡ using any evaluated and validated method; **or**
  - A positive serologic test for measles immunoglobulin M antibody‡§; **or**
  - Direct epidemiologic linkage to a case confirmed by one of the methods above.

† Temperature does not need to reach ≥101°F/38.3°C and rash does not need to last ≥3 days.

‡ Not explained by MMR vaccination during the previous 6-45 days.

§ Not otherwise ruled out by other confirmatory testing or more specific measles testing in a public health laboratory.

Case Classification Comments

CDC does not request or accept reports of suspect cases so this category is no longer needed for national reporting purposes.

C. Case Investigation

- **DPH Responsibility:** The DPH Immunization Program ensures that the appropriate diagnostic work has been completed and works in collaboration with LHD to ensure that contacts of each case-patient have been identified, and appropriate recommendations (e.g., vaccination, exclusion) have been made.
- **LHD Responsibility:** The LHD is involved with case investigations and control measures under DPH guidance as necessary.

D. Control Measures

The DPH Immunization Program (860-509-7929) should be contacted for guidance on control measures and further action, if necessary.

Fact Sheet

What is measles?
Measles is an acute disease that is caused by a virus.

What causes measles?
Measles is caused by a virus.

How does measles spread?
Measles is spread from person to person through the air by infectious droplets; it is highly contagious.

How long does it take to show signs of measles after being exposed?
It takes an average of 10–12 days from exposure to the first symptom, which is usually fever. The measles rash doesn't usually appear until approximately 14 days after exposure, 2–3 days after the fever begins.

What are the symptoms of measles?
Symptoms include fever, runny nose, cough, loss of appetite, "pink eye," and a rash. The rash usually lasts 5–6 days and begins at the hairline, moves to the face and upper neck, and proceeds down the body.

How serious is measles?
Measles can be a serious disease, with 30% of reported cases experiencing one or more complications. Death from measles occurs in 2 to 3 per 1,000 reported cases in the United States. Complications from measles are more common among very young children (younger than five years) and adults (older than 20 years).

What are possible complications from measles?
Diarrhea is the most common complication of measles (occurring in 8% of cases), especially in young children. Ear infections occur in 7% of reported cases. Pneumonia, occurring in 6% of reported cases, accounts for 60% of measles-related deaths. Approximately one out of one thousand cases will develop acute encephalitis, an inflammation of the brain. This serious complication can lead to permanent brain damage.

Measles during pregnancy increases the risk of premature labor, miscarriage, and low-birth-weight infants, although birth defects have not been linked to measles exposure.

Measles can be especially severe in persons with compromised immune systems. Measles is more severe in malnourished children, particularly those with vitamin A deficiency. In developing countries, the fatality rate may be as high as 25%.

How is measles diagnosed?
Measles is diagnosed by a combination of the patient's symptoms and by laboratory tests.

Is there a treatment for measles?
There is no specific treatment for measles. People with measles need bed rest, fluids, and control of fever. Patients with complications may need treatment specific to their problem.

How long is a person with measles contagious?
Measles is highly contagious and can be transmitted from four days before the rash becomes visible to four days after the rash appears.

What should be done if someone is exposed to measles?
Notification of the exposure should be communicated to a doctor. If the person has not been vaccinated, measles vaccine may prevent disease if given within 72 hours of exposure. Immune globulin (a blood product containing antibodies to the measles virus) may prevent or lessen the severity of measles if given within six days of exposure.

How common is measles in the United States?
Before the vaccine was licensed in 1963, there were an estimated 3–4 million cases each year. In the years following 1963, the number of measles cases dropped dramatically with only 1,497 cases in 1983, the lowest annual total reported up to that time. By 2004, only 37 cases were reported – a record low. However, new cases continued to be reported, primarily in populations that have refused vaccination for religious or personal belief reasons. From 2001 through 2011, an average of 63 measles cases (range, 37 to 220) and four outbreaks were reported each year in the United States. Of the 911 cases, a total of 372 (41%) were imported from outside the U.S. and an additional 432 (47%) were associated with importations. Hospitalization was reported for 225 (25%) cases. Two deaths were reported. Most cases occur among people who declined vaccination because of a religious, or personal objection.

The U.S. experienced a record number of measles cases during 2014, with 644 cases reported from 27 states. This is the greatest number of cases since measles elimination was documented in the U.S. in 2000. In 2015, the U.S. is currently experiencing a large, multi-state outbreak of measles linked to an amusement park; for up-to-date case counts and outbreak information (updated on Mondays), visit CDC's Measles Cases and Outbreaks web page at http://www.cdc.gov/measles/cases-outbreaks.html.

Can someone get measles more than once?
No.

When did vaccines for measles, mumps, and rubella become available?
The first measles vaccines (an inactivated and a live virus product) became available in 1963, both of which were largely replaced by a further attenuated live virus vaccine that was licensed in 1968. The mumps vaccine first became available in 1967, followed by the rubella vaccine in 1969. These three vaccines were combined in 1971 to form the measles-mumps-rubella (MMR) vaccine. A vaccine that combines both MMR and varicella (chickenpox) vaccines, known as MMRV, became available in 2005. Single antigen measles, mumps, and rubella vaccines are no longer available in the U.S.

What kind of vaccine is it?
MMR vaccine contains live, attenuated (or weakened) strains of the measles, mumps, and rubella viruses.

How is this vaccine given?
This vaccine is a shot given subcutaneously (in the fatty layer of tissue under the skin).

Who should get this vaccine?
All children, adolescents, and adults born in 1957 or later without a valid contraindication should have documentation of vaccination or other evidence of immunity. Additionally, some healthcare personnel who were born before 1957 may also need proof of vaccination or other evidence of immunity.

What kind of "evidence of immunity" can substitute for MMR vaccination?
Evidence of immunity can be shown by having laboratory evidence of immunity to measles, mumps, and/or rubella or laboratory confirmation of disease. However, if a person doesn't have evidence of immunity to all three diseases (e.g., measles, mumps, and rubella), they would still need to get vaccinated with MMR since the vaccine is not available as a single antigen product in the U.S.

At what age should the first dose of MMR be given?
The first dose of MMR should be given on or after the child's first birthday; the recommended age range is from 12–15 months. A dose given before 12 months of age will not be counted, so the child's medical appointment should be scheduled with this in mind.

When should children get the second MMR shot?
The second dose is usually given when the child is 4–6 years old, or before he or she enters kindergarten or first grade. However, the second dose can be given earlier as long as there has been an interval of at least 28 days since the first dose.

How effective is this vaccine?
The first dose of MMR produces immunity to measles and rubella in 90% to 95% of recipients. The second dose of MMR is intended to produce immunity in those who did not respond to the first dose, but a very small percentage of people may not be protected even after a second dose.

Which adolescents and adults should receive the MMR vaccine?
All unvaccinated adolescents without a valid contraindication to the vaccine should have documentation of two doses of MMR. All adults born in or after 1957 should also have documentation of vaccination or other evidence of immunity.

Adults born before 1957 are likely to have had measles and/or mumps disease as a child and are generally (but not always) considered not to need vaccination.

Which adults need two doses of MMR vaccine?
Certain adults are at higher risk of exposure to measles, mumps, and/or rubella and may need a second dose of MMR unless they have other evidence of immunity; this includes adults who are:

- students in postsecondary educational institutions (for measles and mumps)
- healthcare personnel (for measles and mumps)
- living in a community experiencing an outbreak or recently exposed to the disease (for measles and mumps)
- planning to travel internationally (for measles and mumps)
- people who received inactivated (killed) measles vaccine or measles vaccine of unknown type during 1963–1967 should be revaccinated with two doses of MMR vaccine.
- people vaccinated before 1979 with either killed mumps vaccine or mumps vaccine of unknown type who are at high risk for mumps infection (e.g., persons who are working in a healthcare facility) should be considered for revaccination with 2 doses of MMR vaccine.

Why do healthcare personnel need vaccination or other evidence of immunity to measles, mumps, and rubella?
People who work in medical facilities are at much higher risk for being exposed to disease than is the general population. Making sure that all employees are immune to these diseases protects both the employee and the patients with whom he or she may have contact. All people working in a healthcare facility in any capacity should have documentation of vaccination or evidence of immunity, including full- or part-time employees, medical or non-medical, paid or volunteer, students, and those with or without direct patient responsibilities.

Facilities should consider vaccinating with MMR vaccine healthcare personnel born before 1957 who lack laboratory evidence of measles, mumps, and rubella immunity or laboratory confirmation of previous disease. These facilities should vaccinate healthcare personnel with MMR during an outbreak of any of the diseases, regardless of birth year.

Who recommends this vaccine?
The Centers for Disease Control and Prevention (CDC), the American Academy of Pediatrics (AAP), the American Academy of Family Physicians (AAFP), the American College of Obstetricians and Gynecologists, and the American College of Physicians (ACP) have all recommended this vaccine.

How safe is this vaccine?
Hundreds of millions of doses of measles, mumps, and rubella vaccine prepared either as separate vaccines or as the combined MMR have been given in the United States, and its safety record is excellent.

What side effects have been reported with this vaccine?
Fever is the most common side effect, occurring in 5%–15% of vaccine recipients. About 5% of people develop a mild rash. When they occur, fever and rash usually appear 7–12 days after vaccination. About 25% of adult women receiving MMR vaccine develop temporary joint pain, a symptom related to the rubella component of the combined vaccine. Joint pain only occurs in women who are not immune to rubella at the time of vaccination. MMR vaccine may cause thrombocytopenia (low platelet count) at the rate of about 1 case per 30,000–40,000 vaccinated people. Cases are almost always temporary and not life-threatening. More severe reactions, including allergic reactions, are rare. Other severe problems (e.g., deafness, permanent brain damage) occur so rarely that experts cannot be sure whether they are caused by the vaccine or not.

If a child develops a rash after getting the MMR vaccine, is he contagious?
Transmission of the vaccine viruses does not occur from a vaccinated person, including those who develop a rash. No special precautions (e.g., exclusion from school or work) need be taken.

Who should NOT receive MMR vaccine?
Anyone who had a severe allergic reaction (e.g., generalized hives, swelling of the lips, tongue, or throat, difficulty breathing) following the first dose of MMR should not receive a second dose. Anyone knowing they are allergic to an MMR component (e.g., gelatin, neomycin) should not receive this vaccine.

As with all live virus vaccines, women known to be pregnant should not receive the MMR vaccine, and pregnancy should be avoided for four weeks following vaccination with MMR. Children and other household contacts of pregnant women should be vaccinated according to the recommended schedule. Women who are breast-feeding can be vaccinated.

Severely immunocompromised people should not be given MMR vaccine. This includes people with conditions such as congenital immunodeficiency, AIDS, leukemia, lymphoma, generalized malignancy, and those receiving treatment for cancer with drugs, radiation, or large doses of corticosteroids. Household contacts of immunocompromised people should be vaccinated according to the recommended schedule.

Although people with AIDS or HIV infection with signs of serious immunosuppression should not be given MMR, people with HIV infection who do not have laboratory evidence of severe immunosuppression can and should be vaccinated against measles.

Can individuals with egg allergy receive MMR vaccine?
In the past it was believed that people who were allergic to eggs would be at risk of an allergic reaction from the vaccine because the vaccine is grown in tissue from chick embryos. However, recent studies have shown that this is not the case. MMR may be given to egg-allergic individuals without prior testing or use of special precautions.

Does the MMR vaccine cause autism?
There is no scientific evidence that measles, MMR, or any other vaccine causes autism. The question about a possible link between MMR vaccine and autism has been extensively reviewed by independent groups of experts in the U.S. including the National Academy of Sciences' Institute of Medicine. These reviews have concluded that there is no association between MMR vaccine and autism.

For a summary of the issues on this topic, please read "Do Vaccines Cause Autism?" on the website of the Vaccine Education Center at Children's Hospital of Philadelphia. This discussion can be accessed at http://www.chop.edu/service/vaccine-education-center/vaccine-safety/vaccines-and-health-conditions/autism.html.

"MMR vaccine does not cause autism. Examine the evidence!" lists all the major studies related to this issue with links to journal article abstracts: http://www.immunize.org/catg.d/p4026.pdf.

Dr. Ari Brown has written a good piece for parents questioning the safety of vaccines. To access "Clear Answers & Smart Advice about Your Baby's Shots," go to: http://www.immunize.org/catg.d/p2068.pdf.

For more information, visit CDC's web page about vaccines and autism at http://www.cdc.gov/vaccinesafety/Concerns/Autism/Index.html.

Can the live virus in the vaccine cause measles, mumps, and/or rubella?
Because the measles, mumps, and rubella viruses in the MMR vaccine are weak versions of the disease viruses, they may cause a very mild case of the disease they were designed to prevent; however, it is usually much milder than the natural disease and is referred to as an adverse reaction to the vaccine.

What if a pregnant woman inadvertently got the MMR vaccine?
Women are advised not to receive any live virus vaccine during pregnancy as a safety precaution based on the theoretical possibility of a live vaccine causing disease (e.g., rubella virus leading to congenital rubella syndrome [CRS]).

Because a number of women have inadvertently received this vaccine while pregnant or soon before conception, the Centers for Disease Control and Prevention has collected data about the outcomes of their births. From 1971–1989, no evidence of CRS occurred in the 324 infants born to 321 women who received rubella vaccine while pregnant and continued pregnancy to term. As any risk to the fetus from rubella vaccine appears to be extremely low or zero, individual counseling of women in this situation is recommended, rather than routine termination of pregnancy.

Immunization Action Coalition

Technically reviewed by the Centers for Disease Control and Prevention, April 2015.

1) THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic A

Meningococcal disease is an infection of the tissues that cover the brain and spinal cord. It is caused by a bacterium called *Neisseria meningitidis.* This bacterium has five subtypes: A, B, C, Y, and W-135.

B. Description of Illness

- ***General facts:*** Invasive infection caused by *N. meningitidis* usually results in meningococcemia, meningitis, or both. In the United States, serogroups B, C, and Y each account for approximately 30% of reported cases. With early diagnosis and treatment, the case fatality rate remains at 10% – 15% and 11%-19% of survivors have long term sequelae (e.g., neurologic disability, limb or digit loss, and hearing loss). In the United States, approximately 98% of cases are sporadic but outbreaks do occur. In many parts of the world, it is the leading cause of bacterial meningitis. There are several vaccines against *N. meningitidis* available in the United States: 3 quadrivalent vaccines (Menactra, Menveo, and Menomune), one bivalent vaccine (Menhiberix) and two serogroup B meningococcal vaccines (Bexsero and Trumenba). Connecticut General Statutes Section 10a-155b states that each public or private college or university in this state shall require that each student who resides in on-campus housing be vaccinated against meningitis as a condition of such residence. The provisions of this subsection shall not apply to any such student who (1) presents a certificate from a physician stating that, in the opinion of such physician, such vaccination is medically contraindicated because of the physical condition of such student, or (2) presents a statement that such vaccination would be contrary to the religious beliefs of such student.
- ***Occurrence:*** The incidence of meningococcal disease is seasonal, usually peaking in late winter to early spring. During 2005-2011, an estimated 800-1,200 cases of meningococcal disease occurred annually in the United States, representing an incidence of 0.3 cases per 100,000 population. Incidence has declined annually since a peak of disease in the late 1990s. Meningococcal disease is most common among very small children and the elderly but occurs commonly in teenagers and young adults and is associated with crowded living conditions (e.g., dormitories, barracks). Community outbreaks have affected school and college-aged persons.
- ***Incubation period:*** From 2 – 10 days; usually about 3 – 4 days.
- ***Common symptoms*:** An acute bacterial disease, characterized by sudden onset of high fever, intense headache, nausea and often vomiting, stiff neck and frequently a petechial rash with pink macules or, very rarely, vesicles. Delirium, coma, and seizure may happen as the disease progresses. In newborns and small infants, the hallmarks may be difficult to detect – the infant may appear to be inactive, irritable, vomit, or feed poorly.
- ***Treatment:*** Meningococcal disease can be treated with antibiotics. It is critical to start treatment early. Even with treatment, approximately 10% – 15% of patients die.

C. Reservoirs

Humans are the only source of infection.

D. Modes of Transmission

Transmission occurs through direct contact with respiratory droplets from the nose and throat of infected people; infection usually only causes a subclinical mucosal infection. Up to 5% – 10% of people may be asymptomatic carriers with nasopharyngeal colonization by *N. meningitidis.* Less than 1% of those colonized will progress to invasive disease. Behaviors that facilitate transmission include coughing and kissing. Fomite transmission is not significant.

The communicability of *N. meningitidis* is generally limited. In studies of households in which a case of meningococcal disease has occurred, only 3% – 4% of households had secondary cases. Most households had only one secondary case. Estimates of the risk of secondary transmission are generally 2 – 4 cases per 1,000 household members at risk. However, this risk is 500–800 times that in the general population.

E. Period of Communicability

The bacteria may be transmitted as long as they are present in nasal and oral secretions. Usually, 24 hours of treatment with an antibiotic to which the bacteria are sensitive decreases their numbers in the nose and mouth. Penicillin will temporary suppress the organisms, but it does not usually eradicate them from the oronasopharynx.

2) ACTIONS REQUIRED/CONTROL MEASURES

A. Reporting Requirements

Meningococcal disease is physician reportable immediately by telephone on the day of recognition or strong suspicion to both the Connecticut Department of Public Health (DPH) and the local health department (LHD). A mailed report is also required within 12 hours. The director of any clinical laboratory must also report laboratory evidence of invasive meningococcal disease to both the DPH and LHD. **Additional requirements:** All isolates yielding *N. meningitidis* from invasive sterile sites must be submitted to the DPH State Laboratory for confirmation. See current list of Physician Reportable Diseases (Attachment and Laboratory Report of Significant Findings (Attachment C).

B. Case Definition

- **Clinical Description:** Meningococcal disease manifests most commonly as meningitis and/or meningococcemia that may progress rapidly to purpura fulminans, shock, and death. Other less common manifestations include pneumonia and septic arthritis.
- **Suspect Case:**
  - Clinical purpura fulminans in the absence of a positive blood culture; OR
  - Gram-negative diplococci, not yet identified, from a normally sterile body site.
- **Probable Case:**
  - Evidence of *N. meningitidis* DNA using a validated polymerase chain reaction (PCR), obtained from a normally sterile site; OR
  - Evidence of *N. meningitidis* antigen by immunohistochemistry (IHC) on formalin- fixed tissue or latex agglutination of CSF.
- **Confirmed Case:**
  - Isolation of *N. meningitidis* from a normally sterile site (e.g., blood or CSF or, less commonly, synovial, pleural, or pericardial fluid) or skin scrapings of purpuric lesions; OR
  - Detection of *N. meningitidis* in a specimen obtained from a normally sterile body site by PCR (polymerase chain reaction) assay.

C. Case Investigation

- **DPH Responsibility:** The DPH Epidemiology and Emerging Infections Program will follow-up with the reporting laboratory and physician (or hospital infection control staff) to confirm the diagnosis. DPH will then notify the LHD of the above findings and provide additional recommendations for follow-up, if needed.

  The DPH is available to the LHD for assistance, consultation, guidance, and to ensure that appropriate investigative and control actions are being taken.
- **LHD Responsibility:** Contact case-patient to identify close contacts and ensure they are provided antibiotic prophylaxis (see Control Measures). Provide educational materials describing the nature of disease and preventive measures.

D. Control Measures

- **Close contacts:** Household contacts of all persons with meningococcal disease should receive antibiotic prophylaxis. Prophylaxis is also warranted for people who have been exposed directly to a patient's oral secretions through close social

contact, kissing or sharing food or beverages, as well as childcare and nursery school contacts.

Antimicrobial prophylaxis should be administered as soon as possible (ideally < 24 hours after identification of the index patient). Prophylaxis administered > 14 days after onset of illness in the index patient is probably of limited or no value. Routine prophylaxis is not recommended for healthcare professionals unless they have had intimate exposure, such as occurs with unprotected mouth-to-mouth resuscitation, intubation, or suctioning, before antimicrobial therapy was initiated.

Fact Sheet

What causes meningococcal disease?

Meningococcal disease is caused by the bacterium *Neisseria meningitidis.* This bacterium has at least 13 different subtypes (serogroups). Five of these serogroups, A, B, C, Y, and W, cause almost all invasive disease. The relative importance of these five serogroups depends on geographic location and other factors. In the United States almost all meningococcal disease is caused by serogroups B, C and Y. Each serogroup accounts for about one third of reported cases.

How does meningococcal disease spread?

The disease is spread person-to-person through the exchange of respiratory and throat secretions (e.g., by coughing, kissing, or sharing eating utensils). Meningococcal bacteria can't live for more than a few minutes outside the body, so the disease is not spread as easily as the common cold or influenza.

How long does it take to show signs of meningococcal disease after being exposed?

The incubation period of meningococcal disease is 3 to 4 days, with a range of 2 to 10 days. Meningococcal bacteria can make a person extremely ill by infecting the blood (septicemia) or by infecting the fluid of the spinal cord and around the brain (meningitis). Because this disease progresses quickly, it is important to be diagnosed and start treatment as soon as possible.

What are the symptoms of meningococcal disease?

The most common symptoms are high fever, chills, lethargy, and a rash. If meningitis is present, the symptoms will also include headache and neck stiffness (which may not be present in infants); seizures may also occur. In overwhelming meningococcal infections, shock, coma, and death can follow within several hours, even with appropriate medical treatment.

How serious is meningococcal disease?

Meningococcal disease caused by any serogroup is very serious. About 10 to 15% of people with meningococcal disease die even with appropriate antibiotic treatment. Of those who recover, up to 20% suffer from some serious after-effects, such as permanent hearing loss, limb loss, or brain damage.

How is meningococcal disease diagnosed?

The diagnosis is made by taking samples of blood and spinal fluid from a person who is sick. The spinal fluid is obtained by performing a spinal tap, where a needle is inserted into the lower back. Any bacteria found in the blood or spinal fluid is grown in a medical laboratory and identified.

Meningococcal disease is uncommon in the United States, and the symptoms can be mistaken for other illnesses, which unfortunately can lead to delayed diagnosis and treatment.

Can't meningitis be caused by a virus too?

Yes. The word "meningitis" refers to inflammation of the tissues covering the brain and spinal cord. This inflammation can be caused by viruses and fungi, as well as bacteria. Viral meningitis is the most common type; it has no specific treatment but is usually not as serious as meningitis caused by bacteria.

Is there a treatment for meningococcal disease?

Meningococcal disease can be treated with antibiotics. It is critical to start treatment early.

How common is meningococcal disease in the United States?

Fewer than 700 cases of meningococcal disease were reported each year since 2010 in the United States. An estimated average 80 deaths from meningococcal disease occurred each year in the United States since 2010.

The disease is most common in children younger than 5 years (particularly children younger than age 1 year), people age 16–21 years, and people age 65 years and older.

What people are at special risk for meningococcal disease?
For all meningococcal serogroups risk factors include age, having a damaged or missing spleen, persistent complement component deficiency (an immune system disorder), and occupation as a microbiologist in a laboratory that works with meningococcal isolates.

Certain groups are at increased risk for meningococcal serogroups A, C, Y, and W but not serogroup B. These risk factors include travel to places where meningococcal disease is common (such as certain countries in Africa and in Saudi Arabia), and college freshmen who live in a dormitory (see question below for more on college students). Other risk factors for serogroups A, C, Y and W include having a previous viral infection, living in a crowded household, having an underlying chronic illness, and being exposed to cigarette smoke (either directly or second-hand).

How common is meningococcal disease in the world?
Meningococcal disease occurs throughout the world, but is more common in the area of Africa known as the "meningitis belt." Serogroup A is responsible for most of the meningococcal disease in sub-Saharan Africa. This serogroup is uncommon in the United States.

Can you get meningitis more than once?
Yes. Meningitis can be caused by different serogroups of the meningococcal bacterium, by other bacteria such as *Streptococcus* and *Haemophilus*, as well as by viruses and fungi. Being vaccinated against *Neisseria meningitidis* or having had the disease will not protect you against meningitis from other bacteria or viruses.

If a child is diagnosed with meningococcal disease, can anything be done to protect the other children with whom he has contact?
Individuals who have been exposed to a person with bacterial meningitis can be protected by being started on a course of antibiotics immediately (ideally within 24 hours of the patient being diagnosed). This is usually recommended for household contacts and children attending the same day care or nursery school. Older children and adults (e.g., who are in the same school or church) aren't usually considered exposed unless they have had very close contact with the infected person (e.g., kissing or sharing a glass).

In addition to the antibiotic treatment, vaccination may be recommended for people 2 months of age and older if the person's infection is caused by meningococcus serogroup A, C, Y, or W-135, which are contained in 3 of the 4 meningococcal vaccines available in the United States.

What meningococcal vaccines are available in the United States?
There are 2 types of meningococcal vaccine available in the United States. Vaccines for meningococcal serogroups A, C, W and Y are composed of polysaccharide (sugar molecules) from the surface of the meningococcal bacteria. Meningococcal vaccines in which the polysaccharide is chemically bonded ("conjugated") to a protein produce better protection and are more effective in young children than the original polysaccharide vaccine. Vaccines for meningococcal serogroup B (MenB) are composed of proteins also found in the surface of the bacteria. Neither type of vaccine contains live meningococcal bacteria.

Meningococcal polysaccharide or conjugate vaccines provide no protection against serogroup B disease and MenB vaccines provide no protection against serogroup A, C, W or Y disease. For protection against all 5 serogroups of meningococcus it is necessary to receive both vaccines.

How is this vaccine given?
Meningococcal polysaccharide vaccine (MPSV4) is given as an injection into the fatty tissue of the upper arm. Meningococcal conjugate vaccines (MCV4) are given in a leg muscle of a young

child or the deltoid (arm) muscle of an older child or adult. MenB vaccines are given in the deltoid muscle.

Who should get the meningococcal vaccine?

Certain groups should receive both MCV4 and MenB vaccines. Others are recommended to receive MCV4 only. MPSV4 is recommended only for certain people older than 55 years.

MCV4 is recommended for these groups:

- All children and teens, ages 11 through 18 years
- People younger than 22 years of age if they are or will be a first-year college student living in a residential hall
- People age 2 months and older who have a damaged or missing spleen (MenHibrix may be used for children age 6 weeks through 18 months in this group)
- People age 2 months and older who have persistent complement component deficiency (an immune system disorder), or are at risk during an outbreak caused by a vaccine serogroup (MenHibrix may be used for children age 6 weeks through 18 months in these groups)
- People age 2 months and older who reside in or travel to certain countries in sub-Saharan Africa as well as to other countries for which meningococcal vaccine is recommended (e.g., travel to Mecca, Saudi Arabia, for the annual Hajj).
- People working with meningococcus bacteria in laboratories

MenB is recommended for these groups:

- People age 10 years and older who have a damaged or missing spleen
- People age 10 years and older who have persistent complement component deficiency (an immune system disorder), or are at risk during an outbreak caused by a vaccine serogroup
- People working with meningococcus bacteria in laboratories

MenB vaccines are not routinely recommended for all adolescents or college students. However, at their June 2015 meeting ACIP voted to recommend that a MenB vaccine series may be administered to persons 16 through 23 years of age with a preferred age of vaccination of 16 through 18 years. This permissive (Category B) recommendation allows the clinician to make a MenB vaccine recommendation based on the risk and benefit for the individual patient.

Should college students be vaccinated against meningococcal disease?

The MCV4 vaccine is recommended for previously unvaccinated first-year college students, age younger than 22 years, who are or will be living in a residence hall. Some colleges and universities require incoming freshmen and others to be vaccinated with MCV4; some may also require that a dose of MCV4 have been given since the age of 16 years. MCV4 may be available from the college health service.

Although several small MenB outbreaks have occurred on college campuses since 2013, college students in general are not at higher risk of MenB then persons of the same age who are not college students. Consequently, ACIP does not routinely recommend MenB vaccination for college students. However, college students may choose to receive MenB vaccine to reduce their risk should a MenB outbreak occur.

Why doesn't ACIP recommend MenB vaccination for all adolescents or all college students?

Although a person with MenB disease can die or be permanently scarred or disabled, and may incur staggering medical expenses, MenB disease is rare and MenB vaccine is very expensive. A recommendation to vaccinate all adolescents or all college students is not cost-effective.

How many doses of meningococcal vaccine are needed?
For MCV4 vaccines the number of doses recommended depends on the age when the vaccine is given and the presence of certain medical conditions or risk factors. All adolescents should be vaccinated with one dose of MCV4 at ages 11 or 12 years and with a booster dose at age 16 years. All teens who were vaccinated with MCV4 at ages 13 through 15 years need a booster dose at age 16 through 18 years (at least 8 weeks after the first dose). First-year college students younger than 22 years who are living in a residential hall should get an MCV4 booster dose if their previous dose was given before age 16 years. People ages 2 months and older who have certain risk factors such as no spleen or a damaged spleen, or persistent complement component deficiency (an immune system disorder), may need more than one dose. In addition, vaccinated people who remain at risk, such as people without a spleen, microbiologists who work with meningococcus, or those who travel repeatedly to parts of Africa, should receive a booster dose of MCV4 every 5 years.

A series of MenB vaccine is either 2 (for Bexsero) or 3 (for Trumenba) doses. Booster doses of MenB vaccine following the initial series are currently not recommended, including for people with no spleen or persistent complement component deficiency.

How soon after their first MCV4 dose should people who remain at risk for meningococcal disease be vaccinated again?
The time between the primary (initial) doses(s) of MCV4 and the first booster varies. Children who received their primary MCV4 dose(s) before their seventh birthday should get their first booster 3 years after their primary dose(s). Children who received their primary MCV4 dose(s) at or after age 7 years and all adults should get MCV4 boosters 5 years after their primary dose(s).

What are the side effects of this vaccine?
Up to about half of people who get meningococcal vaccines have mild side effects, such as redness or pain where the shot was given. These symptoms usually last for one or two days and are more common after MCV4 than after MPSV4. A small percentage of people who receive the vaccine develop a fever. Severe reactions, such as a serious allergic reaction, are very rare.

More than 60,000 persons have received MenB vaccines during clinical trials or for outbreak control on college campuses. The most common side effect was pain at the injection site, which was reported by about 80% of recipients. The Vaccine Adverse Event Reporting System (VAERS) and other vaccine safety systems will carefully monitor MenB vaccine safety as they do for other U.S.-licensed vaccines.

How effective is this vaccine?
The MPSV4 vaccine is 85 percent to 100 percent effective at preventing infection from the subtypes of meningococcus found in the vaccine. Based on results of laboratory studies, MCV4 is believed to be at least as effective as MPSV4.

Because of the low incidence of serogroup B meningococcal disease, MenB vaccine efficacy estimates were based on demonstration of an immune response after vaccination. From 63% to 88% of recipients of a full series of MenB vaccine develop a protective level of antibody against representative strains of serogroup B meningococcus.

Who should not receive meningococcal vaccine?
These groups should not receive either type of meningococcal vaccine:

- People who have had a serious allergic reaction to a previous dose of either meningococcal vaccine or to one of the vaccine components. The packaging of some meningococcal vaccines may contain latex. Information on the contents of each vaccine is included with each vaccine.
- People who are moderately or severely ill.

Can a pregnant woman get meningococcal vaccine?

Studies of vaccination with MPSV4 during pregnancy have not documented adverse effects among either pregnant women or newborns. Post-licensure safety data suggest no concerns with the safety of MCV4 during pregnancy. Pregnancy is not considered to be a contraindication to either MPSV4 or MCV4. Although experience with MenB vaccines is limited they have not been shown to be detrimental to a pregnant woman or fetus.

Can the vaccine cause meningococcal disease?

No. Only the *Neisseria meningitidis* bacterium can cause meningococcal disease. Meningococcal vaccines contain only the sugar capsule or capsule protein of the microbe.

Immunization Action Coalition

Technically reviewed by the Centers for Disease Control and Prevention, August 2015.

1) THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent

Mumps is a viral illness caused by a paramyxovirus of the genus *Rubulavirus*.

B. Description of Illness

- ***General facts:*** Mumps is a vaccine-preventable disease. The current mumps vaccine is incorporated with measles and rubella vaccine as a combined vaccine called MMR. Currently, two doses of MMR are necessary to confer lifelong immunity. Mumps vaccine is routinely used in only 38% of countries or areas in the world, and importation of mumps into the United States is now increasingly recognized.
- ***Occurrence:*** The incidence of mumps in the United States has declined since introduction of the live attenuated vaccine in 1967 from 152,209 cases in 1968 to 258 cases in 2004. In 2006 a multistate mumps outbreak resulted in more than 6,000 reported cases. Eight states in the Midwest reported the majority of cases. The outbreak peaked in mid-April. The median age of persons reported with mumps was 22 years. Many cases occurred among college students, many of who had received 1 or 2 doses of MMR vaccine. The incidence of mumps peaks in the winter through spring.
- ***Incubation period:*** The average incubation period is about 14 – 18 days (range 14 – 25 days).
- ***Common symptoms*:** A systemic disease characterized by swelling of one or more of the salivary glands, usually the parotid glands. Additional symptoms include fever, muscle aches, loss of appetite, and headache. Complications include aseptic meningitis, inflammation of the testicles or ovaries, inflammation of the pancreas, and deafness (usually permanent).
- ***Treatment:*** There is no specific treatment for mumps. People with mumps need bed rest, fluids, and control of fever.

C. Reservoirs

Humans are the only source of infection.

D. Modes of Transmission

Mumps is about as contagious as influenza and rubella, but less so than measles or chickenpox. It is spread primarily by airborne transmission or by droplet spread and by direct contact with the saliva of an infected person.

E. Period of Communicability

The virus has been isolated from saliva from 6 – 7 days prior to swelling of the glands to 9 days after the swelling. Maximum infectiousness occurs about 2 days before onset of parotitis and 5 days afterwards. Approximately one third of cases do not have clinically apparent salivary gland swelling. Inapparent infections can be communicable.

2) ACTIONS REQUIRED/CONTROL MEASURES

A. Reporting Requirements

Mumps is physician reportable by mail within 12 hours of recognition or strong suspicion to both the Connecticut Department of Public Health (DPH) and the local health department (LHD). The director of any clinical laboratory must also report laboratory evidence of mumps to both the DPH and the LHD. See current lists of physician Reportable Diseases (Attachment A) and Laboratory Reportable Significant Findings (Attachment C).

B. Case Classification

- **Suspected**
  - Parotitis, acute salivary gland swelling, orchitis, or oophoritis unexplained by another more likely diagnosis, **OR**
  - A positive lab result with no mumps clinical symptoms (with or without epidemiological-linkage to a confirmed or probable case).
- **Probable**
  - Acute parotitis or other salivary gland swelling lasting at least 2 days, or orchitis or oophoritis unexplained by another more likely diagnosis, in:
    - A person with a positive test for serum anti-mumps immunoglobulin M (IgM) antibody, **OR**
    - A person with epidemiologic linkage to another probable or confirmed case or linkage to a group/community defined by public health during an outbreak of mumps.
- **Confirmed**
  - A positive mumps laboratory confirmation for mumps virus with reverse transcription polymerase chain reaction (RT-PCR) or culture in a patient with an acute illness characterized by any of the following:
    - Acute parotitis or other salivary gland swelling, lasting at least 2 days
    - Aseptic meningitis
    - Encephalitis
    - Hearing loss
    - Orchitis
    - Oophoritis
    - Mastitis
    - Pancreatitis

C. Case Investigation

- **DPH Responsibility:** The DPH Immunization Program ensures that the appropriate diagnostic work has been completed and works in collaboration with LHD to ensure that contacts of each case-patient have been identified, and appropriate recommendations (e.g., vaccination, exclusion) have been made.

- **LHD Responsibility:** The LHD is involved with case investigations and control measures under DPH guidance as necessary.

D. Control Measures

The DPH Immunization Program (860-509-7929) should be contacted for guidance on control measures and further action, if necessary.

Fact Sheet

What causes mumps?
Mumps is caused by a virus.

How does mumps spread?
Mumps spreads from person to person via droplets of saliva or mucus from the mouth, nose, or throat of an infected person, usually when the person coughs, sneezes, or talks. The virus may also be spread indirectly when someone with mumps touches items or surfaces without washing their hands and then someone else touches the same surface and rubs their mouth or nose. Mumps is less contagious than measles or chickenpox.

How long does it take to show signs of mumps after being exposed?
The incubation period of mumps is usually 16–18 days, but can range from 12–25 days.

What are the symptoms of mumps?
Individuals with mumps usually first feel sick with nonspecific symptoms like headache, loss of appetite, and low-grade fever. The most well-known sign of mumps is parotitis, the swelling of the salivary glands, or parotid glands, below the ear. Parotitis occurs only in 31% to 65% of individuals infected with mumps. From 15% to 27% of people with mumps have no signs or symptoms of illness; others may have respiratory symptoms or only nonspecific symptoms such as headache, loss of appetite, and low-grade fever.

How serious is mumps?
In children, mumps is usually a mild disease. Adults may have more serious disease and more complications.

What are possible complications from mumps?
Before a vaccine was available mumps accounted for about 10% of viral meningitis reported in the United States. This complication is now rare. Up to 10% of postpubertal males experience orchitis (testicular inflammation) as a complication of mumps. This may involve pain, swelling, nausea, vomiting, and fever, with tenderness of the area possibly lasting for weeks. Approximately half of patients with orchitis have some degree of testicular atrophy, but sterility is rare.
Inflammation of the ovaries (oophoritis) and/or breasts (mastitis) can occur in females who have reached puberty. An increase in spontaneous abortion (miscarriage) has been found among women who developed mumps during the first trimester of pregnancy in some studies but not in others; however, there is no evidence that mumps causes birth defects. Deafness, in one or both ears, can occur in approximately one per 20,000 reported cases of mumps.

Is there a treatment for mumps?
There is no cure for mumps, only supportive treatment (bed rest, fluids, and fever reduction).

How is mumps diagnosed?
Mumps is diagnosed by a combination of symptoms and physical signs and laboratory confirmation of the virus, as not all cases develop characteristic parotitis and not all cases of parotitis are caused by mumps.

How long is a person with mumps contagious?
People with mumps are usually considered most infectious from a few days before until 5 days after the onset of parotitis. Therefore, CDC recommends isolating mumps patients for 5 days after their glands begin to swell.

What should be done if someone is exposed to mumps?
If the exposed person has not been vaccinated against mumps, receiving the vaccine after exposure to the virus will not help prevent disease if the person has already been infected. However, if they did not become infected after this particular exposure, the vaccine may help protect him or her against future infection with mumps virus.

How common is mumps in the United States?
Due to good immunization coverage, mumps is now rare in the United States. An estimated 212,000 cases occurred in 1964, while only 229 cases were reported in 2012. Large outbreaks of mumps occurred in the United States in 2006 and 2009–10 with more than 6,000 and 3,000 cases, respectively, reported in those years.

Can someone get mumps more than once?
People who have had mumps are usually protected for life against another mumps infection. However, second occurrences of mumps do rarely occur.

When did vaccines for measles, mumps, and rubella become available?
The first measles vaccines (an inactivated and a live virus product) became available in 1963, both of which were largely replaced by a further attenuated live virus vaccine that was licensed in 1968. The mumps vaccine first became available in 1967, followed by the rubella vaccine in 1969. These three vaccines were combined in 1971 to form the measles-mumps-rubella (MMR) vaccine. A vaccine that combines both MMR and varicella (chickenpox) vaccines, known as MMRV, became available in 2005. Single antigen measles, mumps, and rubella vaccines are no longer available in the United States.

What kind of vaccine is it?
MMR vaccine contains live, attenuated (or weakened) strains of the measles, mumps, and rubella viruses.

How is this vaccine given?
This vaccine is a shot given subcutaneously (in the fatty layer of tissue under the skin).

Who should get this vaccine?
All children, adolescents, and adults born in 1957 or later without a valid contraindication should have documentation of vaccination or other evidence of immunity. Additionally, some healthcare personnel who were born before 1957 may also need proof of vaccination or other evidence of immunity.

What kind of "evidence of immunity" can substitute for MMR vaccination?
Evidence of immunity can be shown by having laboratory evidence of immunity to measles, mumps, and/or rubella or laboratory confirmation of disease. However, if a person doesn't have evidence of immunity to all three diseases (e.g., measles, mumps, and rubella), they would still need to get vaccinated with MMR since the vaccine is not available as a single antigen product in the U.S.

At what age should the first dose of MMR be given?
The first dose of MMR should be given on or after the child's first birthday; the recommended age range is from 12–15 months. A dose given before 12 months of age will not be counted, so the child's medical appointment should be scheduled with this in mind.

When should children get the second MMR shot?
The second dose is usually given when the child is 4–6 years old, or before he or she enters kindergarten or first grade. However, the second dose can be given earlier as long as there has

been an interval of at least 28 days since the first dose.

How effective is this vaccine?

Post-licensure studies have demonstrated one dose of MMR vaccine is 78% (range, 45%-97%) effective for prevention of mumps. The second dose of MMR is intended to produce immunity in those who did not respond to the first dose, but a very small percentage of people may not be protected even after a second dose.

Which adolescents and adults should receive the MMR vaccine?

All unvaccinated adolescents without a valid contraindication to the vaccine should have documentation of two doses of MMR. All adults born in or after 1957 should also have documentation of vaccination or other evidence of immunity.

Adults born before 1957 are likely to have had measles and/or mumps disease as a child and are generally (but not always) considered not to need vaccination.

Which adults need two doses of MMR vaccine?

Certain adults are at higher risk of exposure to measles, mumps, and/or rubella and may need a second dose of MMR unless they have other evidence of immunity; this includes adults who are:

- students in postsecondary educational institutions (for measles and mumps)
- healthcare personnel (for measles and mumps)
- living in a community experiencing an outbreak or recently exposed to the disease (for measles and mumps)
- planning to travel internationally (for measles and mumps)
- people who received inactivated (killed) measles vaccine or measles vaccine of unknown type during 1963-1967 should be revaccinated with two doses of MMR vaccine.
- people vaccinated before 1979 with either killed mumps vaccine or mumps vaccine of unknown type who are at high risk for mumps infection (e.g., people who are working in a healthcare facility) should be considered for revaccination with 2 doses of MMR vaccine.

Why do healthcare personnel need vaccination or other evidence of immunity to measles, mumps, and rubella?

People who work in medical facilities are at much higher risk for being exposed to disease than is the general population. Making sure that all employees are immune to these diseases protects both the employee and the patients with whom he or she may have contact. All people working in a healthcare facility in any capacity should have documentation of vaccination or evidence of immunity, including full- or part-time employees, medical or non-medical, paid or volunteer, students, and those with or without direct patient responsibilities.

Facilities should consider vaccinating with MMR vaccine healthcare personnel born before 1957 who lack laboratory evidence of measles, mumps, and rubella immunity or laboratory confirmation of previous disease. These facilities should vaccinate healthcare personnel with MMR during an outbreak of any of the diseases, regardless of birth year.

Who recommends this vaccine?

The Centers for Disease Control and Prevention (CDC), the American Academy of Pediatrics (AAP), the American Academy of Family Physicians (AAFP), the American College of Obstetricians and Gynecologists, and the American College of Physicians (ACP) have all recommended this vaccine.

How safe is this vaccine?
Hundreds of millions of doses of measles, mumps, and rubella vaccine prepared either as separate vaccines or as the combined MMR have been given in the United States, and its safety record is excellent.

What side effects have been reported with this vaccine?
Fever is the most common side effect, occurring in 5%–15% of vaccine recipients. About 5% of people develop a mild rash. When they occur, fever and rash usually appear 7–12 days after vaccination. About 25% of adult women receiving MMR vaccine develop temporary joint pain, a symptom related to the rubella component of the combined vaccine. Joint pain only occurs in women who are not immune to rubella at the time of vaccination. MMR vaccine may cause thrombocytopenia (low platelet count) at the rate of about 1 case per 30,000–40,000 vaccinated people. Cases are almost always temporary and not life-threatening. More severe reactions, including allergic reactions, are rare. Other severe problems (e.g., deafness, permanent brain damage) occur so rarely that experts cannot be sure whether they are caused by the vaccine or not.

If a child develops a rash after getting the MMR vaccine, is he contagious?
Transmission of the vaccine viruses does not occur from a vaccinated person, including those who develop a rash. No special precautions (e.g., exclusion from school or work) need be taken.

Who should NOT receive MMR vaccine?
Anyone who had a severe allergic reaction (e.g., generalized hives, swelling of the lips, tongue, or throat, difficulty breathing) following the first dose of MMR should not receive a second dose. Anyone knowing they are allergic to an MMR component (e.g., gelatin, neomycin) should not receive this vaccine.

As with all live virus vaccines, women known to be pregnant should not receive the MMR vaccine, and pregnancy should be avoided for four weeks following vaccination with MMR. Children and other household contacts of pregnant women should be vaccinated according to the recommended schedule. Women who are breast-feeding can be vaccinated.

Severely immunocompromised people should not be given MMR vaccine. This includes people with conditions such as congenital immunodeficiency, AIDS, leukemia, lymphoma, generalized malignancy, and those receiving treatment for cancer with drugs, radiation, or large doses of corticosteroids. Household contacts of immunocompromised people should be vaccinated according to the recommended schedule.

Although people with AIDS or HIV infection with signs of serious immunosuppression should not be given MMR, people with HIV infection who do not have laboratory evidence of severe immunosuppression can and should be vaccinated against measles.

Can individuals with egg allergy receive MMR vaccine?
In the past it was believed that people who were allergic to eggs would be at risk of an allergic reaction from the vaccine because the vaccine is grown in tissue from chick embryos. However, recent studies have shown that this is not the case. MMR may be given to egg-allergic individuals without prior testing or use of special precautions.

Does the MMR vaccine cause autism?
There is no scientific evidence that measles, MMR, or any other vaccine causes autism. The question about a possible link between MMR vaccine and autism has been extensively reviewed by independent groups of experts in the U.S. including the National Academy of Sciences' Institute of Medicine. These reviews have concluded that there is no association between MMR vaccine and autism.

For a summary of the issues on this topic, please read "Do Vaccines Cause Autism?" on the website of the Vaccine Education Center at Children's Hospital of Philadelphia. This discussion can be accessed at http://www.chop.edu/centers-programs/vaccine-education-center. "MMR vaccine does not cause autism. Examine the evidence!" lists all the major studies related to this issue with links to journal article abstracts: http://www.immunize.org/catg.d/p4026.pdf.

Dr. Ari Brown has written a good piece for parents questioning the safety of vaccines. To access "Clear Answers & Smart Advice about Your Baby's Shots," go to: http://www.immunize.org/catg.d/p2068.pdf.

For more information, visit CDC's web page about vaccines and autism at http://www.cdc.gov/vaccinesafety/Concerns/Autism/Index.html.

Can the live virus in the vaccine cause measles, mumps, and/or rubella?

Because the measles, mumps, and rubella viruses in the MMR vaccine are weak versions of the disease viruses, they may cause a very mild case of the disease they were designed to prevent; however, it is usually much milder than the natural disease and is referred to as an adverse reaction to the vaccine.

What if a pregnant woman inadvertently got the MMR vaccine?

Women are advised not to receive any live virus vaccine during pregnancy as a safety precaution based on the theoretical possibility of a live vaccine causing disease (e.g., rubella virus leading to congenital rubella syndrome [CRS]).

Because a number of women have inadvertently received this vaccine while pregnant or soon before conception, the Centers for Disease Control and Prevention has collected data about the outcomes of their births. From 1971–1989, no evidence of CRS occurred in the 324 infants born to 321 women who received rubella vaccine while pregnant and continued pregnancy to term. As any risk to the fetus from rubella vaccine appears to be extremely low or zero, individual counseling of women in this situation is recommended, rather than routine termination of pregnancy.

Immunization Action Coalition

Technically reviewed by the Centers for Disease Control and Prevention, March 2014.

1) THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent

Pertussis, or whooping cough, is an acute bacterial disease of the respiratory tract and is caused by the gram-negative bacillus *Bordetella pertussis.*

B. Description of Illness

- ***General facts:*** Infants under the age of 12 months have more serious illness from pertussis and they are more likely to have complications and be hospitalized than persons in other age groups. Older patients (adolescents and adults) and those partially protected by the vaccine may get infected with *B. pertussis,* but generally have milder disease.
- ***Occurrence:*** Since the introduction of the pertussis vaccine in the 1940s, the average incidence of pertussis decreased from 150 per 100,000 persons between 1922 and 1940 to 0.5 per 100,000 in 1976. However, since the 1980s, the incidence of reported pertussis cases has increased. The increase has been primarily among infants less than 4 months and among adolescents and adults. Reasons for the increase in pertussis are not completely clear. Improvements in diagnosis and reporting of pertussis in adolescents and adults appear to be important factors contributing to the overall increase. Outbreaks are being recognized in high schools and middle schools more frequently.
- ***Incubation period:*** Usually from 7 – 10 days (range 6 – 21 days).
- ***Common symptoms*:** Pertussis begins with mild upper respiratory tract symptoms. The cough gradually (within 1 – 2 weeks) becomes severe, characterized by bursts of numerous, rapid coughs where one cough follows the next without a break for breath. The cough may be accompanied by a characteristic high-pitched whoop. During such an attack, the patient may become cyanotic (turn blue). Vomiting and exhaustion commonly follow the episode. Fever is absent or gradual. Symptoms wane gradually over weeks to months. Disease in infants younger than 6 months of age is unusual; apnea (cessation of breathing) is a common manifestation, and whoop is absent.
- ***Treatment:*** Antibiotics are somewhat helpful in treating pertussis. The drug of choice is usually erythromycin. This antibiotic should be given for 14 days to all household and other close contacts of the patient to minimize transmission, regardless of age and vaccination status. Patients also need supportive therapy such as bed rest, fluids, and control of fever.

C. Reservoirs

Humans are the only known source of infection. Older siblings, including adolescents, and adults may be an important source of *B. pertussis* for infants and young children.

D. Modes of Transmission

Transmission occurs primarily by direct contact with discharges from respiratory mucous membranes of infected persons by the airborne route, probably by droplets. Up to 80% of non-immune household contacts may acquire the disease.

E. Period of Communicability

Pertussis is highly communicable in the early stage of illness. For control purposes, the period of communicability extends from the initial mild respiratory symptoms to 3 weeks after onset of cough in patients not treated with antibiotics. When treated with appropriate antibiotics, the period of infectiousness is usually 5 days or less after onset of therapy.

2) ACTIONS REQUIRED/CONTROL MEASURES

A. Reporting

Pertussis is physician reportable by telephone immediately on the day of recognition or strong suspicion to both the Connecticut Department of Public Health (DPH) and the local health department (LHD). A mailed report is also required within 12 hours. The director of any clinical laboratory must also report laboratory evidence of pertussis to both the DPH and the LHD. **Additional requirements:** Isolates must be submitted to the DPH State Laboratory for confirmation. See current lists of physician Reportable Diseases (Attachment A and Laboratory Reportable Significant Findings (Attachment C).

B. Case Definition

- **Clinical criteria:**

  In the absence of a more likely diagnosis, a cough illness lasting ≥2 weeks, with at least one of the following signs or symptoms:

  - Paroxysms of coughing; **OR**
  - Inspiratory whoop; **OR**
  - Post-tussive vomiting; **OR**
  - Apnea (with or without cyanosis) (FOR INFANTS AGED <1 YEAR ONLY)

- **Laboratory Criteria for Diagnosis**
  - Isolation of *B. pertussis* from a clinical specimen
  - Positive PCR for pertussis
- **Epidemiologic Linkage**
  - Contact with a laboratory-confirmed case of pertussis*.

Case Classification

- **Probable**

  In the absence of a more likely diagnosis, a cough illness lasting ≥2 weeks, with at least one of the following signs or symptoms:

  - Paroxysms of coughing; or inspiratory "whoop"; **or**
  - Post-tussive vomiting; **or**
  - Apnea (with or without cyanosis) (FOR INFANTS AGED <1 YEAR ONLY)

  And

  - Absence of laboratory confirmation;

  And

  - No epidemiologic linkage to a laboratory-confirmed case of pertussis.

  OR, FOR INFANTS AGED <1 YEAR ONLY:

  - Acute cough illness of any duration, with at least one of the following signs or symptoms:
    - Paroxysms of coughing; **or**

- Inspiratory "whoop"; **or**
- Post-tussive vomiting; **or**
- Apnea (with or without cyanosis)

And

- Polymerase chain reaction (PCR) positive for pertussis.

OR, FOR INFANTS AGED <1 YEAR ONLY:

- Acute cough illness of any duration, with at least one of the following signs or symptoms:
  - Paroxysms of coughing; **or**
  - Inspiratory "whoop"; **or**
  - Post-tussive vomiting; or
  - Apnea (with or without cyanosis)

And

- Contact with a laboratory-confirmed case of pertussis.

- **Confirmed**

Acute cough illness of any duration, with isolation of *B. pertussis* from a clinical specimen.

OR

Cough illness lasting ≥ 2 weeks, with at least one of the following signs or symptoms:

- Paroxysms of coughing; **or**
- inspiratory "whoop"; **or**
- Post-tussive vomiting; **or**
- Apnea (with or without cyanosis) (FOR INFANTS AGED <1 YEAR ONLY)

And

- Polymerase chain reaction (PCR) positive for pertussis.

OR

Cough illness lasting ≥ 2 weeks, with at least one of the following signs or symptoms:

- Paroxysms of coughing; or
- inspiratory "whoop"; or
- Post-tussive vomiting; or
- Apnea (with or without cyanosis) (FOR INFANTS AGED <1 YEAR ONLY)

And

- Contact with a laboratory-confirmed case of pertussis*.

Case Classification Comments

*Note: An illness meeting the clinical case definition should be classified as "probable" rather than "confirmed" if it occurs in a patient who has contact with an infant aged <1

year who is Polymerase Chain Reaction (PCR) positive for pertussis and has ≥1 sign or symptom and cough duration <14 days (classified as "probable" case).

C. Case Investigation

- **DPH Responsibility:** The DPH Immunization Program ensures that the appropriate diagnostic work has been completed and works in collaboration with LHD to ensure that contacts of each case-patient have been identified, and appropriate recommendations (e.g., vaccination, exclusion) have been made.
- **LHD Responsibility:** The LHD is involved with case investigation and control measures under DPH guidance as necessary.

D. Control Measures

The DPH Immunization Program (860-509-7929) should be contacted for guidance on control measures and further action, if necessary.

Fact Sheet

What causes pertussis?

Pertussis, commonly known as whooping cough, is caused by a bacterium, *Bordetella pertussis.*

How does pertussis spread?

Pertussis is spread through the air by infectious droplets and is highly contagious.

How long does it take to show signs of pertussis after being exposed?

The incubation period of pertussis is commonly 7 to 10 days, with a range of 4–21 days.

What are the symptoms of pertussis?

Pertussis disease can be divided into three stages:

Catarrhal stage: can last 1–2 weeks and includes a runny nose, sneezing, low-grade fever, and a mild cough (all similar symptoms to the common cold).

Paroxysmal stage: usually lasts 1–6 weeks, but can persist for up to 10 weeks. The characteristic symptom is a burst, or paroxysm, of numerous, rapid coughs. At the end of the cough paroxysm, the patient can suffer from a long inhaling effort that is characterized by a high-pitched whoop (hence the name, "whooping cough"). Infants and young children often appear very ill and distressed, and may turn blue and vomit. “Whooping” does not necessarily have to accompany the cough.

Convalescent stage: usually lasts 2–6 weeks, but may last for months. Although the cough usually disappears after 2–3 weeks, paroxysms may recur whenever the patient suffers any subsequent respiratory infection. The disease is usually milder in adolescents and adults, consisting of a persistent cough similar to that found in other upper respiratory infections. However, these individuals are still able to transmit the disease to others, including unimmunized or incompletely immunized infants.

How serious is pertussis?

Pertussis can be a very serious disease, especially for infants. Infants (6 months of age and younger) are the children most likely to die from this disease. Rates of hospitalization and complications increase with decreasing age. The breathing difficulties associated with this disease can be very distressing and frightening for the patient and his or her family.
Although adults are less likely than infants to become seriously ill with pertussis, most make repeated visits for medical care and miss work, especially when pertussis is not initially considered as a reason for their long-term cough. In addition, adults with pertussis infection have been shown to be a frequent source of infection to infants with whom they have close contact.

What are possible complications from pertussis?

Younger patients have a greater chance of complications from pertussis than older patients. The most common complication is secondary bacterial infection, which is the cause of most pertussis-related deaths. Pneumonia occurs in one out of 20 cases; this percentage is higher for infants younger than age 6 months.

Infants are also more likely to suffer from such neurologic complications such as seizures and encephalopathy, probably due to the reduction of oxygen supply to the brain. Other less serious complications include ear infection, loss of appetite, and dehydration.

Adults with pertussis can have complications such as pneumonia (up to 5% of cases) and rib fracture from coughing (up to 4% of cases). Other reported side effects include (among others), loss of consciousness, female urinary incontinence, hernias, angina, and weight loss.

How do I know if my child has pertussis?
The diagnosis of pertussis is usually made based on its characteristic history and physical examination. A laboratory test may be done, which involves taking a specimen from the back of the patient's throat (through the nose).

Is there a treatment for pertussis?
Antibiotics are necessary in treating pertussis cases. The drug of choice is usually a form of erythromycin that is also given to all household and other close contacts of the patient to minimize transmission, regardless of age and vaccination status. Patients also need supportive therapy such as bed rest, fluids, and control of fever.

All close contacts younger than seven years of age should complete their DTaP vaccine series if they have not already done so. If they have completed their primary four dose series, but have not had a dose from age 4 to 6 years, they should be given a booster dose if it has been at least 6 months since the last dose. People age 10 years and older should receive a dose of Tdap if they haven't received it already.

How long is a person with pertussis contagious?
People with pertussis are most infectious during the catarrhal period and during the first two weeks after onset of the cough (approximately 21 days).

How common is pertussis in the United States?
Before a vaccine against pertussis was available, pertussis (whooping cough) was a major cause of childhood illness and death in the United States. From 1940–1945, over one million cases of pertussis were reported. With the introduction of a vaccine in the late 1940s, the number of reported pertussis cases in the U.S. declined from approximately 200,000 a year in the pre-vaccine era to a low of 1,010 cases in 1976.

Since the 1980s, the number of cases of pertussis has increased, especially among babies younger than 6 months and teenagers. In recent years, several states have reported a significant increase in cases, with outbreaks of pertussis reaching epidemic levels in some states. Many infants have died from whooping cough during this epidemic.

Can you get pertussis more than once?
Reinfection appears to be uncommon but does occur. With natural infection, immunity to pertussis will likely wane as soon as seven years following disease; reinfection may present as a persistent cough, rather than typical pertussis.

When did vaccine first become available for diphtheria, tetanus, and pertussis?
The first inactivated toxin, or toxoid, against diphtheria was developed around 1921, but it was not widely used until the 1930s. In 1924, the first tetanus toxoid (inactivated toxin) was produced and was used successfully to prevent tetanus in the armed services during World War II. The first pertussis vaccine was developed in the 1930s and was in widespread use by the mid-1940s, when pertussis vaccine was combined with diphtheria and tetanus toxoids to make the combination DTP vaccine. A series of 4 doses of whole-cell DTP vaccine was quite (70–90%) effective in preventing serious pertussis disease; however, up to half of the children who received the vaccine developed local reactions such as redness, swelling, and pain at the injection site. In 1991, concerns about safety led to the development of more purified (acellular) pertussis vaccines that are associated with fewer side effects. These acellular pertussis vaccines have replaced the whole cell DTP vaccines in the U.S.

In 2005, two new vaccine products were licensed for use in adolescents and adults that combine the tetanus and diphtheria toxoids with acellular pertussis (Tdap) vaccine. These vaccines are the

first acellular pertussis-containing vaccines that make it possible to vaccinate adolescents and adults against pertussis.

How are vaccines made that prevent diphtheria, tetanus and pertussis?

These vaccines are made by chemically treating the diphtheria, tetanus, and pertussis toxins to render them nontoxic yet still capable of eliciting an immune response in the vaccinated person. They are known as "inactivated" vaccines because they do not contain live bacteria and cannot replicate themselves, which is why multiple doses are needed to produce immunity.

What's the difference between all the vaccines containing diphtheria and tetanus toxoids and pertussis vaccine?

It's like alphabet soup! Here is a listing of the various products:

- DTaP: Diphtheria and tetanus toxoids and acellular pertussis vaccine; given to infants and children ages 6 weeks through 6 years. In addition, three childhood combination vaccines include DTaP as a component.
- DT: Diphtheria and tetanus toxoids, without the pertussis component; given to infants and children ages 6 weeks through 6 years who have a contraindication to the pertussis component.
- Tdap: Tetanus and diphtheria toxoids with acellular pertussis vaccine; given to adolescents and adults, usually as a single dose; the exception is pregnant women who should receive Tdap during each pregnancy.
- Td: Tetanus and diphtheria toxoids; given to children and adults ages 7 years and older. Note the small "d" which indicates a much smaller quantity of diphtheria toxoid than in the pediatric DTaP formulation.

How are these vaccines given?

The DTaP and DT preparations are all given as an injection in the anterolateral thigh muscle (for infants and young toddlers) or in the deltoid muscle (for older children and adults). Tdap and Td are given in the deltoid muscle for children and adults age 7 years and older.

Who should get these vaccines?

All children, beginning at age 2 months, and all adults need protection against these three diseases— diphtheria, tetanus, and pertussis (whooping cough). Routine booster doses are also needed throughout life.

How many doses of vaccine are needed?

The usual schedule for infants is a series of four doses of DTaP given at 2, 4, 6, and 15–18 months of age. A fifth shot, or booster dose, is recommended between age 4 and 6 years, unless the fourth dose was given late (after the fourth birthday).

For people who were never vaccinated or who may have started but not completed a series of shots, a 3-dose series of Td should be given with 1 to 2 months between dose #1 and #2, and 6 to 12 months between dose #2 and #3. One of the doses, preferably the first, should also contain the pertussis component in the form of Tdap.

Because immunity to diphtheria and tetanus wanes with time, boosters of Td are needed every ten years.

When adolescents and adults are scheduled for their routine tetanus and diphtheria booster, should they get vaccinated with Td or Tdap?

Immunization experts recommend that the first dose of Tdap be given to all adolescents at age 11–12 years as a booster during the routine adolescent immunization visit if the adolescent has finished the childhood DTaP schedule and has not already received a dose of Td or Tdap. If a

child age 7–10 years did not complete a primary series in childhood, a dose of Tdap may be given earlier as part of the catch-up vaccinations.

All adults should receive a single dose of Tdap as soon as feasible. Then, subsequent booster doses of Td should be given every ten years. Pregnant teens and women should receive Tdap during each pregnancy. Adolescents and adults who have recently received Td vaccine can be given Tdap without any waiting period.

If someone experiences a deep or puncture wound, or a wound contaminated with dirt, an additional booster dose may be given if the last dose was more than five years ago. This could be a dose of Td or Tdap, depending on the person's vaccination history. It is important to keep an up-to-date record of all immunizations so that repeat doses don't become necessary. Although it is vital to be adequately protected, receiving more doses than recommended can lead to increased local reactions, such as painful swelling of the arm.

Who recommends the use of these vaccines?

The Centers for Disease Control and Prevention (CDC), the American Academy of Pediatrics (AAP), the American Academy of Family Physicians (AAFP), and the American College of Physicians (ACP) all recommend this vaccine.

What side effects have been reported with these vaccines?

Local reactions, such as fever, redness and swelling at the injection site, and soreness and tenderness where the shot was given, are not uncommon in children and adults. These minor local and systemic adverse reactions are much less common with acellular DTaP vaccine; however, a determination of more rare adverse effects can only be made when additional data are available following extended use of DTaP.

Side effects following Td or Tdap in older children and adults include redness and swelling at the injection site (following Td) and generalized body aches, and tiredness (following Tdap). Older children and adults who received more than the recommended doses of Td/Tdap vaccine can experience increased local reactions, such as painful swelling of the arm. This is due to the high levels of tetanus antibody in their blood.

How effective are these vaccines?

After a properly spaced primary series of DTaP or Td/ Tdap, approximately 95% of people will have protective levels of diphtheria antitoxin and 100% will have protective levels of tetanus antitoxin in their blood. However, antitoxin levels decrease with time so routine boosters with tetanus and diphtheria toxoids are recommended every 10 years. Estimates of acellular pertussis vaccine efficacy range from 80% to 85%—a level believed to be far more efficacious than the previously-used whole cell pertussis vaccine.

Can a pregnant woman receive Tdap vaccine?

Yes. All pregnant women should receive Tdap during each pregnancy, preferably between 27 and 36 weeks' gestation. Because infants are not adequately protected against pertussis until they have received at least 3 doses of DTaP, it is especially important that all contacts (family members, caregivers) of infants younger than age 12 months are vaccinated with Tdap. If a new mother hasn't been vaccinated with Tdap, she should receive it before hospital discharge, even if she is breastfeeding.

Who should not receive these vaccines?

Generally, any person who has had a serious allergic reaction to a vaccine component or a prior dose of the vaccine should not receive another dose of the same vaccine. People who had a serious allergic reaction to a previous dose of DTaP or Tdap vaccine should not receive another dose.

Certain rare adverse events following pertussis vaccination usually serve as a precaution against receiving further doses. Such events include a temperature of 105°F or higher within two days, collapse or shock-like state within two days, persistent crying for more than three hours within two days, or convulsions within three days. Even if one of these precautions exists, there may be occasions when the benefit of immunization outweighs the risk (for example, during a community-wide outbreak of pertussis). A person who developed one of these adverse events after pediatric DTaP vaccine may receive Tdap as an adolescent or adult.

A person with a recognized, possible, or potential neurologic condition should delay receiving DTaP or Tdap vaccine until the condition is evaluated, treated, and/or stabilized. Although DTaP vaccine does not cause neurological disorders, receiving the vaccine can cause an already-present underlying condition to show itself.

Can the vaccine cause the disease?

No.

Immunization Action Coalition

Technically reviewed by the Centers for Disease Control and Prevention, July 2013.

- **THE DISEASE AND ITS EPIDEMIOLOGY**

A. Etiologic Agent

Pneumococcal disease is caused by the bacterium *Streptococcus pneumoniae.* There are more than 90 serotypes. While most types can cause disease, the 11 most common serotypes cause at least 75% of invasive disease.

B. Description of Illness

- ***General facts:*** Pneumococcal disease is a vaccine-preventable disease. Following the introduction of the 7-valent pneumococcal conjugate vaccine (PCV7) in 2000, dramatic declines in invasive pneumococcal disease were reported among children less than 5 years old. Rates of PCV7-type invasive pneumococcal disease among children in this age group dropped from around 80 cases per 100,000 population to less than 1 case per 100,000 by 2007 and continue to be low. The use of PCV7 also reduced the burden of invasive pneumococcal disease among older children and adults through reduced transmission of vaccine serotype pneumococci (herd protection). With the introduction of the 13-valent pneumococcal conjugate vaccine (PCV13) in 2010, cases of invasive disease due to the additional serotypes covered by PCV13 but not by PCV7 also decreased substantially.

- ***Occurrence:*** Until 2000, *S. pneumoniae* infections caused 100,000 – 135,000 hospitalizations for pneumonia, 6 million cases of otitis media, and 60,000 cases of invasive disease, including 3,300 cases of meningitis. Incidence from sterile-site infections showed geographic variation from 21 – 33 cases per 100,000 population. These figures decreased substantially following the introduction of the conjugate vaccine in children in 2000. Pneumococcal infections are most prevalent during winter months; most common in infants, young children, and the elderly; and more common in black individuals and some American Indian populations than in other racial and ethnic groups.

- ***Incubation period:*** The incubation period can vary by type of infection and can be as short as 1 – 3 days.

- ***Common symptoms*:** There are three major conditions caused by invasive pneumococcal disease: pneumonia, bacteremia, and meningitis. They are all caused by infection with the same bacteria, but have different symptoms.

- ***Treatment:*** Penicillin is the drug of choice for treatment of pneumococcal disease; however, resistance to penicillin and other antibiotics has been on the rise. Studies indicate that in some areas of the United States up to 40% of pneumococci are resistant to common antibiotics. Treating patients infected with resistant organisms requires expensive alternative antimicrobial agents and may result in prolonged hospital stays. The increased difficulty of treating serious bacterial infection makes prevention through vaccination even more important.

C. Reservoirs

S. pneumoniae is a human pathogen. The reservoir for pneumococci is presumably the nasopharynx of asymptomatic human carriers. There is no animal or insect vector.

D. Modes of Transmission

Transmission of *S. pneumoniae* occurs as the result of direct person-to-person contact via respiratory droplets and b autoinoculation in persons carrying the bacteria in their upper respiratory tract. The pneumococcal serotypes most often responsible for causing infection

are those most frequently found in carriers. The spread of the organism within a family or household is influenced by such factors as crowding, season, and the presence of upper respiratory infections or pneumococcal disease such as pneumonia or otitis media. The spread of pneumococcal disease is usually associated with increased carriage rates. However, high carriage rates do not appear to increase the risk of disease transmission in households.

E. Period of Communicability

The exact period of communicability is unknown. It appears transmission can occur as long as the organism remains in respiratory secretions. Treatment with an appropriate antibiotic renders an individual non-infectious within 24 – 48 hours.

- **ACTIONS REQUIRED/CONTROL MEASURES**

A. Reporting Requirements

Invasive pneumococcal disease is physician reportable by mail within 12 hours of recognition or strong suspicion to both the Connecticut Department of Public Health (DPH) and the local health department (LHD). The director of any clinical laboratory must also report laboratory evidence of invasive pneumococcal disease to both the DPH and LHD.

Additional requirements: All isolates yielding *S. pneumoniae* from invasive sterile sites must be submitted to the DPH State Laboratory for confirmation. See current list of Physician Reportable Diseases (Attachment A) and Laboratory Report of Significant Findings (Attachment C).

B. Case Definition

- **Clinical Description:** Invasive pneumococcal disease may produce any of several clinical syndromes, including meningitis, bacteremia, and pneumonia.
- **Laboratory criteria for diagnosis:** Isolation of *S. pneumoniae* from a normally sterile site (e.g., blood, cerebrospinal fluid, joint fluid, pleural fluid, peritoneal fluid, etc.).
- **Confirmed Case:** A clinically compatible case that is laboratory confirmed.

C. Case Investigation

- **DPH Responsibility:** The DPH Epidemiology Program obtains additional case data by completing a detailed report form through medical chart review. Information is forwarded to the Centers for Disease Control and Prevention.
- **LHD Responsibility:** No action required.

D. Control Measures

No specific control measures are recommended.

Fact Sheet

What causes pneumococcal disease?

Pneumococcal disease is caused by the bacterium *Streptococcus pneumoniae*, also called pneumococcus. There are more than 90 subtypes. Most subtypes can cause disease, but only a few produce the majority of invasive pneumococcal infections. The 10 most common subtypes cause 62% of invasive disease worldwide.

How does pneumococcal disease spread?

The disease is spread from person to person by droplets in the air. The pneumococci bacteria are common inhabitants of the human respiratory tract. They may be isolated from the nasal passages and throat of 5%–70% of normal, healthy adults, depending on the population and setting.

What diseases can pneumococci bacteria cause?

There are three major conditions caused by pneumococci: pneumonia, bacteremia, and meningitis. They are all caused by infection with the same bacteria, but have different symptoms.

Pneumococcal pneumonia (lung disease) is the most common disease caused by pneumococcal bacteria. The incubation period is short (1–3 days). Symptoms include abrupt onset of fever, shaking chills or rigors, chest pain, cough, shortness of breath, rapid breathing and heart rate, and weakness. As many as 400,000 hospitalizations from pneumococcal pneumonia are estimated to occur annually in the United States. Pneumococci account for about 30% of adult community-acquired pneumonia. Complications of pneumococcal pneumonia include empyema (infection of the pleural space), pericarditis (inflammation of the sac surrounding the heart), and respiratory failure. The fatality rate is 5%–7% and may be higher than 50% among elderly people. About 12,000 cases of pneumococcal bacteremia (blood infection) occur each year in the United States. Pneumococcal bacteremia occurs in about 25%–30% of patients with pneumococcal pneumonia. Bacteremia is the most common clinical presentation among children age two years and younger, accounting for 40% of invasive disease in this group. The overall case-fatality rate for bacteremia is about 15% but may be as high as 60% among elderly people. Patients with asplenia who develop bacteremia may experience a severe illness.

Pneumococci cause 50% of all cases of bacterial meningitis (infection of the covering of the brain or spinal cord) in the United States. There are an estimated 3,000 cases of pneumococcal meningitis each year. Symptoms may include headache, tiredness, vomiting, irritability, fever, seizures, and coma. The case-fatality rate of pneumococcal meningitis is 10% but may be higher among elderly people. Permanent neurologic damage is common among survivors. People with a cochlear implant appear to be at increased risk of pneumococcal meningitis. With the decline of invasive Hib disease, pneumococci has become the leading cause of bacterial meningitis among children younger than 5 years of age in the United States.

Pneumococci are also a common cause of acute otitis media (middle ear infection). By age 12 months, more than 60% of children have had at least one episode of acute otitis media. Approximately 28%– 55% of such ear infections are caused by *S. pneumoniae*. In the United States, there were 5 million cases of otitis media each year in children younger than age five years prior to the use of the pneumococcal conjugate vaccine. Middle ear infections are the most frequent reason for pediatric office visits in the United States, resulting in more than 20 million visits annually. Complications of pneumococcal otitis media may include infection of the mastoid bone of the skull and meningitis.

How serious is pneumococcal disease?

Pneumococcal disease is a serious disease that causes much sickness and death. An estimated 31,600 cases and 3,300 deaths from invasive pneumococcal diseases (bacteremia and

meningitis) are estimated to have occurred in the United States in 2012. Many of these cases occurred in adults for whom pneumococcal polysaccharide vaccine was recommended. Young children and the elderly (individuals younger than age five years as well as those older than age 65 years) have the highest incidence of serious disease.

Case-fatality rates are highest for meningitis and bacteremia, and the highest mortality occurs among the elderly and patients who have underlying medical conditions. Despite appropriate antimicrobial therapy and intensive medical care, the overall case-fatality rate for pneumococcal bacteremia is about 15% among adults. Among elderly patients, this rate may be as high as 60%.

Before the routine use of a vaccine for children in the United States, pneumococcal disease was a significant problem in children younger than age five years. Each year it was responsible for causing 700 cases of meningitis, 13,000 blood infections, five million ear infections, and 200 deaths.

Is there a treatment for pneumococcal disease?

Penicillin is the drug of choice for treatment of pneumococcal disease; however, resistance to penicillin and other antibiotics has been on the rise. In 2011, an estimated 31% of pneumococcal bacteria were resistant to one or more antibiotics. How common drug resistance is depends on what part of the country you live in. Treating patients infected with resistant organisms requires expensive alternative antimicrobial agents and may result in prolonged hospital stays. The increased difficulty of treating this serious bacterial infection makes prevention through vaccination even more important.

How long is a person with pneumococcal disease contagious?

The exact period of communicability is not known. It appears that transmission can occur as long as the organism remains in respiratory secretions.

Can you get pneumococcal disease more than once?

Yes. There are more than 90 known subtypes of pneumococcus bacteria, with 23 subtypes included in the current pneumococcal polysaccharide (adult) vaccine and 13 subtypes included in the current conjugate (child) vaccine. Having been infected with one type does not always make the patient immune to other types. Even if an individual has had one or more episodes of invasive pneumococcal disease, he or she needs to be vaccinated.

When did pneumococcal vaccine become available?

There are two types of pneumococcal vaccine — pneumococcal polysaccharide vaccine and pneumococcal conjugate vaccine.

The first pneumococcal polysaccharide vaccine, containing 14 serotypes, was licensed in the United States in 1977. In 1983, an improved pneumococcal polysaccharide vaccine (Pneumovax, Merck) was licensed, containing purified polysaccharide from 23 types of pneumococcal bacteria. This pneumococcal polysaccharide vaccine is commonly known as PPSV23. The PPSV23 vaccine is licensed for routine use in adults 65 years and older and people with certain risk factors who are age 2 through 64 years.

The first pneumococcal conjugate vaccine, PCV7 (Prevnar 7, Pfizer), was licensed in 2000. In 2010, an improved pneumococcal conjugate vaccine (PCV13; Prevnar 13, Pfizer) was licensed and replaced PCV7 for use in the routine vaccination of children. PCV13 offers additional protection against the types of pneumococcal bacteria that cause the majority of invasive pneumococcal disease in the United States. PCV13 is recommended for use in preventing pneumococcal disease in all infants and young children, beginning as young as 6 weeks. In 2014, ACIP decided PCV13 is also recommended for all adults age 65 years or older, as well as in certain adults ages 19 through 64 years at increased risk of invasive pneumococcal disease.

Following the introduction of PCV7 for children in 2000, the incidence of pneumococcal disease decreased significantly. At the time of its introduction, about 80% of disease was caused by the 7 serotypes contained in the vaccine. After the vaccine was introduced, there was a rapid reduction in disease caused by those serotypes and a rise of serotypes not covered in the vaccine. There also has been a substantial decline in the rate of invasive pneumococcal disease caused by the seven serotypes in unvaccinated adults, probably due to a reduction in transmission from vaccinated children to their family members and other close contacts.

What kind of vaccines are they?

Both pneumococcal vaccines are made from inactivated (killed) bacteria. The pneumococcal polysaccharide vaccine (PPSV23) contains long chains of polysaccharide (sugar) molecules that make up the surface capsule of the bacteria. Generally speaking, pure polysaccharide vaccines do not work well in children younger than 2 years, induce only short-term immunity, and multiple doses do not provide a "boost" to immunity.

The pneumococcal conjugate vaccine includes purified capsular polysaccharides from the bacteria that are "conjugated" (or joined) to a protein (a harmless variety of diphtheria toxin). The resultant conjugate vaccine is able to produce an immune response in infants and antibody booster response to multiple doses of vaccine.

How is this vaccine given?

The polysaccharide vaccine (PPSV23) can be given as a shot in either the muscle or the fatty tissue of the arm or leg. The conjugate vaccine (PCV13) is given as a shot in the muscle.

Who should get the pneumococcal polysaccharide vaccine (PPSV23)?

- All adults age 65 years or older
- Anyone age two years or older who has a long-term health problem such as cardiovascular disease, sickle cell anemia, alcoholism, lung disease, diabetes, cirrhosis, or leaks of cerebrospinal fluid
- Anyone who has or is getting a cochlear implant (a surgically implanted device that provides a sense of sound to a person who is profoundly deaf or severely hard of hearing)
- Anyone age two years or older who has a disease or condition that lowers the body's resistance to infection, such as Hodgkin's disease, kidney failure, nephrotic syndrome, lymphoma, leukemia, multiple myeloma, HIV infection or AIDS, damaged spleen or no spleen, or organ transplant
- Anyone age two years or older who is taking any drug or treatment that lowers the body's resistance to infection, such as long-term steroids, certain cancer drugs, or radiation therapy
- Adults ages 19 through 64 years who have asthma
- Adults ages 19 through 64 years who smoke cigarettes
- In special situations, public health authorities may recommend the use of PPSV23 after PCV13 for Alaska Native or American Indian children ages 24 through 59 months who are living in areas in which risk of invasive pneumococcal disease is increased.
- In special situations, public health authorities may recommend PPSV23 for Alaska Natives and American Indians ages 50 through 64 years who are living in areas in which the risk of invasive pneumococcal disease is increased.

Who should get the pneumococcal conjugate vaccine (PCV13)?

All infants beginning at two months of age should receive a four-dose series of vaccine; catch-up vaccination is recommended for children younger than age 5 years who did not receive vaccine on schedule. In addition, all healthy children younger than 5 years who have completed an age-appropriate schedule of vaccination with the earlier PCV7 vaccine are recommended to receive

one additional dose of PCV13 as are children with specific medical conditions who haven't yet reached their 6th birthday.

One dose of PCV13 vaccine should be administered to adults age 65 years or older. One dose of PCV13 should also be given to persons ages 19 through 64 years who have not previously received PCV13 and who are at the highest risk of serious pneumococcal disease. This includes adults with functional or anatomic asplenia, those with chronic renal failure or nephrotic syndrome, a cerebrospinal fluid leak, cochlear implant, and those who are immunocompromised (including HIV infection), on immunosuppressive therapy, or have received an organ or bone marrow transplant.

What is the schedule for the routine doses of PCV13 for children?

All infants and toddlers should get four doses of PCV13 vaccine, usually given at ages two, four, six, and 12 through 15 months.

Can older children be given PCV13?

Yes. Children ages 6 through 18 years who are at increased risk for pneumococcal disease because of sickle cell disease, HIV infection, or other immunocompromising condition; have a cochlear implant; or have a cerebrospinal fluid leak should be vaccinated. These children may get a single dose of PCV13 regardless of their history with PCV7 or PPSV23.

What if my three-year-old child never got his PCV13 shots?

The number of doses a child needs to complete the series depends on his or her current age. Older children need fewer doses. For example, a healthy unvaccinated child age 24 through 59 months needs a single dose of PCV13. Your healthcare provider can tell you how many doses are needed to complete the series at a certain age. PCV13 is not routinely recommended for individuals who are age five years or older but is recommended for certain older children and adults who have a medical condition that increases their risk of pneumococcal disease.

You can find more information about pneumococcal vaccination schedules for children at http://www.immunize.org/catg.d/p2016.pdf.

Do some children need to get both PCV13 and PPSV23?

Yes, children at high risk of invasive pneumococcal disease should receive PCV13 and then also receive PPSV23 when age two years or older. PPSV23 is not given routinely to healthy children.

If influenza vaccine is recommended for healthcare personnel to protect high-risk patients from getting influenza, why isn't pneumococcal vaccine also recommended?

Influenza virus is easily spread from healthcare personnel to their patients, and infection usually leads to clinical illness. Pneumococcus is probably not spread from healthcare personnel to their patients as easily as is influenza, and transmission of pneumococcus does not necessarily lead to clinical illness. Host factors (such as age and underlying illness) are more important in the development of invasive pneumococcal disease than just having the bacteria in one's nose or throat.

My elderly neighbor got a second pneumococcal shot. I thought just one was required.

All adults should receive a dose of PCV13 and PPSV23 at age 65 years. The PCV13 should be given first followed by the PPSV23 6–12 months later. Adults should receive only one dose of PCV13. Most people who receive PPSV23 need only one dose. However an additional dose of PPSV23 (at least 5 years after the first dose) is recommended for people at highest risk of serious infection. For example, people who received a first dose of PPSV23 when they were younger than age 65 years should receive a second dose at age 65 years if at least five years have elapsed since the previous dose.

Likewise, people age two years through 64 years who are at high risk for pneumococcal disease due to certain long-term health problems, in particular immunosuppression, HIV infection, and not having a functional spleen (or having no spleen) should get a second dose five years after the first dose, and then a third and final dose once they are age 65 years. A maximum of three lifetime doses of PPSV23 are currently recommended.

If I have already received at dose of PPSV23 at age 65 years should I still receive PCV13?
Yes. People who have previously received PPSV23 but have not received PCV13 should receive one dose of PCV13 at least 12 months after the most recent PPSV23 dose. Likewise, people age two years through 64 years who are at high risk for pneumococcal disease due to certain long-term health problems, in particular immunosuppression, HIV infection, and not having a functional spleen (or having no spleen) should get a second dose of PPSV23 five years after the first dose, and then a third and final dose once they are age 65 years. A maximum of three lifetime doses of PPSV23 are currently recommended.

Who recommends pneumococcal vaccines?
The Centers for Disease Control and Prevention, the American Academy of Pediatrics, and the American Academy of Family Physicians recommend routine vaccination with PCV13 vaccine. The Centers for Disease Control and Prevention, the American Academy of Pediatrics, the American College of Obstetricians and Gynecologists, the American Academy of Family Physicians, and the American College of Physicians all recommend the PPSV23 vaccine.

Can pregnant women get this vaccine?
Pregnancy is not a contraindication to either PCV13 or PPSV23.

How safe are the pneumococcal vaccines?
PPSV23 and PCV13 are both very safe vaccines. For PPSV23, about 30%–50% of the people who get the vaccine have very mild side effects, such as redness or pain where the shot was given. Fewer than 1% of recipients develop a fever, muscle aches, or more severe local reactions. Serious allergic reactions have been reported very rarely. For PCV13 about 1 out of 3 children have swelling where the shot was given, about 1 of 3 have a mild fever, about 1 in 20 have a higher fever (over 102 ^{0}F), and about 8 out of 10 become fussy or irritable. About half of the children were drowsy after the shot or had a temporary loss of appetite. No serious reactions have been associated with either PPSV23 or PCV13.

How effective is pneumococcal polysaccharide vaccine (PPSV23)?
Overall, PPSV23 is 50%–80% effective in preventing invasive disease. Older adults (that is older than age 65 years) and people with significant underlying illnesses do not respond as well, but vaccination with PPSV23 is still recommended because they are at high risk of developing severe pneumococcal disease.

Who should NOT receive pneumococcal vaccine?
For both PPSV23 and PCV13, people who had a severe allergic reaction to one dose should not receive another (such reactions are rare). People who have a moderate or severe acute illness should wait until their condition improves to be vaccinated.

Can the vaccine cause pneumococcal disease?
No. Both PPSV23 and PCV13 are inactivated vaccines containing only a portion of the bacteria. The vaccines cannot cause pneumococcal disease.

Immunization Action Coalition

Technically reviewed by the Centers for Disease Control and Prevention, October 2014

1) THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent

Poliomyelitis is a highly contagious disease caused by three serotypes of poliovirus that can cause paralysis: types 1, 2, and 3. Type 1 is isolated from paralytic cases most often, type 3 less so, and circulation of wild poliovirus type 2 has been interrupted since 1999. Type 1 most frequently causes epidemics. Most vaccine-associated cases are due to type 2 or 3.

B. Description of Illness

- ***General facts:*** Poliomyelitis is a vaccine-preventable disease nearing worldwide eradication. The last case of indigenously acquired poliomyelitis occurred in the United States in 1979 and in the Western Hemisphere in 1991.
- ***Occurrence:*** In the United States, all cases since 1979 have been vaccine-associated paralytic poliomyelitis (VAPP), which is attributable to the oral poliovirus (OPV) vaccine. An average of 8 VAPP cases occurred in the United States between 1980 and 1996. In 2000, the United States instituted an all-inactivated poliovirus (IPV) vaccine schedule, ending the occurrence of VAPP in this country.
- ***Incubation period:*** Commonly 6 – 20 days (range of 3 to possibly 35 days).
- ***Common symptoms*:** Approximately 95% of poliovirus infections are asymptomatic; 4% – 8% of infected individuals have symptoms of a minor, non-specific nature, such as sore throat and fever, nausea, vomiting, malaise and headache. About 1% – 2% of infected individuals develop non-paralytic aseptic meningitis, with temporary stiffness of the neck, back, and/or legs. Less than 2% of all polio infections result in the classic "flaccid paralysis," where the patient is left with permanent weakness or paralysis of the legs, arms, or both. Adults who contracted paralytic poliomyelitis during childhood may develop postpolio syndrome 30 – 40 years later. Postpolio syndrome is characterized by slow onset of muscle pain and exacerbation of weakness.
- ***Treatment:*** There is no treatment for polio. Persons infected with polio need supportive therapy, such as bed rest and fluids. Standard precautions should be taken to avoid passing on the virus through any contamination from the patient's stool.

C. Reservoirs

Humans are the only source of infection.

D. Modes of Transmission

Poliovirus is spread person to person, primarily through the fecal-oral route. However, it may also spread through oral and nasal secretions. In rare instances, milk, foodstuffs, and other materials contaminated with feces have been incriminated as vehicles.

E. Period of Communicability

Communicability of poliovirus is greatest shortly before and after onset of clinical illness when the virus is present in the throat and excreted in high concentration in feces. The virus persists in the throat for approximately 1 week after the onset of illness and is excreted in feces for several weeks. Patients are potentially contagious for as long as fecal excretion persists.

2) ACTIONS REQUIRED/CONTROL MEASURES

A. Reporting Requirements

Poliomyelitis is physician reportable by telephone immediately on the day of recognition or strong suspicion to both the Connecticut Department of Public Health (DPH) and the local health department (LHD). A mailed report is also required within 12 hours. The director of any clinical laboratory must also report laboratory evidence of poliomyelitis to both the DPH and the LHD. See current lists of physician Reportable Diseases (Attachment A) and Laboratory Reportable Significant Findings (Attachment C).

B. Case Definition

Poliomyelitis, Paralytic:

Case Classification

- **Probable**
    - Acute onset of a flaccid paralysis of one or more limbs with decreased or absent tendon reflexes in the affected limbs, without other apparent cause, and without sensory or cognitive loss.
- **Confirmed**
    - Acute onset of a flaccid paralysis of one or more limbs with decreased or absent tendon reflexes in the affected limbs, without other apparent cause, and without sensory or cognitive loss; AND in which the patient has:
        - A neurologic deficit 60 days after onset of initial symptoms; OR
        - Died; OR
        - Unknown follow-up status.
- **Comments:** All suspected cases of paralytic poliomyelitis are reviewed by a panel of expert consultants before final classification occurs. Confirmed cases are then further classified based on epidemiologic and laboratory criteria.

Poliovirus infection, nonparalytic:

- **Confirmed**

  Any person without symptoms of paralytic poliomyelitis in whom a poliovirus isolate was identified in an appropriate clinical specimen, with confirmatory typing and sequencing performed by the CDC Poliovirus Laboratory, as needed.

C. Case Investigation

- **DPH Responsibility:** The DPH Immunization Program ensures that the appropriate diagnostic work has been completed and works in collaboration with LHD to ensure that contacts of each case-patient have been identified, and appropriate recommendations (e.g., vaccination, exclusion) have been made.
- **LHD Responsibility:** The LHD is involved with case investigations and control measures under DPH guidance as necessary.

D. Control Measures

The DPH Immunization program (860-509-7929) should be contacted for guidance on control measures and further action, if necessary.

Fact Sheet

What causes polio?
Polio is caused by a virus.

How does polio spread?
Polio is usually spread via the fecal-oral route (i.e., the virus is transmitted from the stool of an infected person to the mouth of another person from contaminated hands or such objects as eating utensils). Some cases may be spread directly via an oral to oral route.

How long does it take to show signs of polio after being exposed?
The incubation period for polio is commonly 6–20 days, with a range of 3–35 days.

What are the symptoms of polio?
Surprisingly, 95% of all individuals infected with polio have no apparent symptoms. Another 4%–8% of infected individuals have symptoms of a minor, non-specific nature, such as sore throat and fever, nausea, vomiting, and other common symptoms of any viral illness. About 1%–2% of infected individuals develop non-paralytic aseptic (viral) meningitis, with temporary stiffness of the neck, back, and/or legs. Less than 1% of all polio infections result in the classic "flaccid paralysis," where the patient is left with permanent weakness or paralysis of legs, arms, or both.

How serious is polio?
Although most cases of polio are mild, the 1% of cases resulting in flaccid paralysis has made polio a feared disease for hundreds of years. Of people with paralytic polio, about 2%–5% of children die and up to 15%–30% of adults die.

Are there any long-term concerns for persons who contracted paralytic polio in childhood?
About 25%–40% of people who suffered from paralytic polio as children develop new symptoms in adulthood (usually after an interval of 30–40 years). This problem is called post-polio syndrome (PPS) and symptoms can include new muscle pain, weakness, or paralysis. PPS is not infectious. For more information or for support for people with post-polio syndrome, go to http://www.post-polio.org.

How is polio diagnosed?
If a person is suspected of being infected, a sample from their stool or throat should be tested for the poliomyelitis virus.

How long is a person with polio contagious?
Patients infected with the polio virus can pass the virus on for 7–10 days before the onset of disease. In addition, they can continue to shed the virus in their stool for 3–6 weeks.

Is there a treatment for polio?
There is no "cure" for polio. People infected with polio need supportive therapy, such as bed rest and fluids. Standard precautions should be taken to avoid passing on the virus through any contamination from the patient's stool.

How common is polio in the U.S.?
Before a polio vaccine was developed, polio epidemics were common in the United States. For example, in the immediate pre-vaccine era (i.e., early 1950s), between 13,000 and 20,000 paralytic cases were reported each year. After the development of the inactivated (Salk) injectable vaccine in 1955 and the live (Sabin) oral vaccine in 1961, the number of polio cases

dropped dramatically. In 1960, there were 2,525 paralytic cases reported, but by 1965 this number had fallen to 61.

Due to a concentrated effort to eradicate polio from the world, there have been no cases of "wild" (i.e., natural) polio acquired in the United States since 1979, and no cases of wild polio acquired in the entire Western Hemisphere since 1991.

How common is polio in the world?

In 1988, the World Health Organization (WHO) adopted the goal of global polio eradication. Although the initial target date of 2000 was not met, substantial progress has been made. In 1988, there were estimated to be 350,000 reported cases of polio in the world; in 2001, just 483 cases were reported. Unfortunately, rumors about the safety of polio vaccine in 2003, and subsequent refusal of vaccine by many parents in Nigeria, led to an increase in cases and spread of the virus to nearby countries that had previously been polio free. In 2003, there were 784 reported cases; in 2004, there were 1,255 reported cases.

Wild polio currently exists only in a few countries in Asia and Africa. In 2014, only 359 cases of polio were reported from nine countries, according to the Global Polio Eradication Initiative. About 95% of all cases were reported from Pakistan, Afghanistan, or Nigeria. Many organizations have been working hard toward eradicating polio including the World Health Organization, the United Nations Children's Fund (UNICEF), the Centers for Disease Control and Prevention (CDC), Rotary International, the Bill and Melinda Gates Foundation, and many other international and national groups. Strategies include house-to-house vaccination and National Immunization Days, where even warring factions have called temporary cease fires to allow children to be vaccinated.

When did the polio vaccine first become available?

The first polio vaccine was an inactivated, or killed, vaccine (IPV) developed by Dr. Jonas Salk and licensed in 1955.

What are the polio vaccines that have followed the first Salk vaccine?

In 1961, a live attenuated (e.g., weakened) vaccine was developed by Dr. Albert Sabin. This vaccine was given as an oral preparation instead of as a shot. By 1963, this oral vaccine had been improved to include protection against three strains of polio and was licensed as "trivalent oral poliovirus vaccine" (OPV). OPV was the vaccine of choice for the United States and most other countries of the world from 1963 until changes in U.S. policy in the 1990s.

In 1988, an enhanced-potency IPV formulation became available and by 1997 had become part of the routine schedule for infants and children, given in a sequential combination with OPV. In 2000, an all-IPV vaccine schedule was adopted in the United States. IPV is also available in combination with other vaccines (e.g., DTaP-HepB-IPV, DTaP-IPV/Hib, or DTaP-IPV).

How is the vaccine administered?

IPV is given as a shot in the arm or leg. OPV is given as an oral liquid. OPV is no longer used in the United States, but is still given in other parts of the world where polio is common.

Why was the U.S. polio immunization recommendation changed from OPV to IPV?

The change to an all-IPV schedule in the United States occurred because the few cases of polio that were occurring (8–10 per year) were caused by the OPV vaccine itself and not the wild virus. The change to IPV protects individuals against paralytic polio, while eliminating the small chance (about once in every 2.4 million doses) of actually contracting polio from the live oral vaccine. OPV is better at stopping the spread of the virus to others, but now that wild (natural) polio has been eliminated from the Western Hemisphere, this advantage is no longer a consideration in the United States. IPV has been used exclusively in the United States since 2000. However, in other countries where wild polio is still a threat, OPV is still used.

Who should get this vaccine?
All infants should get this vaccine unless they have a medical reason not to. A primary series of IPV consists of three properly spaced doses, usually given at two months, four months, and 6–18 months. A booster dose is given at 4–6 years (before or at school entry), unless the primary series was given so late that the third dose was given on or after the fourth birthday.

Does my child need additional doses of polio vaccine if he received a combination of OPV and IPV?
No, four doses of any combination of IPV or OPV, properly spaced, is considered a complete poliovirus vaccination series.

Why should I vaccinate my child against polio if this disease has been eliminated from the Western Hemisphere since 1991?
Polio still exists in parts of Africa and Asia and can easily be imported. When the effort to eliminate polio from the world is successful, polio vaccine will become part of history. But we are not to that point yet.

Should adults get vaccinated against polio?
In the United States, routine vaccination of people 18 years of age and older against polio is not recommended because most adults are already immune and also have little risk of being exposed to wild polio virus. Vaccination is recommended, however, for certain adults who are at increased risk of infection, including travelers to areas were polio is common, laboratory workers who handle specimens that might contain polioviruses, and healthcare workers in close contact with patients who might be excreting wild polioviruses in their stool (e.g., those caring for recent immigrants from central Africa or parts of Asia).

If an adult is at increased risk of exposure and has never been vaccinated against polio, he or she should receive three doses of IPV, the first two doses given 1–2 months apart, and the third 6–12 months after the second. If time will not allow the completion of this schedule, a more accelerated schedule is possible (e.g., each dose separated four weeks from the previous dose).

If an adult at risk previously received only one or two doses of polio vaccine (either OPV or IPV), he or she should receive the remaining dose(s) of IPV, regardless of the interval since the last dose.

If an adult at increased risk previously completed a primary course of polio vaccine (three or more doses of either OPV or IPV), he or she may be given another dose of IPV to ensure protection. Only one “booster” dose of polio vaccine in a person’s lifetime is recommended. It is not necessary to receive a booster dose each time a person travels to an area where polio may still occur.

Who recommends this vaccine?
The Centers for Disease Control and Prevention (CDC), the American Academy of Pediatrics (AAP), and the American Academy of Family Physicians (AAFP) have all recommended that children receive this vaccine.

How safe is this vaccine?
The IPV vaccine is very safe; no serious adverse reactions to IPV have been documented.

What side effects have been reported with this vaccine?
Possible side effects include minor local reactions at the site of injection (e.g., pain, redness).

How effective is this vaccine?

IPV is very effective in preventing polio, but only when all recommended doses are completed. A single dose of IPV produces little or no immunity, but 99% of recipients are immune after three doses.

Who should not receive the polio vaccine?

- Anyone who has ever had a life-threatening allergic reaction to neomycin, streptomycin, or polymyxin B should not get the IPV shot because it contains trace amounts of these antibiotics.
- Anyone who has had a severe allergic reaction to a dose of polio vaccine should not get another one.
- Anyone who is moderately or severely ill at the time the shot is scheduled should usually wait until they recover to get vaccination.

Can the IPV vaccine cause polio?

No, the inactivated polio vaccine (IPV) cannot cause paralytic polio because it contains killed virus only.

Immunization Action Coalition

Technically reviewed by the Centers for Disease Control and Prevention, April 2015.

1) THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent

Tetanus is an acute, often fatal, disease caused by an exotoxin produced by *Clostridium tetani. C. tetani* is an anaerobic, spore forming bacterium. The spores enter the body through breaks in the skin and germinate under low oxygen conditions; the exotoxin is produced as the bacteria multiply.

B. Description of Illness

- ***General facts:*** Tetanus is characterized by generalized rigidity and convulsive spasms of skeletal muscles. The muscle stiffness usually involves the jaw (lockjaw) and neck and then becomes generalized. *C. tetani* spores are widely distributed in soil and in the intestine and feces of horses, sheep, cattle, dogs, cats, rats, guinea pigs, and chickens. Manure-treated soil may contain large numbers of spores. In agricultural areas, a significant number of human adults may harbor the organism. The spores can also be found on skin surfaces and in contaminated heroin. Laboratory confirmation for tetanus is of little help as the organisms are rarely recovered from the site of infection, and usually there is no detectable antibody response.
- ***Occurrence:*** Tetanus occurs worldwide and is more frequently seen in warmer climates and months, partly because of the frequency of contaminated wounds. In the United States, the reported morbidity and mortality due to tetanus have declined dramatically since the mid-to late 1940s, when tetanus toxoid became available. Tetanus is sporadic and relatively uncommon in the United States and most industrial countries, mostly because of widespread use of tetanus toxoid as part of routine immunizations and improved wound management. During the period 1996 – 2000, a total of 202 cases were reported in the United States: 72 (36%) were aged ≥ 60 years, 116 (57%) were aged 20- 59 years, and 14 (7%) were aged < 20 years, including 2 cases of neonatal tetanus.
- ***Incubation period:*** The incubation period ranges from 3 – 21 days (average 8 days). In neonates the incubation period is usually 5 – 14 days. Shorter incubation periods are associated with more heavily contaminated wounds, more severe disease, and a worse prognosis.
- ***Common symptoms*:** The most common type (about 80%) of reported tetanus is generalized tetanus. The disease usually presents with a descending pattern. The first sign is trismus or lockjaw, followed by stiffness of the neck, difficulty in swallowing, and rigidity of abdominal muscles. Other symptoms include elevated temperature, sweating, elevated blood pressure, and episodic rapid heart rate. Spasms may occur frequently and last for several minutes. Spasms continue for 3 – 4 weeks. Complete recovery may take months.
- ***Treatment:*** Human tetanus immune globulin (TIG) is recommended for treatment in a single dose of 3000 to 6000 U for children and adults. The optimum therapeutic dose has not been established, and doses as small as 500 U have been effective and cause less discomfort to the patient. TIG can only help remove unbound tetanus toxin. It cannot affect toxin bound to nerve endings.

C. Reservoirs

C. tetani are found in the intestines of horses and other animals, including humans, in which the organism is a harmless normal inhabitant. Soil or fomites contaminated with

animal and human feces can act as a reservoir. Tetanus spores are a normal inhabitant of the environment and can contaminate wounds of all types.

D. Modes of Transmission

Transmission is primarily by contaminated wounds. The wound may be major or minor. In recent years, however, a higher proportion of cases had minor wounds, probably because severe wounds are more likely to be properly managed. Tetanus may follow elective surgery, burns, deep puncture wounds, crush wounds, otitis media (ear infections), dental infection, animal bites, abortion, and pregnancy.

E. Period of Communicability

Tetanus is not contagious from person to person. It is the only vaccine-preventable disease that is infectious but not contagious.

2) ACTIONS REQUIRED/CONTROL MEASURES

A. Reporting Requirements

Tetanus is physician reportable by mail within 12 hours of recognition or strong suspicion to both the Connecticut Department of Public Health (DPH) and the local health department (LHD). See current list of physician Reportable Diseases (Attachment A).

B. Case Classification

- **Probable**
  - In the absence of a more likely diagnosis, an acute illness with muscle spasms or hypertonia, **AND**
  - Diagnosis of tetanus by a health care provider; **OR**
  - Death, with tetanus listed on the death certificate as the cause of death or a significant condition contributing to death
- **Comments:** There is no definition for "confirmed" tetanus.

C. Case Investigation

- **DPH Responsibility:** The DPH Immunization Program is responsible for obtaining additional case data for tetanus, which is reportable to the Centers for Disease Control and Prevention (CDC). The additional information is usually obtained by either calling the reporting source or mailing a more detailed report form.
- **LHD Responsibility:** The assistance of the LHD is usually not required, unless there is an urgent need to simultaneously initiate control measures. The Immunization Program will contact the LHD if there is a need for the LHD to become involved.

D. Control Measures

The DPH Immunization program (860-509-7929) should be contacted for guidance on control measures and further action, if necessary.

Fact Sheet

What causes tetanus?

Tetanus is caused by a toxin (poison) produced by the bacterium *Clostridium tetani.* The *C. tetani* bacteria cannot grow in the presence of oxygen. They produce spores that are very difficult to kill as they are resistant to heat and many chemical agents.

How does tetanus spread?

C. tetani spores can be found in the soil and in the intestines and feces of many household and farm animals and humans. The bacteria usually enter the human body through a puncture (in the presence of anaerobic [low oxygen] conditions, the spores will germinate).

Tetanus is not spread from person to person.

How long does it take to show signs of tetanus after being exposed?

The incubation period varies from 3–21 days, with an average of eight days. The further the injury site is from the central nervous system, the longer the incubation period. The shorter the incubation period, the higher the risk of death.

What are the symptoms of tetanus?

The symptoms of tetanus are caused by the tetanus toxin acting on the central nervous system. In the most common form of tetanus, the first sign is spasm of the jaw muscles, followed by stiffness of the neck, difficulty in swallowing, and stiffness of the abdominal muscles.

Other signs include fever, sweating, elevated blood pressure, and rapid heart rate. Spasms often occur, which may last for several minutes and continue for 3–4 weeks. Complete recovery, if it occurs, may take months.

How serious is tetanus?

Tetanus has a high fatality rate. In recent years, tetanus has been fatal in about 10% of reported cases.

What are possible complications from tetanus?

Laryngospasm (spasm of the vocal cords) is a complication that can lead to interference with breathing. Patients can also break their spine or long bones from convulsions. Other possible complications include hypertension, abnormal heart rhythm, and secondary infections, which are common because of prolonged hospital stays.

Obviously, the high probability of death is a major complication.

How is tetanus diagnosed?

The diagnosis of tetanus is based on the clinical signs and symptoms only. Laboratory diagnosis is not useful as the *C. tetani* bacteria usually cannot be recovered from the wound of an individual who has tetanus, and conversely, can be isolated from the skin of an individual who does not have tetanus.

What kind of injuries might allow tetanus to enter the body?

Tetanus bacilli live in the soil, so the most dangerous kind of injury involves possible contamination with dirt, animal feces, and manure. Although we have traditionally worried about deep puncture wounds, in reality many types of injuries can allow tetanus bacilli to enter the body. In recent years, a higher proportion of cases had minor wounds than had major ones, probably because severe wounds were more likely to be properly managed. People can also get tetanus from splinters, self-piercing, and self-tattooing. Injecting drug users are also at risk for tetanus.

I stepped on a nail in our yard. What should I do?

Any wound that may involve contamination with tetanus bacilli should be attended to as soon as possible. Treatment depends on your vaccination status and the nature of the wound. In all cases, the wound should be cleaned. Seek treatment immediately and bring your immunization record with you.

With wounds that involve the possibility of tetanus contamination, a patient with an unknown or incomplete history of tetanus vaccination needs a tetanus-and diphtheria-containing shot (Td or Tdap) and a dose of tetanus immune globulin (TIG) as soon as possible.

A person with a documented series of three tetanus-and diphtheria-containing shots (Td or Tdap) who has received a booster dose within the last ten years should be protected. However, to ensure adequate protection, a booster dose of vaccine may still be given if it has been more than five years since the last dose and the wound is other than clean and minor.

Is there a treatment for tetanus?

There is no "cure" for tetanus once a person develops symptoms, just supportive treatment and management of complications. The best "treatment" is prevention through immunization.

How common is tetanus in the United States?

Tetanus first became a reportable disease in the late 1940s. At that time, there were 500–600 cases reported per year. After the introduction of the tetanus vaccine in the mid-1940s, reported cases of tetanus dropped steadily.

From 2000 through 2007 an average of 31 cases were reported per year.

Almost all cases of tetanus are in people who have never been vaccinated, or who completed their childhood series, but did not have a booster dose in the preceding 10 years.

What is neonatal tetanus?

Neonatal tetanus is a form of tetanus that occurs in newborn infants, most often through the use of an unsterile cutting instrument on the unhealed umbilical stump. These babies usually have no temporary immunity passed on from their mother because their mother usually hasn't been vaccinated and therefore has no immunity.

Neonatal tetanus is very rare in the United States (only two cases have been reported since 1989), but is common in some developing countries. It caused more than 257,000 deaths worldwide each year in the years 2000 to 2003.

Can you get tetanus more than once?

Yes! Tetanus disease does not result in immunity because so little of the potent toxin is required to cause the disease. People recovering from tetanus should begin or complete the vaccination series.

When did vaccine first become available for diphtheria, tetanus, and pertussis?

The first inactivated toxin, or toxoid, against diphtheria was developed around 1921, but it was not widely used until the 1930s. In 1924, the first tetanus toxoid (inactivated toxin) was produced and was used successfully to prevent tetanus in the armed services during World War II. The first pertussis vaccine was developed in the 1930s and was in widespread use by the mid-1940s, when pertussis vaccine was combined with diphtheria and tetanus toxoids to make the combination DTP vaccine. A series of 4 doses of whole-cell DTP vaccine was quite (70–90%) effective in preventing serious pertussis disease; however, up to half of the children who received the vaccine developed local reactions such as redness, swelling, and pain at the injection site. In 1991, concerns about safety led to the development of more purified (acellular) pertussis vaccines that are associated with fewer side effects. These acellular pertussis vaccines have replaced the whole cell DTP vaccines in the U.S.

In 2005, two new vaccine products were licensed for use in adolescents and adults that combine the tetanus and diphtheria toxoids with acellular pertussis (Tdap) vaccine. These vaccines are the first acellular pertussis-containing vaccines that make it possible to vaccinate adolescents and adults against pertussis.

How are vaccines made that prevent diphtheria, tetanus and pertussis?

These vaccines are made by chemically treating the diphtheria, tetanus, and pertussis toxins to render them nontoxic yet still capable of eliciting an immune response in the vaccinated person. They are known as "inactivated" vaccines because they do not contain live bacteria and cannot replicate themselves, which is why multiple doses are needed to produce immunity.

What's the difference between all the vaccines containing diphtheria and tetanus toxoids and pertussis vaccine?

It's like alphabet soup! Here is a listing of the various products:

- DTaP: Diphtheria and tetanus toxoids and acellular pertussis vaccine; given to infants and children ages 6 weeks through 6 years. In addition, three childhood combination vaccines include DTaP as a component.
- DT: Diphtheria and tetanus toxoids, without the pertussis component; given to infants and children ages 6 weeks through 6 years who have a contraindication to the pertussis component.
- Tdap: Tetanus and diphtheria toxoids with acellular pertussis vaccine; given to adolescents and adults, usually as a single dose; the exception is pregnant women who should receive Tdap during each pregnancy.
- Td: Tetanus and diphtheria toxoids; given to children and adults ages 7 years and older. Note the small "d" which indicates a much smaller quantity of diphtheria toxoid than in the pediatric DTaP formulation.

How are these vaccines given?

The DTaP and DT preparations are all given as an injection in the anterolateral thigh muscle (for infants and young toddlers) or in the deltoid muscle (for older children and adults). Tdap and Td are given in the deltoid muscle for children and adults age 7 years and older.

Who should get these vaccines?

All children, beginning at age 2 months, and adults need protection against these three diseases—diphtheria, tetanus, and pertussis (whooping cough). Routine booster doses are also needed throughout life.

How many doses of vaccine are needed?

The usual schedule for infants is a series of four doses of DTaP given at 2, 4, 6, and 15–18 months of age. A fifth shot, or booster dose, is recommended between age 4 and 6 years, unless the fourth dose was given late (after the fourth birthday).

For people who were never vaccinated or who may have started but not completed a series of shots, a 3-dose series of Td should be given with 1 to 2 months between dose #1 and #2, and 6 to 12 months between dose #2 and #3. One of the doses, preferably the first, should also contain the pertussis component in the form of Tdap.

Because immunity to diphtheria and tetanus wanes with time, boosters of Td are needed every ten years.

When adolescents and adults are scheduled for their routine tetanus and diphtheria booster, should they get vaccinated with Td or Tdap?

Immunization experts recommend that the first dose of Tdap be given to all adolescents at age 11–12 years as a booster during the routine adolescent immunization visit if the adolescent has finished the childhood DTaP schedule and has not already received a dose of Td or Tdap. If a child age 7–10 years did not complete a primary series in childhood, a dose of Tdap may be given earlier as part of the catch-up vaccinations.

All adults should receive a single dose of Tdap as soon as feasible. Then, subsequent booster doses of Td should be given every ten years. Pregnant teens and women should receive Tdap during each pregnancy. Adolescents and adults who have recently received Td vaccine can be given Tdap without any waiting period.

If someone experiences a deep or puncture wound, or a wound contaminated with dirt, an additional booster dose may be given if the last dose was more than five years ago. This could be a dose of Td or Tdap, depending on the person's vaccination history. It is important to keep an up-to-date record of all immunizations so that repeat doses don't become necessary. Although it is vital to be adequately protected, receiving more doses than recommended can lead to increased local reactions, such as painful swelling of the arm.

Who recommends the use of these vaccines?

The Centers for Disease Control and Prevention (CDC), the American Academy of Pediatrics (AAP), the American Academy of Family Physicians (AAFP), and the American College of Physicians (ACP) all recommend this vaccine.

What side effects have been reported with these vaccines?

Local reactions, such as fever, redness and swelling at the injection site, and soreness and tenderness where the shot was given, are not uncommon in children and adults. These minor local and systemic adverse reactions are much less common with acellular DTaP vaccine; however, a determination of more rare adverse effects can only be made when additional data are available following extended use of DTaP.

Side effects following Td or Tdap in older children and adults include redness and swelling at the injection site (following Td) and generalized body aches, and tiredness (following Tdap). Older children and adults who received more than the recommended doses of Td/Tdap vaccine can experience increased local reactions, such as painful swelling of the arm. This is due to the high levels of tetanus antibody in their blood.

How effective are these vaccines?

After a properly spaced primary series of DTaP or Td/ Tdap, approximately 95% of people will have protective levels of diphtheria antitoxin and 100% will have protective levels of tetanus antitoxin in their blood. However, antitoxin levels decrease with time so routine boosters with tetanus and diphtheria toxoids are recommended every 10 years. Estimates of acellular pertussis vaccine efficacy range from 80% to 85%—a level believed to be far more efficacious than the previously-used whole cell pertussis vaccine.

Can a pregnant woman receive Tdap vaccine?

Yes. All pregnant women should receive Tdap during each pregnancy, preferably between 27 and 36 weeks' gestation. Because infants are not adequately protected against pertussis until they have received at least 3 doses of DTaP, it is especially important that all contacts (family members, caregivers) of infants younger than age 12 months are vaccinated with Tdap. If a new mother hasn't been vaccinated with Tdap, she should receive it before hospital discharge, even if she is breastfeeding.

Who should not receive these vaccines?

Generally, any person who has had a serious allergic reaction to a vaccine component or a prior dose of the vaccine should not receive another dose of the same vaccine. People who had a serious allergic reaction to a previous dose of DTaP or Tdap vaccine should not receive another dose.

Certain rare adverse events following pertussis vaccination usually serve as a precaution against receiving further doses. Such events include a temperature of 105°F or higher within two days, collapse or shock-like state within two days, persistent crying for more than three hours within two days, or convulsions within three days. Even if one of these precautions exists, there may be occasions when the benefit of immunization outweighs the risk (for example, during a community-wide outbreak of pertussis). A person who developed one of these adverse events after pediatric DTaP vaccine may receive Tdap as an adolescent or adult.

A person with a recognized, possible, or potential neurologic condition should delay receiving DTaP or Tdap vaccine until the condition is evaluated, treated, and/or stabilized. Although DTaP vaccine does not cause neurological disorders, receiving the vaccine can cause an already-present underlying condition to show itself.

Can the vaccine cause the disease?

No.

Immunization Action Coalition

Technically reviewed by the Centers for Disease Control and Prevention, July 2013.

1) THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent

Varicella (chickenpox) is an acute, infectious disease caused by the varicella zoster virus (VZV). The recurrent infection (herpes zoster, also known as shingles) has been recognized since ancient times.

B. Description of Illness

- ***General facts:*** Varicella (chickenpox) is a febrile rash illness resulting from primary infection with the varicella zoster virus (VZV). Humans are the only source of infection for this virus. Varicella is highly infectious with secondary infection rates in susceptible household contacts from 65% – 86%.
- ***Occurrence:*** Occurrence is worldwide. In temperate climates, like the United States, 90% of the population has had chickenpox by age 15 and 95% by young adulthood. Chickenpox is more common in children, whereas shingles is more common in adults.
- ***Incubation period:*** From 10 – 21 days; usually about 14 – 16 days.
- ***Common symptoms*:** The most common symptoms of chickenpox are rash, fever, cough, headache, and loss of appetite. Generally, the rash develops on the scalp and body, and then spreads to the face, arms, and legs. The rash usually forms 200 – 500 itchy blisters in several successive crops with several stages of maturity present at the same time. Symptoms last about 5 – 10 days. Varicella severity and complications are increased among immunocompromised persons, neonates, children less than 1 year of age, and adults. However, healthy children and adults may also develop serious complications and even die from varicella. Serious complications include secondary bacterial infections (most notably caused by group A streptococcus including cellulitis, necrotizing fasciitis, septicemia, and toxic shock syndrome), pneumonia, encephalitis, cerebellar ataxia, Reye's syndrome, and death. In vaccinated persons who develop varicella more than 42 days after vaccination (breakthrough disease), the disease is almost always mild with fewer than 50 skin lesions and a shorter duration of illness. The rash may also be atypical in appearance (maculopapular with a few or no vesicles).
- ***Treatment:*** Most cases of chickenpox in otherwise healthy children are treated with bed rest, fluids, and control of fever. Children with chickenpox should ***not*** receive aspirin because of possible subsequent risk of Reye's syndrome. Acetaminophen may be given for fever control. Chickenpox may be treated with an antiviral drug in serious cases, depending on the patient's age and health, the extent of the infection, and the timing of treatment.

C. Reservoirs

Humans are the only source of infection.

D. Modes of Transmission

Chickenpox is highly contagious and spreads from person to person by direct contact or through the air from an infected person's coughing or sneezing or from aerosolization of virus from skin lesions. The virus can also be spread indirectly through articles freshly soiled

by discharges from vesicles and mucous membranes of infected people. Scabs from varicella lesions are not infectious.

E. Period of Communicability.

As long as 5 days but usually 1 – 2 days before rash onset and continuing until lesions are crusted over (usually about 6 – 8 days). Susceptible individuals should be considered infectious 10 – 21 days following exposure.

2) ACTIONS REQUIRED/CONTROL MEASURES

A. Reporting Requirements

Chickenpox in adults ≥ 18 years and all hospitalized cases are physician reportable immediately by telephone to the Connecticut Department of Public Health (DPH) and the local health department (LHD). Chickenpox in children <18 years old is physician reportable by mail within 12 hours of recognition or strong suspicion to both the DPH and the LHD. The director of any clinical laboratory must also report laboratory evidence of acute chickenpox infection to both the DPH and LHD. See current list of Physician Reportable Diseases (Attachment A) and Laboratory Report of Significant Findings (Attachment C).

In addition to healthcare providers, school and daycare center administrators are requested to report demographics and vaccination status of all cases they hear about using the DPH "Varicella Case Report Form" (Attachment K). A copy of the completed form can be mailed or faxed back to the Immunization Program at 860-509-7945.

B. Clinical Description

An illness with acute onset of diffuse (generalized) maculo-papulovesicular rash without other apparent cause.

- **Laboratory Criteria for Diagnosis**
  - Isolation of varicella virus from a clinical specimen, **OR**
  - Varicella antigen detected by direct fluorescent antibody test, **OR**
  - Varicella-specific nucleic acid detected by polymerase chain reaction (PCR), **OR**
  - Significant rise in serum anti-varicella immunoglobulin G (IgG) antibody level by any standard serologic assay.

Case Classification

- **Probable**
  - An acute illness with
    - Diffuse (generalized) maculo-papulovesicular rash, **AND**
    - Lack of laboratory confirmation, **AND**
    - Lack of epidemiologic linkage to another probable or confirmed case.
- **Confirmed**
  - An acute illness with diffuse (generalized) maculo-papulovesicular rash, **AND**
    - Epidemiologic linkage to another probable or confirmed case, **OR**
    - Laboratory confirmation according to above criteria for diagnosis.
- **Comments**

  Two probable cases that are epidemiologically linked would be considered confirmed, even in the absence of laboratory confirmation.

  In vaccinated persons who develop varicella more than 42 days after vaccination

(breakthrough disease), the disease is almost always mild with fewer than 50 skin lesions and shorter duration of illness. The rash may also be atypical in appearance (maculopapular with few or no vesicles).

Laboratory confirmation of cases of varicella is not routinely recommended; laboratory confirmation is recommended for fatal cases and in other special circumstances.

C. Case Investigation

- **DPH Responsibility:** The DPH Immunization Program ensures that the appropriate diagnostic work has been completed and works in collaboration with LHD to ensure that contacts of each case-patient have been identified, and appropriate recommendations (e.g., vaccination, exclusion) have been made.
- **LHD Responsibility:** The LHD is involved with case investigation and control measures under DPH guidance as necessary.

D. Control Measures

The DPH Immunization Program (860-509-7929) should be contacted for guidance on control measures and further action, if necessary.

Varicella (Chickenpox)

Fact Sheet

What causes chickenpox?
Chickenpox is caused by a virus, the varicella-zoster virus.

How does chickenpox spread?
Chickenpox spreads from person to person by direct contact or through the air by coughing or sneezing. It is highly contagious. It can also be spread through direct contact with the fluid from a blister of a person infected with chickenpox, or from direct contact with a sore from a person with shingles.

How long does it take to show signs of chickenpox after being exposed?
It takes from 10 to 21 days to develop symptoms after being exposed to a person infected with chickenpox. The usual time period is 14–16 days.

What are the symptoms of chickenpox?
The most common symptoms of chickenpox are rash, fever, coughing, fussiness, headache, and loss of appetite. The rash usually develops on the scalp and body, and then spreads to the face, arms, and legs. The rash usually forms 200–500 itchy blisters in several successive crops. The illness lasts about 5–10 days.

How serious is chickenpox?
Many cases of chickenpox are mild, but deaths from this disease can occur. Before vaccine became available, about 100 people died every year in the United States from chickenpox. Most of these people were previously healthy. Chickenpox also accounted for about 11,000 hospitalizations each year. Even children with average cases of chickenpox are uncomfortable and need to be kept out of daycare or school for a week or more.

What are possible complications from chickenpox?
The most common complication is bacterial infection of the skin or other parts of the body including the bones, lungs, joints, and blood. The virus can also lead to pneumonia or infection of the brain. These complications are rare but serious. Complications are more common in infants, adults, and people with weakened immune systems.

How do I know if my child has chickenpox?
Usually chickenpox can be diagnosed by disease history and appearance alone. Adults who need to know if they've had chickenpox in the past can have this determined by a laboratory test. Chickenpox is much less common now than it was before a vaccine became available, so parents, doctors, and nurses are less familiar with it. It may be necessary to perform laboratory testing for children to confirm chickenpox.

How long is a person with chickenpox contagious?
Patients with chickenpox are contagious for 1–2 days before the rash appears and continue to be contagious through the first 4–5 days or until all the blisters are crusted over.

Is there a treatment for chickenpox?
Most cases of chickenpox in otherwise healthy children are treated with bed rest, fluids, and control of fever. Children with chickenpox should NOT receive aspirin because of possible subsequent risk of Reye's syndrome. Acetaminophen may be given for fever control.

Chickenpox may be treated with an antiviral drug in serious cases, depending on the patient's age and health, the extent of the infection, and the timing of the treatment.

Varicella (Chickenpox)

How common is chickenpox in the U.S.?
Because it is so easy to catch chickenpox, almost every adult in the United States has been infected. Until a vaccine became available, there were an estimated four million cases/year. Since the vaccine was licensed in 1995, the number of cases of chickenpox had fallen more than 90%.

Can you get chickenpox more than once?
Most people are immune to chickenpox after having the disease. However, although it is not common, second cases of chickenpox can occur, particularly in immunocompromised people.

If I think my child has been exposed to chickenpox, what should I do?
If the child has had chickenpox or has been vaccinated, nothing needs to be done. It is recommended that a susceptible person (one who has never had chickenpox) receive the chickenpox vaccine as soon as possible after being exposed to the virus. There is evidence that the vaccine may prevent illness or reduce the seriousness of the disease, if given within 3 to 5 days following exposure. Even if the person was not infected with the chickenpox virus from the exposure, receiving the vaccination will prevent future disease.

How are chickenpox and shingles related?
Both chickenpox and shingles are caused by the same virus. After a person has had chickenpox, the virus remains in the body permanently, but silently. About one-third of all people who have been infected with chickenpox later develop the disease known as herpes zoster, or shingles. Symptoms of shingles are pain, itching, blisters, and loss of feeling along a nerve. Most cases occur in people older than 50, and the risk of developing shingles increases with age. In May 2006, the FDA approved a zoster vaccine to prevent shingles. Currently, the zoster vaccine is recommended by CDC's Advisory Committee on Immunization Practices for people age 60 years and older. (See the shingles section for more information about shingles disease and zoster vaccine.)

When did the chickenpox vaccine become available?
The chickenpox (varicella) vaccine was licensed in the United States in 1995. Since that time, the number of hospitalizations and deaths from varicella has declined more than 90%. In 2005, a combination vaccine containing live attenuated measles-mumps-rubella and varicella (MMRV) vaccine was licensed for use in people age 12 months through age 12 years.

What kind of vaccine is it?
The chickenpox vaccine is a live attenuated vaccine. This means the live, disease-producing virus was modified, or weakened, in the laboratory to produce an organism that can grow and produce immunity in the body without causing illness.

How is this vaccine administered?
The chickenpox vaccine is a shot, given in the fatty tissue. It should be given at the same visit as all other recommended vaccines.

Who should get this vaccine?
Chickenpox vaccine is recommended for the following:

- All children younger than age 13 years (one dose at 12–15 months and a second dose at age 4–6 years);
- Everyone age 13 years and older who has never had chickenpox (two doses, given 4–8 weeks apart);

Anyone who is overdue for receiving a dose should get the missed dose at their next visit to their doctor or clinic.

Who recommends this vaccine?

The Centers for Disease Control and Prevention (CDC), the American Academy of Pediatrics (AAP), and the American Academy of Family Physicians (AAFP) have all recommended that children receive this vaccine.

Should adults be tested before vaccination to see if they are already immune to chickenpox?

Currently, 90% of adults are immune to chickenpox because of having had the disease as children. If you have a history of chickenpox disease, you don't need testing or vaccination, unless you are working in an environment where your immune status must be documented (such as in a hospital). If you are uncertain of your medical history, blood testing can be done to see if immunization is appropriate.

How safe is chickenpox (varicella) vaccine?

Tens of millions of doses of varicella vaccine have been given in the United States, and studies continue to show that the vaccine is safe. Serious side effects are very rare.

What side effects have been reported with this vaccine?

Possible side effects are generally mild and include redness, stiffness, and soreness at the injection site; such localized reactions occur in 19% of children immunized and 24% of adolescents and adults (slightly more following the second dose). A small percentage of people develop a mild rash, usually around the spot where the shot was given.

In the several years following the licensure of the combined measles-mumps-rubella (MMR) and varicella vaccines in 2005, surveillance of side effects showed that children who got their first dose as the combined product (MMRV) had more fevers and fever-related seizures (about 1 in 1,250) than children who got the first dose as separate shots of MMR and varicella on the same day. Consequently, in May 2010, the CDC recommended that parents and doctors discuss the risks and benefits of both vaccination options and, unless a clear preference is expressed, the shots should be given separately for the first dose in children age 12 through 47 months. The use of the combination vaccine (MMRV) is generally preferred over separate injections for children who are receiving their second dose or their first dose when age 4 through 12 years.

How effective is this vaccine?

Almost all (more than 99%) children develop immunity to the disease after two doses of vaccine. For older children and adults, an average of 78% develop immunity after one dose and 99% develop immunity after the recommended two doses.

Although some vaccinated children (about 2%) will still get chickenpox, they generally will have a much milder form of the disease, with fewer blisters (typically fewer than 50), lower fever, and a more rapid recovery.

The vaccine almost always prevents against severe disease. Getting chickenpox vaccine is much safer than getting chickenpox disease.

Isn't it better for a child to get chickenpox naturally?

Some parents purposely seek to get their children infected with varicella virus, even promoting "chickenpox parties" for this purpose. The belief is that it's better to be infected when young, a time when the infection is ordinarily less severe. Some parents also believe that something "natural" (the disease) is better than something "artificial" (the vaccine), or that immunity derived from the disease will be more permanent than that from the vaccine.

However, when a safe vaccine is available, parents need to weigh the supposed benefits of infection against its potential risks, including severe disease with complications such as infection

with flesh-eating bacteria. No one can predict which child will develop a life-threatening case of chickenpox; in fact, most serious cases occur in previously healthy children.

In addition, in a recent study, 7 out of 10 children said given the choice, they'd rather have the shot than have the natural disease.

Can the vaccine protect you if you've already been exposed to chickenpox?

Yes, it is 70% to 100% effective if given within 72 hours of exposure.

Who should not receive the chickenpox vaccine?

People with weakened immune systems and those with life-threatening allergies to gelatin or the antibiotic neomycin should not receive this vaccine.

People who had a severe allergic reaction to a prior dose of this vaccine should not receive a second dose.

Pregnant women and women attempting to become pregnant should not receive this vaccine, as the possible effects on fetal development are unknown. However, non-pregnant women of childbearing age who have never had the disease may be immunized against chickenpox to avoid contracting the disease while pregnant.

Can the vaccine cause chickenpox?

Because this vaccine is made from a live, but weakened, virus, about 1% of recipients develop a mild form of the disease, consisting of a limited rash, most often with only 5–6 blisters. Usually there is no fever. These people are then safe from the more serious, naturally occurring form of the virus.

Can the varicella vaccine virus be transmitted (caught) from a person who was vaccinated?

Yes; however, transmission of the varicella vaccine virus is extremely rare. It has only been documented in healthy people on five occasions out of more than 55 million doses of vaccine distributed. All five cases resulted in mild disease without complications.

Can the vaccine cause herpes zoster (shingles)?

Yes, this is possible. The risk of zoster following vaccination appears to be less than that following infection with the varicella virus. The majority of cases of shingles following vaccine have been mild and have not been associated with serious complications.

Immunization Action Coalition

Technically reviewed by the Centers for Disease Control and Prevention, July 2013.

1) THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent

- Dengue viruses include the flaviviruses DENV1, DENV2, DENV3 and DENV4.

B. Description of Illness

- ***General facts:*** Dengue fever (DF) is a disease caused by any one of four closely related dengue viruses (DENV 1, DENV 2, DENV 3, or DENV 4). The viruses are transmitted to humans by the bite of an infected mosquito. In the Western Hemisphere, the *Aedes aegypti* mosquito is the most important transmitter or vector of dengue viruses.
- ***Occurrence:*** Dengue virus is a leading cause of illness and death in the tropics and subtropics. As many as 400 million people are infected yearly. Although dengue rarely occurs in the continental United States, it is endemic in Puerto Rico and in many destinations in Latin America, Southeast Asia and the Pacific islands. Nearly all cases reported in the continental U.S. were acquired elsewhere by travelers or immigrants. Because contact between *Aedes* and people is infrequent in the continental U.S., these imported cases rarely result in secondary transmission. The last reported continental dengue outbreak was in south Texas in 2005. Most dengue cases in U.S. citizens occur in inhabitants of Puerto Rico, the U.S. Virgin Islands, Samoa and Guam, which are endemic for the virus.
- ***Incubation period:*** Usually 4-7 days after the mosquito bite
- ***Common symptoms*:** The principle symptoms of dengue are fever lasting 2-7 days and at least two of the following: severe headache, severe pain behind the eye, joint pain, muscle and/or bone pain, rash, mild bleeding manifestations (e.g. nose or gum bleed, petechiae, or easy bruising) or low white blood cell count. Generally, younger children and those with their first dengue infections have a milder illness than older children and adults, or those with repeat infections. More severe symptoms include severe abdominal pain or persistent vomiting, red spots or patches on skin, bleeding from nose or gums, vomiting blood, black tarry stools, drowsiness or irritability, pale cold or clammy skin, and difficulty breathing.
  Dengue hemorrhagic fever (DHF) is characterized by a fever that lasts from 2-7 days, with the general signs and symptoms of dengue fever. When the fever declines, symptoms include persistent vomiting, severe abdominal pain, and possibly difficult breathing. This marks the beginning of the 24- to 48-hour period when the capillaries become excessively permeable, allowing the fluid component to escape from the blood vessels into the peritoneum, causing ascites, and the pleural cavity, leading to pleural effusions. This may lead to circulatory system failure and shock, followed by death if circulation is not corrected. Patients with DHF have a low platelet count and hemorrhagic manifestations, tendency to bruise easily, bleeding nose or gums, and possibly internal bleeding.
  Dengue shock syndrome (DSS) has all of the criteria for DHF plus circulatory failure. Evidence of circulatory failure includes rapid, weak pulse and narrow pulse pressure, age-specific hypotension and cold, clammy skin, and restlessness.
- ***Treatment:*** There are currently no vaccines to prevent infection with dengue virus and the most effective protective measures are those that avoid mosquito bites. Once a person is ill, there is no specific medication to treat for either dengue or DHF. Persons who think they have dengue should use pain relievers with acetaminophen and avoid

those containing aspirin. They should also rest, drink plenty of fluids and consult a physician. If they develop vomiting and/or severe abdominal pain in the first 24 hours after fever declines, they should be evaluated immediately at a hospital.
For illness that progresses to DHF, fluid replacement therapy may be effective if early clinical diagnosis is made. DHF management frequently requires hospitalization.

C. Reservoirs

Humans are the main reservoir of dengue viruses for female mosquitoes.

D. Modes of Transmission

Dengue cannot be spread directly from person to person. Transmission usually occurs through the bite of an *Aedes* mosquito that is infected with dengue virus. The mosquito becomes infected with dengue virus when it bites a person who has dengue virus in their blood. The person can either have symptoms of dengue fever or DHF, or they may have no symptoms. About one week later, the mosquito can then transmit the virus while biting a healthy person. The mosquito remains infectious for the duration of its approximate 1-month lifespan.

In rare cases dengue can be transmitted in organ transplants or blood transfusions from infected donors, and there is evidence of transmission from an infected pregnant mother to her fetus when mothers are acutely ill around the time of delivery. It is not known if DENV is transmitted through breast milk.

E. Period of Communicability

- There is an approximate 7-day period of viremia in humans, during which time mosquito-borne, bloodborne or perinatal transmission may occur.

2) ACTIONS REQUIRED/CONTROL MEASURES

A. Reporting Requirements

Dengue is physician reportable to both the Connecticut Department of Public Health (DPH) and the local health department (LHD). The director of any clinical laboratory must also report laboratory evidence of dengue to both the DPH and the LHD. See current lists of physician Reportable Diseases (Attachment A) and Laboratory Reportable Significant Findings (Attachment C).

B. Case Definition*

- Confirmed Case: A clinically compatible case of DF, DHF or DSS with confirmatory lab results
- Probable Case: A clinically compatible case of DF, DHF, or DSS with laboratory results indicative of presumptive infection
- Suspect Case: A clinically compatible case of DF, DHF or DSS that is epidemiologically linked to a confirmed case

*Please see the following link to further information on laboratory and exposure criteria for case classification:
http://wwwn.cdc.gov/nndss/script/casedef.aspx?CondYrID=655&DatePub=1/1/2010%2012:00:00%20AM

C. Investigation

- **DPH Responsibility**: The DPH Epidemiology Program will follow-up with the ordering physician to collect basic demographic, hospitalization and risk factor information (attachment L). Risk factors of interest include recent history of travel, blood transfusion or blood donation. If the patient reports no travel or travel only within the U.S., additional clinical and laboratory information will be collected and shared with the Centers for Disease Control and Prevention (CDC).

- **LHD Responsibility:** If DPH identifies a case that may have been acquired within the U.S., the local health department may assist with collecting additional information.

D. Control Measures

- There is no vaccine to prevent dengue. Residents living in areas infested with *Aedes* mosquitos should eliminate standing water where mosquitos can breed, specifically artificial containers that hold water.
- Containers used to collect rainwater or to store water should be covered or properly discarded. Animal watering containers and flower vases should be emptied and cleaned (to remove eggs) at least once a week. This will eliminate the mosquito eggs and larvae and reduce the number of mosquitoes present in these areas.
- Reduce the risk of mosquitoes coming indoors by using air conditioning and window screens. Reduce risk of mosquito bites by applying mosquito repellant containing 20% to 30% DEET on clothing and exposed skin.

Fact Sheet

- Please see the CDC fact sheet at the following link: http://www.cdc.gov/dengue/faqFacts/fact.html

References

Centers for Disease Control and Prevention online, Dengue Homepage: https://www.cdc.gov/dengue

CDC Travelers' Health: http://wwwnc.cdc.gov/travel/yellowbook/2014/chapter-3-infectious-diseases-related-to-travel/dengue

This fact sheet is for information only and is not meant to be used for self-diagnosis or as a substitute for consultation with a health care provider. If you have any questions about the disease described above or think that you may have this infection, consult a health care provider.

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1) THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent

Hepatitis C virus (HCV) is an RNA virus. Many genotypes and subtypes exist.

B. Description of IllnesS

- ***General facts:*** HCV can cause chronic infection with potentially serious consequences including cirrhosis, liver failure, and hepatocellular carcinoma. Initial infection may be asymptomatic, and between 50-80% will develop chronic infection. Of chronically infected persons, 10-20% will eventually develop cirrhosis and 1-5%, liver cancer. Chronic infection may persist for up to 20 years before onset of cirrhosis or liver cancer.
- ***Occurrence:*** It is estimated that 50,000 Connecticut residents are chronically infected. In the United States, it is estimated that 3.2 million persons are chronically infected.
- ***Incubation period:*** Ranges from 2 weeks - 6 months, usually within 2 months. The time from exposure to viremia generally is 1 - 2 weeks.
- ***Common symptoms:*** Similar to other viral hepatitis infections: fatigue, abdominal pain, loss of appetite, nausea, and joint pain. Jaundice or dark urine may also be observed. It is estimated that 75% of persons with initial infection do not have any signs or symptoms.
- ***Treatment:*** No specific therapy for acute HCV infection is available. Medications for treatment of chronic HCV are available. Treatment outcome is highly variable depending on viral genotype and patient factors. Patients should be referred to specialized care for evaluation of treatment options.

C. Reservoir

Humans are the only known reservoir for HCV.

D. Modes of Transmission

- The highest risk is for persons with parenteral (by injection) exposure to blood such as individuals sharing contaminated needles or “works” (equipment or materials used in preparing drugs for injection).
- Sexual and mother-to-child transmission have been documented but are far less efficient or frequent than the parenteral route. Approximately 5% of cases are due to perinatal transmission.
- Recipients of clotting factors made before 1987 and recipients of blood transfusions before 1992 are also at risk.
- Hepatitis C is <u>not</u> transmitted through food or water, sharing eating utensils, breastfeeding, hugging, kissing, hand holding, coughing, or sneezing. There is no exclusion of food handlers.

E. Period of Communicability

From one or more weeks before the onset of first symptoms. All persons with HCV antibodies (anti-HCV+) or HCV-RNA (PCR+) in their blood should be considered infectious.

2) ACTIONS REQUIRED/CONTROL MEASURES

A. Reporting Requirements

Acute HCV infection is physician reportable by mail within 12 hours of recognition or strong suspicion to both DPH and the local health department (LHD). The director of any clinical laboratory must also report laboratory evidence of HCV infection to both DPH and LHD.

- Anti-HCV+ is laboratory reportable. Confirmatory test results, including signal-to-cutoff ratio, if available, RIBA+ and PCR+, are also reportable.
- Values for signal-to-cutoff assays predictive of a true positive can be found at http://www.cdc.gov/hepatitis/HCV/LabTesting.htm - section1

B. Case Classification:

- **Confirmed Acute Case:** Acute cases must meet both clinical and laboratory criteria.
  - Clinical criteria include:
    - Discrete onset of symptoms consistent with viral hepatitis infection (fatigue, abdominal pain, loss of appetite, flu like symptoms); AND,
    - Jaundice; OR, elevated liver enzymes (ALT) >400 IU/L.
  - Laboratory criteria include:
    - Anti-HCV-positive with a signal-to-cutoff ratio predictive of a true positive as determined for the particular assay as defined by CDC, OR positive for one of the following: HCV RIBA, HCV RNA nucleic acid testing, or HCV genotype.
    - AND IgM anti-HAV negative AND IgM anti-HBc negative.
  - Notes about acute HCV:
    - Serologic tests for anti-HCV do not distinguish between acute and chronic or past infection. Thus, other causes of acute hepatitis should be excluded for anti-HCV+ patients who have acute illness compatible with hepatitis.
    - The diagnosis of HCV can be made by detecting HCV RNA using gene amplification techniques (PCR). However, a negative PCR test does not exclude the possibility of HCV infection as a person may have intermittent viremia.

- **Confirmed Chronic/resolved (Past/Present) Case:** A case that is laboratory confirmed that does not meet the case definition for acute HCV.
  - Laboratory criteria
    - Positive by a specific assay such as one of the following: HCV RIBA , HCV RNA nucleic acid testing, HCV genotype, anti-HCV with a signal-to-cutoff ratio predictive of a true positive as determined for the particular assay (e.g., ≥3.8 for the enzyme immunoassays).

C. Case Investigation

- **DPH Responsibility:**
  - DPH maintains a statewide HCV registry. The DPH database registers new reports of HCV. DPH does not monitor changes in patient residence from one local health jurisdiction to another.

- DPH conducts statewide follow-up on all newly reported HCV with the ordering physician. The purpose of follow-up is to ascertain acute versus chronic case status, reasons for testing, and risk factors.
- DPH investigates all cases that meet the acute HCV case definition with the attending physician to determine if the patient is aware of their diagnosis. DPH will interview the case to provide education and determine risk factors.
- DPH provides line lists to LHDs so that education letters can be sent to newly reported confirmed cases.
- DPH consults with LHDs about HCV follow-up [(860) 509-7900].

- **Local Health Department Responsibility:**
  - Control measures, described below.
  - Staff conducting follow-up should be familiar with CDC HCV recommendations.

D. Control Measures

Working in conjunction with DPH, the following HCV control measures are recommended:

1. *HCV registry*
   - DPH does not recommend that LHDs maintain a registry of cases unless this is identified as a priority of the LHD and staffing resources are sufficient to keep the registry updated.

   - DPH will provide a line list of newly reported acute and chronic cases from the DPH registry. After an initial confirmed report of an acute or chronic case, DPH does not track changes in residence. LHDs should use line list information to evaluate ongoing need and to conduct activities in 2, below.

2. *Follow-up of chronic HCV patients*
   - Based on the monthly line listings received from DPH, confirmed chronic HCV patients should receive follow-up that includes a fact sheet or brochure and a list of medical resources available in the local health jurisdiction.

   - DPH can provide a sample cover letter, one-page fact sheet, and information about how to obtain free CDC brochures.

   - Follow-up activities. LHDs should provide services that include the following:
     - Education: Inform patients about the implications of HCV infection. Avoidance of alcohol and the need to discuss medications (even over-the-counter medications) with his/her physician. LHDs should maintain a list of locally available medical care providers where patients can be referred for ongoing evaluation and additional testing.
     - Prevention counseling: Cautions about not sharing needles, limiting blood exposure to household contacts, and low but measurable risk of sexual transmission. Offer to send a fact sheet (available from DPH).
     - Additional testing: Persons in risk groups for HIV or HBV should be referred for testing.
     - Vaccination: Against HAV and HBV, as appropriate.

Fact Sheet

What is hepatitis C?
Hepatitis C is a liver disease caused by the hepatitis C virus. Acute hepatitis C is a newly acquired infection that causes inflammation of the liver for six months or less. Chronic hepatitis C is inflammation of the liver for greater than six months.

How is hepatitis C spread?
Transmission occurs when blood or body fluids from an infected person enters the body of an uninfected person. This may happen through sharing of needles or "works" when "shooting" drugs, through accidental needle sticks, or from an infected mother to baby during birth. Sexual transmission can occur but is much less efficient than transmission through blood exposure. Hepatitis C is not spread through kissing, hugging, breastfeeding, sharing eating utensils or drinking glasses, coughing, sneezing, food, water, or casual contact.

What are the symptoms of hepatitis C?
Most people (80%) do not experience any symptoms. Some people experience abdominal pain, loss of appetite, fatigue, nausea and vomiting, dark urine, or jaundice (yellowing of skin and eyes).

How soon do symptoms appear?
Symptoms may occur from 2 weeks to 6 months after infection but usually within 2 months.

What are the long-term effects of hepatitis C?
Most infected persons (75-85%) develop a chronic infection. With chronic infection, the virus is not cleared from the body and can lead to liver disease in about 70% of persons.

How long is a person able to spread hepatitis C?
Hepatitis C appears in the blood one or more weeks prior to symptoms. Chronically infected persons carry the virus indefinitely, and therefore may transmit it to others if prevention methods are not undertaken.

Can you get hepatitis C more than once?
Yes. Hepatitis C antibodies are not protective, unlike some other infectious diseases. Therefore, it is important not to expose yourself to the blood of others.

How is hepatitis C diagnosed?
Only a clinician can diagnose hepatitis C. Diagnosis is based on a laboratory test for hepatitis C.

What is the treatment and medical management for hepatitis C?
People with hepatitis C should be evaluated by their doctor for liver disease. Treatment options are complex and not everyone needs treatment. Interferon and ribavirin are two drugs licensed for the treatment of persons with chronic hepatitis C. Combination therapy using interferon and ribavirin is currently the most popular treatment choice. Combination therapy can clear the virus in up to 5 out of 10 people with genotype 1 and in up to 8 out 10 people for genotype 2 and 3.

How can the risk of chronic liver disease be reduced among people chronically infected with hepatitis C?

See your doctor regularly. Additional tests may be needed to check to see if you have liver damage. Do not drink alcohol. Check with your doctor before taking any medications, even over-the-counter and herbal medicines may be toxic to your liver. You may need to get vaccinated against hepatitis A and B.

How can hepatitis C be prevented?

- People with hepatitis C should be aware that their blood and possibly other body fluids contain the virus.
- Do not shoot drugs. If you do, never share needles or works.
- Do not share toothbrushes, razors, needles, or other personal care items.
- If you are a health care worker, use standard barrier precautions.
- Hepatitis C can be transmitted though sexual contact, but it is rare. Use of condoms may help reduce the chance of hepatitis C transmission.
- Persons with hepatitis C should not donate blood, tissues, or organs.
- There is no vaccine to prevent hepatitis C infection.

This fact sheet is for information only and is not meant to be used for self-diagnosis or as a substitute for consultation with a health care provider. If you have any questions about the disease described above or think that you may have this infection, consult a health care provider.

Connecticut Department of Public Health
410 Capitol Avenue
P.O. Box 340308
Hartford, CT 06134-0308
Phone: (860) 509-7900
FAX: (860) 509-8237
www.ct.gov/dph

REPORTABLE DISEASES, EMERGENCY ILLNESSES and HEALTH CONDITIONS - 2016

The Commissioner of the Department of Public Health (DPH) is required to declare an annual list of Reportable Diseases, Emergency Illnesses and Health Conditions. The Reportable Disease Confidential Case Report form (PD-23) or other disease specific form should be used to report the disease, illness, or condition. Reports (mailed, faxed, or telephoned into the DPH) should include the full name and address of the person reporting and attending physician, name of disease, illness or condition, and full name, address, date of birth, race/ethnicity, gender and occupation of the person affected. Forms can be found on the DPH website. See page 4 for a list of persons required to report Reportable Diseases, Emergency Illnesses and Health Conditions. Mailed reports must be sent in envelopes marked "CONFIDENTIAL." Changes for 2016 are noted in **bold** and with an asterisk (*).

Category 1 Diseases: Report immediately by telephone on the day of recognition or strong suspicion of disease for those diseases marked with a telephone (☎). Also mail a report within 12 hours.

Category 2 Diseases: Diseases not marked with a telephone are Category 2 diseases. Report by mail within 12 hours of recognition or strong suspicion of disease.

Acquired Immunodeficiency Syndrome (1,2)
Acute flaccid myelitis*
☎ Anthrax
Babesiosis
☎ Botulism
☎ Brucellosis
California group arbovirus infection
Campylobacteriosis
Carbon monoxide poisoning (3)
Chancroid
Chickenpox
Chickenpox-related death
Chikungunya
Chlamydia (*C. trachomatis*) (all sites)
☎ Cholera
Cryptosporidiosis
Cyclosporiasis
Dengue
☎ Diphtheria
Eastern equine encephalitis virus infection
Ehrlichia chaffeensis infection
Escherichia coli O157:H7 gastroenteritis
Gonorrhea
Group A Streptococcal disease, invasive (4)
Group B Streptococcal disease, invasive (4)
Haemophilus influenzae disease, invasive all serotypes (4)
Hansen's disease (Leprosy)
Healthcare-associated Infections (5)
Hemolytic-uremic syndrome (6)
Hepatitis A
Hepatitis B
- acute infection (2)
  - HBsAg positive pregnant women

Hepatitis C
- acute infection (2)
- positive rapid antibody test result

HIV-1 / HIV-2 infection in (1)
- persons with active tuberculosis disease
- persons with a latent tuberculous infection (history or tuberculin skin test ≥5 mm induration by Mantoux technique)
- persons of any age
- pregnant women

HPV: biopsy proven CIN 2, CIN 3 or AIS or their equivalent (1)
Influenza-associated death
Influenza-associated hospitalization (7)
Lead toxicity (blood level ≥ 15 µg/dL)
Legionellosis
Listeriosis
Lyme disease
Malaria
☎ Measles
☎ Melioidosis
☎ Meningococcal disease
Mercury poisoning
Mumps
Neonatal bacterial sepsis (8)
Neonatal herpes (≤60 days of age)
Occupational asthma
☎ Outbreaks:
- Foodborne (involving ≥ 2 persons)
- Institutional
- Unusual disease or illness (9)

Pertussis* *(no longer category 1)
☎ Plague
Pneumococcal disease, invasive (4)
☎ Poliomyelitis
☎ Q fever
☎ Rabies
☎ Ricin poisoning
Rocky Mountain spotted fever
Rotavirus
Rubella (including congenital)* *(no longer category 1)
Salmonellosis
☎ SARS-CoV
Shiga toxin-related disease (gastroenteritis)
Shigellosis
Silicosis
☎ Smallpox
St. Louis encephalitis virus infection
☎ Staphylococcal enterotoxin B pulmonary poisoning
☎ *Staphylococcus aureus* disease, reduced or resistant susceptibility to vancomycin (1)
Staphylococcus aureus methicillin-resistant disease, invasive, community acquired (4,10)
Staphylococcus epidermidis disease, reduced or resistant susceptibility to vancomycin (1)
Syphilis
Tetanus
Trichinosis
☎ Tuberculosis
☎ Tularemia
Typhoid fever
Vaccinia disease
☎ Venezuelan equine encephalitis
Vibrio infection (*parahaemolyticus, vulnificus*, other)
☎ Viral hemorrhagic fever
West Nile virus infection
☎ Yellow fever
Zika virus

FOOTNOTES:

1. Report only to State.
2. CDC case definition.
3. Includes persons being treated in hyperbaric chambers for suspect CO poisoning.
4. Invasive disease: confirmed by isolation from sterile fluid (blood, CSF, pericardial, pleural, peritoneal, joint, or vitreous) bone, internal body sites, or other normally sterile site including muscle.
5. Report HAIs according to current CMS pay-for-reporting or pay-for-performance requirements. Detailed instructions on the types of HAIs, facility types and locations, and methods of reporting are available on the DPH website: www.ct.gov/dph/HAI.
6. On request from the DPH and if adequate serum is available, send serum from patients with HUS to the DPH Laboratory for antibody testing.
7. Reporting requirements are satisfied by submitting the Hospitalized and Fatal Cases of Influenza—Case Report Form to the DPH in a manner specified by the DPH.
8. Clinical sepsis and blood or CSF isolate obtained from an infant ≤72 hours of age.
9. Individual cases of "significant unusual illness" are also reportable.
10. Community-acquired: infection present on admission to hospital, and person has no previous hospitalizations or regular contact with the health-care setting.

How to report: The PD-23 is the general disease reporting form and should be used if other specialized forms are not available. The PD-23 can be found on the DPH website (www.ct.gov/dph/forms). It can also ordered by writing the Department of Public Health, 410 Capitol Ave., MS#11EPI, P.O. Box 340308, Hartford, CT 06134-0308 or by calling the Epidemiology and Emerging Infections Program (860-509-7994). Specialized reporting forms are available on the DPH website or by calling the following programs: Epidemiology and Emerging Infections Program (860-509-7994) - Hospitalized and Fatal Cases of Influenza, Healthcare Associated Infections (860-509-7995) - National Healthcare Safety Network, HIV/AIDS Surveillance (860-509-7900) - Adult HIV Confidential Case Report form, Immunizations Program (860-509-7929) - Chickenpox Case Report (Varicella) form, Occupational Health Surveillance Program (860-509-7740) - Physician's Report of Occupational Disease, Sexually Transmitted Disease Program (860-509-7920), and Tuberculosis Control Program (860-509-7722).

Telephone reports of Category 1 disease should be made to the local Director of Health for the town in which the patient resides, and to the Epidemiology and Emerging Infections Program (860-509-7994). Tuberculosis cases should be directly reported to the Tuberculosis Control Program (860-509-7722). For the name, address, or telephone number of the local Director of Health for a specific town contact the Office of Local Health Administration (860-509-7660).

For public health emergencies on evenings, weekends, and holidays call 860-509-8000.

State of Connecticut
Reportable Disease Confidential Case Report Form PD-23

(rev. 01/01/2016)

Department of Public Health
410 Capitol Avenue, MS#11FDS
P.O. Box 340308
Hartford, CT 06134-0308

For information or weekday disease reporting call 860-509-7994. For reporting on evenings, weekends, and holidays call 860-509-8000.

Instructions for Submitting the PD-23

This is a three-part form for reporting diseases as required under Sections 19a-36-A3 and 19a-36-A4 (see back side of form) of the Public Health Code and Sections 19a-2a and 19a-215 of the Connecticut General Statutes. The list of reportable diseases, emergency illnesses, and health conditions is revised annually. Mail the *white* copy to the Connecticut Department of Public Health, Epidemiology and Emerging Infections Program at the address above. Mail the *canary* copy to the Director of Health of the patient's town of residence. Retain the *pink* copy in the patient's medical record. Mail reports in envelopes marked "**Confidential**."

Use Other Forms or Methods to Report

- **Epidemiology and Emerging Infections Program** 860-509-7994
  Confidential Case Report Form PD-23
  Hospitalized and Fatal Cases of Influenza Case Report Form
- **Healthcare-associated infections** 860-509-7995
  Use the National Healthcare Safety Network (NHSN)
- **HIV/AIDS** 860-509-7900
  Adult HIV Confidential Case Report Form
- **Immunization Program** 860-509-7929
  Chickenpox (Varicella) Case Report Form
- **Occupational Diseases** 860-509-7740
  Physician's Report Form
- **Sexually Transmitted Diseases** 860-509-7920
  STD-23 Form
- **Tuberculosis** 860-509-7722
  TB-86 Form – TB Disease
  LTBI Form – Latent TB Infection

Category 1 Diseases:	Report immediately by telephone on the day of recognition or strong suspicion of disease for those diseases marked with a telephone (☎). *Call 860-509-7994*. These diseases must also be reported by mail within 12 hours.
Category 2 Diseases:	All other diseases not marked with a telephone are Category 2 diseases. These diseases must be reported by mail within 12 hours of recognition or strong suspicion of disease.

Acquired Immunodeficiency Syndrome (1,2)
Acute flaccid myelitis
☎ Anthrax
Babesiosis
☎ Botulism
☎ Brucellosis
California group arbovirus infection
Campylobacteriosis
Carbon monoxide poisoning (3)
Chancroid
Chickenpox
Chickenpox-related death
Chikungunya
Chlamydia (*C. trachomatis*) (all sites)
☎ Cholera
Cryptosporidiosis
Cyclosporiasis
Dengue
☎ Diphtheria
Eastern equine encephalitis virus infection
Ehrlichia chaffeensis infection
Escherichia coli O157:H7 gastroenteritis
Gonorrhea
Group A Streptococcal disease, invasive (4)
Group B Streptococcal disease, invasive (4)
Haemophilus influenzae disease, invasive all serotypes (4)
Hansen's disease (Leprosy)
Healthcare-associated infections (5)
Hemolytic-uremic syndrome (6)
Hepatitis A
Hepatitis B
- acute infection (2)
- HBsAg positive pregnant women

Hepatitis C
- acute infection (2)
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HIV-1 / HIV-2 infection in (1)
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HPV: biopsy proven CIN 2, CIN 3, or AIS or their equivalent (1)
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Influenza-associated hospitalization (7)
Lead toxicity (blood level ≥ 15 µg/dL)
Legionellosis
Listeriosis
Lyme disease
Malaria
☎ Measles
☎ Melioidosis
☎ Meningococcal disease
Mercury poisoning
Mumps
Neonatal bacterial sepsis (8)
Neonatal herpes (≤60 days of age)
Occupational asthma
☎ Outbreaks:
- Foodborne (involving ≥ 2 persons)
- Institutional
- Unusual disease or illness (9)

Pertussis
☎ Plague
Pneumococcal disease, invasive (4)
☎ Poliomyelitis
☎ Q fever
☎ Rabies
☎ Ricin poisoning
Rocky Mountain spotted fever
Rotavirus
Rubella (including congenital)
Salmonellosis
☎ SARS-CoV
Shiga toxin-related disease (gastroenteritis)
Shigellosis
Silicosis
☎ Smallpox
St. Louis encephalitis virus infection
☎ Staphylococcal enterotoxin B pulmonary poisoning
☎ *Staphylococcus aureus* disease, reduced or resistant susceptibility to vancomycin (1)
Staphylococcus aureus methicillin-resistant disease, invasive, community acquired (4,10)
Staphylococcus epidermidis disease, reduced or resistant susceptibility to vancomycin (1)
Syphilis
Tetanus
Trichinosis
☎ Tuberculosis
☎ Tularemia
Typhoid fever
Vaccinia disease
☎ Venezuelan equine encephalitis
Vibrio infection (*parahaemolyticus, vulnificus*, other)
☎ Viral hemorrhagic fever
West Nile virus infection
☎ Yellow fever
Zika virus

FOOTNOTES:

1. Report only to State.
2. CDC case definition.
3. Includes persons being treated in hyperbaric chambers for suspect CO poisoning.
4. Invasive disease: confirmed by isolation from sterile fluid (blood, CSF, pericardial, pleural, peritoneal, joint, or vitreous), bone, internal body sites, or other normally sterile site including muscle.
5. Report HAIs according to current CMS pay-for-reporting or pay-for-performance requirements. Detailed instructions on the types of HAIs, facility types and locations, and methods of reporting are available on the DPH website: www.ct.gov/dph/HAI.
6. On request from the DPH and if adequate serum is available, send serum from patients with HUS to the DPH Laboratory for antibody testing.
7. Reporting requirements are satisfied by submitting the Hospitalized and Fatal Cases of Influenza—Case Report Form to the DPH in a manner specified by the DPH.
8. Clinical sepsis and blood or CSF isolate obtained from an infant ≤72 hours of age.
9. Individual cases of "significant unusual illness" are also reportable.
10. Community-acquired: infection present on admission to hospital, and person has no previous hospitalizations or regular contact with the health-care setting.

State of Connecticut
Reportable Disease Confidential Case Report Form PD-23 (rev. 01/01/2016)

Department of Public Health
410 Capitol Avenue, MS#11FDS
P.O. Box 340308
Hartford, CT 06134-0308

Date Completed:

☐ ***Check this box to request additional PD-23 forms, or call 860-509-7994.***

For information or weekday disease reporting, call 860-509-7994. For reporting on evenings, weekends, and holidays, call 860-509-8000.

Patient Name (Last) (First) (MI)	Parent or Guardian Name	Age	Birth Date	Patient's Telephone Home Work Cell

Address (No. and Street) (Apt. #) (City or Town) (State) (Zip Code)

(Primary Language Spoken)
☐ English ☐ Spanish ☐ Other:

Gender ☐ Male ☐ Female ☐ Other specify: ☐ Unknown

Race ☐ White ☐ Black/African American ☐ Asian
☐ American Indian/Alaska Native ☐ Native Hawaiian/Other Pacific Islander
☐ Other specify: ☐ Unknown

Hispanic/Latino	Is patient pregnant? Due date:	Did patient die of this illness?
☐ Yes ☐ No ☐ Unknown	☐ Yes ☐ No ☐ Unknown	☐ Yes ☐ No ☐ Unknown

[redacted]

Is this condition work related? ☐ Yes ☐ No ☐ Unknown
If yes, occupation:

Did patient have recent international travel? ☐ Yes ☐ No ☐ Unknown
If yes, country visited: Dates visited:

Confirmatory information: If specimen obtained, collection date:

Laboratory data, immunization status, dates, and comments (be specific).

Reporting healthcare provider name and address:

Direct telephone

If hospitalized, **hospital**:	Date Admitted	Date Discharged
Name City State	Patient ID #	

Name of person completing report:

Address:

Phone: FAX: Report Date:

(Please print)

Is patient a (please check): ☐ Health care worker ☐ Student/Day care attendee
☐ Day care worker ☐ Food handler ☐ LTC facility resident

Name and address of workplace, school, day care or other facility:

Viral Hepatitis

Symptoms: ☐ Yes ☐ No Onset date: Jaundice: ☐ Yes ☐ No Onset date:
ALT Result: ALT Date: AST Result: AST Date:

IgM anti-HAV:	☐ Positive	☐ Negative	☐ Not Done
HBsAg:	☐ Positive	☐ Negative	☐ Not Done
IgM anti-HBc:	☐ Positive	☐ Negative	☐ Not Done
Anti-HCV: Method: ☐Rapid ☐Serology	☐ Positive	☐ Negative	☐ Not Done
HCV confirmed by: ☐ RNA	☐ Value:		
HBV Chronic/Carrier:	☐ Yes	☐ No	☐ Unknown

Risk Factors: ☐ IDU ☐ Non-injection street drugs
☐ Hemodialysis ☐ Multiple sex partners
☐ Perinatal (infected mom to baby) ☐ Contact w/ infected person (☐ household ☐ sexual)
☐ Blood Transfusion ☐ Incarcerated (☐ present ☐ past)
☐ MSM (men who have sex with men) ☐ Other:

Lyme disease surveillance case definition signs and symptoms

Physician diagnosed EM rash ≥ 5cm	☐ Yes	☐ No	☐ Unknown
Arthritis (objective joint swelling)	☐ Yes	☐ No	☐ Unknown
Bell's palsy or other cranial neuritis	☐ Yes	☐ No	☐ Unknown
Radiculoneuropathy	☐ Yes	☐ No	☐ Unknown
Lymphocytic meningitis	☐ Yes	☐ No	☐ Unknown
Encephalomyelitis	☐ Yes	☐ No	☐ Unknown
If yes, is antibody to *B. burgdorferi* higher in CSF than serum	☐ Yes	☐ No	☐ Unknown
Myocarditis	☐ Yes	☐ No	☐ Unknown
2nd or 3rd degree atrioventricular block	☐ Yes	☐ No	☐ Unknown
Was patient diagnosed with Lyme disease in current year?	☐ Yes	☐ No	☐ Unknown

Lyme disease laboratory results

EIA/IFA
☐ Positive ☐ Negative ☐ Unknown

Culture
☐ Positive ☐ Negative ☐ Unknown

Western Blot: IgM
☐ Positive ☐ Negative ☐ Unknown

Western Blot: IgG
☐ Positive ☐ Negative ☐ Unknown

HEALTH INSURANCE PORTABILITY AND ACCOUNTABILITY ACT (HIPAA) GUIDELINES

Pursuant to Connecticut General Statutes (CGS) § 19a-2a and § 19a-215 and to the Regulations of Connecticut State Agencies §s 19a-36-A3 and §s 19a-36-A4, the requested information is required to be provided to the Department of Public Health (DPH).

Please note that CGS § 52-146o(b)(1) authorizes the release of these records to the Department without the patient's consent. Additionally, the federal Privacy Regulations of the Health Insurance Portability and Accountability Act of 1996 (HIPAA) also authorize you, as a provider, to release this information without an authorization, consent, release, opportunity to object by the patient, as information (i) required by law to be disclosed [HIPAA Privacy regulation 45 CFR § 164.512(a)] and (ii) as part of the Department's public health activities [HIPAA Privacy regulation, 45 CFR § 164.512(b)(1)(i)]. The requested information is what is minimally necessary to achieve the purpose of the disclosure, and you may rely upon this representation in releasing the requested information, pursuant to 45 CFR § 164.514(d)(3)(iii)(A) of the HIPAA Privacy regulations.

REPORTING (Section *19a-36-A4*)

Each report should include: 1) name, address, and phone number of the person reporting and of the physician attending; 2) name, address, date of birth, age, sex, race/ethnicity, and occupation of person affected; and 3) the diagnosed or suspected disease, and date of onset. Reports must be mailed in envelopes marked "**CONFIDENTIAL**" within 12 hours of recognition or strong suspicion to the:

1. **Local Director of Health of town in which the patient resides** (Canary)

AND

2. **Connecticut Department of Public Health (**White**)**
   410 Capitol Avenue, MS#11FDS
   P.O. Box 340308
   Hartford, CT 06134-0308

PERSONS REQUIRED TO REPORT, REPORTABLE DISEASES (Section *19a-36-A3*)

1. Every health care provider who treats or examines any person who has or is suspected to have a reportable disease shall report the case to the local director of health or other health authority within whose jurisdiction the patient resides and to the DPH.
2. If the case or suspected case of reportable disease is in a health care facility, the person in charge of such facility shall ensure that reports are made to the local director of health and DPH. The person in charge shall designate appropriate infection control or record keeping personnel for this purpose.
3. If the case or suspected case of reportable disease is not in a health care facility, and if a health care provider is not in attendance or is not known to have made a report within the appropriate time, such report of reportable diseases shall be made to the local director of health or other health authority within whose jurisdiction the patient lives and DPH by:
   A. the administrator serving a public or private school or day care center attended by any person affected or apparently affected with such disease;
   B. the person in charge of any camp;
   C. the master or any other person in charge of any vessel lying within the jurisdiction of the state;
   D. the master or any other person in charge of any aircraft landing within the jurisdiction of the state;
   E. the owner or person in charge of any establishment producing, handling, or processing dairy products, other food, or non-alcoholic beverages for sale or distribution;
   F. morticians and funeral directors.

REPORTABLE LABORATORY FINDINGS—2016

The director of a clinical laboratory must report laboratory evidence suggestive of reportable diseases. The Laboratory Report of Significant Findings form (OL-15C) can be obtained from the Connecticut Department of Public Health (DPH), 410 Capitol Ave., MS#11EPI, P.O. Box 340308, Hartford, CT 06134-0308; telephone: 860-509-7994 or on the DPH website. The OL-15C is not a substitute for the physician report; it is a supplement to the physician report that allows verification of diagnosis. Diseases on the OL-15C are listed in alphabetic order; however, possible disease indicators for bioterrorism are listed separately. Changes for 2016 are noted in **bold** and with an asterisk (*****). ***All footnotes are renumbered.***

Anaplasma phagocytophilum by PCR only
Babesiosis: ❑ IFA IgM (titer) IgG (titer)
❑ Blood smear ❑ PCR ❑ Other
❑ *microti* ❑ *divergens* ❑ *duncani* ❑ Unspeciated
California group virus (species) (1)
Carbapenem-resistant Enterobacteriaceae* (2)
Genus Species
Campylobacteriosis (1) (species/test type)
Carboxyhemoglobin ≥5% % COHb
Chancroid
Chickenpox, acute ❑ Culture ❑ PCR ❑ DFA ❑ Other
Chikungunya virus
Chlamydia (*C. trachomatis)* (test type)
***Clostridium difficile* (3) ***
Cryptosporidiosis (test type)
Cyclosporiasis (test type)
Dengue
Diphtheria (4)
Eastern equine encephalitis virus
Ehrlichia chaffeensis by PCR only
Escherichia coli O157 infection (4) (test type)
Giardiasis
Gonorrhea (test type)
Group A streptococcal disease, invasive (2, 4)
Group B streptococcal disease, invasive (2)
Haemophilus influenzae disease, invasive, all serotypes (2, 4)
Hansen's disease (Leprosy)
Hepatitis A IgM anti-HAV (5) ALT AST ❑ Not Done
Hepatitis B ❑ HBsAg ❑ IgM anti-HBc
Hepatitis C (anti-HCV) ❑Rapid antibody ❑RNA (6) ❑**Genotype(6)***
Herpes simplex virus (infants ≤60 days of age) (specify type)
❑ Culture ❑ PCR ❑ IFA ❑ Ag detection
HIV Related Testing (report only to the State) (7)
☐ **Detectable Screen (IA) ***
Antibody Confirmation (WB/IFA/Type-diff*) (4, 7)
HIV 1 ☐ Positive ☐Neg/Ind* HIV 2 ☐Positive ☐ Neg/Ind*
☐ HIV NAAT (or qualitative RNA) ☐ Detectable ☐ Not Detectable
☐ HIV Viral Load: copies/mL ☐ Not Detectable
☐ HIV genotype **(7)***
☐ CD4 count: cells/uL; % **(7)***
HPV (report only to the State) (8)
Biopsy proven ❑ CIN 2 ❑ CIN 3 ❑ AIS
or their equivalent (specify)
Influenza: ❑ Rapid antigen (9) ❑ RT-PCR ❑ Culture-confirmed
❑ Type A ❑ Type B ❑ Type Unknown
❑ Subtype
Lead poisoning (blood lead ≥10 µg/dL) (10)
❑ Finger stick level µg/dL ❑ Venous level µg/dL
Legionellosis
❑ Culture ❑ DFA ❑ Ag positive
❑ Four-fold serologic change (titers)
Listeriosis (4)
Lyme disease (9)
Malaria/blood parasites (1, 4)
Measles (Rubeola) (11) (titer) ❑ **PCR ***
Meningococcal disease, invasive (2, 4)
❑ Culture (2,4) ❑ PCR (2) ❑ Other
Mercury poisoning
❑ Urine ≥35 µg/g creatinine µg/g
❑ Blood ≥15 µg/L µg/L
Mumps (11) (titer) ☐ **PCR***
Neonatal bacterial sepsis (12) spp
Pertussis (titer)
❑ Culture (4) ❑ Non-pertussis *Bordetella* (specify) (4)
❑ DFA ❑ PCR
Pneumococcal disease ❑ Culture (2,4) ❑ Urine antigen
Poliomyelitis
Rabies
Rocky Mountain spotted fever
Rotavirus
Rubella (11) (titer)
St. Louis encephalitis virus
Salmonellosis * (1, 4) (serogroup/serotype)
SARS-CoV infection (4) ❑ IgM/IgG
❑ PCR (specimen) ❑ Other
Shiga toxin-related disease (4) ❑ Stx1 ❑ Stx2 ❑ Type Unknown
Shigellosis * (1, 4) (serogroup/species test type)
Staphylococcus aureus with MIC to vancomycin ≥4 µg/mL (4)
MIC to vancomycin µg/mL
Staphylococcus aureus disease, invasive (2)
methicillin-resistant Date pt. Admitted
Staphylococcus epidermidis with MIC to vancomycin ≥32 µg/mL (4)
MIC to vancomycin µg/mL
Syphilis ❑ RPR (titer) ❑ FTA
❑ VDRL (titer) ❑ TPPA
Trichinosis
Tuberculosis (4)
AFB Smear ❑ Positive ❑ Negative
If positive ❑ Rare ❑ Few ❑ Numerous
NAAT ❑ Positive ❑ Negative ❑ Indeterminate
Culture ❑ *Mycobacterium tuberculosis*
❑ Non-TB mycobacterium. (specify *M.*)
Vibrio* infection (1, 4) (species/test type)
West Nile virus
Yellow fever
Yersiniosis (1) (species/test type)
Zika virus

BIOTERRORISM possible disease indicators (13)
Anthrax (4)
Botulism
Brucellosis (4)
Glanders (4)
Melioidosis (4)
Plague (4)
Q fever
Ricin poisoning
Smallpox (4)
Staphylococcal enterotoxin B pulmonary poisoning
Tularemia
Venezuelan equine encephalitis
Viral hemorrhagic fever

1. Specify species/serogroup/serotype.
2. Sterile site: defined as sterile fluids (blood, CSF, pericardial, pleural, peritoneal, joint, or vitreous), bone, internal body site (lymph node, brain, heart, liver, spleen, kidney, pancreas, or ovary), or other normally sterile site including muscle. For CRE, also include urine or sputum, but not stool.
3. **Upon request, submit reports of all *C. difficile* positive stool samples according to DPH instructions.***
4. Send isolate, culture, or slide to the DPH Laboratory for confirmation. **For *Salmonella*, *Shigella*, and *Vibrio* tested by non-culture methods, send the isolate from reflex testing. For Shiga toxin-related disease, send positive broth or stool in transport media*.** For positive HIV, send ≥0.5mL residual serum.
5. Report the peak liver function tests (ALT, AST) conducted within one week of patient's HAV IgM positive test, if available. Check "Not Done" when appropriate.
6. Report all RNA results. **Genotypes and Negative** RNA results required only by laboratories **with electronic file reporting***.
7. **Report all HIV antibody, antigen, viral load, and** qualitative NAAT results. Laboratories conducting HIV genotype or CD4 testing should report HIV DNA sequence and all CD4 test results **with electronic file reporting.***
8. On request from the DPH, and if adequate tissue is available, send fixed tissue from the specimen used to diagnose CIN2, 3 or cervical AIS or their equivalent for HPV typing according to instructions from the DPH.
9. Only laboratories **with electronic file reporting** are required to report positive results.*****
10. Report lead results ≥10µg/dL within 48 hours to the Local Health Director and the DPH; submit ALL lead results at least monthly to the DPH.
11. Report all IgM positive titers, but only IgG titers that are considered significant by the laboratory performing the test.
12. Report all bacterial isolates from blood or CSF obtained from an infant ≤72 hours of age.
13. Report by telephone to the DPH, weekdays 860-509-7994; evenings, weekends, and holidays 860-509-8000.

Laboratory Report of Significant Findings
Diseases Relating to Public Health - Form OL-15C
For information or to order forms call (860) 509-7994. (rev. 1/2016)

Connecticut Department of Public Health
410 Capitol Avenue, MS #11FDS
P.O. Box 340308
Hartford, CT 06134-0308

Patient Last Name:_____ First:_____ D.O.B._____ Age: _____
Street Address:_____ City:_____ State/Zip Code: _____
Patient Telephone:_____ Gender: ☐ Male ☐ Female ☐ Other specify:_____ Hispanic/Latino: ☐ Yes ☐ No ☐ Unk.
Race: ☐ White ☐ Black/African Amer. ☐ Asian ☐ Amer. Indian/Alaska Nat. ☐ Nat. Hawaiian/Other Pacific Islander
☐ Other specify:_____ ☐ Unknown If patient resides in a LTC facility please check: ☐ Yes
Occupation:_____ Name and address of workplace: _____
Attending Physician Last Name:_____ First: _____
Address:_____ Telephone: _____

Person Reporting: _____
Lab Telephone: _____
Submitting Laboratory: (name/address or label)

Specimen collection date: _____
Date laboratory finding reported to physician:_____ Date
OL-15C completed:_____ Hospital Chart No:__ Lab
Specimen No: _____ Source/Type specimen: _____
_____ Submitted to state lab: (see reverse) ☐ Yes ☐ No

☐ *Anaplasma phagocytophilum* by PCR only
☐ Babesiosis
☐ IFA IgM (titer)_____ IgG (titer)_____
☐ Blood smear ☐ PCR ☐ Other_____
☐ *microti* ☐ *divergens* ☐ *duncani* ☐ Unspeciated
☐ California group virus (species) [1]_____
☐ Carbapenem-resistant Enterobacteriaceae [2]
Genus_____ Species_____
☐ Carboxyhemoglobin ≥ 5%_____ % COHb
☐ Chancroid
☐ Chickenpox, acute ☐ Culture ☐ PCR ☐ DFA ☐ Other_____
☐ Chikungunya virus
☐ Chlamydia (*C. trachomatis*) (test type)_____
☐ *Clostridium difficile* [3]
☐ Dengue
☐ Diphtheria [4]
☐ Eastern equine encephalitis virus
☐ *Ehrlichia chaffeensis* by PCR only
☐ Giardiasis
☐ Gonorrhea (test type)_____
☐ Group A streptococcal disease, invasive [2,4]
☐ Group B streptococcal disease, invasive [2]
☐ *Haemophilus influenzae* disease, invasive, all serotypes [2,4]
☐ Hansen's disease (Leprosy)
☐ Hepatitis A IgM anti-HAV [5] ALT_____ AST_____ ☐ Not Done
☐ Hepatitis B ☐ HBsAg ☐ IgM anti-HBc
☐ Hepatitis C (anti-HCV) ☐ Rapid antibody ☐ RNA [6] ☐ Genotype [6]_____
☐ Herpes simplex virus (infants ≤ 60 days of age) (specify type)_____
☐ Culture ☐ PCR ☐ IFA ☐ Ag detection
HIV Related Testing (report only to the State) [7]
☐ Detectable Screen (IA)
Antibody Confirmation (WB/IFA/Type-diff) [4,7]
HIV 1 ☐ Positive ☐ Negative/Ind HIV 2 ☐ Positive ☐ Negative/Ind
☐ HIV NAAT (or qualitative RNA) ☐ Detectable ☐ Not Detectable
☐ HIV Viral Load:_____ copies/mL ☐ Not Detectable
☐ HIV genotype [7]
☐ CD4 count:_____ cells/uL;_____ % [7]
☐ HPV (report only to the State) [8]
Biopsy proven ☐ CIN2 ☐ CIN3 ☐ AIS
or their equivalent, (specify)_____
☐ Influenza ☐ Rapid antigen [9] ☐ RT-PCR ☐ Culture-confirmed
☐ Type A ☐ Type B ☐ Type Unknown
Subtype:_____
☐ Lead poisoning (blood lead ≥ 10 µg/dL) [10]
☐ Finger stick lead level_____ µg/dL
☐ Venous lead level_____ µg/dL
☐ Legionellosis
☐ Culture ☐ DFA ☐ Ag positive
☐ Four-fold serologic change (titers) _____
☐ Lyme disease [9]
☐ Malaria/blood parasites [1,4]_____
☐ Measles (Rubeola) [11] (titer)_____ ☐ PCR
☐ Meningococcal disease, invasive [2,4]
☐ Culture [2,4] ☐ PCR [2] ☐ Other _____
☐ Mercury poisoning
☐ Urine ≥ 35 µg/g creatinine_____ µg/g
☐ Blood ≥ 15 µg/L _____ µg/L
☐ Mumps [11] (titer)_____ ☐ PCR
☐ Neonatal bacterial sepsis [12] spp_____
☐ Pertussis (titer) _____
☐ Culture [4] ☐ Non-pertussis *Bordetella* [4] (specify) _____
☐ DFA ☐ PCR
☐ Pneumococcal disease ☐ Culture [2,4] ☐ Urine antigen
☐ Poliomyelitis
☐ Rabies
☐ Rocky Mountain spotted fever
☐ Rotavirus
☐ Rubella [11] (titer) _____
☐ St. Louis encephalitis virus
☐ SARS-CoV infection [4] ☐ IgM/IgG
☐ PCR_____ (specimen) ☐ Other _____ [4]
☐ *Staphylococcus aureus* with MIC to vancomycin ≥ 4 µg/mL [4]
MIC to vancomycin_____ µg/mL
Date pt. admitted_____
☐ *Staphylococcus aureus* disease, invasive methicillin-resistant [2]
☐ *Staphylococcus epidermidis* with MIC to vancomycin ≥ 32 µg/mL [4]
MIC to vancomycin_____ µg/mL
☐ Syphilis
☐ RPR (titer)_____ ☐ FTA
☐ VDRL (titer)_____ ☐ TPPA
☐ Trichinosis
☐ Tuberculosis [4]
AFB Smear ☐ Positive ☐ Negative
If positive ☐ Rare ☐ Few ☐ Numerous
NAAT ☐ Positive ☐ Negative ☐ Indeterminate
Culture ☐ *Mycobacterium tuberculosis*
☐ Non-TB mycobacterium (specify *M.*) _____
☐ West Nile virus
☐ Yellow fever
☐ Zika virus

BIOTERRORISM possible disease indicators [13]
☐ Anthrax [4]
☐ Botulism
☐ Brucellosis [4]
☐ Glanders [4]
☐ Melioidosis [4]
☐ Plague [4]
☐ Q fever
☐ Ricin poisoning
☐ Smallpox [4]
☐ Staphylococcal enterotoxin B pulmonary poisoning
☐ Tularemia
☐ Venezuelan equine encephalitis
☐ Viral hemorrhagic fever

SPECIFIC DISEASES RELATING TO FOODBORNE ILLNESS ACTIVE SURVEILLANCE NETWORK (FoodNet)
☐ Campylobacteriosis [1] (species)_____
☐ Cryptosporidiosis
☐ Cyclosporiasis
☐ *Escherichia coli* O157 infection [4]
☐ Listeriosis [4]
☐ Salmonellosis [1,4] (serogroup/serotype) _____
☐ Shiga toxin-related disease [4] ☐ Stx1 ☐ Stx2 ☐ Type Unknown
☐ Shigellosis [1,4] (serogroup/species) _____
☐ *Vibrio* infection [1,4] (species) _____
☐ Yersiniosis [1] (species) _____

Specify all methods yielding positive result: ☐ Culture ☐ PCR ☐ EIA ☐ Other: _____
Patient status when specimen collected: ☐ Hospitalized ☐ Outpatient ☐ Unk. If outpatient, was patient later **hospitalized**? ☐ Yes ☐ No ☐ Unk.
If hospitalized, **Hospital Name**:_____ **Date Admitted**:_____ **Date Discharged**: _

1. Specify species/serogroup/serotype.
2. Sterile site: defined as sterile fluids (blood, CSF, pericardial, pleural, peritoneal, joint, or vitreous), bone, internal body site (lymph node, brain, heart, liver, spleen, kidney, pancreas, or ovary), or other normally sterile site including muscle. For CRE, also include urine or sputum, but not stool.
3. Upon request, submit reports of all *C. difficile* positive stool samples according to DPH instructions.
4. Send isolate, culture, or slide to the DPH Laboratory for confirmation. For *Salmonella*, *Shigella*, and *Vibrio* tested by non-culture methods, send the isolate from reflex testing. For Shiga toxin-related disease, send positive broth or stool in transport media. For positive HIV, send ≥ 0.5mL residual serum.
5. Report the peak liver function tests (ALT, AST) conducted within one week of patient's HAV IgM positive test, if available. Check "Not Done" when appropriate.
6. Report all RNA results. Genotypes and Negative RNA results required only by laboratories with electronic file reporting.
7. Report all HIV antibody, antigen, viral load, and qualitative NAAT results. Laboratories conducting HIV genotype or CD4 testing should report HIV DNA sequence and all CD4 test results with electronic file reporting.
8. On request from the DPH, and if adequate tissue is available, send fixed tissue from the specimen used to diagnose CIN2, 3 or cervical AIS or their equivalent for HPV typing according to instructions from the DPH.
9. Only laboratories with electronic file reporting are required to report positive results.
10. Report lead results ≥ 10 µg/dL within 48 hours to the Local Health Director and the DPH; submit ALL lead results at least monthly to the DPH.
11. Report all IgM positive titers, but only IgG titers that are considered significant by the laboratory performing the test.
12. Report all bacterial isolates from blood or CSF from an infant ≤ 72 hours of age.
13. Report by telephone to the DPH, weekdays 860-509-7994; evenings, weekends, and holidays 860-509-8000.

This form must be completely filled out by the primary laboratory. Excerpts from the regulations of the State of Connecticut are given below.

ANNUAL LIST (*Section 19a-36-A2*)

An annual list of the laboratory reportable significant findings will be prepared and mailed to directors of clinical laboratories licensed, registered, or approved by the Department of Public Health (DPH). Please refer to the current list when reporting findings since the list will be reviewed annually and revised when necessary.

RESPONSIBILITY FOR REPORTING (*Section 19a-36-A3*)

The director of a laboratory that receives a primary specimen or sample which yields a reportable laboratory finding shall be responsible for reporting such findings within forty-eight (48) hours to the local director of health of the town in which the affected person normally resides, or, in the absence of such information, of the town from which the specimen originated, and to the DPH on forms provided by the DPH.

REPORTING (*Section 19a-36-A4*)

Each report should include:

1. Name, address and phone number of the person reporting and of the physician attending;
2. Name, address, date of birth, age, gender, race/ethnicity, and occupation of person affected;
3. Identity of the infectious agent or other reportable laboratory findings and date of collection;
4. Method of identification.

Reports must be mailed in envelopes marked "**CONFIDENTIAL**" within 48 hours of making the finding to the:

1. **Local Director of Health of town in which the patient resides** (Canary)

   AND

2. **Connecticut Department of Public Health** (White)
   410 Capitol Avenue, MS#11FDS
   P.O. Box 340308
   Hartford, CT 06134-0308

or submitted in a manner specified by the DPH.

CONFIRMATION *(Section 19a-36-A3(b)(1))*

When a laboratory identifies or presumptively identifies a significant isolate or other finding that requires confirmation by the laboratory as required in the annual list, the director must submit the isolate or specimen from which the finding was made to the Department's laboratory division.

HEALTH INSURANCE PORTABILITY AND ACCOUNTABILITY ACT (HIPAA) GUIDELINES

Pursuant to Connecticut General Statutes § 19a-2a and § 19a-215 and to the Regulations of Connecticut State Agencies §s 19a-36-A3 and §s 19a-36-A4 as cited above, the requested information is required to be provided to the Department of Public Health.

Please note that CGS § 52-146o(b)(1) authorizes the release of these records to the Department without the patient's consent. Additionally, the federal Privacy Regulations of the Health Insurance Portability and Accountability Act of 1996 (HIPAA) also authorize you, as a provider, to release this information without an authorization, consent, release, opportunity to object by the patient, as information (i) required by law to be disclosed [HIPAA Privacy regulation 45 CFR § 164.512(a)] and (ii) as part of the Department's public health activities [HIPAA Privacy regulation, 45 CFR § 164.512(b)(1)(i)]. The requested information is what is minimally necessary to achieve the purpose of the disclosure, and you may rely upon this representation in releasing the requested information, pursuant to 45 CFR § 164.514(d)(3)(iii)(A) of the HIPAA Privacy regulations.

Connecticut Department of Public Health

CONFIDENTIALITY PLEDGE

I recognize the importance of maintaining the confidentiality of personal and personal health information collected by the Connecticut Department of Public Health (DPH), and of assuring the right to privacy of persons, facilities, clients of facilities, and agencies which cooperate with programs within DPH, are regulated by DPH, or participate in DPH's information collection efforts. I also understand that DPH is legally obligated to protect the privacy of personal health information. I have read Connecticut General Statutes, Section 19a-25 and Sections 19a-25-1 through 19a-25-4 of the Regulations of Connecticut State Agencies concerning confidentiality of records concerning morbidity and mortality and have been advised that DPH can take necessary action if a breach of confidentiality occurs. I also understand that my adherence to this pledge applies throughout and subsequent to my employment at the Department of Public Health.

I therefore pledge that I will *NOT* divulge the identity of patients, physicians, facilities, clients of facilities, or agencies included in information obtained from DPH to anyone other than another DPH employee or associate of DPH who is approved for access to the information and has either signed a DPH confidentiality pledge or executed a contract or Memorandum of Agreement authorizing such disclosure.

I agree to protect all confidential information during its collection, use, storage, and destruction. Disclosure of confidential information will be done only in the discharge of my duties (including reporting duties imposed by legislation) and based on a programmatic need to know.

Date: _____

Individual Pledging to Maintain Confidentiality

Name _____

Title _____

Address _____

_____

SIGNATURES:

_____ _____

Individual Pledging to Maintain Confidentiality Program Supervisor

GENERAL ENTERIC DISEASES INTERVIEW FORM

Revised 12/11/15

Use this form for: Salmonella, Campylobacter, Cryptosporidium, Shigella, and Yersinia.

Reporting Health Department:		
Completed by:	LHD:	Phone:
Date of first interview attempt: / /	Date interview completed: / /	
☐ Case was interviewed	Case was not interviewed because: ☐ Unreachable ☐ Refused ☐ No working phone ☐ Other_____	

Note: Even if case could not be interviewed, please complete above information and enter into Maven or fax this page to the DPH Epidemiology Program at 860-509-7910.

Case Information:				
Last name:	First Name:			
Street:	City:			Zip:
Date specimen collected: / /	Source: ☐ Stool ☐ Blood ☐ Urine ☐ Other			
Pathogen:	Laboratory:			

	Yes	**No**	**Unk**	**If yes, additional details:**
Did you have any symptoms associated with this illness?				Date/time of onset: / / : AM PM
Vomiting				Date/time of onset: / / : AM PM
Diarrhea				Date/time of onset: / / : AM PM Number of days diarrhea lasted:
Bloody Diarrhea				
Fever				Highest temperature:
Total number of days illness lasted:				
	Yes	**No**	**Unk**	**If yes, additional details:**
Were you hospitalized? (Inpatient only, not just ED visit)				Hospital name: Admit date: / / Discharge date: / /
Do you have any underlying medical conditions or are you immunocompromised?				Describe:
Outcome: ☐ Survived ☐ Died				

Occupation and Risk Factor Information:				
Occupation:				
	Yes	**No**	**Unk**	**If yes, specify where:**
Prepare foods outside the home:				
Provide direct patient care outside the home:				
Work in day care setting?				
Attend day care setting:				

Can you tell us about other household members, their ages, occupation, and whether they have been ill with a similar illness:

Name	**Relationship**	**Age**	**Occupation**	**Ill**	**If yes, onset date and symptoms**
				☐ Yes ☐ No	
				☐ Yes ☐ No	
				☐ Yes ☐ No	
				☐ Yes ☐ No	

NOTE: If case or household contacts are involved in high risk occupations/activities, implement appropriate control recommendations. Refer to the "Reportable Diseases Reference Manual".

What is your race? White ☐ Black ☐ Asian ☐ Native Hawaiian/Pacific Islander
☐ American Indian/Alaska Native ☐ Other Unknown

Are you of Hispanic background? ☐ Yes ☐ No ☐ Unknown

Did you travel outside of the United States in the 7 days before illness? **Yes** **No** **Unknown**		
Country:	**Depart CT:** / /	**Return CT:** / /
Country:	**Depart CT:** / /	**Return CT:** / /
Did you travel to any other states in the 7 days before illness? **Yes** **No** **Unknown**		
City/State	**Depart CT:** / /	**Return CT:** / /
City/State	**Depart CT:** / /	**Return CT:** / /
Did you attend any large parties or gatherings (parties, fairs, festivals) in the 7 days before illness? **Yes** **No** **Unknown**		
Event:	City:	Date/Time: / / : AM PM
Foods eaten:		
Did you eat out at any restaurants in the 7 days before illness? **Yes** **No** **Unknown**		
Name:	City:	Date/Time: / / : AM PM
Foods eaten:		
Name:	City:	Date/Time: / / : AM PM
Foods eaten:		
Name:	City:	Date/Time: / / : AM PM
Foods eaten:		

Where did you purchase groceries eaten in the 7 days before illness (including farmer's markets, home delivery service)

Store Name	**City**

Special Diet	**Yes**	**No**	**Unk**	**If yes, specify/describe, brand/type:**
Food allergies that prevent you from eating certain foods?				
Vegetarian or Vegan diet?				
Special or restricted diet? (weight-loss, cultural, religious)				
If infant, formula or baby food?				

Did you have any of the following exposures in the 7 days before your illness?
(Note for interviewer: If yes, please ask any listed follow-up questions)

Water-Related Exposure	**Yes**	**No**	**Unk**	**If yes, where:**
Live in a home with a septic system?				
Use water from a private well as drinking water?				
Drink untreated water (pond, lake, river, etc.?)				
Swim or wade in untreated water?				
Swim or wade in treated water?				
Animal Contact	**Yes**	**No**	**Unk**	**If yes, where/type of animal:**
Dog?				
Cat?				
Other pet mammals? (rodent, ferrets, rabbits)				
Pet bird (not poultry)				
Reptiles/Amphibians (turtles, frogs, lizards)				
Other pets? (fish, hermit crabs)				
Live poultry? (chicken, turkey)				
Cattle, goats, sheep?				
Pigs?				
Contact with a pet that had diarrhea?				
Visit, work, or live on farm/ranch/petting zoo?				
Ill Contacts	**Yes**	**No**	**Unk**	**If yes, who:**
Household or close contact with diarrhea?				

COMMENTS:_____

ADDITIONAL EXPOSURE QUESTIONS FOR SALMONELLA AND CAMPYLOBACTER ONLY

Did you eat the following items in the 7 days before your illness?
(Note for interviewer: If yes, please ask any listed follow-up questions and specify brand/type, where purchased/eaten.)

Meats and Seafood	**Yes**	**No**	**Unk**	**If yes, food details:**
Chicken or foods containing chicken (deli, ground, jerky)				
Was chicken eaten outside the home?				
Any chicken at home bought fresh?				
Any chicken at home bought frozen?				
Was chicken ground?				
Turkey or foods containing turkey (deli, ground, jerky)				
Was turkey eaten outside the home?				
Was turkey ground?				
Beef or foods containing beef (deli, ground, jerky)				
Was beef eaten outside the home?				
Was beef ground?				
Was ground beef undercooked or raw?				
Pork or foods containing pork (deli, ground, jerky)				
Lamb or mutton				
Raw or undercooked liver				
Liver pate				
Game meat (bison, elk, rabbit, venison, etc.)				
Fish or fish products				
Was fish undercooked or raw? (sushi)				
Shellfish (crab, shrimp, oysters, clams)?				
Was shellfish undercooked or raw?				
Anyone in household handle raw meat?				
Anyone in household handle raw poultry?				
Anyone in household handle raw seafood?				
Eggs and Dairy	**Yes**	**No**	**Unk**	**If yes, food details:**
Eggs				
Were eggs eaten outside of home?				
Were eggs undercooked or raw?				
Foods made with raw eggs				
Dairy Products				
Unpasteurized or Raw Milk				
Pasteurized cow's or goat's milk				
Soft cheese				
Was soft cheese unpasteurized?				
Other raw/unpasteurized dairy products?				
Fresh, Raw Produce	**Yes**	**No**	**Unk**	**If yes, food details:**
Cantaloupe				
Watermelon				
Berries (specify type:_)				
Lettuce (specify type:_)				
Was lettuce prepackaged/bagged?				
Was lettuce whole head or loose leaf?				
Raw Spinach				
Raw Tomatoes (specify type:_)				
Cucumbers (specify type:)				
Sprouts (specify type:_)				
Fresh Herbs (specify type:__ _)				
Other fresh fruits and vegetables				
Other Foods	**Yes**	**No**	**Unk**	**If yes, food details:**
Any juice not pasteurized and not from concentrate				
Raw nuts (not roasted, processed)				
Peanut butter				
Peanut butter-containing products (crackers, candies)				
Frozen entrees (pot pies, stuffed chicken products, pizza)				

Please enter interview data into Maven or fax to DPH Epidemiology Program at 860-509-7910. Thank you.

Save As... Reset

PATIENT'S NAME: TEL.: Home Work

ADDRESS:

PHYSICIAN'S NAME: TEL.:

– PATIENT IDENTIFIERS NOT TRANSMITTED TO CDC

Reset Form

SEND COMPLETED REPORT TO STATE INFECTION CONTROL

State will forward to: Centers for Disease Control and Prevention
Enteric Diseases Epidemiology Branch
1600 Clifton Road, MS D36
Atlanta, GA 30333
Fax 404-639-2205

CDC Centers for Disease Control and Prevention

CHOLERA AND OTHER VIBRIO ILLNESS SURVEILLANCE REPORT

I. DEMOGRAPHIC AND ISOLATE INFORMATION

OMB 0920-0004 Exp. Date 06/30/2013

1. First three letters of patient's last name: (1-3)

REPORTING HEALTH DEPARTMENT

State: (4-5) City: (6-15) County/Parish: (16-26)

State Epi No.: (27-37) State Lab Isolate ID: (38-49) CDC USE ONLY (50-60) FDA No.: (61-69)

2. Date of birth: Mo. Day Yr. (70-75)

3. Age: Years Mos. (76-79)

4. Sex: (80) M (1) F (2) Unk. (9)

5. Ethnicity: (81) Hispanic or Latino Origin? Yes (1) No (2) Unk (9) Reset #5

6. Race: Reset #6 American Indian/ Alaska Native (5) Asian (4) Black or African American (2) Native Hawaiian or other Pacific Islander (6) White (1) Unk. (9)

7. Occupation: (71-81)

8. ***Vibrio* species isolated** (check one or more): Reset #4

Species	Stool	Blood	Wound	Other	Date specimen collected (If more than one specify earliest date) Mo. Day Yr.	If wound or other, specify site:
V. alginolyticus				(85)	(86-91)	(92-103)
V. cholerae O1				(107)	(108-113)	(114-125)
V. cholerae O139				(129)	(130-135)	(136-147)
V. cholerae ***non***-O1, ***non***-O139				(151)	(152-157)	(158-169)
V. cincinnatiensis				(173)	(174-179)	(180-191)
V. damsela				(195)	(196-201)	(202-213)
V. fluvialis				(217)	(218-223)	(224-235)
V. furnissii				(239)	(240-245)	(246-257)
V. hollisae				(261)	(262-267)	(268-279)
V. metschnikovii				(283)	(284-289)	(290-301)
V. mimicus				(305)	(306-311)	(312-323)
V. parahaemolyticus				(327)	(328-333)	(334-345)
V. vulnificus				(349)	(350-355)	(356-367)
Vibrio species - not identified				(371)	(372-377)	(378-389)
Other (specify): (390-405)				(409)	(410-415)	(416-427)

9. **Were other organisms isolated from the same specimen that yielded *Vibrio*?** Yes (1) No (2) Unk (9) (428) Reset #9

Specify organism(s): (429-450)

10. **Was the identification of the species of *Vibrio* (e.g., *vulnificus*, *fluvialis*) confirmed at the State Public Health Laboratory?** Reset #10 Yes (1) No (2) Unk (9) (451)

11. **Complete the following information if the isolate is *Vibrio cholerae* O1 or O139:**

Serotype (452) (check one): Inaba (1) Ogawa (2) Hikojima (3) Not Done (4) Unk. (9)

Biotype (453) (check one): El Tor (1) Classical (2) Not Done (3) Unk. (9)

Toxigenic? (454) (check one): Yes (1) No (2) Unk (9)

If YES, toxin positive by: (check all, that apply) ELISA (455) Latex agglutination (456) Other (specify): (457-471)

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Name of Hospital:

State: Age: Sex:

II. CLINICAL INFORMATION

Vibrio species:

1. Date and time of onset of first symptoms:

Mo. Day Yr. (472-7)

Hour Min. am (1) pm (2) (478-9) (480-1) (482)

2. Symptoms and signs: max. temp. (483-5) • (486) (487) (488) F (1) C (2)

	Yes (1)	No (2)	Unk. (9)	
Fever				(489)
Nausea				(490)
Vomiting				(491)
Diarrhea				(492)
(max. no. stools/24 hours:)				(493-494)
Visible blood in stools				(495)
Abdominal cramps				(496)

Reset #2

	Yes (1)	No (2)	Unk. (9)	
Headache				(497)
Mus				(498)
Cell				(499)
Bullae				(515)
Shock (systolic BP<90)				(531)
Other				(532)

Site: (516-530)

(specify): (533-549)

3. Total duration of illness: (days) (550-552)

4. Admitted to a hospital for this illness? (553) Reset #4

Yes (1) No (2) Unk. (9)

Admission date: Mo. Day Yr. (554-559)

Discharge date: (560-565)

5. Any sequelae? (e.g., amputation, skin graft) (566)

If YES, describe: Reset #5

Yes (1) No (2) Unk. (9) (567-635)

6. Did patient die? (636) Reset #6

Yes (1) No (2) Unk. (9)

If YES, date of death: Mo. Day Yr. (637-642)

7. Did patient take an antibiotic as treatment for this illness? (643) Yes (1) No (2) Unk. (9)

Reset #7

If YES, name(s) of antibiotic(s):

1. (644-646)
2. (659-661)
3. (674-676)

Date began antibiotic: Mo. Day Yr. (647-652) (662-667) (677-682)

Date ended antibiotic: Mo. Day Yr. (653-658) (668-673) (683-688)

8. Pre-existing conditions? Reset #8

	Yes (1)	No (2)	Unk. (9)	
Alcoholism				(689)
Diabetes				(690)
on insulin?				(691)
Peptic ulcer				(692)
Gastric surgery				(693)
type:				(694-709)
Heart disease				(710)
Heart failure?				(711)
Hematologic disease				(712)
type:				(713-728)
Immunodeficiency				(729)
type:				(730-745)
Liver disease				(746)
type:				(747-762)
Malignancy				(763)
type:				(764-779)
Renal disease				(780)
type:				(781-796)
Other				(797)
specify:				(798-810)

9. Was the patient receiving any of the following treatments or taking any of the following medications in the 30 days before this *Vibrio* illness began?

Reset #9

	Yes (1)	No (2)	Unk. (9)	If YES, specify treatment and dates:
Antibiotics				(811) (812-830)
Chemotherapy				(831) (832-850)
Radiotherapy				(851) (852-870)
Systemic steroids				(871) (872-890)
Immunosuppressants				(891) (892-910)
Antacids				(911) (912-930)
H_2-Blocker or other ulcer medication (e.g., Tagamet, Zantac, Omeprazole)				(931) (932-950)

III. EPIDEMIOLOGIC INFORMATION

1. Did this case occur as part of an outbreak? (Two or more cases of *Vibrio* infection) Yes (1) No (2) Unk. (9) (951) Reset #1

If YES, describe: (952-970)

2. Did the patient travel outside his/her home state in the 7 days before illness began? Reset #2

Yes (1) No (2) Unk. (9) (973)

Patient home state: (971-972)

If YES, list destination(s) and dates:

City/State/Country

1. (974-1004)
2. (1017-1047)
3. (1060-1090)

Date Entered: Mo. Day Yr. (1005-1010) (1048-1053) (1091-1096)

Date Left: Mo. Day Yr. (1011-1016) (1054-1059) (1097-1102)

3. Please specify which of the following seafoods were eaten by the patient in the 7 days before illness began: (If multiple times, most recent meal)

Reset #3

Type of seafood	Yes (1)	No (2)	Unk. (9)		Mo. Day Yr.		Any eaten raw? Yes (1)	No (2)	Unk. (9)	
Clams				(1103)		(1104-1109)				(1110)
Crab				(1111)		(1112-1117)				(1118)
Lobster				(1119)		(1120-1125)				(1126)
Mussels				(1127)		(1128-1133)				(1134)
Oysters				(1135)		(1136-1141)				(1142)

Type of seafood	Yes (1)	No (2)	Unk. (9)		Mo. Day Yr.		Any eaten raw? Yes (1)	No (2)	Unk. (9)	
Shrimp				(1143)		(1144-1149)				(1150)
Crawfish				(1151)		(1152-1157)				(1158)
Other shellfish				(1159)		(1160-1165)				(1166)
(specify):						(1167-1191)				
Fish				(1192)		(1193-1198)				(1199)
(specify):						(1200-1225)				

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State: Age: Sex:

III. EPIDEMIOLOGIC INFORMATION (CONT.)

Vibrio species:

4. In the 7 days before illness began, was patient's skin exposed to any of the following? Reset #4

	Yes (1)	No (2)	Unk. (9)	
A body of water (fresh, salt, or brackish water)	☐	☐	☐	(1226)
Drippings from raw or live seafood	☐	☐	☐	(1227)
Other contact with marine or freshwater life	☐	☐	☐	(1228)

If YES, specify body of water location: (1229-1242)

Date of exposure: Mo. Day Yr. (1250-5)

Time of exposure: Hour (1256-7) Min. (1258-9) ☐ am (1) ☐ pm (2) (1260)

If YES to any of the above, answer each:

	Yes (1)	No (2)	Unk. (9)		Yes (1)	No (2)	Unk. (9)	
Handling/cleaning seafood	☐	☐	☐	(1243)	Construction/repairs	☐	☐	☐	(1247)
Swimming/diving/wading	☐	☐	☐	(1244)	Bitten/stung	☐	☐	☐	(1248)
Walking on beach/shore/ fell on rocks/shells	☐	☐	☐	(1245)	Other: (specify)	☐	☐	☐	(1249)
Boating/skiing/surfing	☐	☐	☐	(1246)					

(1261-1275)

- If skin was exposed to water, indicate type: (1276)
  ☐ Salt (1) ☐ Brackish (3) ☐ Unk. (9) ☐ Fresh (2) ☐ Other (8) (specify): (1277-1284)

Additional comments: (1285-1290)

- If skin was exposed, did the patient sustain a wound during this exposure, or have a pre-existing wound? (choose one): (1291)
  ☐ YES, sustained a wound. (1) ☐ YES, had a pre-existing wound. (2) ☐ YES, uncertain if wound new or old. (3) ☐ NO. (4) ☐ Unk. (9)

If YES, describe how wound occurred and site on body:
(Note: Skin bullae that appear as part of the acute illness should be recorded in section II, Clinical Information, only). (1292-1320)

If isolate is *Vibrio cholerae* O1 or O139 please answer questions 5 - 8.

5. If patient was infected with *V. cholerae* O1 or O139, to which of the following risks was the patient exposed in the 4 days before illness began: Reset #5

	Yes (1)	No (2)	Unk. (9)		Yes (1)	No (2)	Unk. (9)	
Raw seafood	☐	☐	☐	(1321)	Other person(s) with cholera or cholera-like illness	☐	☐	☐	(1324)
Cooked seafood	☐	☐	☐	(1322)	Street-vended food	☐	☐	☐	(1325)
Foreign travel	☐	☐	☐	(1323)	Other	☐	☐	☐	(1326)

(specify): (1327-1350)

6. If answered "yes" to foreign travel (question III. 5), had the patient been educated in cholera prevention measures before travel? Reset #6 Yes (1) ☐ No (2) ☐ Unk. (9) ☐ (1351)

If YES, check all source(s) of information received:

☐ Pre-travel clinic (1352) ☐ Friends (1355) ☐ Travel agency (1358)
☐ Airport (departure gate) (1353) ☐ Private physician (1356) ☐ CDC travelers' hotline (1359)
☐ Newspaper (1354) ☐ Health department (1357) ☐ Other (specify): (1360) (1361-1400)

7. If answered "yes" to foreign travel (question III. 5), what was the patient's reason for travel? (check all that apply) Reset #7

☐ To visit relatives/friends (1401)
☐ Business (1402)
☐ Tourism (1403)
☐ Military (1404)
☐ Other (specify): (1405) (1406-1426)
☐ Unk. (1427)

8. Has patient ever received a cholera vaccine? Yes (1) ☐ No (2) ☐ Unk. (9) ☐ (1428) Reset #8

(If YES, specify type most recently received):
☐ Oral (1429) ☐ Parenteral (1430)

Most recent date: Mo. Day Yr. (1431-1436)

If domestically acquired illness due to any *Vibrio* species is suspected to be related to seafood consumption, please complete section IV (Seafood Investigation).

ADDITIONAL INFORMATION or COMMENTS

CDC Use Only
Source: (1443)
Comment: (1444-1454)

Person completing section I - III: **Date:** Mo. Day Yr. (1437-1442)

Title/Agency: **Tel.:**

Syndrome: (1455)

CDC Isolate No. (1456-1463)

(OVER)

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Previous Page Save As...

State: Age: Sex:

IV. SEAFOOD INVESTIGATION SECTION

Vibrio species:

For each seafood ingestion investigated, please complete as many of the following questions as possible. (Include additional pages section IV if more than one seafood type was ingested and investigated.)

1. Type of seafood (e.g., clams): (1464-1480)

Date consumed: Mo. Day Yr. (1481-1486)

Time consumed: Hour (1487-8) Min. (1489-90) am (1) pm (2) (1491) Reset #1

Amount consumed: (1492-1512)

If patient ate multiple seafoods in the 7 days before onset of illness, please note why this seafood was investigated (e.g., consumed raw, implicated in outbreak investigation):

2. How was this fish or seafood prepared? Reset #2

Raw (1) Baked (2) Boiled (3) Broiled (4) Fried (5) Steamed (6) Unk. (9) Other (8) (specify): (1514-1530)

3. Was seafood imported from another country? Reset #3 Yes (1) No (2) Unk. (9) (1531) If YES, specify exporting country if known: (1532-1554)

4. Was this fish or shellfish harvested by the patient or a friend of the patient? Yes (1) No (2) Unk. (9) (1555) (If YES, go to question 12.) Reset #4

5. Where was this seafood obtained? (1556) (Checkone)

Oyster bar or restaurant (1) Seafood market (4) Unk. (9)
Truck or roadside vendor (2) Other (8) (specify): (1557-1590)
Food store (3)

6. Name of restaurant, oyster bar, or food store: Tel.:

Address:

7. If oysters, clams, or mussels were eaten, how were they distributed to the retail outlet? (1591)

Shellstock (sold in the shell) (1) Shucked (2) Unk. (9) Other (8) (specify): (1592-1610)

8. Date restaurant or food outlet received seafood: Mo. Day Yr. (1611-1616)

9. Was this restaurant or food outlet inspected as part of this investigation? Yes (1) No (2) Unk. (9) (1617)

10. Are shipping tags available from the suspect lot? (1618) Yes (1) No (2) Unk. (9)

(Attach copies if available)

11. Shippers who handled suspected seafood: (please include certification numbers if on tags)

12. Source(s) of seafood:

13. Harvest site: (1619-1639)

Date: Mo. Day Yr. (1640-1645)

Status: (1646) Approved (1) Prohibited (2) Conditional (3) Other (8) (specify): (1647-1666)

(1667-1687)

Date: Mo. Day Yr. (1688-1693)

Status: (1694) Approved (1) Prohibited (2) Conditional (3) Other (8) (specify): (1695-1714)

14. Physical characteristics of harvest area as close as possible to harvest date:

	Result		Date Measured Mo. Day Yr.
Maximum ambient temp. (1715-1718)		F (1) C (2) (1719)	(1720-1725)
Surface water temp. (1726-1727)		F (1) C (2) (1728)	(1729-1734)
Salinity (ppt) (1735-1736)			(1737-1742)
Total rainfall (inches in prev. 5 days) (1743-1744)			(1745-1750)
Fecal coliform count (1751-1755)			(1756-1761) (Attach copy of coliform data)

15. Was there evidence of improper storage, cross-contamination, or holding temperature at any point? Reset #15 Yes (1) No (2) Unk. (9) (1762) If YES, specify deficiencies:

Person completing section IV:

Date: Mo. Day Yr. (1763-1768)

Title/Agency:

Tel.:

Save As... Save Data

Hepatitis A Case Report Form

Connecticut Department of Public Health
Epidemiology and Emerging Infections Program
410 Capitol Avenue, MS# 11EPI
P.O. Box 340308
Hartford, CT 06134-0308
Phone: 860-509-7994, Fax: 860-509-7910

Completed by:_____ **Date of Completion**:___/___/____

PATIENT INFORMATION

LAST: _____ **FIRST**: _____

STREET:_____ **CITY**:_____ **STATE**:_____ **ZIP**:_____

COUNTY:_____ **PHONE**: _____

DEMOGRAPHIC INFORMATION

DATE OF BIRTH: ___/___/_____ **AGE**:_____(years) (000= <1 yr, 999= Unk) **SEX:** ☐ Male ☐ Female

RACE: *(check all that apply)*

☐ American Indian/Alaska Native ☐ Black or African American ☐ White
☐ Asian ☐ Native Hawaiian/Pacific Islander ☐ Other, specify_____

ETHNICITY: *(check one)*

☐ Hispanic ☐ Non-Hispanic ☐ Other/Unknown

PLACE OF BIRTH:

☐ USA ☐ Other, specify _____

CLINICAL AND DIAGNOSTIC DATA

Laboratory: _____

Physician:_____

Address: _____

Phone: _____

Diagnosis date (specimen collection date):____/____/_____

Was the patient symptomatic? ☐ Yes ☐ No ☐ Unk

If yes, symptom onset date:____/____/_____

Fever	☐ Yes	☐ No	☐ Unk
Nausea	☐ Yes	☐ No	☐ Unk
Vomiting	☐ Yes	☐ No	☐ Unk
Loss of appetite	☐ Yes	☐ No	☐ Unk
Abdominal pain	☐ Yes	☐ No	☐ Unk
Dark urine	☐ Yes	☐ No	☐ Unk
Diarrhea	☐ Yes	☐ No	☐ Unk

Was the patient jaundiced? ☐ Yes ☐ No ☐ Unk

If yes, jaundice onset date: / /_____

Was the patient hospitalized for hepatitis? ☐ Yes ☐ No ☐ Unk

If yes, admitted:____/____/_____ discharged:____/____/_____

Hospital: _____

Was the patient pregnant? ☐ Yes ☐ No ☐ Unk

If yes, due date:____/____/_____

Did the patient die from hepatitis? ☐ Yes ☐ No ☐ Unk

If yes, date of death:____/____/_____

REASON FOR TESTING *(check all that apply)*

☐ Symptoms of acute hepatitis
☐ Evaluation of elevated liver enzymes
☐ Screening of asymptomatic patient with reported risk factors
☐ Screening of asymptomatic patient w/ no risk factors (e.g., patient requested)
☐ Prenatal screening
☐ Blood/organ donor screening
☐ Follow-up testing for previous marker of viral hepatitis
☐ Other, specify: _____
☐ Unknown

LIVER ENZYME LEVELS AT TIME OF DIAGNOSIS

Date___/__/____ALT [SGPT]_____Upper limit normal _____

Date___/___/____AST [SGOT]_____Upper limit normal _____

DIAGNOSITIC TESTS *(check all that apply)*	Pos	Neg	Unk	ND
Total antibody to hepatitis A virus [total anti-HAV]	☐	☐	☐	☐
IgM antibody to hepatitis A virus [IgM anti-HAV]	☐	☐	☐	☐
Hepatitis B surface antigen [HBsAg]	☐	☐	☐	☐
Total antibody to hepatitis B core antigen [Total anti-HBc]	☐	☐	☐	☐
IgM antibody to hepatitis B core antigen [IgM anti-HBc]	☐	☐	☐	☐
Antibody to hepatitis C virus [anti-HCV]	☐	☐	☐	☐
Anti-HCV signal to cut-off ratio _____				
Supplemental anti-HCV assay [e.g., RIBA]	☐	☐	☐	☐
HCV RNA [e.g., PCR]	☐	☐	☐	☐
Antibody to hepatitis D virus [anti-HDV]	☐	☐	☐	☐
Antibody to hepatitis E virus [anti-HEV]	☐	☐	☐	☐

DPH USE ONLY

Is this a confirmed* case? ☐ Yes ☐ No

If yes, case ID: _____

*CDC case definition (2000)
Confirmed = a case that meets the clinical and laboratory criteria
Clinical criteria: An acute illness with
a) discrete onset of symptoms and
b) jaundice or elevated serum aminotransferase levels
Laboratory criteria: Immunoglobulin M (IgM) antibody to hepatitis A virus (anti-HAV) positive

Serum forwarded to State Lab? ☐ Yes ☐ No
If No, reason:
☐ Did not know had to send serum to State Lab
☐ Not enough residual sample
☐ Out-of-state laboratory
☐ Other, specify:_____

Serum received at State Lab? ☐ Yes ☐ No
If yes, accession#: _____

Serum forwarded to CDC? ☐ Yes ☐ No
CDC result: _____

Record submitted to CDC through NETSS?
☐ Yes ☐ No

If yes, NETSS ID: _____

EXPOSURE (during 2 to 6 weeks prior to onset of symptoms unless otherwise noted)

1. **Was the patient a contact of a person with confirmed or suspected hepatitis A virus infection?** ☐ Yes ☐ No ☐ Unk

If yes, was the contact: Household member (non-sexual) ☐ Yes ☐ No ☐ Unk

Sex partner ☐ Yes ☐ No ☐ Unk

Child cared for by this patient ☐ Yes ☐ No ☐ Unk

Babysitter of this patient ☐ Yes ☐ No ☐ Unk

Playmate ☐ Yes ☐ No ☐ Unk

Other, specify_____ ☐ Yes ☐ No ☐ Unk

2. **Was the patient a child or employee in a day care center, nursery or preschool?** ☐ Yes ☐ No ☐ Unk

If yes, name of facility_____ Address: _____

3. **Was the patient a household contact of a child or employee in a day care center, nursery, or preschool?** ☐ Yes ☐ No ☐ Unk

If yes, name of facility_____ Address: _____

4. **If yes to question 2 or 3, was there an identified hepatitis A case in the child care facility?** ☐ Yes ☐ No ☐ Unk

If yes, provide details _____

5. **Was the patient employed as a health care worker with direct patient contact?** ☐ Yes ☐ No ☐ Unk

If yes, name of facility_____ Address: _____

6. **Was the patient employed as a food handler <u>during the 2 weeks prior to onset of symptoms or while ill</u>?** ☐ Yes ☐ No ☐ Unk

If yes, name of restaurant_____ Address: _____

7. **Did the patient eat raw shellfish?** ☐ Yes ☐ No ☐ Unk

If yes, specify type of shellfish and where eaten/purchased _____

8. **Did the patient inject drugs not prescribed by a doctor?** ☐ Yes ☐ No ☐ Unk

9. **Did the patient use street drugs but not inject?** ☐ Yes ☐ No ☐ Unk

10. **Did the patient travel outside of the US or Canada?** ☐ Yes ☐ No ☐ Unk

If yes, where and when? Country 1:_____ Date(s) of travel: / / - / /

Country 2:_____ Date(s) of travel: / / - / /

Country 3:_____ Date(s) of travel: / / - / /_____

11. **In the <u>3 months</u> prior to onset of symptoms, did anyone <u>in the patient's household</u> travel outside the US or Canada?** ☐ Yes ☐ No ☐ Unk

If yes, where and when? Country 1:_____ Date(s) of travel:____/____/_____-____/____/_____

Country 2:_____ Date(s) of travel:____/____/_____-____/____/_____

Country 3:_____ Date(s) of travel:____/____/_____-____/____/_____

12. **Is the patient suspected to be part of a common-source outbreak?** ☐ Yes ☐ No ☐ Unk

If yes, was the outbreak: Foodborne – associated with an infected food handler ☐ Yes ☐ No ☐ Unk

Foodborne – NOT associated with an infected food handler ☐ Yes ☐ No ☐ Unk

Specify food item:_____ Waterborne

Yes No ☐ Unk ☐ ☐

Other, specify_____ ☐ Yes ☐ No ☐ Unk

Source not identified ☐ Yes ☐ No ☐ Unk

13. **Please ask both of the following questions regardless of the patient's gender:**

How many **<u>male</u>** sex partners did the patient have? ☐ 0 ☐ 1 ☐ 2-5 ☐ >5 ☐ Unk

How many **<u>female</u>** sex partners did the patient have? ☐ 0 ☐ 1 ☐ 2-5 ☐ >5 ☐ Unk

VACCINATION HISTORY

14. **Has the patient ever received the hepatitis A vaccine?** ☐ Yes ☐ No ☐ Unk

If yes, how many doses? ☐ 1 ☐ ≥2 ☐ Unk

In what year was the last dose received? _____

15. **Has the patient ever received immune globulin?** ☐ Yes ☐ No ☐ Unk

If yes, when was the last dose received?_____/_____(month/year)

NOTES/COMMENTS:

_____

_____

_____

_____

CASE AND CONTACT MANAGEMENT

Definitions:

"Contact" is generally defined as a person who has had ***close contact*** with a confirmed case during the 2 weeks before and 1 week after onset of jaundice and usually includes:

- household contacts **(H)**
- sexual contacts **(S)**
- other ongoing close personal contact (e.g. regular babysitting) **(O)**
- staff and children in the same child care center **(C)**
- foodhandlers employed in the same establishment **(F)**

HCP = health care provider
PEP = post-exposure prophylaxis

CONTACT ROSTER *Please list all* ***close contacts*** *below and complete at least information in SECTION A. If contact PEP status or PEP type is unknown at time of case interview, inform case that DPH will be calling contacts and/or their physician to determine PEP status.*

SECTION A						SECTION B		
Name	**Age**	**Relation to case**	**Contact Type** (H, S, O, C, F) (if "O", specify)	**Phone Number** *(if not from same household)*	**Referred to HCP for PEP?**	**PEP Received?**	**PEP Type**	**Physician/Clinic Name**
					☐ Yes ☐ No	Yes No	IG Vaccine Date / /	
					☐ Yes ☐ No	Yes No	IG Vaccine Date / /	
					☐ Yes ☐ No	Yes No	IG Vaccine Date / /	
					☐ Yes ☐ No	Yes No	IG Vaccine Date / /	
					☐ Yes ☐ No	Yes No	IG Vaccine Date / /	
					☐ Yes ☐ No	Yes No	IG Vaccine Date / /	

PATIENT EDUCATION

Was education provided regarding nature of disease and preventive measures? ☐ Yes ☐ No

If yes, how was education provided? ☐ Verbally ☐ Sent written material ☐ Other _____

State of Connecticut
Department of Public Health

Varicella Case Report Form

Please make and use copies of this form.

Report Status

Date reported: _____._____._____ Reported by: _____ Phone #: _____

Reporting Site/Clinic: _____ Town/City: _____

Site Type reporting:
☐ School ☐ Daycare ☐ Physician ☐ Health Dept. ☐ Other: _____

Demographic Information

Patient Name: _____ Date of Birth: _____ _____ _____ Age: _____
mm dd yyyy

Address: _____ City: _____ Zip Code: _____ Home Phone: _____

Race: ☐ American Indian/Alaska Native ☐ Asian ☐ Black/African American ☐ Native Hawaiian/Other Pacific Islander ☐ White
☐ Unknown ☐ Other: _____

Ethnicity: ☐ Hispanic or Latino origin ☐ Not of Hispanic or Latino origin ☐ Unknown **Sex**: ☐ Male ☐ Female ☐ Unknown/Un-specified

Parent/Guardian Name (optional): _____ Parent/Guardian Work Phone (optional): _____

Case Attends: ☐ School ☐ Daycare ☐ Work ☐ College ☐ Other: _____

Name of Institution: _____ City: _____

Clinical Data

Rash Onset:
mm dd yyyy

Number of Lesions:
☐ Less than Average (<50) ☐ Average (50-250) ☐ Greater than Average (>250)

Hospitalized? : ☐ Yes ☐ No If yes, Hospital Name: _____ Days Hospitalized: _____

Diagnosed by:
☐ Parent/Guardian ☐ Physician/Nurse ☐ School ☐ Self ☐ Other: _____

Lab Confirmed: ☐ Yes ☐ No ☐ Unknown
Test type: ☐ DFA ☐ IgM ☐ IgG ☐ PCR ☐ Other: _____ Result:

Previous History:
Chickenpox?: ☐ Yes ☐ No ☐ Unknown Age: _____

Vaccination?: ☐ Yes ☐ No ☐ Unknown

If yes, Date Administered: VZV Dose 1: VZV Dose 2:

History of MMR:
Date Administered: MMR Dose 1: MMR Dose 2:

Immunization Services Program
410 Capitol Avenue, MS#11MUN
P.O. Box 340308
Hartford, CT 06134-0308
Phone: (860) 509-7929 Fax: (860) 509-7945

rev. 7/6/07

Reset Form

DEPARTMENT OF
HEALTH & HUMAN SERVICES
CENTERS FOR DISEASE CONTROL
AND PREVENTION
ATLANTA, GA30333

TYPHOID AND PARATYPHOID FEVER SURVEILLANCE REPORT

CDC NO.: ☐☐☐☐☐ STATE LAB ISOLATE ID NO. ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

CENTERS FOR DISEASE CONTROL AND PREVENTION

Instructions:

Form Approved:
OMB No. 0920-0009

– Please complete this form only for new, symptomatic, culture-proven cases of typhoid or paratyphoid fever. –

DEMOGRAPHIC DATA

1. Reporting State: ☐☐

2. First three letters of patient's last name: ☐☐☐

3. Date of birth: ☐☐ Mo. ☐☐ Day ☐☐☐☐ Yr. *or* Age: (in years) ☐☐

4. Sex: ☐ Male ☐ Female

5. Does the patient work as a foodhandler? ☐ Yes ☐ No ☐ Unk.

6. Citizenship: ☐ U.S. ☐ Other: _____ ☐ Unk.

CLINICAL DATA

7. Was the patient ill with typhoid or paratyphoid fever? (fever, abdominal pain, headache, etc) ☐ Yes ☐ No ☐ Unk.

If Yes, give date of onset of symptoms: ☐☐ Mo. ☐☐ Day ☐☐ Yr.

8. Was the patient hospitalized? ☐ Yes ☐ No ☐ Unk.

If Yes, how many days was the patient hospitalized? ☐☐ Days

9. Outcome of case: ☐ Recovered ☐ Died ☐ Unk.

LABORATORY DATA

10. Date *Salmonella* first isolated: ☐☐ Mo. ☐☐ Day ☐☐ Yr.

Site(s) of isolation: *(check all that apply)*

☐ Blood ☐ Stool ☐ Gall Bladder ☐ Other (specify): _____

Serotype:

☐ Typhi ☐ Paratyphi A ☐ Paratyphi B ☐ Paratyphi C

11. Was **antibiotic sensitivity testing** performed on this (these) isolate(s) at the laboratory? *(Please contact the clinical laboratory for this information)* ☐ Yes ☐ No ☐ Unk.

If Yes, was the organism resistant to:

• Ampicillin:	☐ Yes	☐ No	☐ Not tested
• Chloramphenicol:	☐ Yes	☐ No	☐ Not tested
• Trimethoprim-sulfamethoxazole:	☐ Yes	☐ No	☐ Not tested
• Fluoroquinolones (e.g., Ciprofloxacin):	☐ Yes	☐ No	☐ Not tested

EPIDEMIOLOGIC DATA

12. Did this case occur as part of an outbreak? *(two or more cases of typhoid or paratyphoid fever associated by time and place)* ☐ Yes ☐ No ☐ Unk.

13. Did the patient receive typhoid vaccination (primary series or booster) within **five years** before onset of illness? ☐ Yes ☐ No ☐ Unk.

If Yes, indicate type of vaccine received:

				Year received
• Oral Ty21a or Vivotif (Berna) four pill series:	☐ Yes	☐ No	☐ Unk.	☐☐
• ViCPS or Typhim Vi shot (Pasteur Merieux):	☐ Yes	☐ No	☐ Unk.	☐☐

14. Did the patient travel or live outside the United States during the 30 days before the illness began? ☐ Yes ☐ No ☐ Unk.

If Yes, please list in order the countries visited during the 30 days before the illness began: (other than the United States)

1. _____ 3. _____
2. _____ 4. _____

Date of most recent return or entry to the United States: ☐☐ Mo. ☐☐ Day ☐☐ Yr.

15. Did this case occur as part of an outbreak?

a. Business?	☐ Yes	☐ No	☐ Unk.	d. Immigration to U.S.?	☐ Yes	☐ No	☐ Unk.
b. Tourism?	☐ Yes	☐ No	☐ Unk.	e. Other?	☐ Yes	☐ No	☐ Unk.
c. Visiting relatives or friends?	☐ Yes	☐ No	☐ Unk.	(if other, specify): _____			

16. Was the case traced to a typhoid or paratyphoid carrier? ☐ Yes ☐ No ☐ Unk.

If Yes, was the carrier previously known to the health department? ☐ Yes ☐ No ☐ Unk.

17. Comments:

18. Name of Person Completing Form: _____

Address: _____

Telephone: _____ **Date:** 09/17/2015 Mo. Day Yr.

– THANK YOU VERY MUCH FOR TAKING THE TIME TO COMPLETE THIS FORM –

Please send a copy to your STATE EPIDEMIOLOGY OFFICE and the
Enteric Diseases Epidemiology Branch, Centers for Disease Control and Prevention
Mailstop C-09, Atlanta, Georgia 30333 • Fax: (404) 639-2205

Print Save Form

Updated 01/06/2014

DENGUE FEVER CASE REPORT,
CONNECTICUT FOLLOW-UP

Patient Name:_ _____ **MAVEN ID**:_ _____

1. **Demographic Information:**
Address (street, city, State):_____
Telephone:_____
Date of Birth: _____ Sex: □ Male □ Female □ Other_____

Race: □ White □ Black/African American □ Asian □ American Indian/Alaska Native
□ Native Hawaiian/Other Pacific Islander □ Other, specify_____ □ Unknown

Hispanic/Latino: □ Yes □ No □Unknown

2. **Laboratory Information:**
Date of Collection:_____ Specimen source:_____ Test method:_____
Result:_____ Normal value range:_____
Testing laboratory:_____
Ordering provider name/address/telephone:_____
_____
_____
_____

3. **Clinical Information:**
Date of symptom onset:_____
Was patient hospitalized?
□ Yes □ No □ Unknown
If yes, name of Hospital:_____
Outcome: □ survived □ died □ unknown

4. **Risk Factor/Exposure Information:**
In the 14 days prior to onset of illness, did the case travel?
□ Yes, within the United States** □ Yes, outside of the United States □ No** □ Unknown
Where did you travel?
Location:_____ Dates:_____
Location:_____ Dates:_____
Location:_____ Dates:_____

Was the case a recent blood donor or organ donor?
If yes, please explain:_____

Comments: _____
_____
_____
_____

** *If case reports no travel, or travel within the US only:*

- Complete the CDC Dengue Case Investigation Report: http://www.cdc.gov/dengue/resources/dengueCaseReports/DCIF_English.pdf
- Fax de-identified form to CDC Dengue Branch
- Report case to ArboNet: https://wwwn.cdc.gov/arbonet/Login.aspx

Appendix M

Cluster investigations are used to identify outbreaks of infectious diseases. When the public health response to an infectious disease outbreak or multiple outbreaks exceeds the resources of the local health departments involved or threatens to become a statewide public health emergency as defined in the Public Health Emergency Response Act, the Commissioner of the Department of Public Health will notify the Governor. In the event of a statewide or regional public health emergency, the Governor may order the Commissioner of Public Health to implement all or a portion of the Public Health Emergency Response Plan.

The Epidemiology and Emerging Infections Program staff developed and implemented three foodborne outbreak/Maven CTEDSS related protocols to facilitate cluster identification and outbreak investigations. They include:

1. Protocol for Outbreak Management in Maven CTEDSS,
2. Protocol for Follow-up of Local and Multistate Clusters, and
3. Protocol for Surveillance of Pathogens That Do Not Undergo Routine Pulsed Field Gel Electrophoresis.
4. Connecticut DPH Legionellosis Case Follow-Up Protocol

A "cluster tracking tool" was developed within the outbreak module in CTEDSS. All identified PFGE-based clusters of *Salmonella*, Shiga toxin-producing *E. coli*, *Shigella sonnei*, *Vibrio* and *Listeria* had "cluster events" initiated in CTEDSS with all cluster-associated cases linked to their cluster event. This allowed efficient evaluation of exposures among cluster-associated cases and enables tracking of the progress and outcomes of all clusters. Individual case interview results are directly entered into CTEDSS improving the timeliness of exposure information for rapid review as clusters are identified. A cluster triage and management process was established, whereby each identified cluster was assigned to a regional field epidemiologist for follow-up investigation. Clusters were identified and assigned to staff in real-time (i.e. as DPH State Laboratory molecular test results/PFGE - are available).

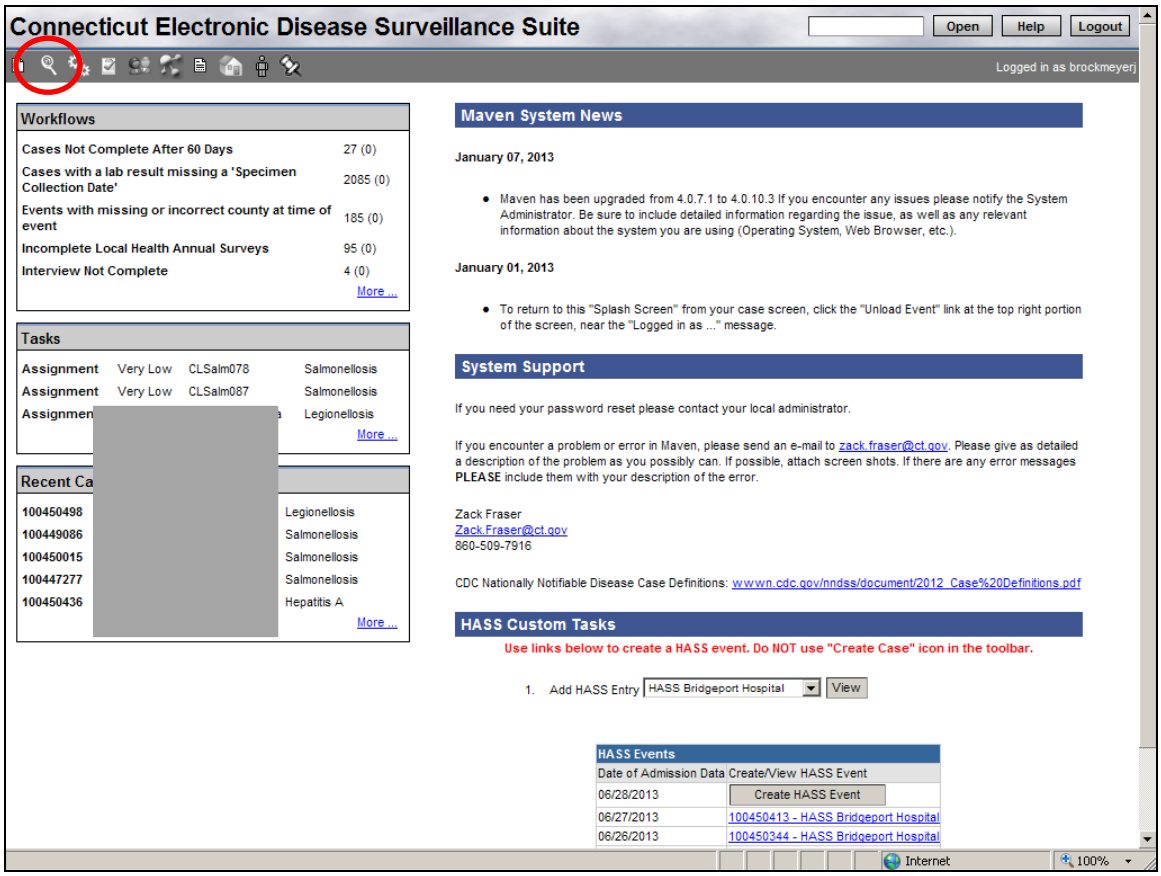
Pathogens which do not undergo routine molecular testing at the DPH State Laboratory include *Campylobacter*, *Cryptosporidium*, *Cyclospora*, *Shigella* non-*sonnei* and *Yersinia*. In the absence of molecular/PFGE data for these pathogens, clusters are detectable through twice weekly review of the temporal and geographic distribution of routine disease reports. Surveillance of non-PFGE'd pathogens includes analysis of disease report data in Maven CTEDSS, identification of disease incidence by date and geography, and assessment of exposure data for clustered cases. Should a point-source outbreak be identified, public health intervention will proceed as necessary, in cooperation with the appropriate local department.

CT DPH Protocol for Follow-up of Local and Multistate Clusters

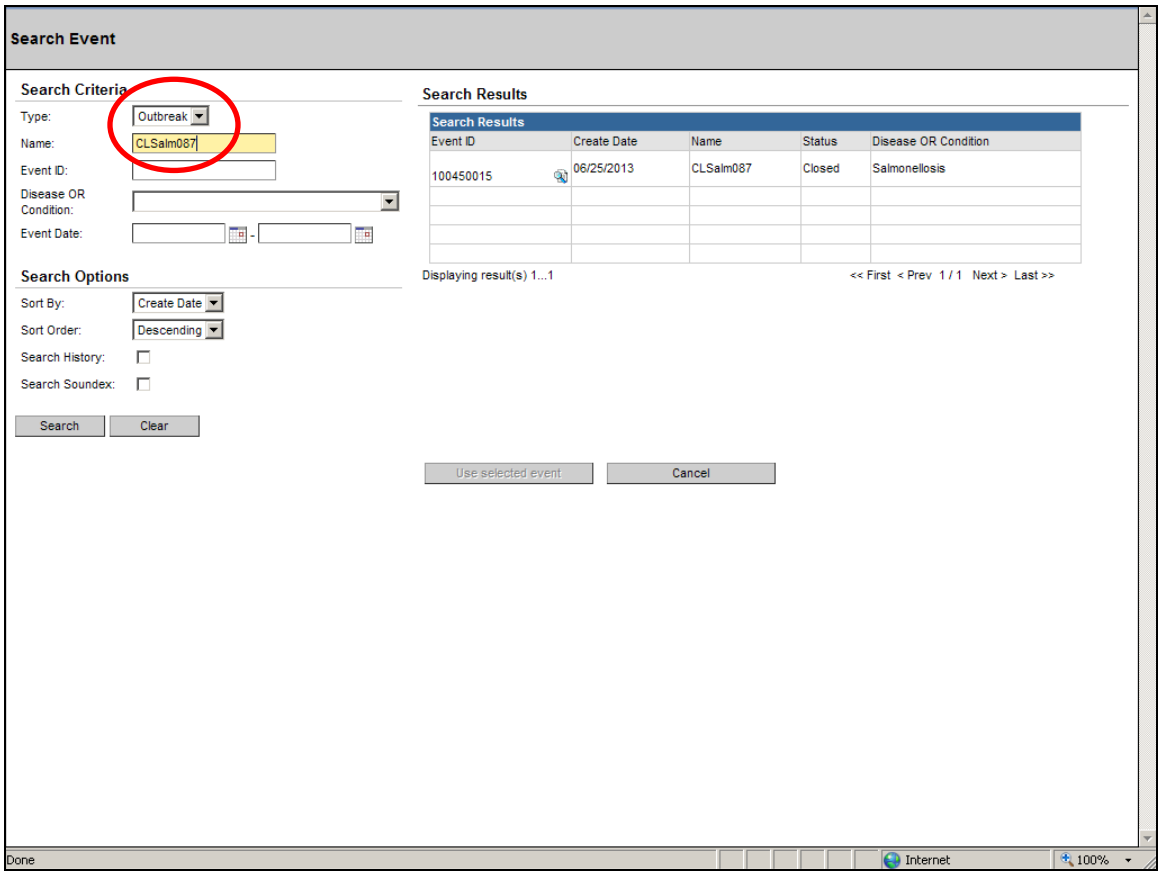
CT DPH follow-up procedure for identified clusters

1. You will receive an email notification regarding your cluster assignment. The email will include the cluster name, a line list of isolates included in the cluster, their Maven ID numbers, and any other cluster-related information as provided by the DPH State Lab and/or CDC.

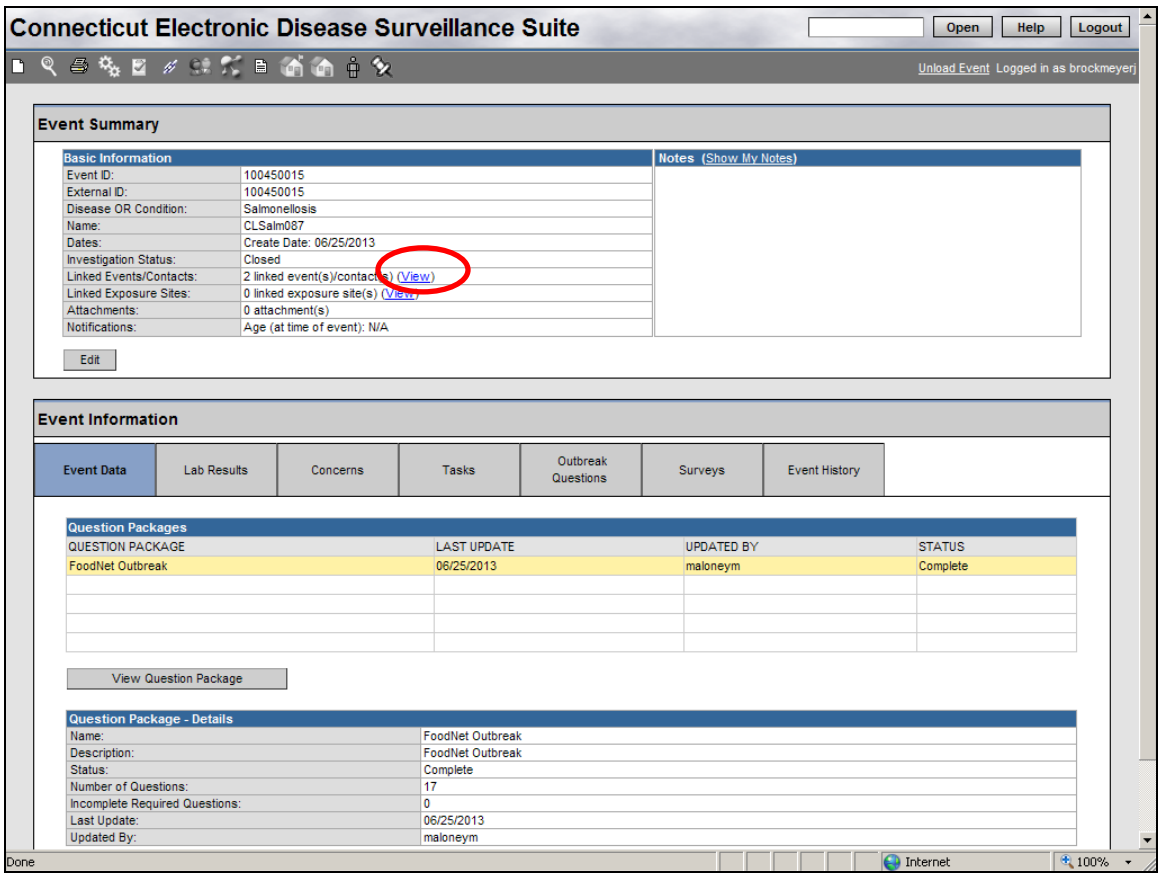
2. Log into the Maven site: https://www.dphapps1.ct.gov/maven/login.do. Locate your cluster in the system using the Search function.



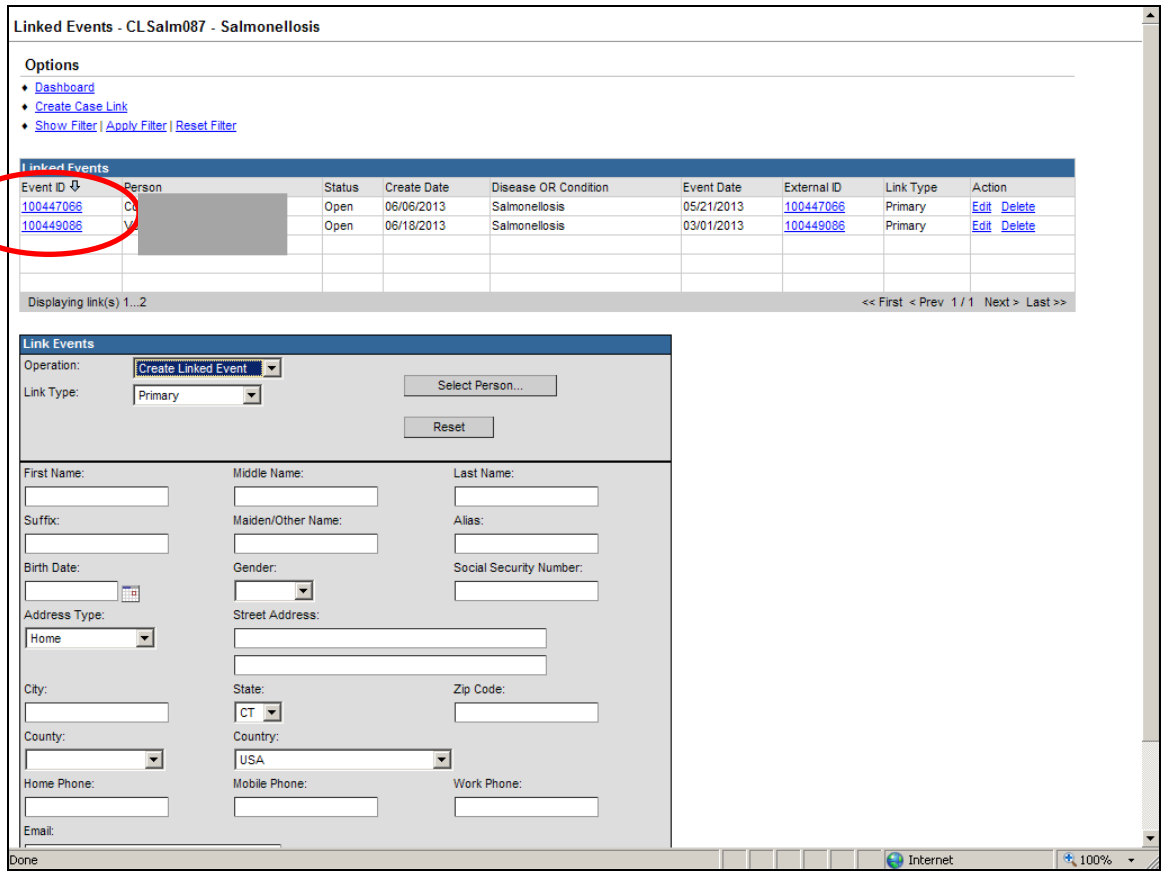
3. When you arrive on the Search Criteria screen, be sure to select Type=Outbreak. Enter the cluster name and hit "Search" at the bottom of the screen.



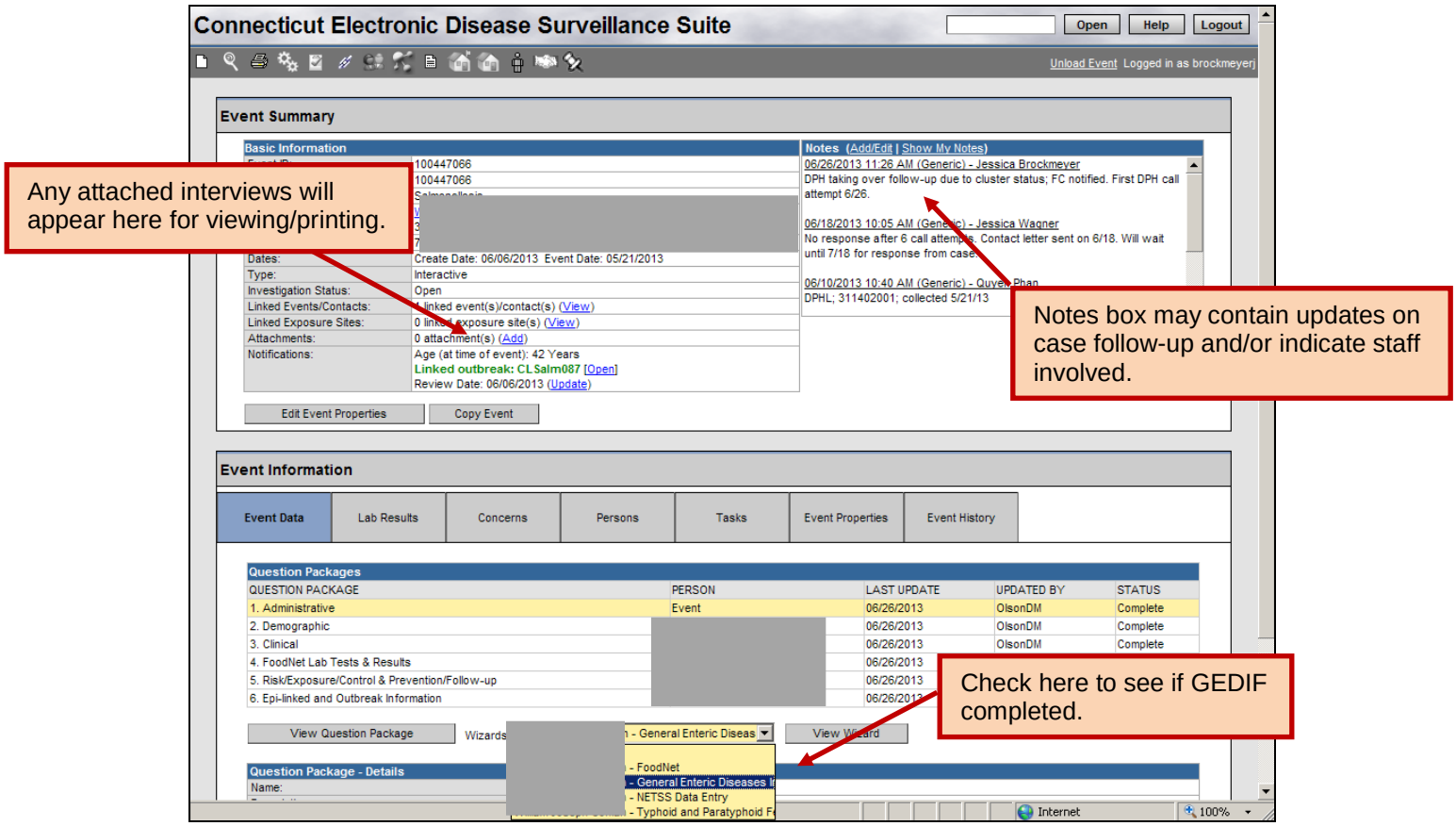
4. You will arrive at the cluster Event Summary page. In the "Basic Information" section next to "Linked Events", you will see the number of cases currently included in the cluster. Click on "View" to see a line list of included cases.



5. Click on each Event ID to access each case's record. Note that for multistate clusters, CT may have only one included case.



6. For each case, assess the status and completeness of follow-up efforts by checking the Notes section and the GEDIF data entry wizard. Completed interviews are entered into corresponding data entry wizards. If there are attachments, you will see an option to "View" in the Attachments section under "Basic Information".



If the GEDIF or other enteric interview has been completed

- Review interview information for exposure history.
- Compare exposure history reported by each case in cluster to assess commonly reported food items, restaurants, gatherings or other possible sources of illness.

If no interview has been completed

- Check the Notes section to see if anyone has attempted the interview.

CT DPH Protocol for Follow-up of Local and Multistate Clusters

If notes indicate that FoodCORE has initiated follow-up:

- Email the student assignee regarding follow-up status and to inform them of the case's inclusion in a cluster. Copy Sharon Hurd on the email.
- If student has been unsuccessful in completing the interview, work with FoodCORE to determine best next steps (i.e. whether students will continue with interview attempts or if DPH Epi will attempt the interview). If an interview is being transferred, make note in Maven.
- Ensure that any newly completed interviews are entered into the GEDIF wizard. Indicate in the Notes section that interview has been completed.

If Notes section is empty but LHD routinely defers interviews to FoodCORE for follow-up:

- Email Sharon Hurd regarding follow-up status and to relay the case's inclusion in a cluster.
- If FoodCORE has been unsuccessful in completing the interview, work with FoodCORE to determine best next steps (i.e. whether students will continue with interview attempts or if DPH Epi will attempt the interview). If an interview is being transferred, make note in Maven. Ensure that any newly completed interviews are entered into the GEDIF wizard. Indicate in the Notes section that interview has been completed.

If notes indicate that LHD has initiated follow-up, or if Notes section is empty and LHD does *not* routinely defer interviews to FoodCORE for follow-up:

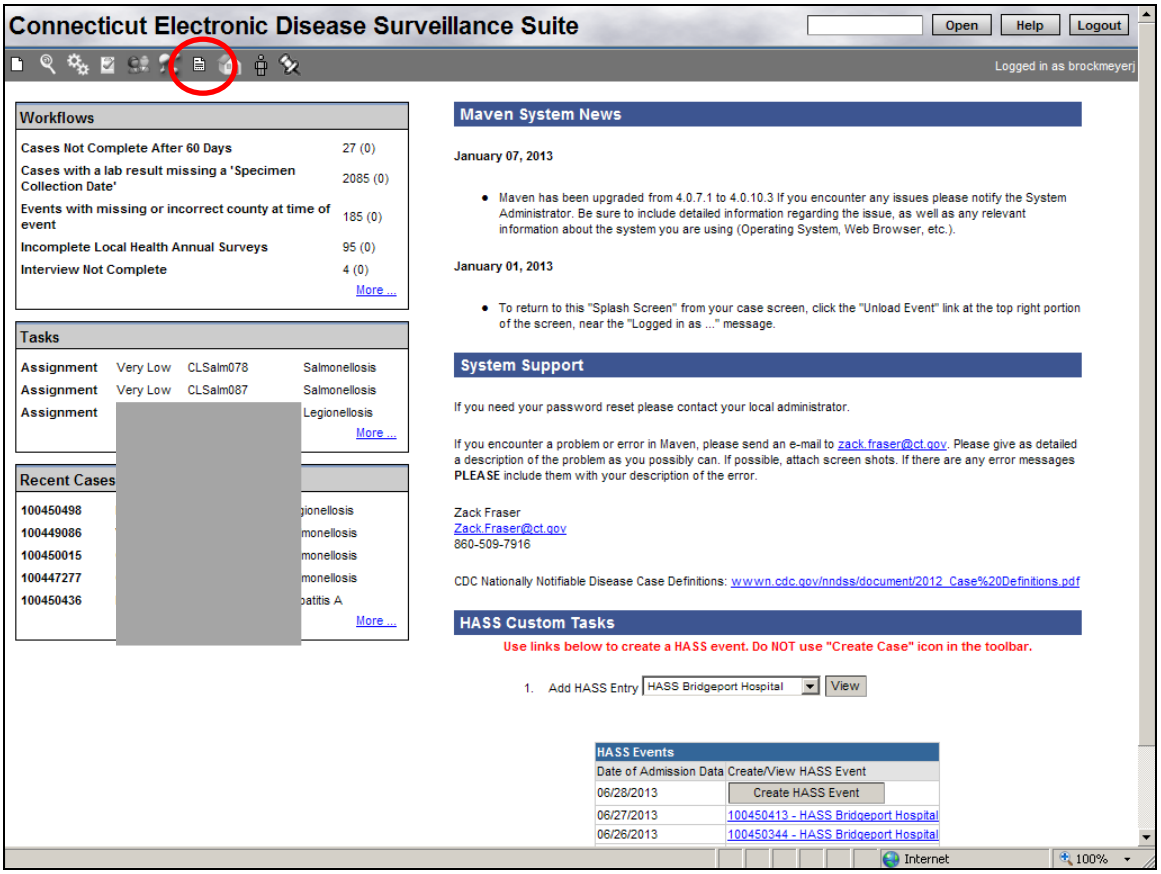
- Contact the LHD regarding follow-up status.
- If LHD has been unsuccessful in completing the interview, work with LHD to determine best next steps (i.e. whether LHD would like to continue with interview attempts or if DPH will attempt the interview). If an interview is being transferred, make note in Maven.
- Ensure that any newly completed interviews are entered into the GEDIF wizard. Indicate in the Notes section that interview has been completed.

CT DPH Protocol for Follow-up of Local and Multistate Clusters

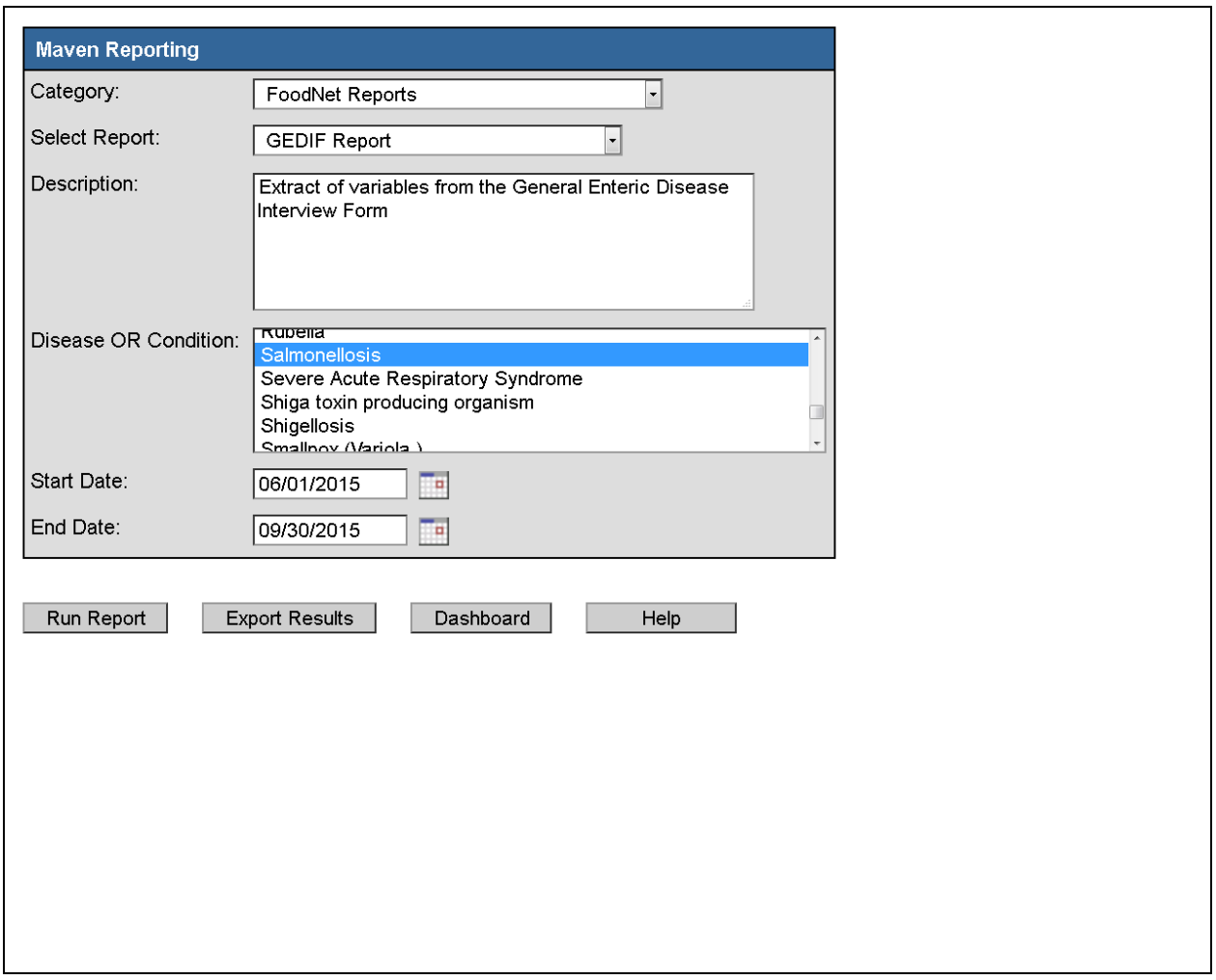
Exposure Assessment and Communication

When investigating a local or multistate cluster, review all completed interview forms for common exposures among cases. For clusters containing multiple isolates, it might be useful to utilize the Maven GEDIF Report to help organize and review reported exposure information. Take the following steps to run the GEDIF Report:

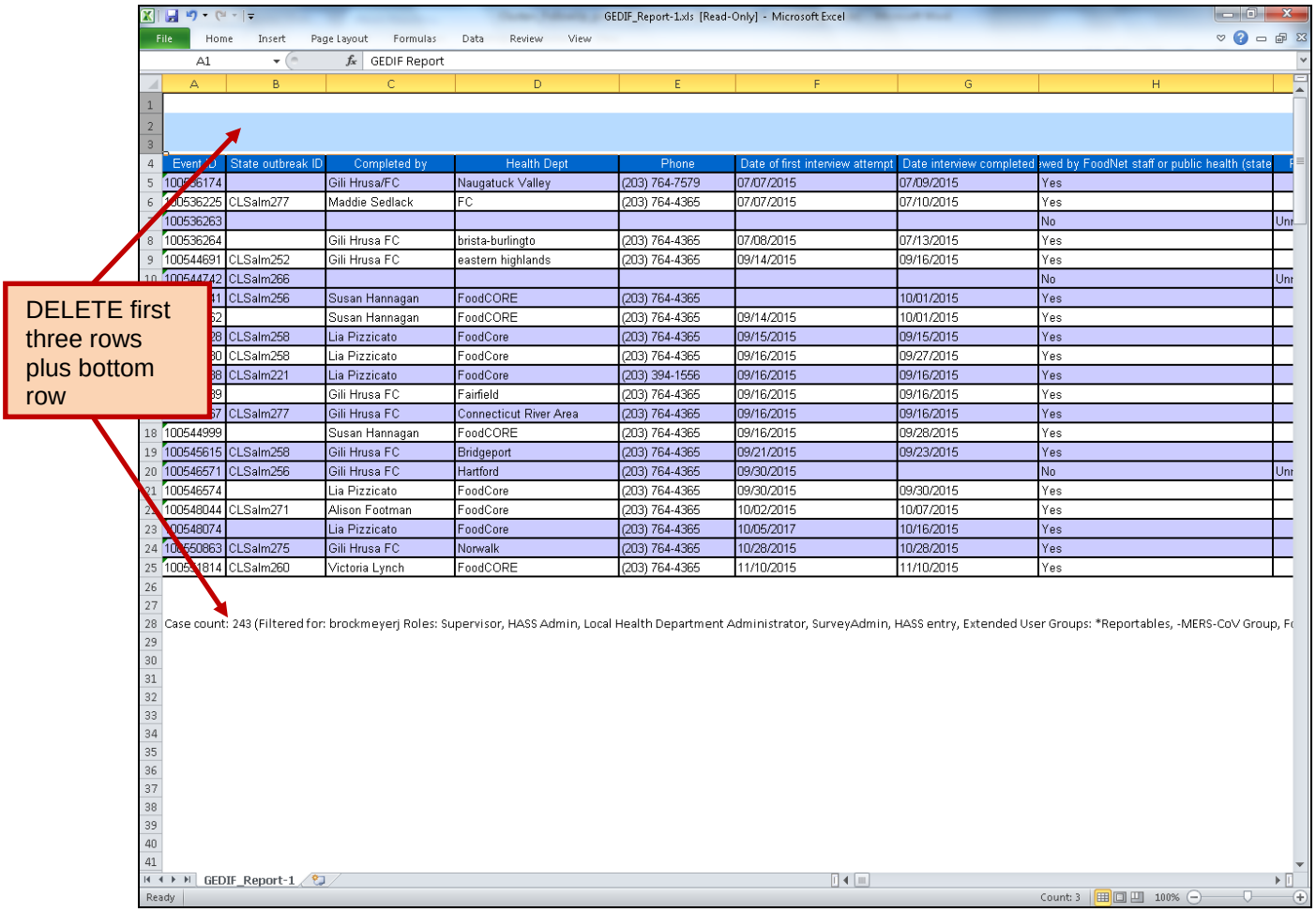
1. Locate the "Reports" icon on the Maven toolbar.



2. Select the FoodNet Reports category, and the GEDIF Report. Specify the pathogen associated with your cluster, and a date range that would include any cluster-associated cases. Click “export”, and open the report when prompted.

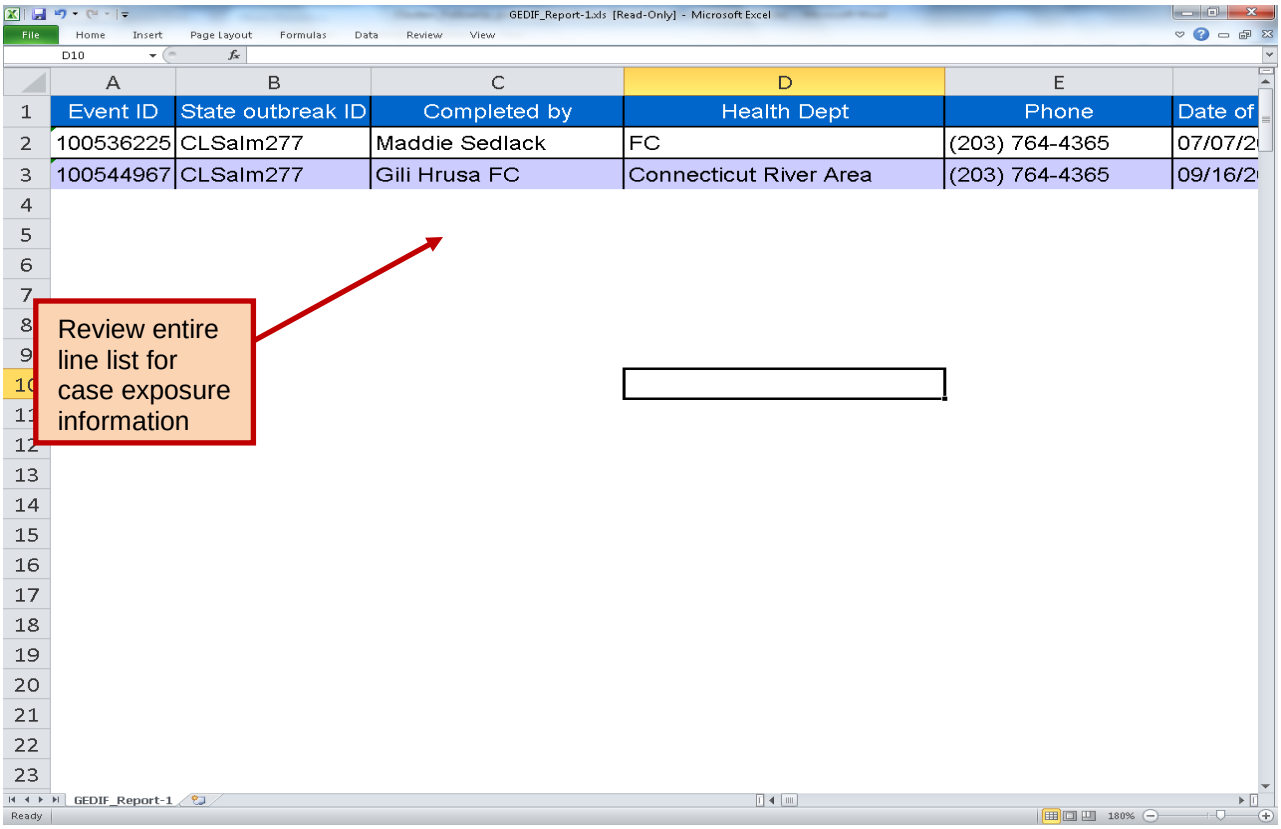


3. Once you have opened the report, delete the first three rows plus the bottom row of text in the spreadsheet to enable sorting. Sort by State outbreak ID to find cluster-associated cases.



4. Once sorted, restrict the line list to only those cases associated with your cluster (as indicated by State outbreak ID). Review the line list to compare exposure histories of cases as captured by interview.

CT DPH Protocol for Follow-up of Local and Multistate Clusters



Event ID	State outbreak ID	Completed by	Health Dept	Phone	Date of
100536225	CLSalm277	Maddie Sedlack	FC	(203) 764-4365	07/07/2
100544967	CLSalm277	Gili Hrusa FC	Connecticut River Area	(203) 764-4365	09/16/2

Note that some reported exposures, even from just one interview, should be specifically asked as part of next interview, or re-asked of a previous case. An example when this would be appropriate is when a cluster is obviously geographically-linked and a case has reported a local food service establishment. Re-interviewing prior cases regarding any newly identified common exposures may be warranted. If supplemental questionnaires are developed, cases should often be re-interviewed using the new questionnaire. FoodCORE students may be available to assist with re-interviewing.

When investigating a multistate cluster, The CDC SEDRIC and SharePoint sites are resources that facilitate information sharing and may help to guide investigations involving multiple states.

CT DPH Protocol for Follow-up of Local and Multistate Clusters

SEDRIC

CDC SEDRIC (https://sedric.cdc.gov) provides a forum for information sharing between CDC and states involved with multistate investigations. Information housed in SEDRIC includes case line lists showing epidemiologic data and exposures of interest among cases. During your case interviews, be sure to consider information that has been posted on SEDRIC.

When working on a multistate cluster investigation, watch for cluster-related emails from CDC. CDC will often ask states to update line lists with case exposure history or other information. If you are asked to update a line list in SEDRIC:

- Login to Maven or consult personal files to review case interview data.
- Login to SEDRIC. For guidance on how to find and update a cluster or outbreak-specific line list, please see the tutorial entitled SEDRIC Palantir Line List Editor.

One can also use SEDRIC to assess current or historic trends in the cluster-specific PFGE pattern. There are several ways to locate an isolate in SEDRIC. For instance, you can enter the Key (State Lab Accession number) or CDC cluster code into the Browser. The Key code is typically the first number listed for each isolate in the line list provided in your assignment email. Another option is to use the Object Explorer to locate an isolate based on PFGE pattern, drilling down as necessary to view different case characteristics. Because SEDRIC houses data on isolates submitted nationwide, including collection date and source state, it can be useful in assessing cluster trends and characteristics. For guidance on how to view historic data in SEDRIC, please see the Welcome to Palantir PowerPoint presentation.

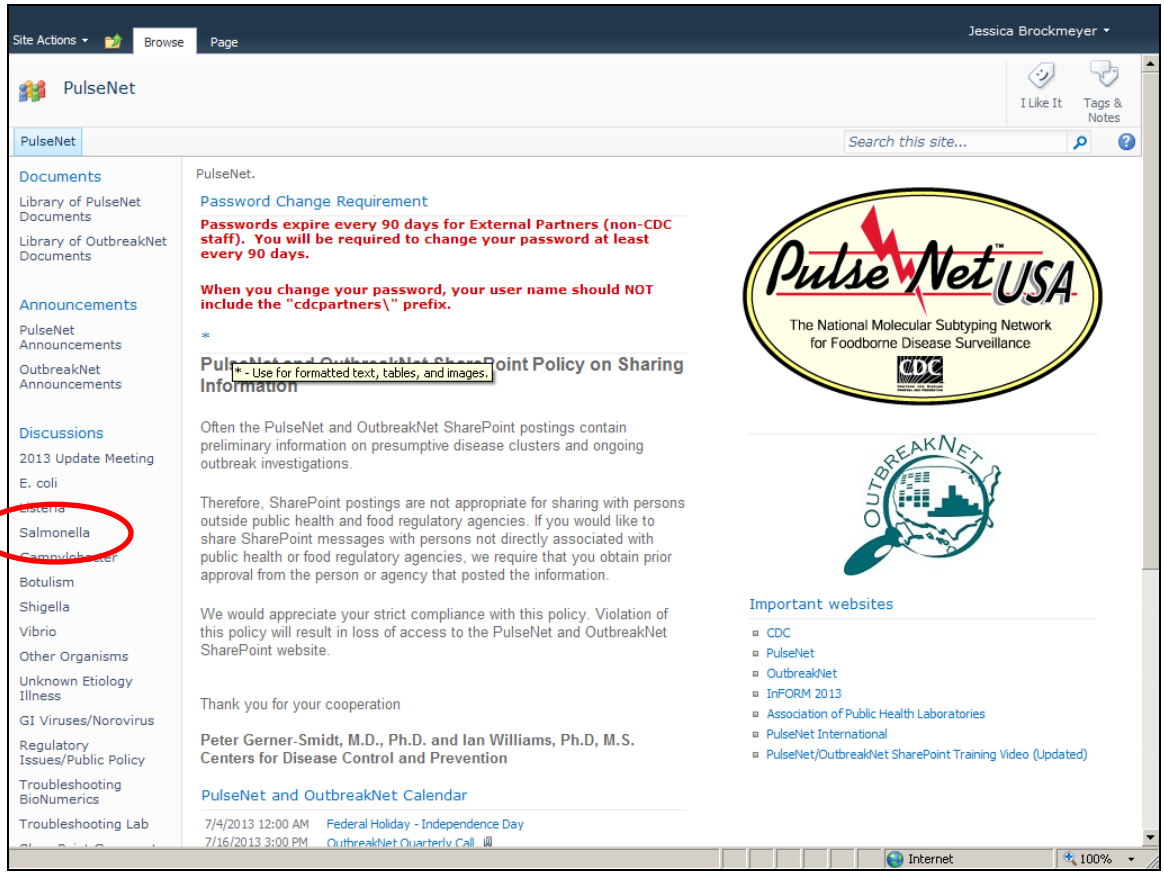
SharePoint

In addition to SEDRIC, SharePoint may provide useful information during cluster investigations. CDC uses SharePoint to house cluster and outbreak-related documents, as well as some training materials. Check SharePoint to access information that has been posted about the cluster by other states and by CDC, including case line lists and general updates.
CDC SharePoint may be accessed here:
https://partner.cdc.gov/CookieAuth.dll?GetLogon?curl=Z2FSitesZ2FNCEZ5AIDZ2FDFWEDZ2FEDLBZ2FPulseNet&reason=0&formdir=5

CT DPH Protocol for Follow-up of Local and Multistate Clusters

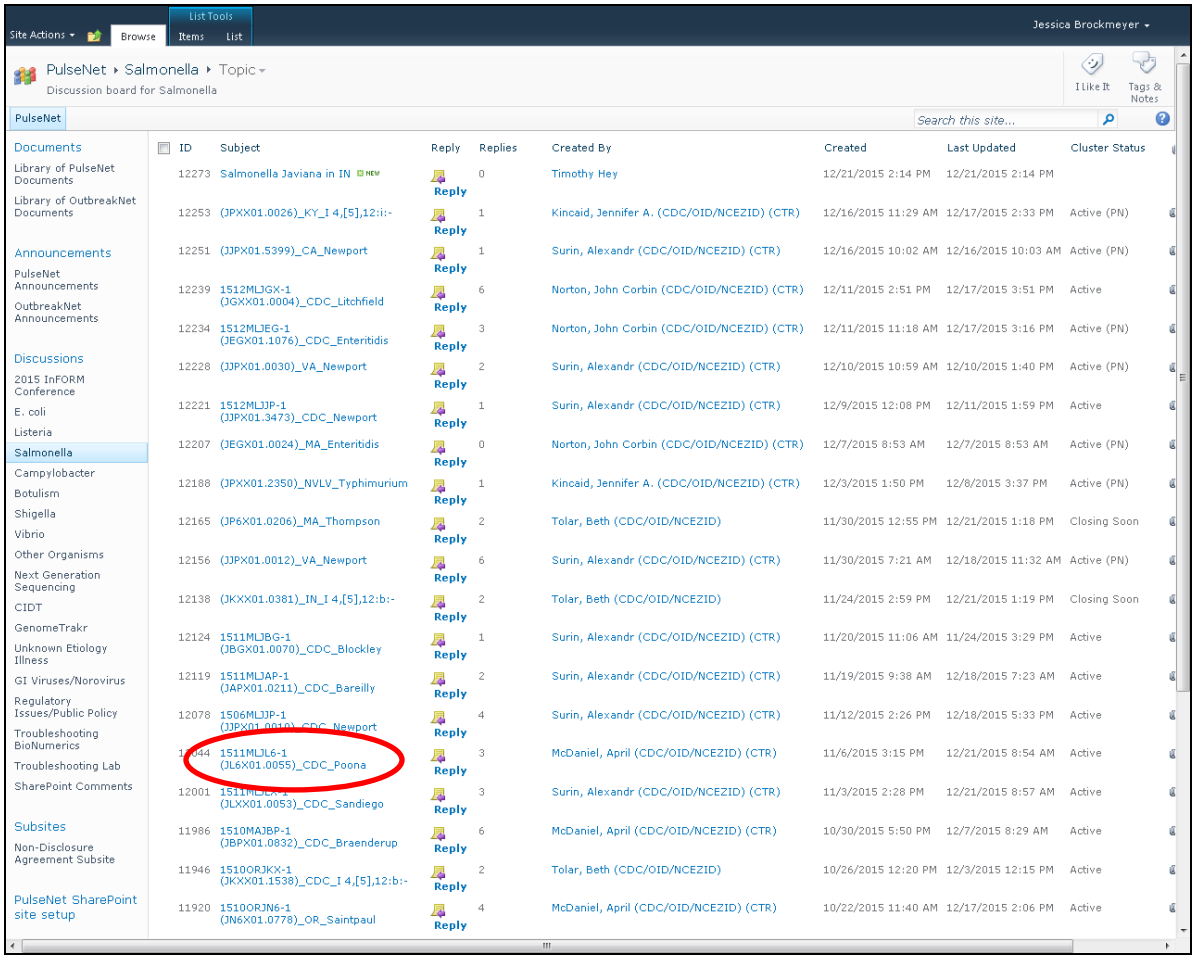
Using SharePoint

- Once you have logged in, navigate to the pathogen of interest under “Discussions”.



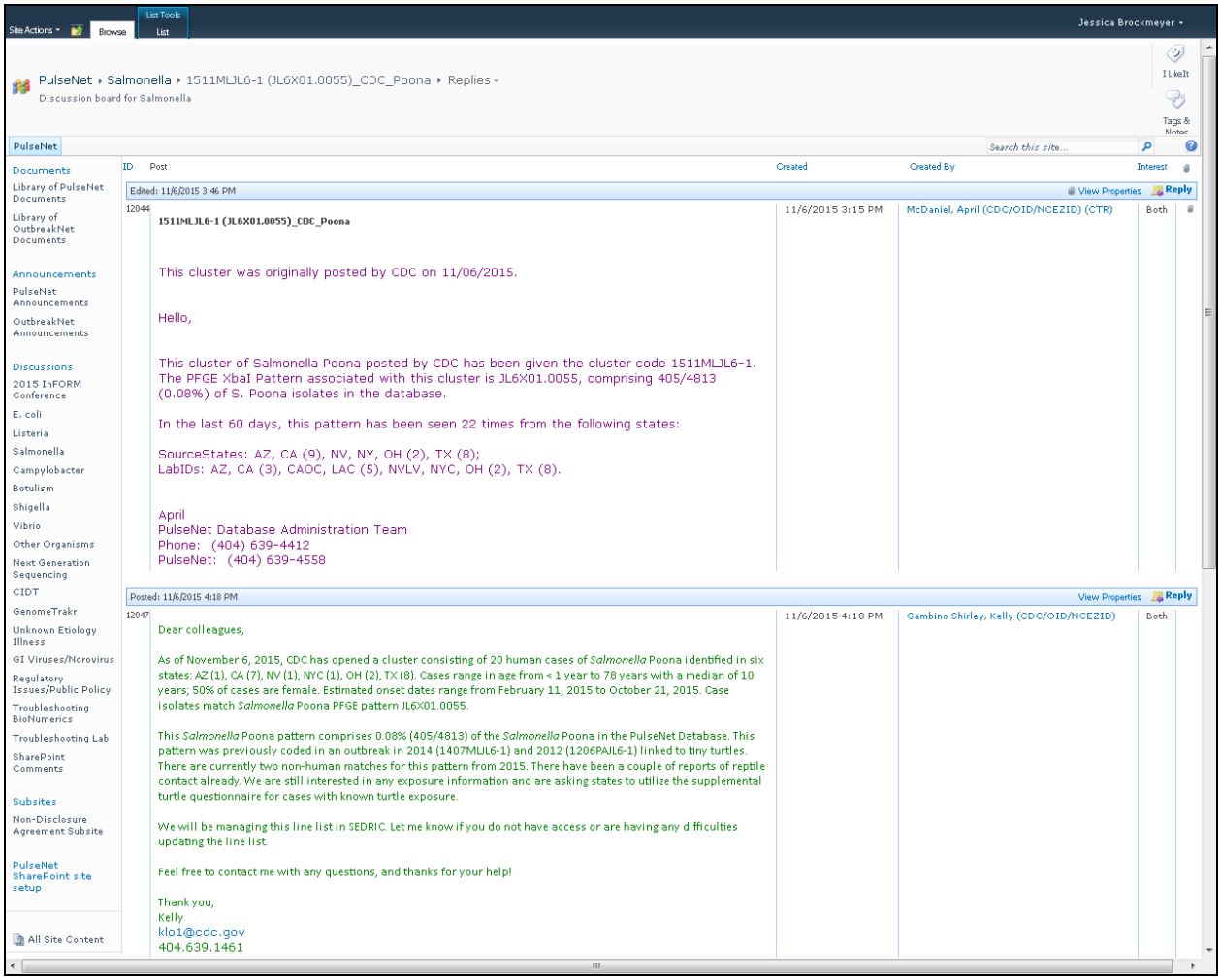
CT DPH Protocol for Follow-up of Local and Multistate Clusters

- From here, navigate to your cluster.



CT DPH Protocol for Follow-up of Local and Multistate Clusters

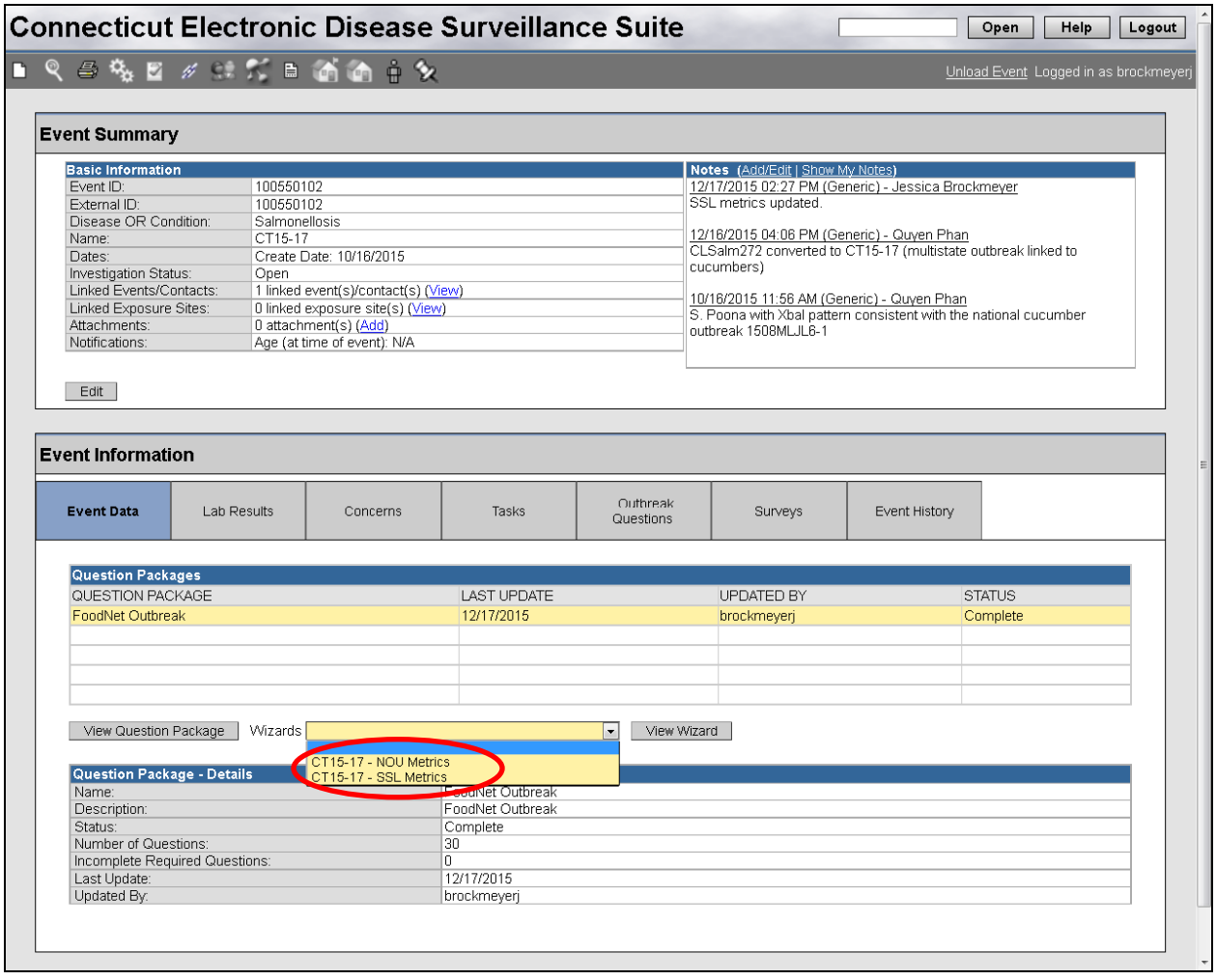
- Within each cluster discussion, you may see posts from individual states containing isolate information, PFGE patterns and their historical associations, leads on common exposures, or other investigative updates. CDC may post line lists, comments on investigation progress, conference calls or exposures of interest. Review postings for information that may be critical to the investigation.



CT DPH Protocol for Follow-up of Local and Multistate Clusters

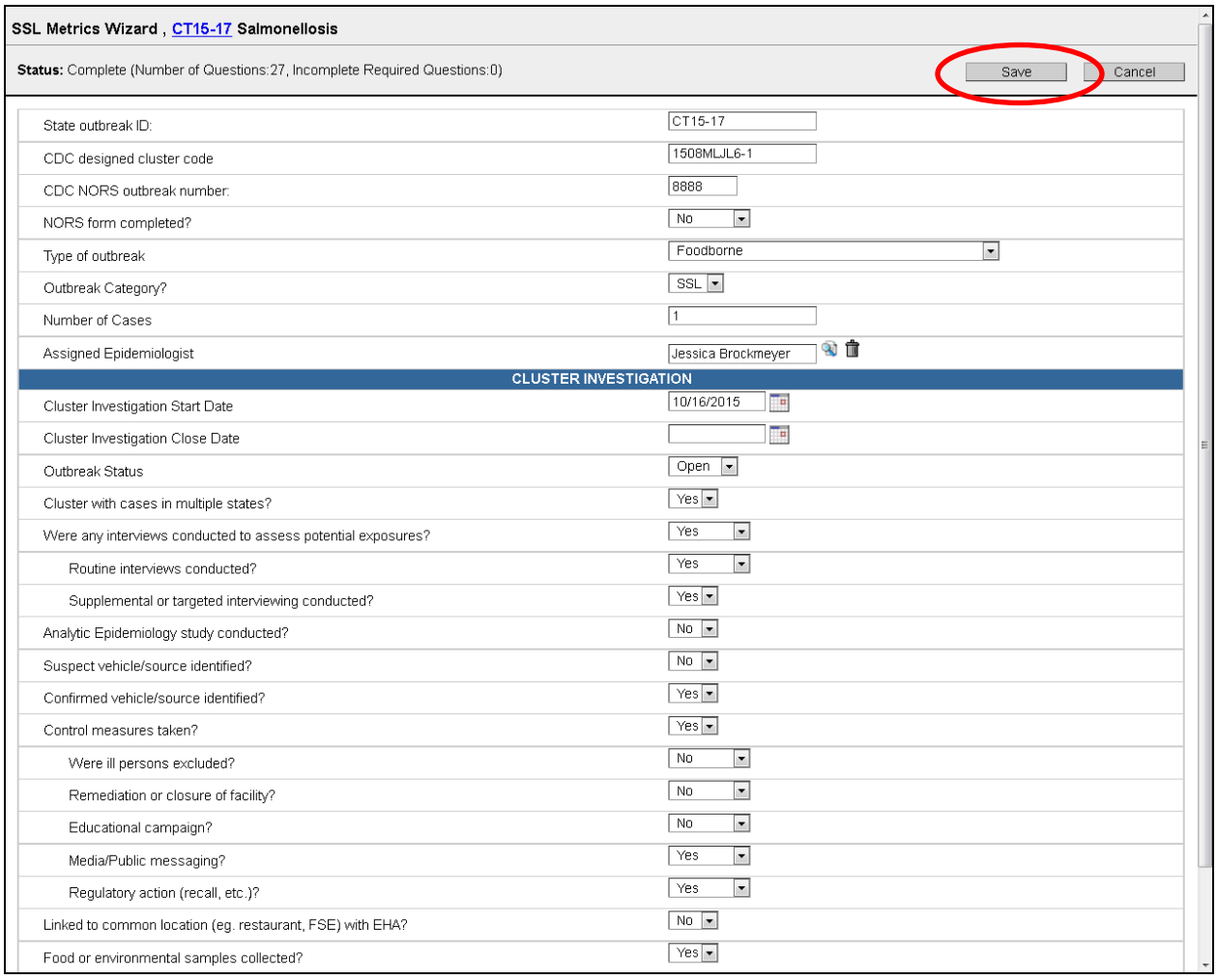
FoodCORE Metrics Completion

Upon completion of a cluster investigation, update the relevant Metrics wizard in Maven. For clusters involving Salmonella, STEC and Listeria, complete the SSL metrics wizard. For outbreaks involving Norovirus, other and unknown pathogens, complete the NOU metrics.



CT DPH Protocol for Follow-up of Local and Multistate Clusters

- Be sure to SAVE any changes or updates to the Metrics wizard.



CT DPH Protocol for Outbreak Management in Maven

Overview

Outbreak investigations require ongoing communication between investigative partners at both the State and local levels. Maven, a web-based electronic disease surveillance reporting software, is currently used by the CT Department of Public Health (CT DPH) for various public health functions. The Maven Outbreak Module may be used to share information and documents that contain identifiable information during outbreak investigations. Advantages of using Maven during outbreak investigations include:

- Real-time accessibility of materials to all investigative partners (Epi/FoodCORE, Lab, FPP, local health departments)
- Accessibility from off-site locations (Yale, State Lab, field/home offices)
- Ability to share information in a secured environment

Those who will have access to Maven include staff of the CT DPH Epidemiology Program, Yale FoodNet/FoodCORE, CT DPH Food Protection Program, local health departments (LHDs) and staff of the State DPH Enterics Lab and Pulse Field Gel Electrophoresis (PFGE) Lab who have roles in outbreak investigation. Hospitals may be able to see outbreak-related data but will not be asked to actively participate in investigations at this time.

Contents **Page number**

When to initiate an outbreak in Maven……..2
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Upload/attach documents to an event…… . ……5
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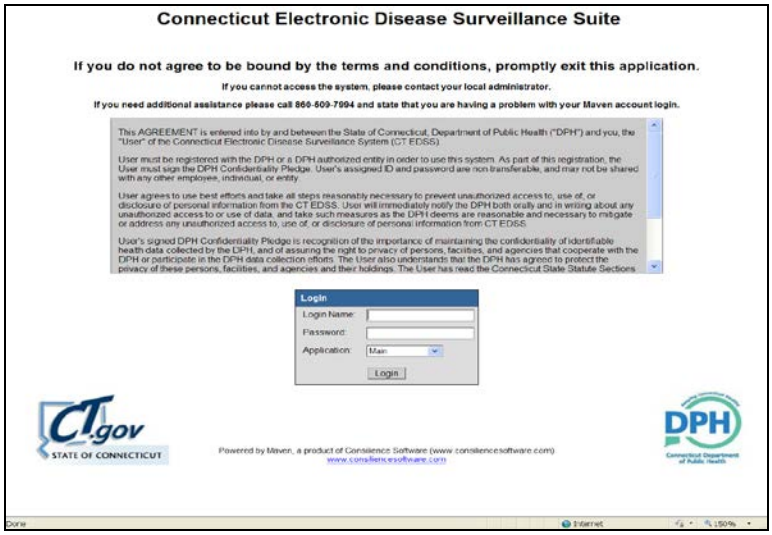
CT DPH Protocol for Outbreak Management in Maven

When to Initiate an Outbreak in Maven
Each outbreak (or suspect outbreak) with specimens being submitted to the State Lab shall have an outbreak "event" created. The decision to initiate an outbreak event should be made in consultation with the Epi Program, which will designate a point-of-contact (POC) or lead investigator. The Epi POC will create the outbreak event in Maven, and will follow-up with a notification email to investigative partners. The email will contain the assigned event name, the Maven Event ID number, and the password to be used to access any associated protected documents.

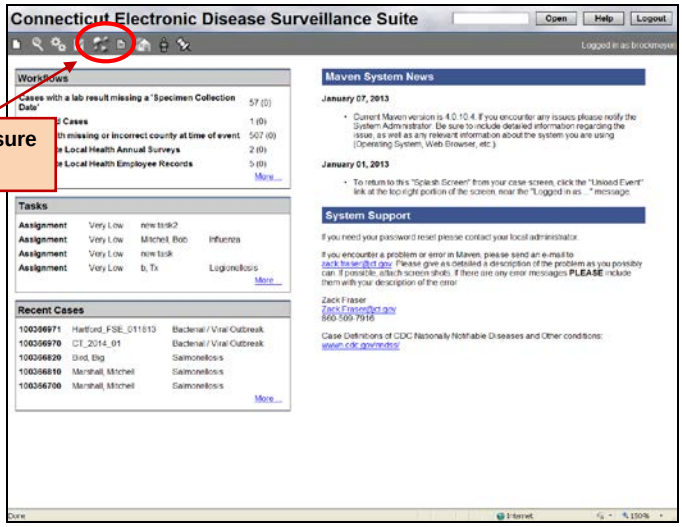
How to Initiate Event

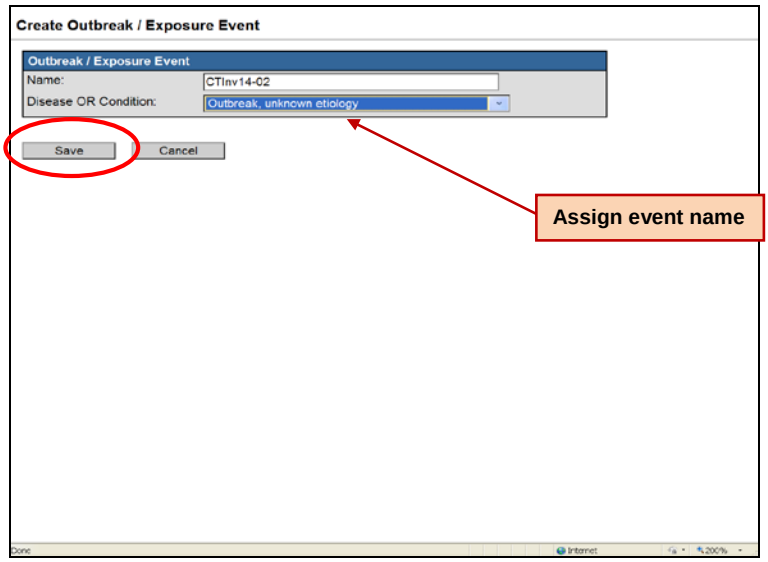
- *Please note that only Epi staff will initiate outbreak events.*

- **Link to Maven:** https://www.dphapps1.ct.gov/maven/login.do. Log in using your username and password. Maven allows up to three login attempts before you are locked out of the system. If you do not remember your login credentials, or exceed your maximum allowable number of login attempts, call the Epidemiology Program at 860-509-7994 to have your password reset in the system.



- You will arrive on the Splash Screen (home page). From the toolbar at the top of the page, select “Create Outbreak/Exposure Event”.



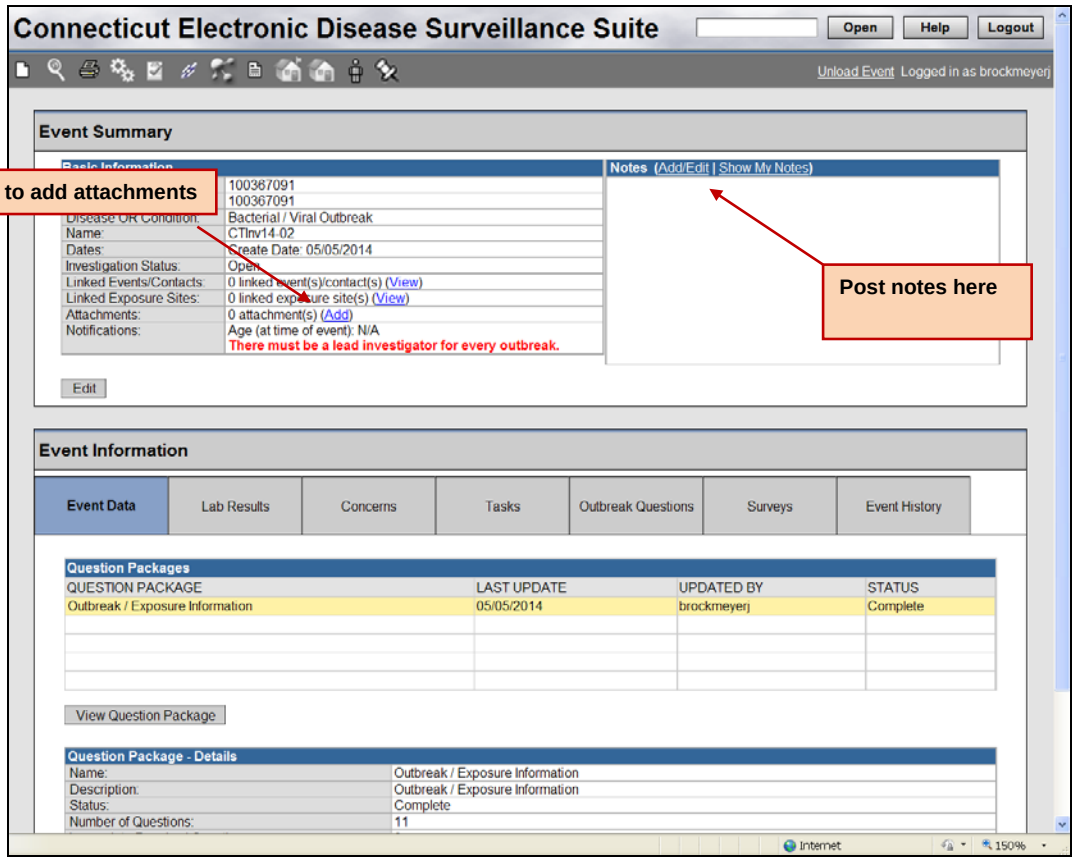


- Create a name for the outbreak event, using the naming convention below:

  CTInv[year-outbreak number] *(Example: CTInv14-02).* In this example, CTInv refers to "CT investigation", followed by the current year, with "02" indicating the second outbreak of the year. Please refer to the year in which the investigation begins, rather than that of the exposure date. For example, if an exposure occurs in December 2013 but investigation begins in January 2014, use 2014 as the naming year.

- For Disease or Condition, select "Outbreak, unknown etiology". Click "Save". If and when etiology is determined, the Epi POC will change the disease/condition to indicate the implicated agent.

- You will arrive at the dashboard (main event) screen. From here, several actions are possible including attaching outbreak-related documents to the event, or posting notes for self or partners.

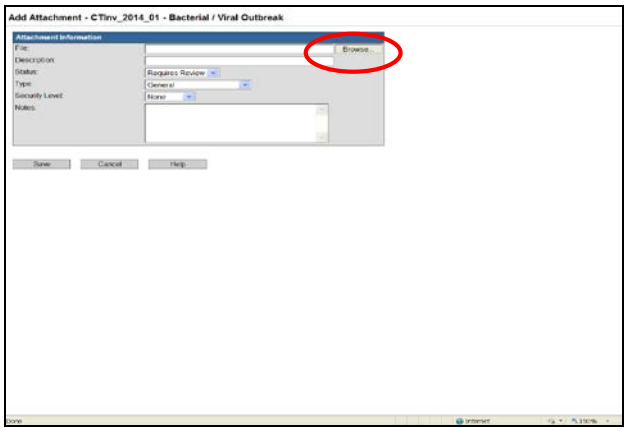


Upload/attach documents to an event

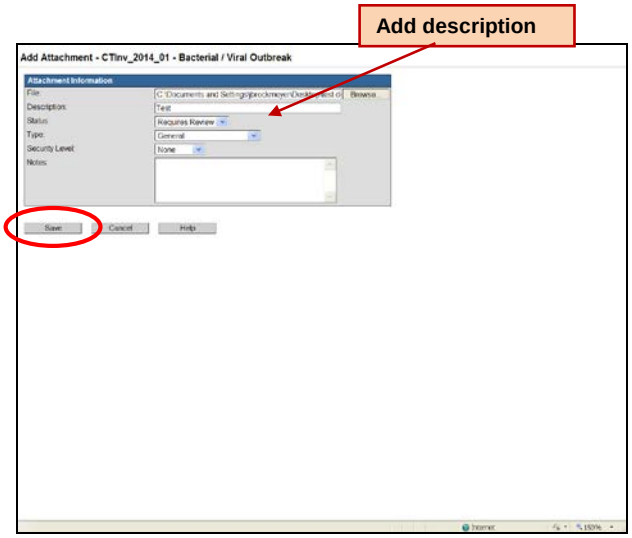
- Attachments may include specimen lists for patrons and food workers, invoices, menus and reports of findings by DPH or LHDs. Scanned documents may be attached if the user has the necessary equipment.
  ***Please note*:** Any documents that are attached to an outbreak event must be password-protected, since outbreak events are viewable to **all** users, including LHDs outside of the outbreak jurisdiction. See Appendix A for instructions on how to password-protect files.

- In the Basic Information section, to the right of Attachments, click “Add”.

- When you arrive at the “Add Attachment” page, click “Browse” to locate desired file.



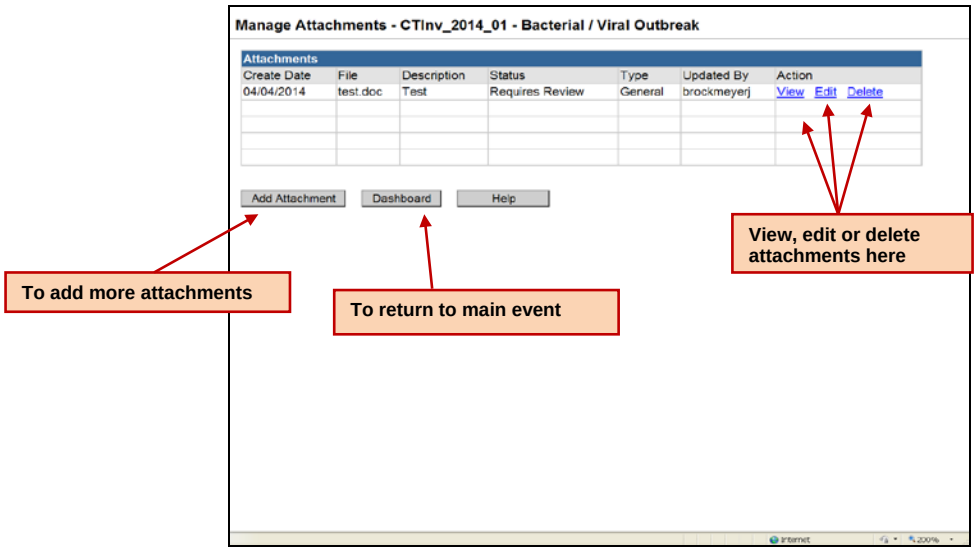
- Check to ensure file(s) to be attached is/are password-protected with the password assigned by the Epi POC.
- Select file, add a “Description”, then click “Save”.



- When attaching documents, please post a note indicating the new attachment (see Posting Notes, page 11).
- From here you can view, edit or delete an attachment, or add additional attachments.

To update an existing document

- Select “view”, open document and make necessary changes.
- Once you have started updating an attachment, do not unload the event or exit the system until the updated version is re-attached. This will avoid multiple users simultaneously updating the same document.
- Add the date and your initials to the document name, and attach as described above. Once the updated document is attached, please delete the older version of the document. Only the most updated version should be attached.
- When updating documents, please post a note indicating the update that has been made (see Posting Notes, page 11).
- To return to the splash screen, click “Dashboard”.



- **Posting specimen lists**: For most outbreaks there will be two specimen lists generated; one for patrons and one for food workers. Usually, Epi will generate the patron list and FPP the food worker list. The files should be follow the naming convention below:
  - Patron_Samples
  - FoodWorker_Samples

  On each list, indicate the name and phone number of the event-specific Epi and FPP POC. See Appendix B for specimen tracking form templates. When attaching the list to an outbreak event, send an email to Diane Barden, David Johnson, Christina Nishimura,

Kimberly Holmes-Talbot, and Laurn Mank, cc-ing the Epi POC, FPP POC, Quyen Phan, and Tracey Weeks to notify that a list has been posted/updated.

- **Reporting of results**: When results are available, the Laboratory will update the specimen tracking form and re-attach to the outbreak event. Please send an email to the Epi POC, FPP POC, cc-ing Quyen and Tracey to notify that new results have been attached.

- **Please use Word documents or Excel files (rather than scanned PDFs) to store specimen results, thus enabling editing/updating by partners.

- There should only be two working "specimen" documents (one for patrons and one for food workers) attached to the event. Only make changes/updates to the current working documents. If you make changes/updates and post a new document, be sure to delete the previous version from the event to avoid confusion.

➢ The attachments feature can also be used to share other documents such as menus and invoices that contain confidential information and therefore cannot be emailed, if scanning equipment is available.

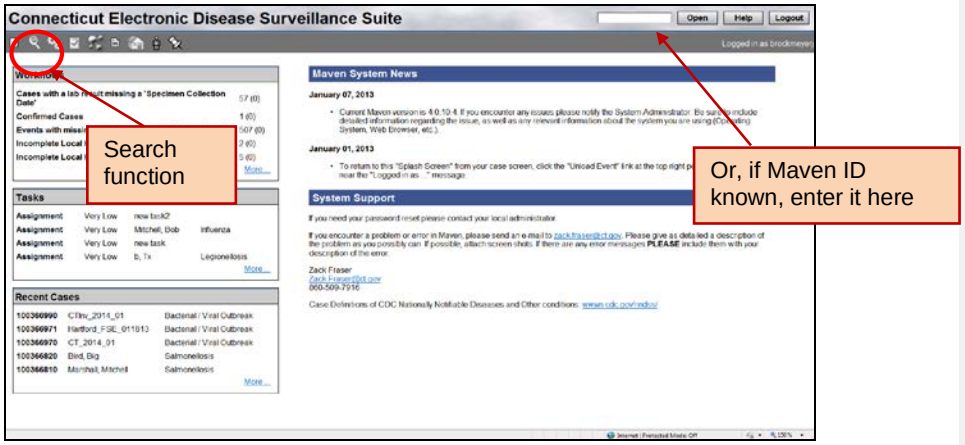
Search for existing outbreak event

During an outbreak investigation, partners can access the event any time to update, post or view information. Outbreak events can be found based on name or Maven ID number.

- Log into Maven (https://www.dphapps1.ct.gov/maven/login.do). Locate your event in the system using the Search function.

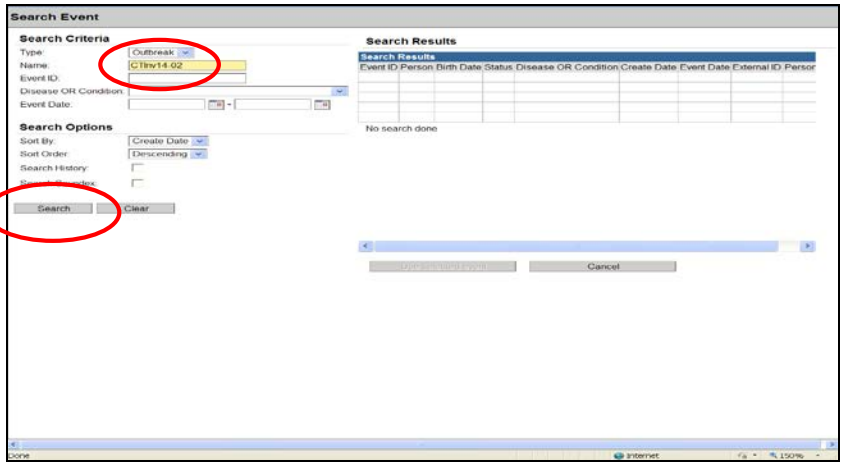
- Alternatively, if you have the Maven ID number of the event, enter it into the shortcut box in the upper-right corner.

Formatted

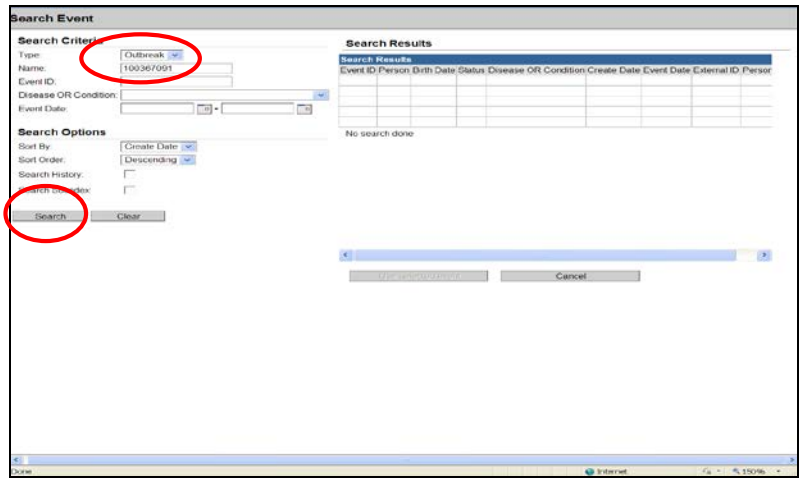


To Use Search Function

- To search by Outbreak name: When you arrive on the Search Criteria screen, be sure to select Type=Outbreak. Enter the event name and hit “Search” at the bottom of the screen.



- To search by Maven ID number: Select Type=Outbreak and enter the Event ID. You will have received the ID number in the initial notification email sent by the Epi POC. Then, hit “Search” at the bottom of the screen.

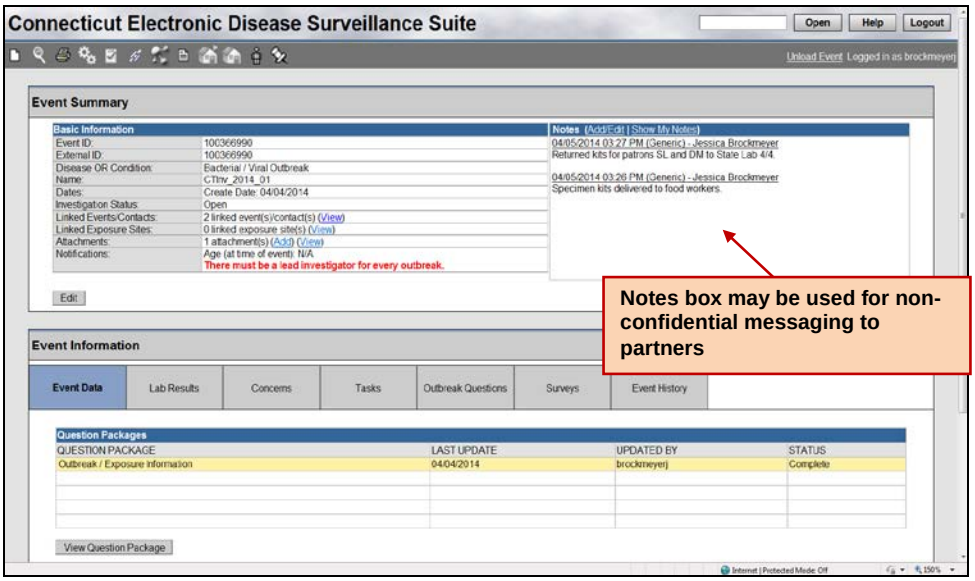


You will arrive back at the main event screen. Check the Event Summary section to find basic information about the event, to view/add/edit attachments and to view any linked events (cases).

Posting notes

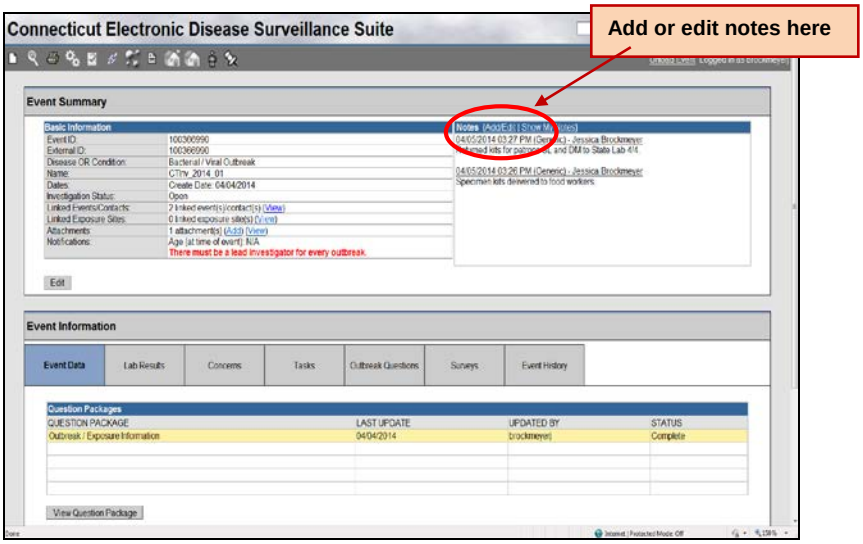
Once an investigation is underway, the Notes section may be used to communicate information regarding event follow-up. **Because information posted in the Notes section will be visible to all LHDs, avoid including confidential or identifying information in this section.**

****Please utilize the Notes feature to communicate to partners whenever new documents have been posted, or when existing documents have been updated.*

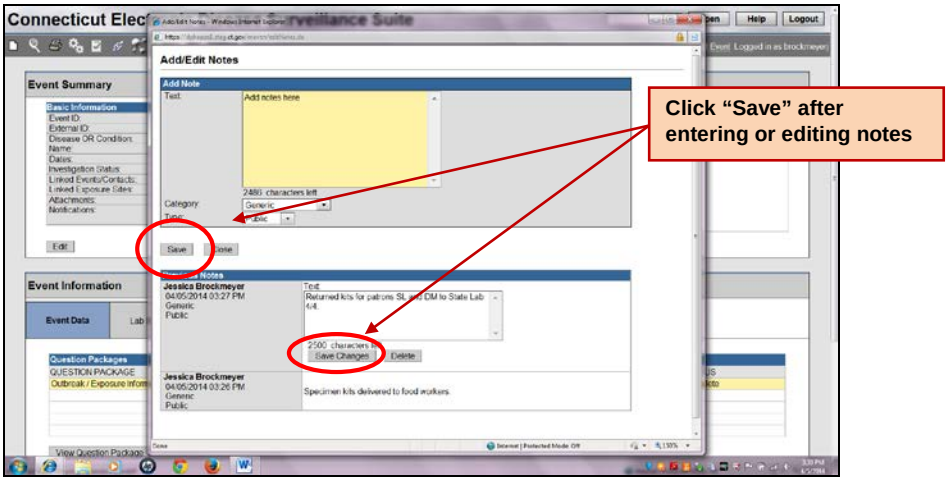


To add or edit notes

- In the Notes section, click “Add/Edit”.



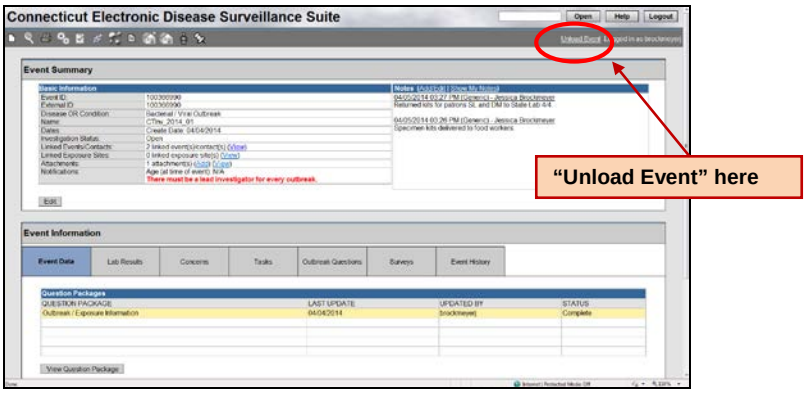
- Enter new notes and click “Save”. To edit a previous note, make changes directly in the text box below and click “Save Changes”. Be aware that only your most recent note can be altered. To return to the main screen without making any changes, click “Close”.



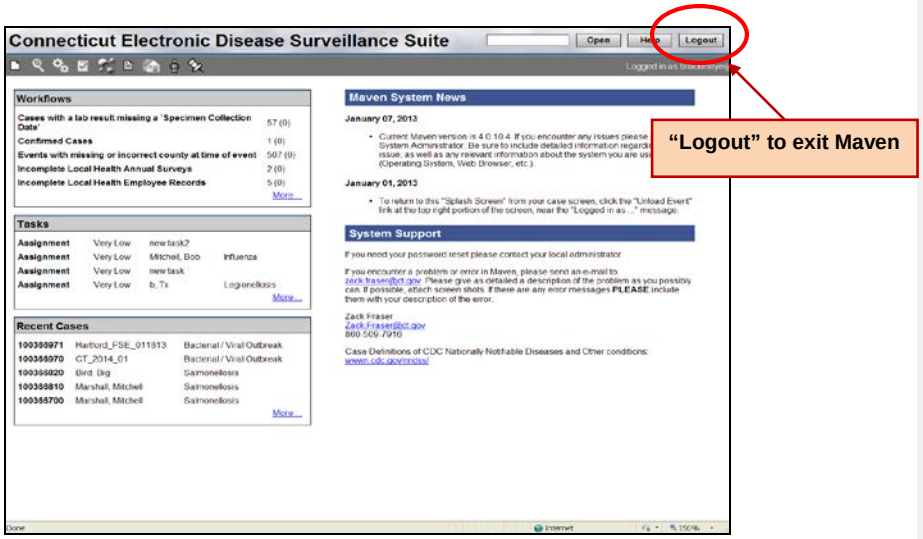
- Return to main screen.

When you are finished working with an event

Once you have finished working with the event, click “Unload Event” in the upper-right corner of the screen.



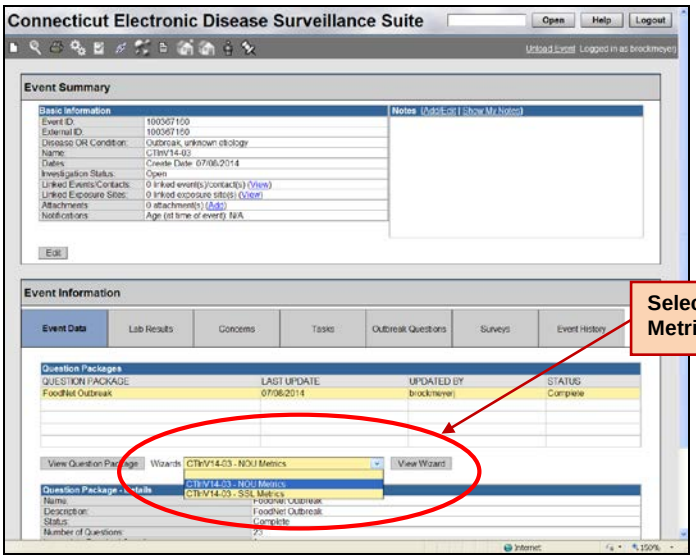
You will arrive at the splash screen. Click “Logout” in the upper-right corner to exit the system.

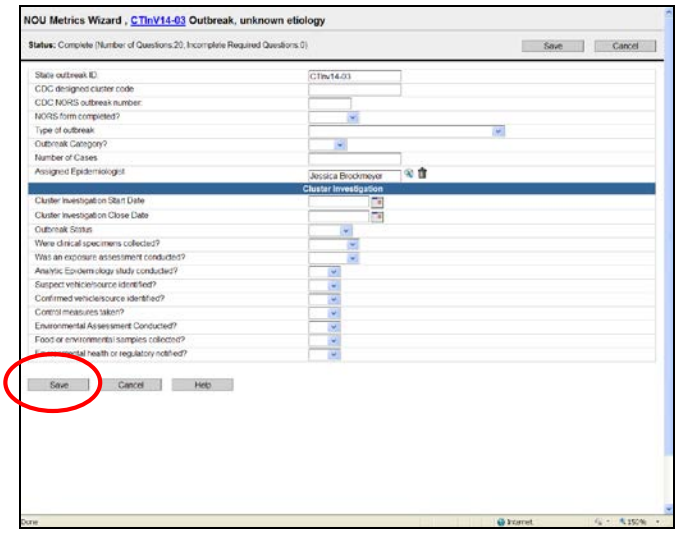


CDC FoodCORE metrics

- *Please note that only Epi staff will complete the outbreak metrics section.*
- The Epi POC will provide the FoodCORE metrics for each outbreak created, by completing either the SSL wizard (for *Salmonella,* STEC (Shiga toxin-producing *Escherichia coli*), or *Listeria*) or the NOU wizard (Norovirus, other, or unknown etiology).
- To complete the metrics, locate the appropriate wizard based on the outbreak etiology.
- When completing the wizard, provide as much information as is available. Be sure to click “Save” after entering new information.
- Update the wizard as the outbreak progresses, and/or upon outbreak closure.

CT DPH Protocol for Outbreak Management in Maven





CT DPH Protocol for Outbreak Management in Maven

Post-outbreak: Closing an event

- *Please note that only Epi staff will close outbreak events.*

- Outbreak events will be "closed" by the Epi POC once all anticipated specimen results have been reported and final epidemiologic/environmental reports have been posted, unless the outbreak investigation is deemed ongoing. Once an event has been closed, information may be viewed but not added or updated. If you must post or edit information after an event has been closed, please contact the Epi POC. Only those with specific system permissions may re-open an event that has been closed.

- At the time of event closure, any attachments will be archived in the outbreak folder on the W drive at DPH.

Appendix A
How to password-protect an attachment

- *Word or Excel file*
  On the **File** menu, click **Save As**.
  On the **Tools** menu in the **Save As** dialog box, click **General Options**.
  In the **Password to open box**, type a password, and then click **OK**.
  In the **Reenter password to open** box, type the password again, and then click **OK**.
  Click **Save**.

- *PDF* (to use when creating a PDF file in Adobe Reader)*
  Select **Save As PDF**
  Enter the file name.
  Under the **Permissions** tab, click "Enable permissions compatible with:"
  Under "**Password required to view document**", enter password.
  Click **Save**.

  *If you are having trouble password-protecting your PDF document, try the following back-up method: Open the PDF. Click Alt-Print Screen (or fn-Print Screen) to capture the PDF image. Open a new Word document, and paste the image into the document. Repeat as needed to capture entire PDF. Add password to Word file as described above.

Appendix B: Specimen tracking forms (attach as separate files with protocol)

Patron Specimen Tracking Form

Epi point of contact (name and phone number):

FPP point of contact (name and phone number):

Last name	First name	Town	Date kit distributed	Date kit returned to lab	Lab result

Specimen Tracking Form (attach in landscape orientation)

Request stool specimens be submitted within 48 hours after being distributed to food workers. Before submitting to the lab: Specimen vials must have a name on them, lab paperwork inside kit must be complete with Your Account Label, Patient Information, and Specimen Information must be complete. Be sure to check the type of testing service requested, for example: Enteric (Stool) Culture is a test for *Salmonella, Shigella, Campylobacter and E coli* 0157 and *Norovirus RT-PCR*. The State Lab will not be able to process specimens if paperwork is not complete.

	Worker Name(last,first)	Title	Date worker interviewed	Date kit distributed	Date kit returned	Lab	Second kit test result	Distrib	Returned	Result	Notes:
1.											
2.											
3.											
4.											
5.											
6.											
7.											
8.											

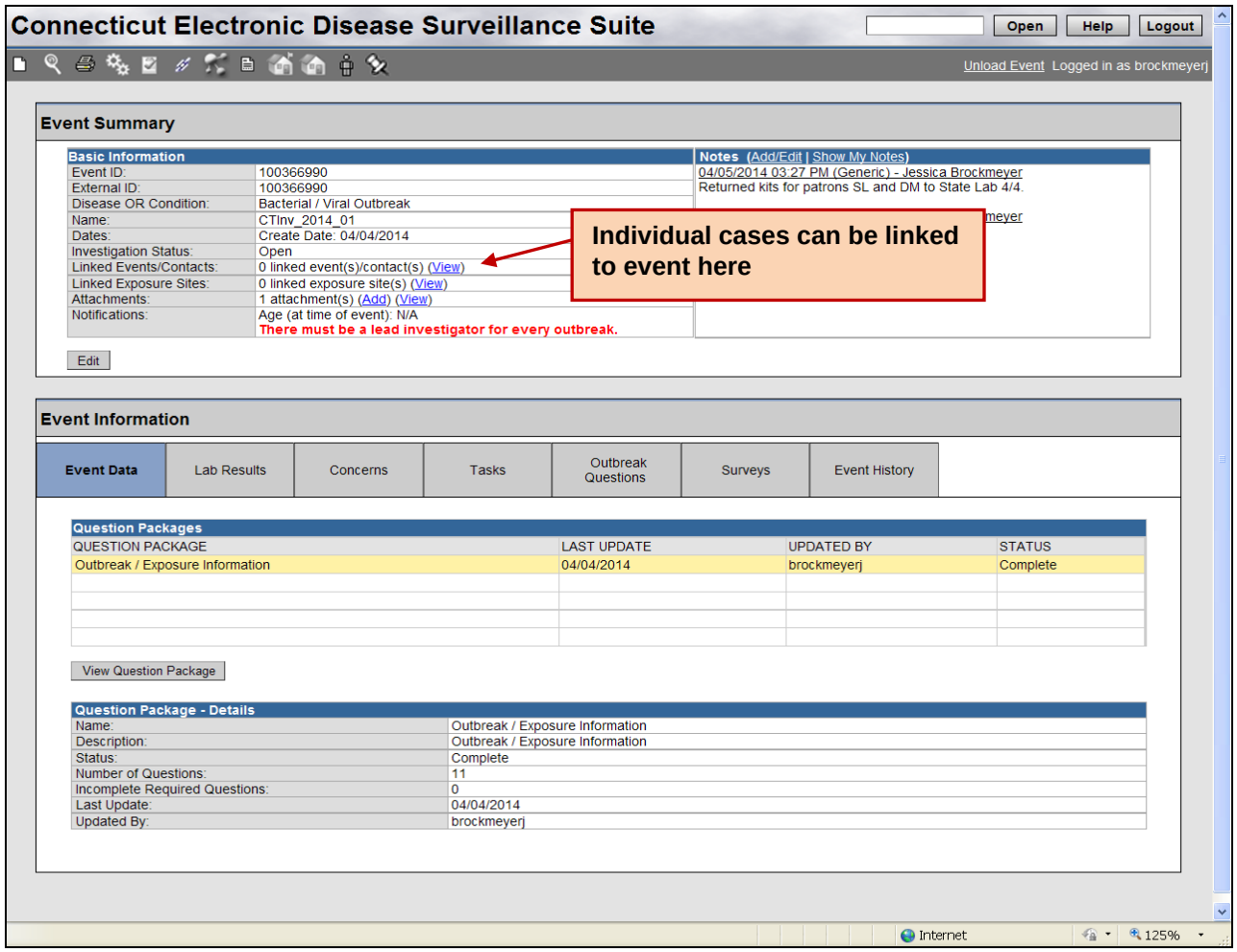
CT DPH Protocol for Outbreak Management in Maven

-CONTACT FPP OR EPI before giving out stool kits to determine whether State lab will test for enteric pathogens or Norovirus AND enteric pathogens.
-FPP or EPI must contact the State lab to advise them that stool samples will be arriving (so that media can be prepared for testing).

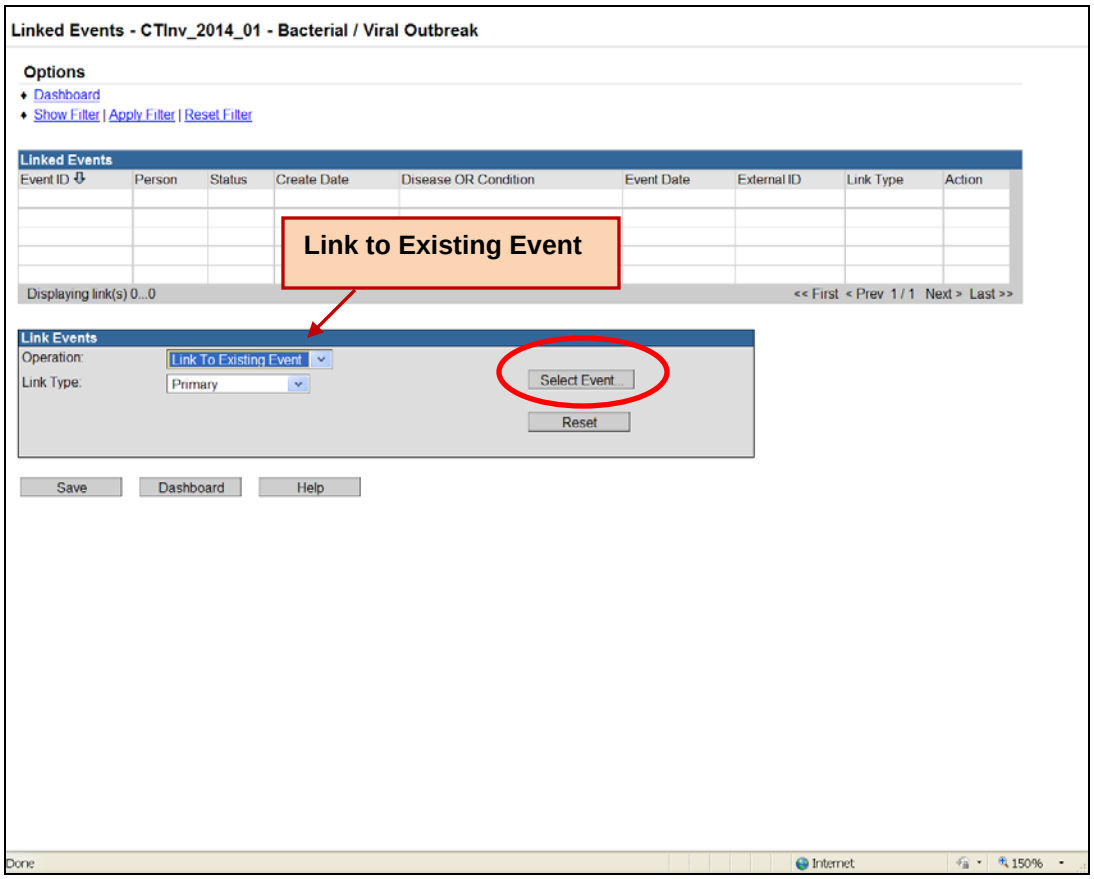
CT DPH Protocol for Outbreak Management in Maven
Addendum 1: Linking events (cases)

Addendum overview
If there are patrons or food workers for whom event-associated reportable disease reports have been received, the Epidemiology POC will link them to the outbreak investigation. Below are instructions for linking cases to an investigation and for viewing cases that have already been linked.

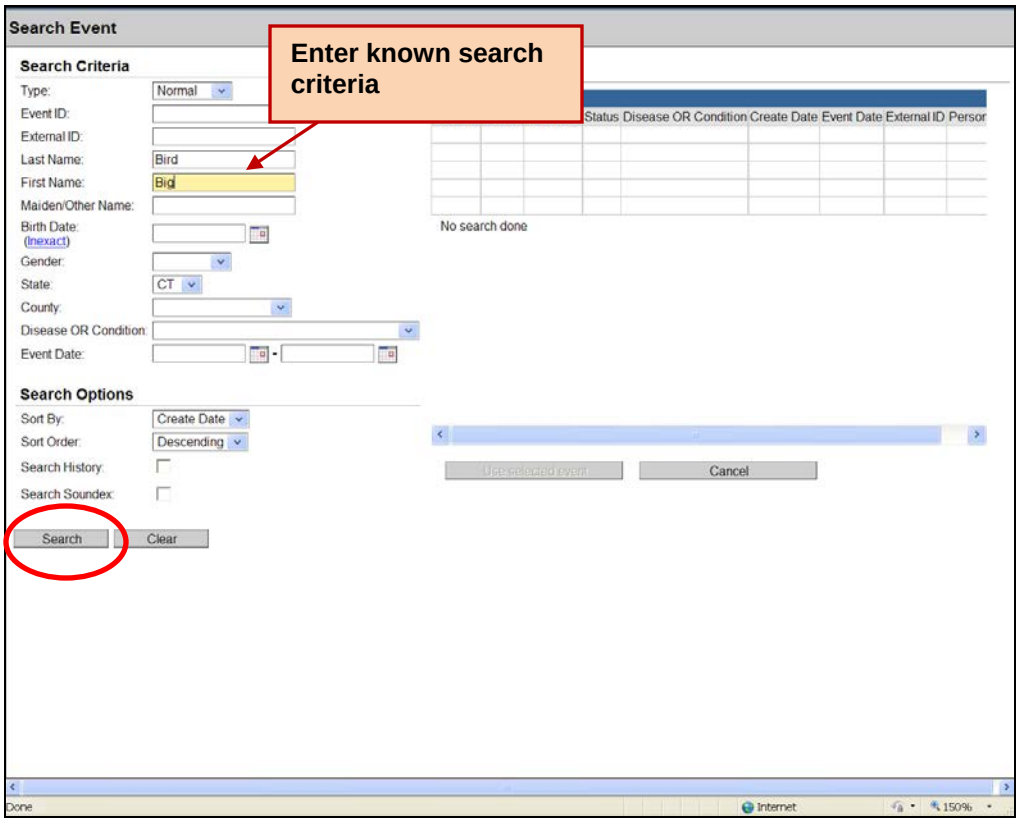
Linking cases to outbreak or cluster
From the main outbreak event screen, find “Linked Events/Contacts”. Click “View”.



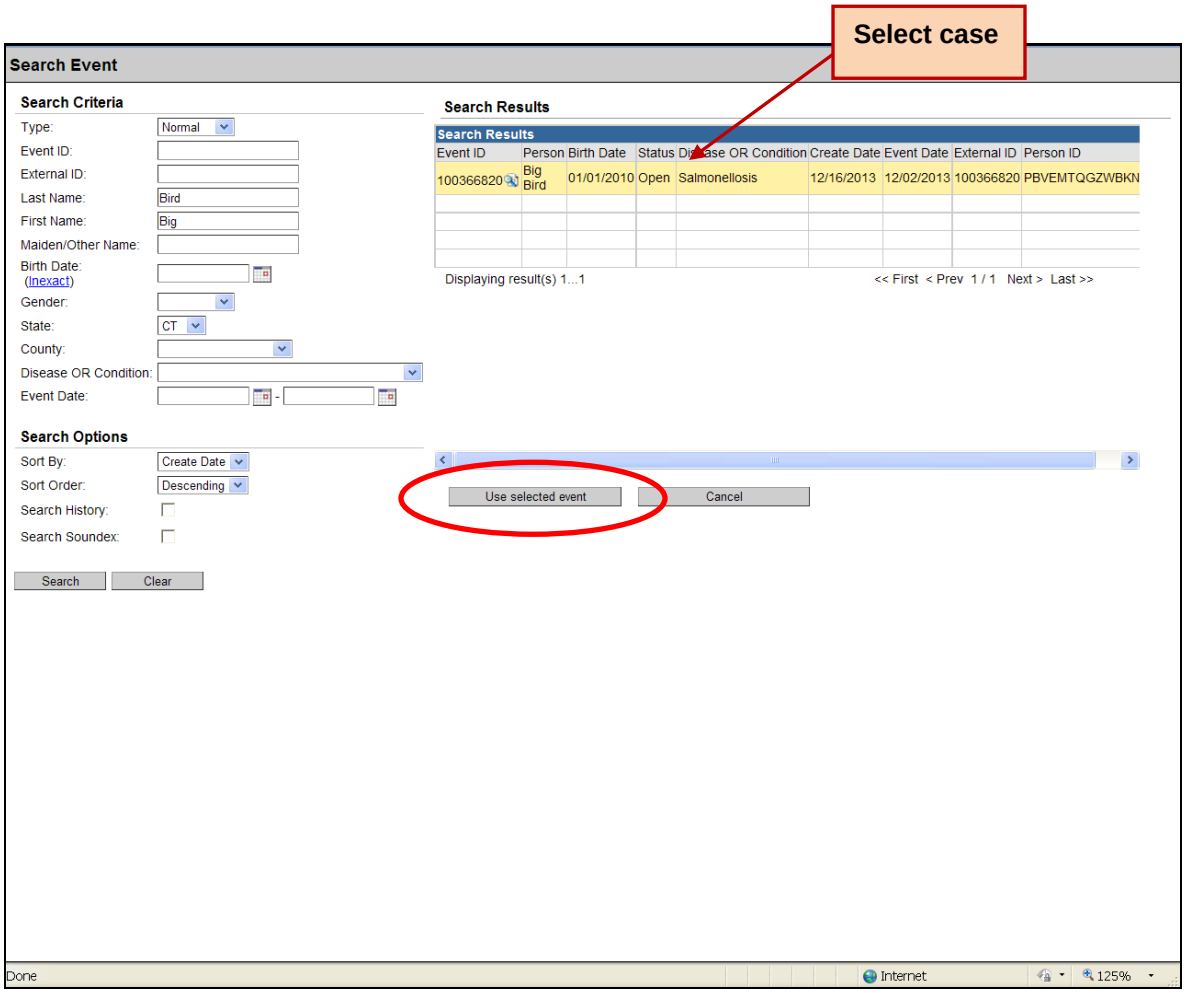
You will arrive on the Linked Events page. In the Link Events section, select “Link to Existing Event” in the drop-down menu. Then, click “Select Event”.



Enter the name or Maven ID number of the case you would like to link to the investigation. Then, click "Search".

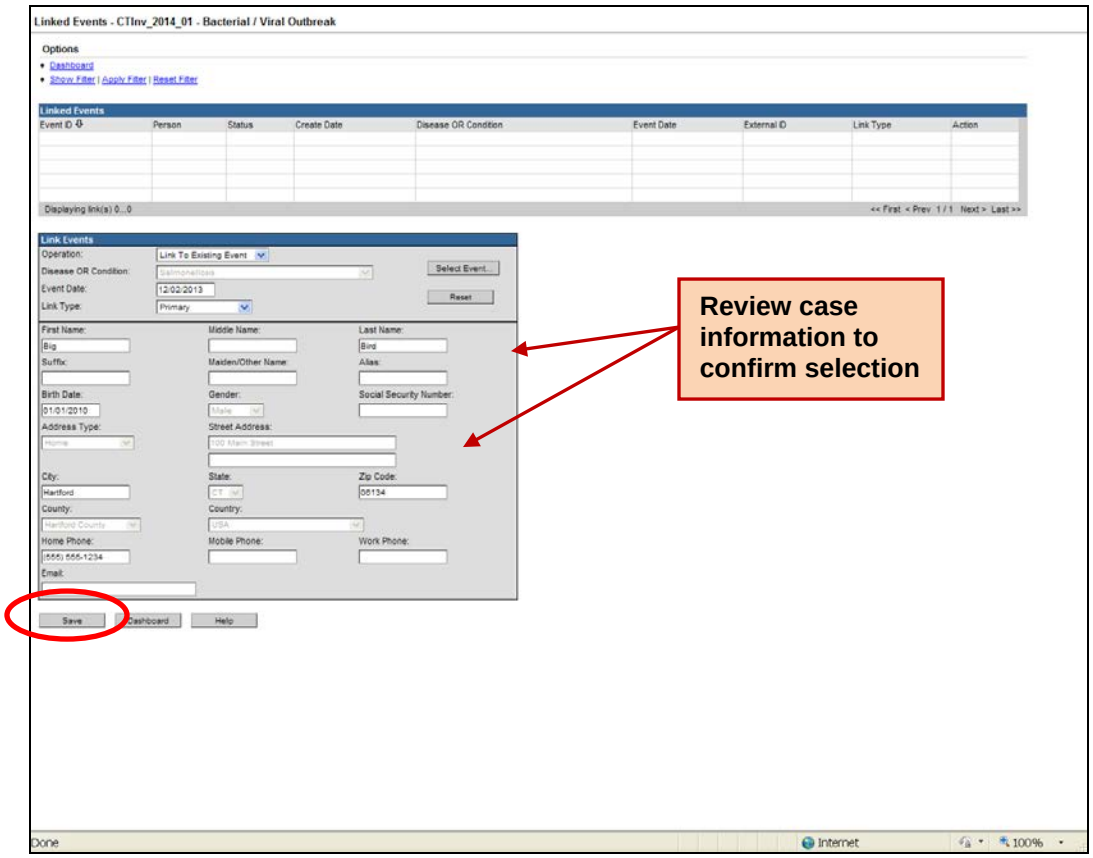


When the desired case record appears in “Search Results”, select the case and double click, or click “Use selected event” option below.



You will arrive back on the Linked Events page. Review the displayed demographic information for selected case to confirm case selection is correct. Click Save to link case to investigation.

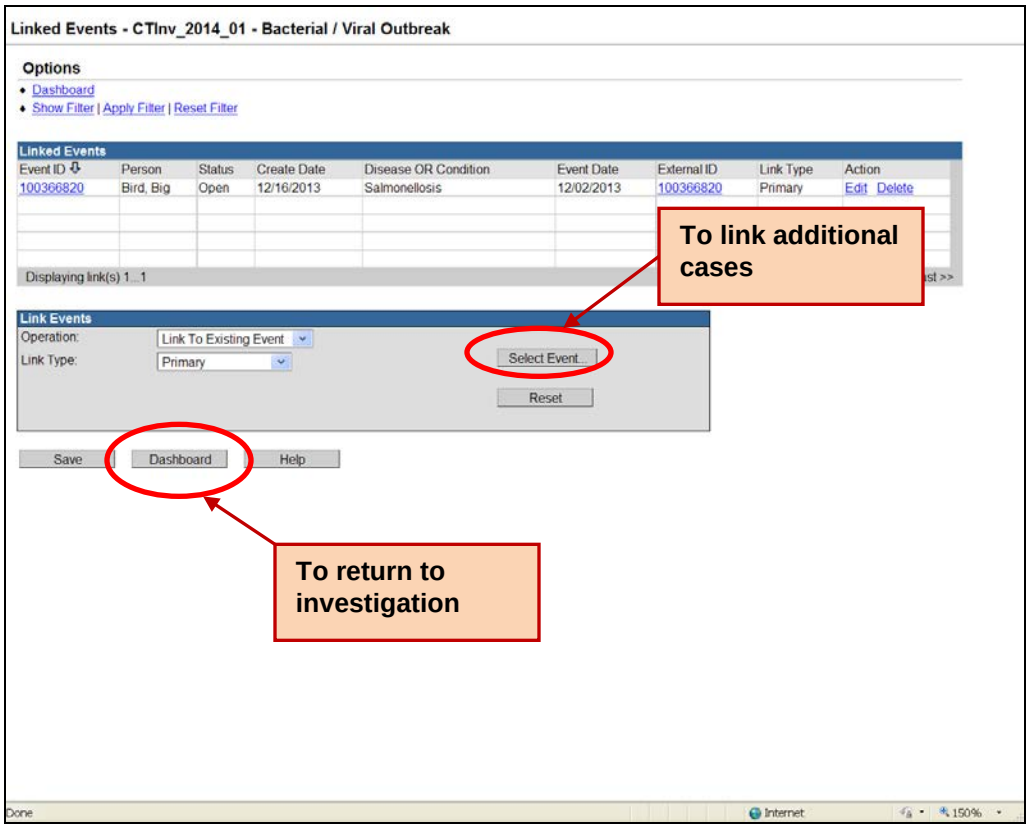
To return to dashboard *without* linking case, click Dashboard.



CT DPH Protocol for Outbreak Management in Maven
Addendum 1: Linking events (cases)

To link additional cases, click “Select Event” and proceed as described above. To return to the main investigation page, click Dashboard.

CT DPH Protocol for Outbreak Management in Maven
Addendum 1: Linking events (cases)

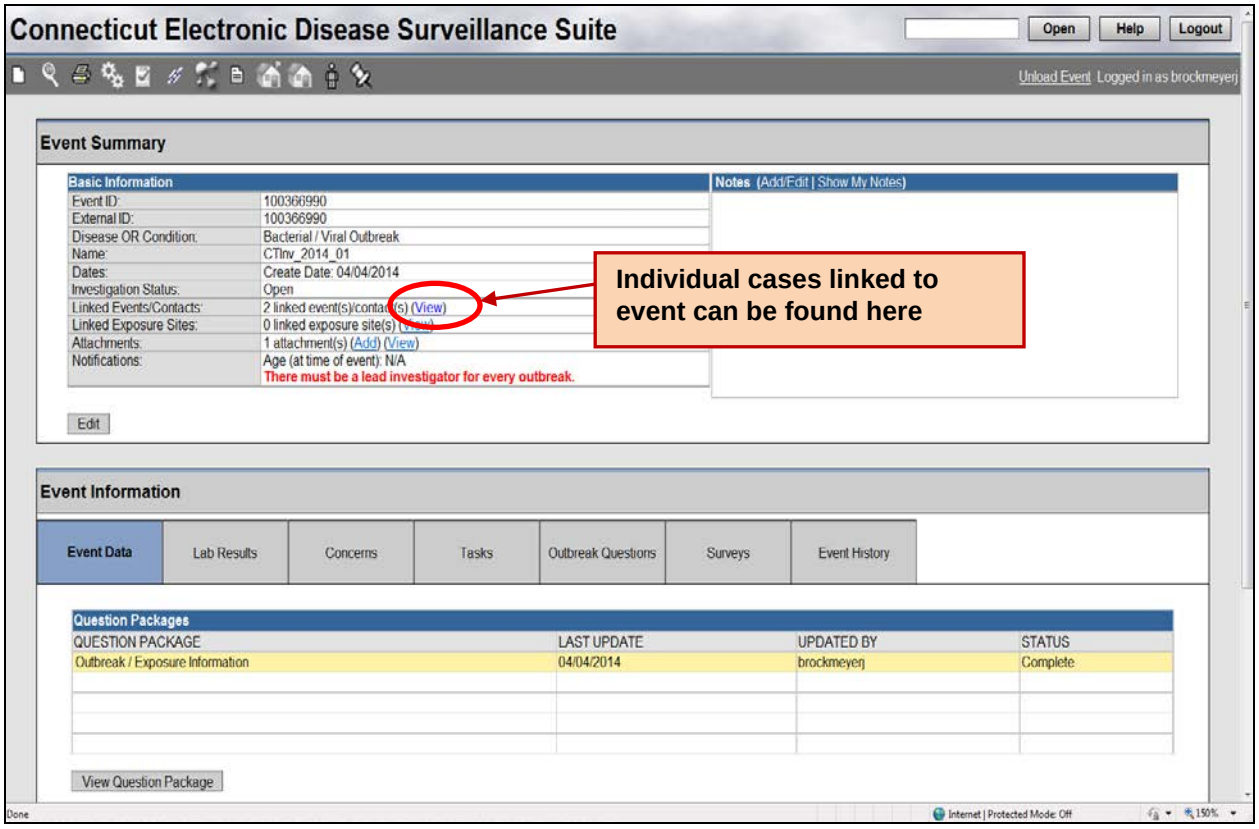


CT DPH Protocol for Outbreak Management in Maven
Addendum 1: Linking events (cases)

Viewing linked cases

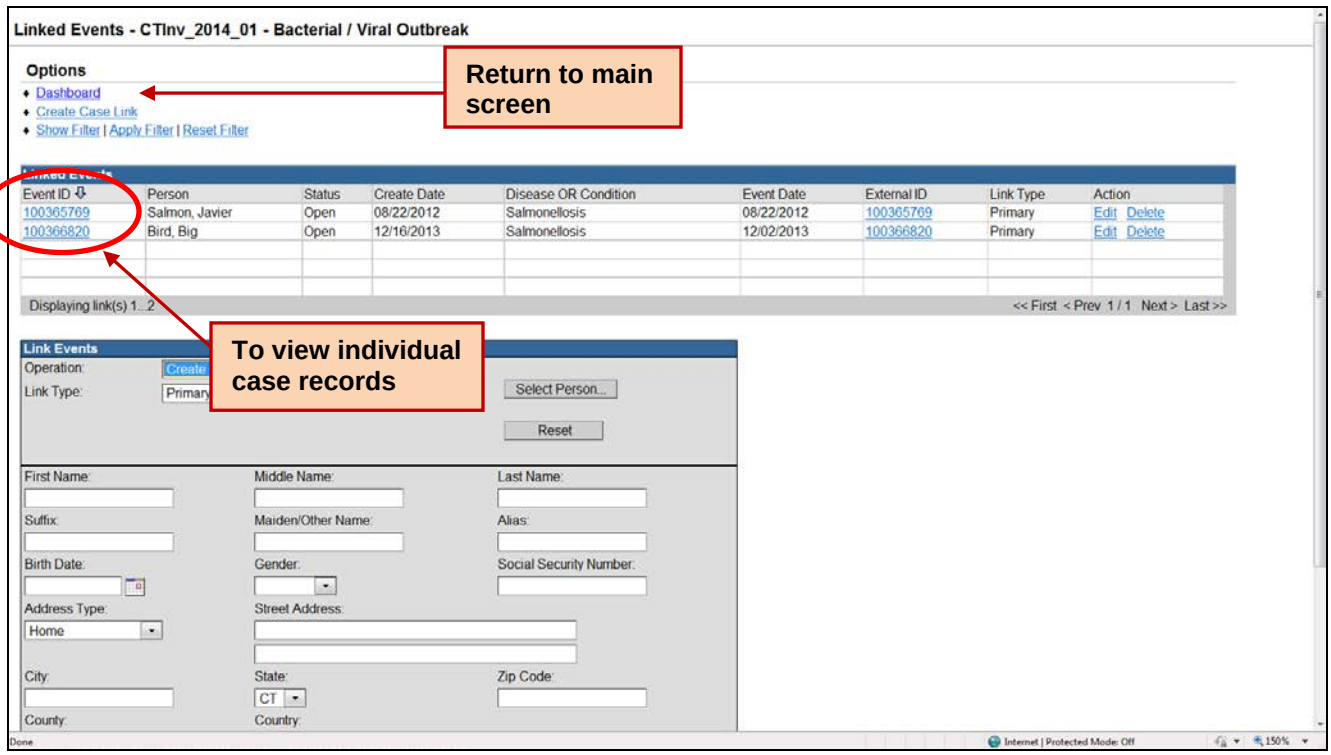
If there are patrons or food workers that have been linked to the investigation, they will appear next to "Linked Events/Contacts". Click on "View" to see a line list of linked cases.

Please note that if the case etiology is not reportable (e.g. Norovirus) or is unknown, it will not be linked to the investigation.



CT DPH Protocol for Outbreak Management in Maven
Addendum 1: Linking events (cases)

Click on each Event ID to access individual case events. Individual case event screens will look and function just like event screens described in the accompanying Outbreak Management Protocol, but will refer only to one person rather than to a group of people.



To return to main outbreak event screen, click on “Dashboard” (top of screen).

CT DPH Protocol for Surveillance of Pathogens that do not Undergo Routine Pulse Field Gel Electrophoresis

Background

Pathogens which do not undergo routine pulse field gel electrophoresis (PFGE) at the Connecticut Department of Public Health (CDPH) Laboratory include Campylobacter, Cryptosporidum, Cyclospora, Shigella non-*sonnei* and Yersinia. In the absence of PFGE data for these pathogens, clusters are detectable through twice weekly review of the temporal and geographic distribution of routine disease reports. Surveillance of non-PFGE'd pathogens includes analysis of disease report data in Maven CEDSS, identification of disease incidence by date and geography, and assessment of exposure data for clustered cases. Should a point-source outbreak be identified, public health intervention will proceed as necessary, in cooperation with the appropriate local department.

Surveillance is performed by CDPH Epidemiology Program staff and includes the following steps.

1. **Login to Maven CEDSS and run two reports**
    a. Case Management Reports ⟶ Case Information Extract
        i. Dates: 1/1/2012- current date
        ii. Case Status: Open, Closed
        iii. Disease OR Condition: Campylobacter, Cryptosporidium, Cyclospora, Shigella and Yersina
        iv. Question Packages: 1, 2, 3, 6
        v. Report Format: Excel

    b. FoodNet Reports ⟶ FoodNet SAS Analysis
        i. Lab Test Status: Confirmed, Probable
        ii. Specimen Collection Dates: 1/1/2012- current date
        iii. Case Status: Open, Closed
        iv. Report Format: Excel

2. **Import each report into SAS for analysis (see program nonPFGE_03132015.sas).** Change files names and directories as needed.

3. **Modify and analyze data as shown in nonPFGE_03132015.sas.**
    a. Merge two datasets by Maven ID as shown in program.
    b. Create separate datasets for each pathogen.
    c. For each pathogen, look at counts by city and MMWR week going back through 2012. Review counts per week for each city to identify unusual increases in disease reports as compared with the same week in prior years.

d. For each pathogen*, run a line list of reports by MMWR week, targeting only the past six or seven weeks. Look at geographic patterns to identify possible clusters by week.
e. For each pathogen*, run a line list of reports by city, targeting only the past six or seven weeks. Look at patterns over time to identify possible clusters within a city.

**For campylobacter cases, select only those with "no" or "unknown" international travel.*

4. When potential clusters are identified

a. Enter basic information (Maven ID, name, address, city) into running excel spreadsheet (nonPFGE_12172014_checked.xls). Be sure to enter information into the appropriate pathogen-specific worksheet tab.
b. Search Maven to obtain event date and basic demographics for each ID, and enter it into spreadsheet.
c. If information on spreadsheet suggests possible cluster, label cluster for triage.
    i. Label is pathogen-specific and should be determined after sorting spreadsheet based on "Cluster ID".
    ii. Clusters are assigned to field epidemiologists on a rotational and alphabetical basis. Consult most recent cluster in each of the workbook tabs to determine next designated field epidemiologist.
    iii. Populate each row with new Cluster ID and the covering field epidemiologist.
d. Create cluster event in Maven. The event name should reflect the spreadsheet Cluster ID. Link all relevant cases.
e. In the FoodNet Outbreak Question Package, enter the cluster name into the State outbreak ID field, populate Assigned Epidemiologist, and mark the Outbreak Status as "open". Do **not** complete SSL or NOU metrics.
f. Email assigned field epidemiologist with name of new cluster assignment. Copy Quyen.
g. Field epidemiologist will review exposure history of cases (see CT DPH Protocol for Follow-up of Local and Multistate Clusters, January 2015 version for details pertaining to cluster follow-up).
h. If cases are *not* associated with a common exposure, assigned field epidemiologist will close the cluster in Maven.
i. If cases appear to be associated with a common exposure, assigned field epidemiologist will follow-up as necessary with the local health department to determine appropriate public health intervention.

Connecticut DPH Legionellosis Case Follow-Up Protocol

1) Case Notification

In Connecticut, legionellosis has been a reportable disease since 1997. The majority of legionellosis cases that are not travel-related occur from June to October. One species of *Legionella*, *L. pneumophila*, is estimated to causes approximately 90% of all reported cases of legionellosis in the United States (1). There are 15 serogroups of *L. pneumophila*, and 79% of all culture-confirmed or urine antigen-confirmed cases are caused by *L. pneumophila* serogroup 1 (1). There are at least 48 species, which comprising 70 distinct serogroups in the genus *Legionella* (2, 3, 4, 5). It has been documented that 20 of the 48 species of *Legionella* have been associated with human disease (6) (Attachment 1).

We are routinely made aware of cases of legionellosis through mandated physician reporting (PD-23) and laboratory reporting (OL15-C). Reported cases of legionellosis diagnosed by urine antigen, culture, DFA, or paired serology require follow-up. No follow-up is conducted for single titer results.

1a) The Epidemiology Program receives notification of the majority of legionellosis cases through routine surveillance (via faxes and paper mailings). When a report is received, DPH staff enter the demographic, laboratory, and NETSS wizard data elements into MAVEN CTEDSS to create a record.

1b) Since January 2013, legionellosis case reports can also be directly entered into MAVEN CTEDSS by a hospital's Infection Prevention Department trained staff member. When a report is entered by the hospital-designated staff member the demographic and laboratory data variables are completed. Additionally, data for the Case Report Form (CRF) wizard may be completed. Information may include clinical and exposure information recorded in the patient's medical record.

In either reporting situation, a field epidemiologist is assigned a task for follow-up in MAVEN. The field epidemiologist is assigned based on the reporting hospital (Attachment 2).

2) Completion of Case Report Forms (CRFs)

For all cases of legionellosis, the CDC CRF (Attachment 3) and *Connecticut Supplemental Form* (Attachment 4) are completed. Field epidemiologists initially contacts the infection control practitioner (for hospitalized cases) or physician (for outpatients) to obtain all clinical information and any exposure information documented in the chart. The patient (or next of kin) is interviewed to confirm information documented in the medical chart and to collect additional information on potential exposures.

As the CDC CRF and Connecticut Supplemental form are completed, the field epidemiologist updates the case information in MAVEN. The "Legionellosis Data Entry Wizard" corresponds to the CDC CRF

and the CT supplemental Follow-up forms. The completed paperwork is given to the Legionella Coordinator after data entry is completed. Completed Legionella paperwork is scanned, attached to the MAVEN record, and filed at DPH. Additionally, a de-identified copy of the CDC CRF is securely up loaded to the Center for Disease Control and Preventions' National Center for Immunization and Respiratory Diseases Program.

3) Cases which require further action

a. Overnight Travel

Any cases reporting overnight travel out of state should be reported to the CDC travel legionella e-mail (travellegionella@cdc.gov) immediately and the legionellosis coordinator copied on the email. The email should include the following information:

- Patient gender, age, and county of residence
- Date of diagnosis/test type
- Date of symptom onset
- Dates and location of travel
- Lodging name, room number, water exposures

Note: Any information that identifies the case should not be included in the email.

b. Geographic/Temporal Clusters

Both the legionellosis coordinator and a senior level epidemiologist should be made aware of any geographic or temporal clusters. Geographic and temporal clusters without a known exposure should also be interviewed using the *Connecticut Long Form Legionellosis Questionnaire* (Attachment 5) for hypothesis generation about potential community exposures..

OSHA's References for legionella in the workplace
https://www.osha.gov/dts/osta/otm/legionnaires/index.html

c. Healthcare Associated Case or Cases (Hospital and LTCF-associated cases)

Both the legionellosis coordinator and a senior level epidemiologist should be made aware of a possible or definite health care associated cases.

A possible nosocomial case is defined as an inpatient with limited (some of the 10 days prior to onset) hospital exposure during their incubation period.

A definite nosocomial case is defined as an inpatient patient with exclusive (all of the 10 days prior to onset) hospital exposure during their incubation period.

i. Possibly Health Care Associated

One possible nosocomial case in a hospital without recipients of a solid organ transplant or among a case-patient with a limited (some of the 10 days prior to onset) LTCF exposure during their incubation period (i.e. outpatient visits, employment, volunteer work, or facility visits) requires that the legionellosis database be reviewed to ensure

that there are no other cases that are epidemiologically linked to these facilities in the past 6 months. In the absence of additional epidemiological data, no further follow-up is necessary.

ii. **Health Care Associated Case(s) Requiring Follow-up**

1. One definite nosocomial case in a hospital with or without recipients of a solid organ transplant.
2. One possible nosocomial case in a hospital with recipients of a solid organ transplant.
3. Two possible nosocomial cases in a hospital without recipients of a solid organ transplant, within 6 month of each other. References for follow-up of Health Care Associated Cases.

CDC' References/Outbreak Toolkit: www.cdc.gov/legionella/outbreak-toolkit

References for Health Care Associated Follow-up and Investigation

1. ***Centers for Disease Control and Prevention. Guidelines for preventing health-care-associated pneumonia:*** **MMWR 2004; 53 (No. RRO3); 11-13.**
2. ***Centers for Disease Control and Prevention. Guidelines for environmental infection control in health-care facilities: recommendations of CDC and the Healthcare Infection Control Practices Advisory Committee (HICPAC). MMWR 2003;52 (No. RR-10).***

References

1. Adeleke, A. A., B. S. Fields, R. F. Benson, et al. 2001. Legionella drozanskii sp. nov., Legionella rowbothamii sp. nov. and Legionella fallonii sp. nov.: three unusual new Legionella species. *Int. J. Syst. Evol. Microbiol*. 51:1151–1160.

2. Benson, R. F., and B. S. Fields. 1998. Classification of the genus Legionella. *Semin. Respir. Infect.* 13:90–99.

3. Lo Presti, F., S. Riffard, H. Meugnier, et. al 2001. Legionella gresilensis sp. nov. and Legionella beliardensis sp. nov., isolated from water in France. *Int. J. Syst. Evol. Microbiol*. 51:1949–1957.

4. Lo Presti, F., S. Riffard, H. Meugnier, et al. 1999. Legionella taurinensis sp. nov., a new species antigenically similar to Legionella spiritensis. Int. J. Syst. Bacteriol. 49:397–403.

5. L. Benin and R. E. Besser, Abstr. 41st Intersci. Conf. Antimicrob. Agents Chemother., abstr. 873, 2001.

6. Fields, B. S, Benson, R. F, and Besser R. B. Legionella and Legionnaires' Disease: 25 Years of Investigation. 2002. *Clinical Microbiology Reviews*, Vol. 15, No. 3, 506–526.

Attachment 1

TABLE 1. *Legionella* species and serogroups[a]

Species	No. of serogroups	No. associated with disease
1. *L. pneumophila*	15	15
2. *L. bozemanii*	2	2
3. *L. dumoffii*	1	1
4. *L. micdadei*	1	1
5. *L. longbeachae*	2	2
6. *L. jordanis*	1	1
7. *L. wadsworthii*	1	1
8. *L. hackeliae*	2	2
9. *L. feeleii*	2	2
10. *L. maceacherniі*	1	1
11. *L. birminghamensis*	1	1
12. *L. cincinnatiensis*	1	1
13. *L. gormanii*	1	1
14. *L. sainthelensi*	2	2
15. *L. tucsonensis*	1	1
16. *L. anisa*	1	1
17. *L. lansingensis*	1	1
18. *L. erythra*	2	1[b]
19. *L. parisiensis*	1	1
20. *L. oakridgensis*	1	1
21. *L. spiritensis*	1	0
22. *L. jamestowniensis*	1	0
23. *L. sanaicrucis*	1	0
24. *L. cherrii*	1	0
25. *L. steigerwaltii*	1	0
26. *L. rubrilucens*	1	0
27. *L. israelensis*	1	0
28. *L. quinlivanii*	2	0
29. *L. brunensis*	1	0
30. *L. moravica*	1	0
31. *L. gratiana*	1	0
32. *L. adelaidensis*	1	0
33. *L. fairfieldensis*	1	0
34. *L. shakespearei*	1	0
35. *L. waltersii*	1	0
36. *L. genomospecies*	1	0
37. *L. quateirensis*	1	0
38. *L. worsleiensis*	1	0
39. *L. geestiana*	1	0
40. *L. natarum*	1	0
41. *L. londoniensis*	1	0
42. *L. taurinensis*	1	0
43. *L. lytica*	1	0
44. *L. drozanskii*	1	0
45. *L. rowbothamii*	1	0
46. *L. fallonii*	1	0
47. *L. gresilensis*	1	0
48. *L. beliardensis*	1	0

[a] Species are listed in chronological order based on the date of isolation or identification.
[b] Serogroup 2 of *L. erythra* has been associated with human disease.

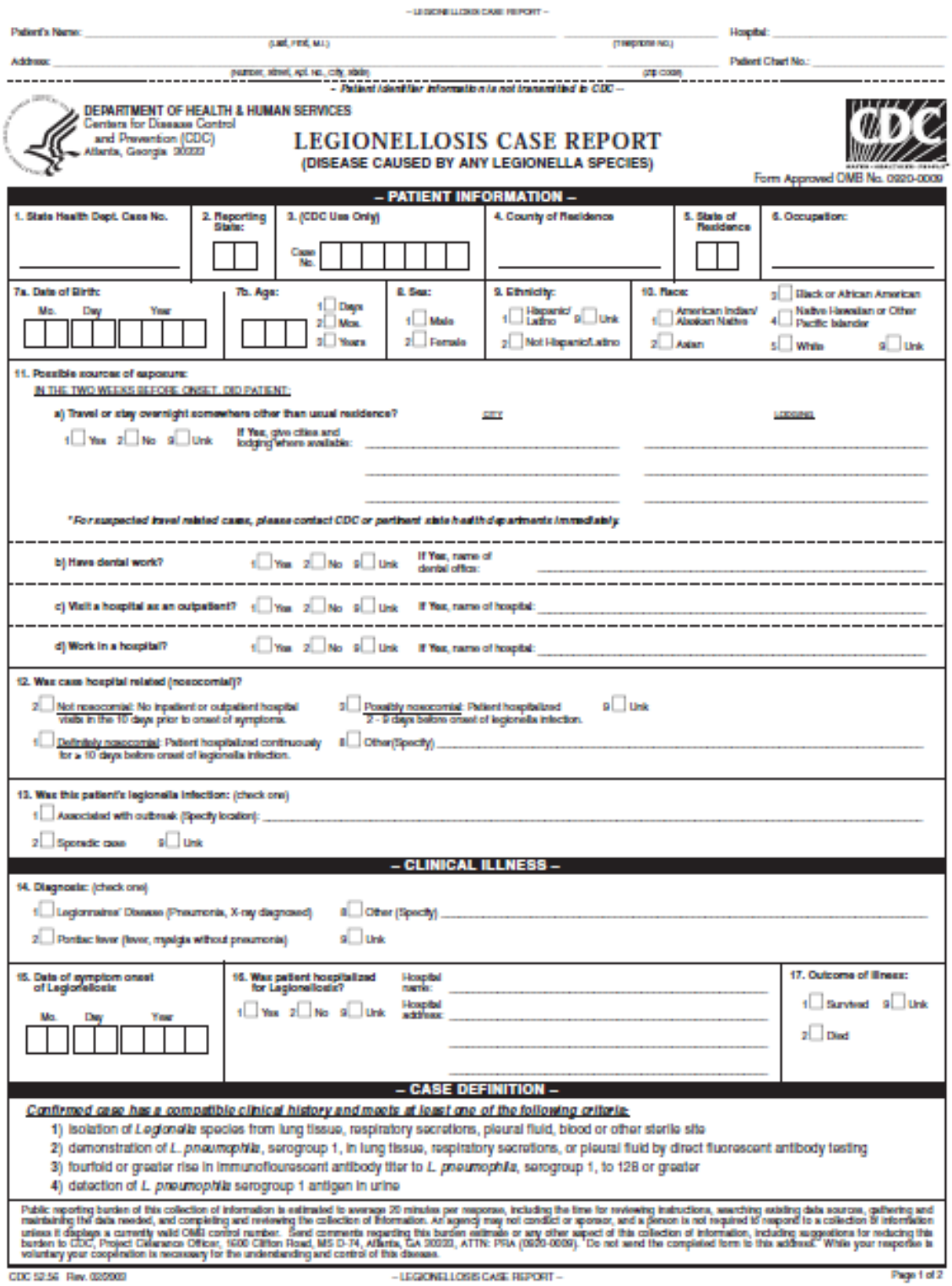
The above table is copied from Fields, B, Benson, R, and Besser R. Legionella and Legionnaires' Disease: 25 Years of Investigation. 2002. *Clinical Microbiology Reviews*, Vol. 15, No. 3, 506–526.

Attachment 2

Legionellosis Follow-up Hospital Assignments by Field Epidemiologist *(effective 1/8/2016)*	
Hospital	**Field Epidemiologist**
Bridgeport	Christina Turner
Bristol	Paul Gacek
CCMC	Jessica Brockmeyer
Charlotte Hungerford	Paul Gacek
Danbury	Paul Gacek
Day Kimball	Jaime Krasnitski
Greenwich	Paul Gacek
Griffin	Christina Turner
Hartford	Jessica Brockmeyer
Hospital of Central CT (Bradley, NBGH)	Jessica Brockmeyer
Hospital of Saint Raphael	Christina Turner
Johnson Memorial	Jessica Brockmeyer
Lawrence & Memorial	Jaime Krasnitski
Manchester	Jaime Krasnitski
Middlesex	Jaime Krasnitski
Midstate	Paul Gacek
Milford	Christina Turner
New Milford	Paul Gacek
Norwalk	Paul Gacek
Rockville General	Jaime Krasnitski
Saint Francis	Jessica Brockmeyer
Saint Mary's	Paul Gacek
Saint Vincent's	Christina Turner
Sharon	Paul Gacek
Stamford	Paul Gacek
UCONN	Jessica Brockmeyer
VA-West Haven	Christina Turner
Waterbury	Paul Gacek
William Backus	Jaime Krasnitski
Windham	Jaime Krasnitski
Yale	Christina Turner

Note: if the epidemiologist is out of the office, another field epidemiologist can conduct the follow-up.

Attachment 3



-- LEGIONELLOSIS CASE REPORT --

Patient's Name: _____ (Last, First, M.I.) _____ (Telephone No.) Hospital: _____

Address: _____ (number, street, apt. no., city, state) _____ (zip code) Patient Chart No.: _____

-- Patient identifier information is not transmitted to CDC --

DEPARTMENT OF HEALTH & HUMAN SERVICES
Centers for Disease Control and Prevention (CDC)
Atlanta, Georgia 30333

LEGIONELLOSIS CASE REPORT
(DISEASE CAUSED BY ANY LEGIONELLA SPECIES)

Form Approved OMB No. 0920-0009

-- PATIENT INFORMATION --

1. State Health Dept. Case No.	2. Reporting State:	3. (CDC Use Only)	4. County of Residence	5. State of Residence	6. Occupation:
		Case No.			

7a. Date of Birth:	7b. Age:	8. Sex:	9. Ethnicity:	10. Race:
Mo. Day Year	1 Days 2 Mos. 3 Years	1 Male 2 Female	1 Hispanic/Latino 2 Not Hispanic/Latino 9 Unk	1 American Indian/Alaskan Native 2 Asian 3 Black or African American 4 Native Hawaiian or Other Pacific Islander 5 White 9 Unk

11. Possible sources of exposure:

IN THE TWO WEEKS BEFORE ONSET, DID PATIENT:

a) Travel or stay overnight somewhere other than usual residence? 1 Yes 2 No 9 Unk

If Yes, give cities and lodging where available: CITY _____ LODGING _____

* For suspected travel related cases, please contact CDC or pertinent state health departments immediately.

b) Have dental work? 1 Yes 2 No 9 Unk If Yes, name of dental office: _____

c) Visit a hospital as an outpatient? 1 Yes 2 No 9 Unk If Yes, name of hospital: _____

d) Work in a hospital? 1 Yes 2 No 9 Unk If Yes, name of hospital: _____

12. Was case hospital related (nosocomial)?

2 Not nosocomial: No inpatient or outpatient hospital visits in the 10 days prior to onset of symptoms.

3 Possibly nosocomial: Patient hospitalized 2 - 9 days before onset of legionella infection.

9 Unk

1 Definitely nosocomial: Patient hospitalized continuously for ≥ 10 days before onset of legionella infection.

8 Other (Specify) _____

13. Was this patient's legionella infection: (check one)

1 Associated with outbreak (Specify location): _____

2 Sporadic case 9 Unk

-- CLINICAL ILLNESS --

14. Diagnosis: (check one)

1 Legionnaires' Disease (Pneumonia, X-ray diagnosed)

2 Pontiac fever (fever, myalgia without pneumonia)

8 Other (Specify) _____

9 Unk

15. Date of symptom onset of Legionellosis:	16. Was patient hospitalized for Legionellosis?	17. Outcome of illness:
Mo. Day Year	1 Yes 2 No 9 Unk Hospital name: _____ Hospital address: _____	1 Survived 9 Unk 2 Died

-- CASE DEFINITION --

Confirmed case has a compatible clinical history and meets at least one of the following criteria:

1) Isolation of *Legionella* species from lung tissue, respiratory secretions, pleural fluid, blood or other sterile site
2) demonstration of *L. pneumophila*, serogroup 1, in lung tissue, respiratory secretions, or pleural fluid by direct fluorescent antibody testing
3) fourfold or greater rise in immunofluorescent antibody titer to *L. pneumophila*, serogroup 1, to 128 or greater
4) detection of *L. pneumophila* serogroup 1 antigen in urine

Public reporting burden of this collection of information is estimated to average 20 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. An agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to CDC, Project Clearance Officer, 1600 Clifton Road, MS D-74, Atlanta, GA 30333, ATTN: PRA (0920-0009). "Do not send the completed form to this address." While your response is voluntary your cooperation is necessary for the understanding and control of this disease.

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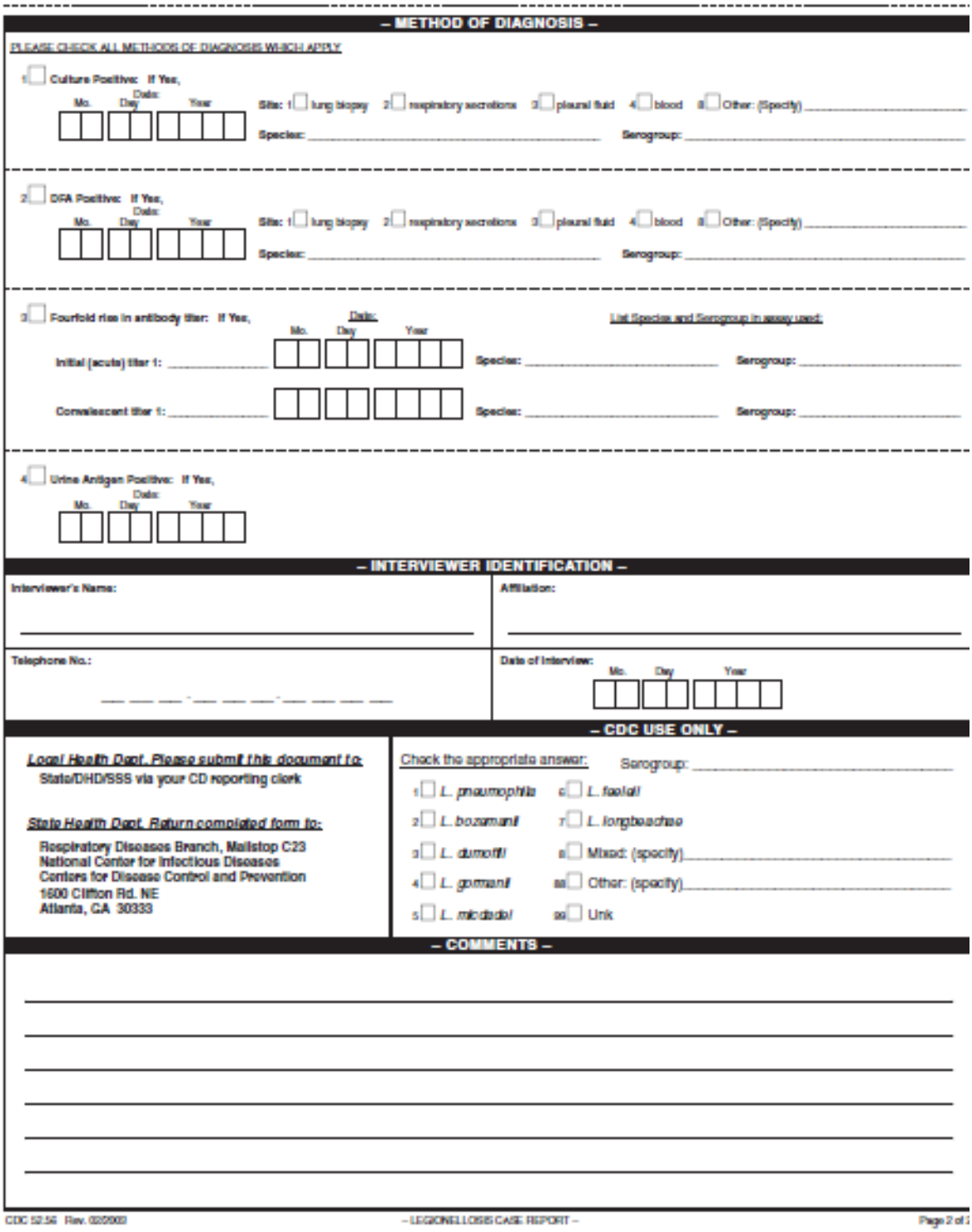

– METHOD OF DIAGNOSIS –

PLEASE CHECK ALL METHODS OF DIAGNOSIS WHICH APPLY

1 ☐ Culture Positive: If Yes, Date: Mo. Day Year ☐☐ ☐☐ ☐☐☐☐ Site: 1 ☐ lung biopsy 2 ☐ respiratory secretions 3 ☐ pleural fluid 4 ☐ blood 8 ☐ Other: (Specify) _____ Species: _____ Serogroup: _____

2 ☐ DFA Positive: If Yes, Date: Mo. Day Year ☐☐ ☐☐ ☐☐☐☐ Site: 1 ☐ lung biopsy 2 ☐ respiratory secretions 3 ☐ pleural fluid 4 ☐ blood 8 ☐ Other: (Specify) _____ Species: _____ Serogroup: _____

3 ☐ Fourfold rise in antibody titer: If Yes, Date: Mo. Day Year — List Species and Serogroup in assay used:

Initial (acute) titer 1: _____ ☐☐ ☐☐ ☐☐☐☐ Species: _____ Serogroup: _____

Convalescent titer 1: _____ ☐☐ ☐☐ ☐☐☐☐ Species: _____ Serogroup: _____

4 ☐ Urine Antigen Positive: If Yes, Date: Mo. Day Year ☐☐ ☐☐ ☐☐☐☐

– INTERVIEWER IDENTIFICATION –

Interviewer's Name: _____ Affiliation: _____

Telephone No.: ___ ___ ___ - ___ ___ ___ - ___ ___ ___ ___ Date of Interview: Mo. Day Year ☐☐ ☐☐ ☐☐☐☐

– CDC USE ONLY –

Local Health Dept. Please submit this document to:
State/DHD/SSS via your CD reporting clerk

State Health Dept. Return completed form to:
Respiratory Diseases Branch, Mailstop C23
National Center for Infectious Diseases
Centers for Disease Control and Prevention
1600 Clifton Rd. NE
Atlanta, GA 30333

Check the appropriate answer: Serogroup: _____

1 ☐ *L. pneumophila* 6 ☐ *L. feeleii*
2 ☐ *L. bozemanii* 7 ☐ *L. longbeachae*
3 ☐ *L. dumoffii* 8 ☐ Mixed: (specify) _____
4 ☐ *L. gormanii* 88 ☐ Other: (specify) _____
5 ☐ *L. micdadei* 99 ☐ Unk

– COMMENTS –

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Attachment 4

LEGIONELLOSIS CASE REPORT

Patient Name:_____ MAVEN
ID:_____

1. Occupation:
Is the patient employed? (include volunteer work)
□ Yes □ No (if no, skip to *Hospitalization Information*) □ Unknown
Occupation:_____
Name of Company:_____
City:_____ State:_____

2. Hospitalization Information:

Date of Admission:_____ Date of Discharge:_____ Admission diagnosis:_____

3. In the 10 days prior to onset was the patient admitted to a hospital?
□ Yes □ No (if no, skip to *Skilled nursing*) □ Unknown
Date of Admission:_____ Date of Discharge:_____ Admission diagnosis:_____
Hospital Name/room number:_____
Was the patient able to leave their hospital room?
□ Yes (Ambulatory) □ No (Bedbound) □ Unknown
Did the patient have a roommate? □ Yes □ No □ Unknown
If yes, have they been ill? □ Yes □ No □ Unknown
Did the patient have a bathroom and shower in their room?
□ Bathroom and shower □ Bathroom, no shower □ Neither
Did the patient take showers? □ Yes □ No □ Unknown

4. Skilled Nursing Facility:
In the two weeks prior to onset, was the patient a resident of a skilled nursing facility?
□ Yes □ No (if no, you are finished) □ Unknown
Dates of residence:_____
Travel outside of skilled nursing facility in the two weeks prior to onset: (medical appointments, visits to family/friends, etc.)
Location:_____ Dates:_____
Location:_____ Dates:_____
Is the patient able to leave their room in the skilled nursing facility?
□ Yes (Ambulatory) □ No (Bedbound) □ Unknown
Does the patient have a roommate? □ Yes □ No □ Unknown
If yes, have they been ill? □ Yes □ No □ Unknown
Does the patient have a bathroom and shower in their room?
□ Bathroom and shower □ Bathroom, no shower □ Neither
Does the patient take showers? □ Yes □ No □ Unknown

Comments:

Attachment 5

Connecticut Long Form Legionellosis Questionnaire

Name _____
Address _____

Phone (H) _____ Phone (O) _____
Gender Male Female (circle one) Birthdate (mm/dd/yyyy): ____/____/_____
I would first like to ask you on what date you become sick? (mm/dd/yyyy): ____/____/_____

Now I would like to ask you about areas you traveled to during the 2 weeks before this date, which would be from _____ to _____.

1. What is your occupation? _____
   In which town do you work? _____

2. Did you travel out of state in the 2 weeks before getting sick?
   ☐ yes ☐ no ☐ don't know
   If yes, where did you go? _____
   Did you stay overnight? ☐ yes ☐ no ☐ don't know
   Where did you stay? (name if hotel, friend's address, etc.) _____
   _____
   Dates of travel? _____

3. Did you travel to any other towns in CT (besides the town where you live) in the 2 weeks before getting sick? ☐ yes ☐ no ☐ don't know
   If yes, where did you go? _____
   Did you stay overnight? ☐ yes ☐ no ☐ don't know
   Where did you stay? (name if hotel, friend's address, etc.) _____
   Dates of travel? _____

4. Thinking about your activities, have you done any of the following in the 2 weeks before getting sick:

Doctors office (includes eye doctor, podiatrist, chiropractor, physical therapy etc…)	☐ yes	☐ no	☐ don't know	If yes, where:_____
Dentist	☐ yes	☐ no	☐ don't know	If yes, where:_____
Hospital/Emergency Dept	☐ yes	☐ no	☐ don't know	If yes, where:_____
Grocery Store	☐ yes	☐ no	☐ don't know	If yes, where:_____
Pharmacy	☐ yes	☐ no	☐ don't know	If yes, where:_____
Convenience/package store	☐ yes	☐ no	☐ don't know	If yes, where:_____
Video store	☐ yes	☐ no	☐ don't know	If yes, where:_____
Home improvements store	☐ yes	☐ no	☐ don't know	If yes, where:_____
Gardening store	☐ yes	☐ no	☐ don't know	If yes, where:_____
Mall	☐ yes	☐ no	☐ don't know	If yes, where:_____
Department store	☐ yes	☐ no	☐ don't know	If yes, where:_____
Large chain store (includes stores like Walmart, Target, Kohls, etc…)	☐ yes	☐ no	☐ don't know	If yes, where:_____
Bank	☐ yes	☐ no	☐ don't know	If yes, where:_____
Post office	☐ yes	☐ no	☐ don't know	If yes, where:_____
Mechanic/car repair	☐ yes	☐ no	☐ don't know	If yes, where:_____
Car wash	☐ yes	☐ no	☐ don't know	If yes, where:_____
Gas Station	☐ yes	☐ no	☐ don't know	If yes, where:_____
Laundromat	☐ yes	☐ no	☐ don't know	If yes, where:_____
Home of friend/family	☐ yes	☐ no	☐ don't know	If yes, where:_____
2nd home, cabin, trailer, RV	☐ yes	☐ no	☐ don't know	If yes, where:_____
Church	☐ yes	☐ no	☐ don't know	If yes, where:_____
Restaurant/coffee shop	☐ yes	☐ no	☐ don't know	If yes, where:_____
Bar/nightclub	☐ yes	☐ no	☐ don't know	If yes, where:_____
Group activities (bingo, poker., etc…)	☐ yes	☐ no	☐ don't know	If yes, where:_____

Casino ☐ yes ☐ no ☐ don't know If yes, where:_____

Meetings ☐ yes ☐ no ☐ don't know If yes, where:_____

(work meetings, neighborhood associations, etc…)

Movie theater ☐ yes ☐ no ☐ don't know If yes, where:_____

Performances ☐ yes ☐ no ☐ don't know If yes, where:_____

(Concerts, plays, etc…)

Museum ☐ yes ☐ no ☐ don't know If yes, where:_____

Aquarium/zoo ☐ yes ☐ no ☐ don't know If yes, where:_____

Sporting events ☐ yes ☐ no ☐ don't know If yes, where:_____

Parks/walking trails ☐ yes ☐ no ☐ don't know If yes, where:_____

Cemeteries ☐ yes ☐ no ☐ don't know If yes, where:_____

Gym ☐ yes ☐ no ☐ don't know If yes, where:_____

(Includes yoga studios, indoor tracks)

Swimming pool ☐ yes ☐ no ☐ don't know If yes, where:_____

Whirlpool ☐ yes ☐ no ☐ don't know If yes, where:_____

Hair or nail salon ☐ yes ☐ no ☐ don't know If yes, where:_____

Pet groomer, kennel, vet ☐ yes ☐ no ☐ don't know If yes, where:_____

Fairs/festivals ☐ yes ☐ no ☐ don't know If yes, where:_____

Fruit picking ☐ yes ☐ no ☐ don't know If yes, where:_____

Wedding/large party ☐ yes ☐ no ☐ don't know If yes, where:_____

5. Did you use any respiratory therapy device (such as a nebulizer) in the 2 weeks before your illness?

☐ yes ☐ no ☐ don't know

If yes, where:_____How often? _____When (date/time)? _____

6. Can you think of any exposure you may have had to an aerosol (mist of water), such as a fountain or waterfall, in the 2 weeks before your illness that we haven't asked you about?

☐ yes ☐ no ☐ don't know

If yes, explain_____

7. How would you best describe the structure of your home? (ex. Single family, apartment, duplex, etc.)

☐ Single-Unit, attached ☐ Single-Unit, detached ☐ Multi-family ☐ Apartment

☐ Facility_____ ☐ Don't know

8. In the 2 weeks before your illness, was there any excavation, construction or digging going on near where you live or work?

☐ yes ☐ no ☐ don't know

If yes, explain_____

9. Were any plumbing repairs done to your house in the 1 month before you became ill?

☐ yes ☐ no ☐ don't know

If yes, explain_____

STATE OF CONNECTICUT
DEPARTMENT OF PUBLIC HEALTH

Raul Pino, M.D., M.P.H.
Commissioner

Dannel P. Malloy
Governor

Nancy Wyman
Lt. Governor

Protocols for the Ebola-Related Monitoring of Travelers

Last reviewed: March 23, 2016

Phone: (860) 509-8000 • Fax: (860) 509-7184
410 Capitol Avenue, P.O. Box 340308
Hartford, Connecticut 06134-0308
www.ct.gov/dph
Affirmative Action/Equal Opportunity Employer

Epidemiology Program Protocol for Ebola Virus Disease (EVD)

Connecticut continues to operate under a Public Health Emergency due to the Ebola outbreak in West Africa. The Connecticut Department of Public Health (CT DPH) is responsible for assuring that symptomatic individuals are evaluated appropriately and that asymptomatic individuals are monitored appropriately. All health professionals evaluating a patient for suspected Ebola infection have been instructed to call the CT DPH Epidemiology Program. Notifications of asymptomatic travelers will be assessed by the CT DPH and triaged to the applicable Local Health Department for monitoring as needed.

1. Symptomatic Individuals

The Ebola case definition for a person under investigation (PUI) is a person with the following characteristics (http://www.cdc.gov/vhf/ebola/hcp/case-definition.html):

1. Fever* (measured or subjective) OR severe headache, fatigue, muscle pain, vomiting, diarrhea, abdominal pain, or unexplained hemorrhage; AND
2. An epidemiologic risk factor within the 21 days before symptom onset (http://www.cdc.gov/vhf/ebola/exposure/risk-factors-when-evaluating-person-for-exposure.html)

Epidemiologic risk factors are divided into 4 exposure categories: high risk, some risk, low (not zero) risk, and no identifiable risk. **Symptomatic individuals with high, some, or low (not zero) risk require medical evaluation.** It is anticipated that they will be hospitalized until a diagnosis is made. Recommendations for testing based upon clinical criteria are found in the monitoring and movement guidelines (http://www.cdc.gov/vhf/ebola/hcp/monitoring-and-movement-of-persons-with-exposure.html). Symptomatic individuals with 'no identifiable risk' do not require medical evaluation for Ebola but may need to be evaluated for other diseases.

DPH role: CT DPH Epidemiology Program staff will complete the Connecticut 'Screening Form for Evaluation and Testing for Ebola Virus Disease" to determine if testing and/or other public health action is warranted.

- **Infection Control/Prevention:** If the patient is evaluated at or admitted to a healthcare facility, standard, contact, and droplet precautions are recommended. For further details refer callers to the CDC infection control (http://www.cdc.gov/vhf/ebola/hcp/infection-prevention-and-control-recommendations.html) and personal protective equipment (http://www.cdc.gov/vhf/ebola/hcp/procedures-for-ppe.html) guidance.

LHD role: If a Local Health Department receives a call about a symptomatic potential case the caller should be referred to the CT DPH Epidemiology Program for screening.

*A temperature ≥ 100.4F is the screening threshold. However, testing may be recommended for individuals with lower temperatures and/or nonspecific symptoms (e.g. fatigue) based upon exposure category and clinical presentation.

2. Asymptomatic Individuals

Asymptomatic individuals requiring public health follow-up includes those with high, some, and low (but not zero) risk exposures. Notification of asymptomatic travelers returning from affected areas who underwent airport screening will be made via Epi-X to the DPH Epidemiology Program. Notifications may also be received from local clinicians, schools, workplaces, etc. as concerns arise. Guidance regarding management of asymptomatic individuals is detailed in the "Interim US Guidance for Monitoring and Movement of Persons with Potential Ebola Virus Exposure" (http://www.cdc.gov/vhf/ebola/exposure/monitoring-and-

movement-of-persons-with-exposure.html). This guidance represents the minimum requirements. Depending upon the situation, more stringent restrictions than that described here may be recommended by CT DPH.

DPH role: Upon receiving notification of a new traveler, DPH Epidemiology Program staff will contact the Local Health Director in the jurisdiction the asymptomatic individual(s) are destined for. CT DPH Epidemiology Program staff will interview the traveler using the Connecticut 'Screening Form for Travelers Returning from Ebola Affected Areas' to verify the accuracy of the airport screening risk assessment. Depending upon LHD preference and resources, traveler interviews may be delegated to LHD staff. Based upon the information gathered on this form, the DPH Commissioner or her designee will make decisions on a case by case basis as to the appropriate monitoring type (Active or Direct active) and movement restrictions. The applicable Local Health Director will be notified by phone and email and informed of the decided monitoring and movement restrictions. DPH staff will enter the individuals into Maven (see below).

LHD role: Once notified by DPH of the traveler's monitoring type and movement restrictions, begin 21-day twice daily fever/symptom monitoring as per the Connecticut 'Ebola Virus Contact and Traveler Monitoring Follow-up Protocol'. An initial home visit by LHD staff within 24 hours of being notified by DPH of the traveler's arrival is strongly encouraged/recommended for those under active monitoring and is required for those under direct active monitoring. During this home visit LHD staff should assure travelers are using the thermometer properly and understand the applicable monitoring and movement restrictions. Maintain a daily log of fever/symptom monitoring and enter into the Maven contact/travel monitoring wizard on a daily basis. Assist quarantined individuals with needs (e.g., food, shelter, security) as applicable. Assure that there is a plan in place for transport of the individual for medical evaluation should he/she become symptomatic that includes pre-notification of relevant parties (i.e., CT DPH, EMS, hospital). Assist travelers under direct active monitoring in removal of any mammalian pets to an alternate location to be cared for by a person that is not being monitored (http://www.cdc.gov/vhf/ebola/pdf/pets-of-ebola-contacts.pdf).

Non-English speaking travelers: If available, English speaking household members can be used to translate during the initial interview and/or monitoring calls. If an English speaker is not available, a language line should be used for interpreter services.

3. Maven

All persons requiring monitoring by public health should be entered by CT DPH staff into Maven CT- EDSS by selecting "Viral hemorrhagic fever" as the 'Disease' and selecting "Ebola" as the 'Type of viral hemorrhagic fever' in the Ebola Consultation Record Wizard.
The case "status" should be selected according to the guidelines below:

- Confirmed: Individuals with a positive EVD test
- Probable: Symptomatic individuals with high, some, or low (not zero) risk exposures within the 21 days before onset of symptoms (i.e., a PUI)
- Unknown: Asymptomatic individuals with either high, some, or low (not zero) risk exposures who are being monitored. A 'contact/travel monitoring wizard' has been added to Maven for tracking symptoms in these individuals.
- Contact: Individuals who are close contacts of a confirmed or probable case who are being monitored for EVD symptoms. These individuals should be linked back to the case. A 'contact/travel monitoring wizard' has been added to Maven for tracking symptoms in these individuals.

4. **Contact Tracing**

Individuals who may have had close contact with a symptomatic confirmed or probable case should be identified upon determining that EVD testing is indicated so that contact monitoring can be initiated as quickly as possible in the event the case tests positive for EVD. Identification of individuals requiring contact monitoring will be guided by information collected on the 'Ebola Virus Disease Contact Tracing Form'. See the Connecticut "Ebola Virus Contact and Traveler Monitoring Follow-up Protocol" for further details and monitoring forms.

5. **Laboratory Testing**

EVD is generally detectable in infected patients on the third day after illness onset by reverse transcription real-time (rRT) PCR. All testing requests approved by the Epidemiology Program should be sent from the clinical laboratory **DIRECTLY** to the CDC and/or to a regional reference laboratory. The specimens should **NOT** be sent to the DPH State Laboratory first. The DPH State Laboratory will assist/facilitate via phone clinical labs in completing the paperwork and advising on the packaging and shipping of the specimen. Laboratorians with questions about the process for submitting specimens for diagnostic testing for Ebola virus should be referred to DPH State Laboratory at (860) 920-6550 or after hours, at (860) 920-6500.

The preferred specimen for EVD testing is whole blood (minimum 4 ml) preserved with EDTA, clot activator, sodium polyanethol sulfonate (SPS), or citrate in a **PLASTIC** collection tube, and stored at 2-8°C. For further details laboratories can be referred to the CDC guidelines (http://www.cdc.gov/vhf/ebola/hcp/interim-guidance-specimen-collection-submission-patients-suspected-infection-ebola.html).

CT DPH Epidemiology Program staff will notify the State Laboratory (Diane Barden: (w) 860-920-6550, (c) 860-250-9596, (BT cell) 860-716-2705, (Lab after hours) 860-920-6500) of all new patients under investigation via email and phone. The e-mail with contain the Maven ID# and cc Matt Cartter, Randy Nelson, Lynn Sosa, Susan Petit, and Terry Rabatsky-Ehr.

Epidemiology Program
Protocol for Triaging of Epi-X Reports of Travelers Arriving from Ebola Affected Countries

Weekdays

- Jocelyn or designated Epidemiology Program staff downloads traveler reports from Epi-X and saves in W:\DosApps\EPI\EPISTAFF\Ebola\Traveler screening spreadsheets. Jocelyn or designated Epidemiology Program staff enters initial traveler data into Maven and emails Matt Cartter, Lynn Sosa, Terry Rabatsky-Ehr, Susan Petit, Alan Siniscalchi, Randy Nelson and the Field Epi in the applicable region to acknowledge receipt of the Epi-X notification and intent to follow-up.
- Jocelyn or designated Epidemiology Program staff will notify the applicable LHD.
- Initial traveler interviews will be conducted by Jocelyn or designated Epidemiology Program staff within 24 hours of receiving the Epi-X report.
- After the interview, a brief summary of the status of the returning traveler information will be emailed to Matt Cartter, Lynn Sosa, Terry Rabatsky-Ehr, Susan Petit, Alan Siniscalchi, Randy Nelson, the Field Epi in the applicable region, and Acting Commissioner Pino or his designee for subsequent monitoring and movement decisions.
- The designated epidemiologist will communicate the decided monitoring and movement restrictions to the local health director by phone with email confirmation. The email should be a 'reply to all' version of the previous brief summary with the local health director and other applicable local health staff added to the recipient list. Email will confirm the traveler Maven ID #, decided monitoring type and movement restrictions, and instructions for LHD staff. The most recent version of the "Ebola Virus Contact and Traveler Monitoring Follow-up Protocol" should be attached to the e-mail.

  Sample e-mail:

  The details of this traveler's time in an Ebola affected area have been reviewed with [*Acting Commissioner Pino or designee*]. Here is a summary of the decided monitoring and movement restrictions and relevant dates.
  - Maven ID: [*Insert Maven ID number]*.
  - Monitoring type: [*Enter Active or Direct Active*]
  - Movement restrictions: [*Enter 'None' or list applicable restrictions]*
  - Last date of potential exposure to Ebola: Day '0' [*Enter last date in affected area]*
  - Monitoring dates: Day '1' [*Enter date]* to Day '21' [*Enter date]*

  Please begin daily monitoring of this traveler as per the attached "Ebola Virus Contact and Traveler Monitoring Follow-up Protocol" (also available under Ebola resources at www.ct.gov/dph/cerc). An initial home visit by local health staff is strongly encouraged. During the monitoring period please notify DPH Epidemiology Program (24/7 Ebola line: 860-893-3399, days: 860-509-7994, after hours: 860-509-8000) if any of the following occur:
  - The traveler reports a fever and/or symptoms consistent with Ebola.
  - New details of the traveler's dates and/or activities in the affected area emerge that are not detailed in the summary below.
  - The traveler indicates plans to travel to another state and remain overnight OR of plans to travel out of the U.S. during the monitoring period.
    - Obtain date(s) of intended travel, mode of transportation, and address in intended destination.
  - The traveler indicates a change in previously reported dates and/or locations of intended travel out of state or country.
  - The traveler is not reachable for the daily monitoring call.

Routine questions regarding EMS notifications and transportation should be directed to the DPH Office of Public Health Preparedness and Response PHPR at 860-509-8282. PHPR staff may be reached after hours at 860-509-8000.

- Follow-up on Epi-X reports received on weekday evenings (Mon-Thurs) are conducted on the following business day. Follow-up on reports received after 4:00 pm on Friday/day before a holiday will be conducted by the on-call epidemiologist/designated epidemiologist on Saturday.
- Follow-up that begins during the workday on Friday/day before a holiday that is not completed by close of business will either be the responsibility of day staff or the designated weekend/holiday epidemiologist to complete. This will be decided on a case by case basis depending upon day staff availability after hours.
- Notify Randy Nelson and/or Kathy Kudish if a traveler indicates there are pets in his/her household and/or anticipated direct contact with animals during the 21-day monitoring period. They will then notify the CT Department of Agriculture.

Weekends/Holidays

- Each weekend/holiday an epidemiologist will be pre-assigned to monitor Epi-X traveler reports. This may either be the after-hours on-call epidemiologist or other Epidemiology Program staff.
- The designated epidemiologist will send an e-mail confirmation indicating receipt of the traveler report and intent to follow up on it to Matt Cartter, Lynn Sosa, Terry Rabatsky-Ehr, Susan Petit, Alan Siniscalchi, Randy Nelson, and the Field Epi in the applicable region.
- The designated epidemiologist will interview the traveler over the phone, enter the traveler data into Maven, and notify the applicable local health director.
- After the interview, a brief summary of the status of the returning traveler information will be emailed to Matt Cartter, Lynn Sosa, Terry Rabatsky-Ehr, Susan Petit, Alan Siniscalchi, Randy Nelson, the Field Epi in the applicable region, and Acting Commissioner Pino or his designee for subsequent monitoring and movement decisions.
- The designated epidemiologist will communicate the decided monitoring and movement restrictions to the local health director by phone with email confirmation. The email should be a 'reply to all' version of the previous brief summary with the local health director and other applicable local health staff added to the recipient list. Email will confirm the traveler Maven ID #, decided monitoring type and movement restrictions, and instructions for LHD staff.

See Sample e-mail above under weekdays.

- The temperature/symptoms collected during the initial interview count as the once daily monitoring for a traveler. The designated epidemiologist will ask the local health director to assume monitoring once daily for the remainder of the weekend. In the event that a local health department is not able to do so (e.g., part-time health department) the designated epidemiologist is responsible for the once daily monitoring calls for the remainder of the initial weekend.
- Follow-up on reports received after 4:00 PM on Friday/day before a holiday will be conducted by the on-call epidemiologist/designated epidemiologist on Saturday/the holiday
- Follow-up on reports received on Saturday after 4:00 PM will be conducted on Sunday.
- Follow-up on reports received on Sunday/weekday holiday after 4:00 PM will be triaged on Monday morning/next business day as per the above Weekday protocol.

Daily Situation Reports (Update on Ebola in Connecticut):

Jocelyn or a designated Epidemiology Program staff sends a daily Connecticut status report to: Jonathan Best, Anna Sigler, Matt Cartter with cc to Scott Szalkiewicz, William Gerrish, Acting Commissioner Pino, Lynn Sosa, Terry Rabatsky-Ehr, Susan Petit, and Randy Nelson. The status report is updated and sent by noon daily (including holidays/weekends). The designated weekend/holiday epidemiologist will be responsible for sending this report on Saturday, Sunday, and holidays. He/she will obtain relevant traveler counts as of Friday/day before a holiday afternoon from Jocelyn and then revise traveler counts as needed on the weekend/holiday.

The report includes: # of quarantine orders involving x persons and active post-arrival monitoring for travelers from impacted countries involving x persons.

Sample Report:
The status of returning travelers from [Guinea] for [Monday December 21, 2015] includes: active post-arrival monitoring involving [13] persons. The status of an additional [2] travelers is pending review by the [Acting] Commissioner.

Compensation for Weekend/Holiday Traveler Monitoring:

1. Staff conducting weekend and holiday traveler monitoring are required, at a minimum, to:
    a. Check their email mail a minimum of 4 times/day (9:00am, noon, 2:00 pm and before 4:00 pm) for new Epi-X traveler postings and
    b. Send the *Daily Situation Report for Connecticut* by noon.
2. Compensation for the minimum activities (#1 above) is calculated at two-hours OVT per day.
3. Additional compensation will be earned for time spent interviewing returned travelers, entering data into Maven, contacting local health departments, and emailing summaries to DPH and Local Health Department staff. Staff are required to keep track of the time spend on these activities for approval by supervisors.

REPORTING TO CDC

Daily Monitoring report for CDC:

Jocelyn Mullins or designated Epidemiology Program staff submits a **Daily** Monitoring Report to CDC for persons in the following 3 categories: 1) **High** risk persons under direct active monitoring, 2) **Compliance** issues regardless of risk category (failure to make initial contact or lost to follow-up for >=48 hours), and 3) **Symptomatic** persons regardless of risk category to CDC. Reports are submitted daily via the SAMS CRA activity.

Weekly Active Monitoring report for CDC:

Jocelyn Mullins or a designated Epidemiology Program staff submits a **Weekly** Aggregate Report for **all persons under monitoring regardless of risk category** to CDC. Weekly reports are due on Wednesdays, whether or not there is anyone being actively monitored. Reports are submitted on line at:
http://phprsurveys.cdc.gov/mrIWeb/mrIWeb.dll?I.Project=WEEKLYREPORT_V2_LOWEBOLARISKEXPOSURE

Traveler name:_____

Screening Form for Travelers Returning from Ebola Affected Areas

I. TRAVELER INFORMATION

Interview Date: / / Time:		**Interviewer:**	
Interviewer phone Office:		**Cell:**	
Traveler Name	**First:**	**Last:**	
Traveler Address		**Town:**	**State/Zip:**
Traveler Phone	**Home:**	**Work:**	**Cell:**
Date of Birth: / /		**Age:**	**Sex:**
Race: American Indian/Alaska Native Asian Black/African-American Native Hawaiian/Pacific Islander White Other_____		**Ethnicity:** Hispanic/Latino Non-Hispanic/Latino	
Occupation:	Workplace and address:		
US Citizen? Yes No **If no, Country of Residence**:			
Physician (if any):		**Physician Phone:**	

II. TRAVEL DETAILS

Country(s) Visited:	**Locations visited in [name country(s)]:**	
What date did you arrive in [name country(s)]? / /		
What date did you leave [name country(s)]? / /		
What date did you arrive in the US: / /	**NO**	**YES**
Do you currently have, or had within the past 48 hours, symptoms of fever (either subjective or >=100.4°F or 38°C)* OR tiredness (fatigue), muscle pain, headache, weakness, muscle pain, vomiting, diarrhea, abdominal pain or hemorrhage?		
IF YES, STOP AND CALL DPH	↓	**STOP**
If NO, continue to questions below.		

*as of 10/27/14 CDC case definition for person under investigation:
1.Elevated body temperature or subjective fever or symptoms, including severe headache, fatigue, muscle pain, vomiting, diarrhea, abdominal pain, or unexplained hemorrhage; AND
2.An epidemiologic risk(http://www.cdc.gov/vhf/ebola/exposure/risk-factors-when-evaluating-person-for-exposure.html) factor within the 21 days before the onset of symptoms.

Case Definition for Ebola Virus Disease (EVD) | Ebola Hemorrhagic Fever | CDC

Traveler name:_____

II. TRAVEL DETAILS (CONTINUED)

What was the reason for your travel to (NAME COUNTRY)?

☐ Resident of Country ☐ Visiting friends/family ☐ Tourism

☐ Work (if checked, type of work): ☐ Healthcare ☐ Humanitarian Aid – not Healthcare Related ☐ Journalist/Photographer/Related field ☐ Other (specify) _____

☐ Other (specify) _____

Please describe your activities while you were in [NAME COUNTRY(S)]. Include your work duties, daily activities, proximity to Ebola patients and any precautions taken, how you traveled in country such as by private car or bus, etc.. I'll get a general sense of your activities here and ask some specific questions about your specific risk for Ebola in a minute.

Traveler name:_____

III. EXPOSURE RISK ASSESSMENT

While in (name country):	**NO**	**YES**
1. Did you have any type of brief contact, such as being in the room for a brief period of time, or shaking hands, with a person who had or might have had Ebola?		
2. Did you have a household member, friend, or acquaintance with confirmed or suspected Ebola?		
3. Did you attend or participate in a funeral?		
4. Did you have close contact, meaning within 3 feet for an hour or longer, with a person with Ebola while the person was symptomatic?		
Did you wear personal protective equipment (PPE) at all times (describe below)?		
5. Did you live in, spend time in, or work in the same household as a person with Ebola while the person had symptoms?		
Did you provide care for that person while the person had symptoms?		
On what day did the person become sick? / /		
What days were you in the same household? / / to / /		
6. Did you visit, work in, or volunteer in a facility where there were Ebola patients?		
Did you wear PPE at all times (describe below)?		
7. Did you provide medical care to an Ebola patient in a healthcare facility?		
Did you wear PPE at all times (describe below)?		
8. Did you process blood or body fluids from an Ebola patient, such as in a laboratory?		
Did you wear appropriate PPE or standard biosafety precautions at all times? (describe)		
9. Did you touch a dead body?		
Did you wear PPE at all times (describe below)?		
10. Did you get stuck with a needle or other sharp object while providing medical care or laboratory work involving persons with Ebola?		
11. Did you get blood or body fluids from an infected person directly on your skin, or in your eyes, nose, or mouth? Body fluids include sweat, blood, saliva, mucus, vomit, urine, or feces.		
IF YES to any question, what was the date of the last known exposure: / /		
IF YES to any question provide details of exposure, including duration of exposure or description of PPE use:		
Risk Assessment (assessed by DPH): High Some Low (not Zero) No Identified Risks		

http://www.cdc.gov/vhf/ebola/hcp/monitoring-and-movement-of-persons-with-exposure.html

Traveler name:_____

IV. CONNECTICUT ACTIVITIES AND HOUSING

1. What is the reason for your being in Connecticut?

☐ Resident of CT ☐ Visiting friends/family ☐ Tourism

☐ Traveling to CT for Work Type of work and workplace addresss:

☐ Other (specify) _____

2. Please describe your activities while you will be in Connecticut. Include your work duties, daily activities, transportation.

3. Do you have plans to travel within in the next 21 days? Yes No

If yes, where and on what date(s)?_____ _____

4. Is this address [name address listed above] where you intended to stay for the next 21 days? ☐ Yes ☐ No

If no, what is the other address? _____

5. What type of housing is at this address?

☐ Single family house ☐ Apartment/condo w/ private entrance ☐ Apartment/condo w/shared entrance

☐ Multi-family house ☐ Hotel ☐ Dormitory ☐ Other: *specify* _____

6. Other relevant housing details: (e.g., size of dwelling, number of bedrooms/bathrooms, etc.)

7. Who else currently lives at this address and/or is expected to stay at the residence within the next 21 days? Please provide names, ages, and indicate whether each individual was in [name country] also.

8. Are there any pets at this address? ☐ Yes ☐ No

9. Do you anticipate any direct contact with animals (pets, livestock, wildlife, etc.) during the next 21 days? ☐ Yes ☐ No

If yes to question 8 or 9, complete table below.

Animal Name	Animal Species	Location housed if different from #4

Traveler name:_____

9. In the event that you are asked to remain home for the 21 day monitoring period, please let us know of any anticipated financial, social service, and educational needs (e.g., loss of wages, paying for food and shelter, presence/absence of someone to deliver food and other necessities, children in school, laundry, etc.)

****At conclusion of screening interview, tell traveler to expect once daily calls from the local health department for fever/symptom monitoring. However, emphasize the need to notify local health department any time fever/symptoms are noted rather than waiting for the next daily monitoring call.****

Ebola Virus Contact and Traveler Monitoring Follow-up Protocol

The following guidance is to be used for 21-day temperature and symptom monitoring for persons who have been identified as contacts of an Ebola Virus Disease (EVD) case and for persons who have traveled to affected areas who have either high, some, or low (but not zero) exposure risks.

Why is it necessary to monitor temperature and symptoms?

Monitoring contacts and travelers for symptoms of EVD will ensure that should a contact or traveler become ill, he or she will be quickly isolated and transmission mitigated. Contacts of suspected or confirmed EVD cases should be monitored twice daily for symptoms of EVD for 21 days after the last date of known exposure. All travelers should be monitored once daily for symptoms of EVD for 21 days after leaving the affected area. This is the longest interval between exposure to EVD and the development of symptoms.

FORM INSTRUCTIONS

Each day, record the contact's/traveler's temperature and any of the symptoms listed on the ***EVD Symptom Monitoring Log***:

- The date of the last known exposure to a potential case is considered day "0" and the date following the last known exposure is day "1". For travelers, day "0" is the last day in the affected area and day "1" is first date outside of the affected area(s).
- Fill in the subsequent dates in the spaces under rest of the numbers.
    - For example, if the date of last known exposure is October 3, 2014 monitoring would begin on October 4, 2014, and therefore you should write 10/4/2014 under the number "1", and 10/5/2014 under the number "2", and so on.
- Two symptom and temperature checks should be conducted in a 24 hour period at least 6 hours apart. Fill in the time of symptom and temperature check for the respective date of follow-up.
- In the blank for each symptom, type "Y" (reported or observed symptom) or "N" (did not report or observe symptom). **Do not leave the space blank.**
- Note whether the contact/traveler is taking aspirin, Tylenol® (acetaminophen), or MOTRIN® (ibuprofen or Advil®).
- Symptoms (Y/N) and temperatures collected during twice daily monitoring checks should be entered into Maven on a daily basis on weekdays using the contact/travel monitoring wizard. Weekend monitoring results can be entered into Maven on Mondays.
- DPH staff will monitor temperature/symptom logs entered in Maven and work with LHDs to assure completeness and timeliness of entries. LHDs will be contacted if more than 48 hours pass without an entry.

MONITORING TYPE INSTRUCTIONS

Follow the instructions for the specified type of monitoring (active or direct active).

1) Active monitoring: Telephone contact once per day

- An initial home visit by LHD staff within 24-hours of notification by DPH of the traveler's arrival is strongly encouraged/recommended. At this visit, LHD staff should instruct/observe proper use of the thermometer by the traveler and explain the applicable monitoring and movement restrictions.
- Call the contact/traveler once daily at a pre-arranged time to assess for signs/symptoms of EVD[1] on that morning and the previous evening Ask the contact/traveler about their health (feverish, overall general health). E-mail and/or texting can be used in lieu of a phone call if the traveler demonstrates consistent reporting at the pre-arranged time via one of these methods.

- Instruct the traveler to report fever and/or symptoms as soon as either is noted rather than waiting for the daily monitoring call.
- If the contact/traveler reports a fever[2] **call DPH Epi Program (days: 860-509-7994, evenings: 860-509-8000, Ebola direct line 860-893-3399)** as soon as possible.
- If the contact/traveler does not report a fever[2] continue with the full symptom assessment.
- If a **contact/traveler** reports one or more symptoms (not including fever), inquire about possible explanations for the symptom. For example, if the contact reports muscle aches but states aches are typical of those they experience after exercising type "Y" and make any notes in the space provided on the form. If no reasonable alternative is provided for the reported symptom, call **DPH Epi Program (days: 860-509-7994, evenings: 860-509-8000, Ebola direct line 860-893-3399)** as soon as possible to discuss need for formal medical evaluation and EVD testing.
- If the **contact/traveler** exhibits symptoms indicative of EVD, the contact is now classified as a "Person Under Investigation".

- Inability to reach active monitoring contact/traveler:
  - For the daily monitoring call, three attempts shall be made to reach the contact/traveler at their primary and secondary telephone numbers.
  - If the contact does not respond via telephone to the daily call, contact the **DPH Epi Program (days: 860-509-7994, evenings: 860-509-8000, Ebola direct line 860-893-3399)** to discuss the need for an in-person visit and/or law enforcement welfare check.

2) Direct active monitoring: In-person contact once per day and telephone contact once per day.

- An initial home visit by LHD staff should occur within 24-hours of notification by DPH of the traveler's arrival. At this visit, LHD staff should instruct the traveler on proper use of the thermometer and of the applicable monitoring and movement restrictions.
- Schedule subsequent in-person visits with the contact/traveler at a pre-arranged times each day to obtain visual confirmation of temperature readings and to assess for symptoms of EVD[1]. The acceptability of using secure video conferencing methods (see Appendix 1) in lieu of in-person visits will be determined on a case-by-case basis in consultation with DPH.
  - Physical contact with the person under monitoring should be avoided. Entering the home is not required. Temperature/symptom assessments can be conducted at the doorway.
  - Temperatures can be taken by the individual being monitored and the temperature reading can be done from a distance of 3 feet from the contact/traveler.
  - A call to the contact/traveler shortly before arrival at the home is suggested to assure the individual is home and is well.
- The second daily monitoring check can be conducted either in-person or via phone. The acceptability of video conferencing (see Appendix 1), texting, and/or e-mail will be determined on a case-by-case basis in consultation with DPH.
- Ask the contact/traveler about their health (feverish, overall general health).
  - If the contact/traveler reports a fever[2] **call DPH Epi Program (days: 860-509-7994, evenings: 860-509-8000, Ebola direct line 860-893-3399)** as soon as possible.
  - If the contact/traveler does not report a fever[2] continue with the full symptom assessment.

- If a **contact/traveler** reports one or more symptoms (not including fever), inquire about possible explanations for the symptom. For example, if the contact reports muscle aches but states aches are typical of those they experience after exercising type "Y" and make any notes in the space provided on the form. If no reasonable alternative is provided for the reported symptom, call **DPH Epi Program (days: 860-509-7994, evenings: 860-509-8000, Ebola direct line 860-893-3399)** as soon as possible to discuss need for formal medical evaluation and EVD testing.
- If the **contact/traveler** exhibits symptoms indicative of EVD, the contact is now classified as a "Person Under Investigation".

- Inability to reach direct active monitoring contact/traveler:
  - If the contact/traveler is not home at the time of a pre-scheduled home visit attempt to contact the individual at all available phone numbers to schedule an alternate time that day for an in-person visit.
  - For daily monitoring calls, three attempts shall be made to reach the contact/traveler at their primary and secondary telephone numbers.
  - If the contact/traveler is not available for an in-person visit or does not respond via telephone to a daily call, contact the **DPH Epi Program (days: 860-509-7994, evenings: 860-509-8000, Ebola direct line 860-893-3399)** to discuss the need for a law enforcement welfare check and/or other action.

DPH NOTIFICATIONS

- In addition to situations described above, contact the DPH Epi Program (days: 860-509-7994, evenings: 860-509-8000, Ebola line 860-893-3399) if any of the following occur:
  - Any new or updated information on travelers being monitored including changes to information collected on initial interview including details of the traveler's dates and/or activities in the affected area.
  - The traveler indicates plans to travel to another state and remain overnight OR of plans to travel out of the U.S. during the monitoring period.
    - Obtain date(s) of intended travel, mode of transportation, and address in intended destination.
  - The traveler indicates a change in previously reported dates and/or locations of intended travel out of state or country.
- DPH will send both US and International travel notifications to recipient locations that include: dates of travel, mode of travel, destinations (including local address), and status of active monitoring.

[1] Symptoms of EVD include fever ≥ 100.4°, severe headache, muscle pain, weakness/fatigue, diarrhea, vomiting, abdominal (stomach) pain, unexplained hemorrhage or bruising

[2] The temperature threshold for requiring medical evaluation is ≥ 100.4°F/38°C. However, medical evaluation may be recommended for lower measured temperatures or subjective fever based upon exposure level and clinical presentation.

APPENDIX 1

Protocol for Using Video Teleconferencing for Direct Active Monitoring of Contacts and Travelers ~ Ebola Virus Disease

Background

In Connecticut, **active monitoring** consists of telephone contact once daily at a pre-arranged time to assess for signs/symptoms of Ebola Virus Disease (EVD). **Direct active monitoring** requires in-person contact once per day and telephone contact once per day to obtain at least one visual confirmation of temperature readings and to assess for symptoms of EVD. An initial home visit by local health department (LHD) staff typically occurs within 24-hours of notification by DPH of the traveler's arrival. For contacts or travelers requiring direct active monitoring, subsequent in-person visits can be scheduled with the contact/traveler at pre-arranged times each day. The acceptability of using secure video conferencing methods in lieu of in-person visits can be determined on a case-by-case basis in consultation with DPH.

In-person direct active monitoring can be time-consuming and costly, especially in rural communities where a LHD worker may have to travel a significant distance for home visits. It may also be inconvenient for contacts/travelers that need to be accessible to the LHD worker during daily visual temperature and symptom checks. Video technology that is secure (HIPPA compliant) provides an innovative and effective means to verify contacts'/travelers' thermometer readings. .

Video Teleconferencing tools for use in Connecticut

The following protocol describes a video conferencing tool, Vsee that is approved for use in Connecticut for EVD direct active monitoring of contacts and travelers. LHD staff can observe contacts/travelers taking their temperatures remotely via a smartphone, tablet, or computer. Also approved for use is FaceTime, an application available on Apple devices (iPhone, iPad, iPod Touch or Mac computers). FaceTime comes preloaded on these devices and requires that both the LHD and contact/traveler being directly monitored have compatible devices. Instructions for using FaceTime can be found at: https://www.apple.com/ios/facetime/.

VSee Video Teleconference Instructions

Below you will find help to you get started with the Video Conference Software setup on your home PC or Laptop. If you are using a desktop computer, a web Camera will need to be utilized in order to conduct a video call. If you are using a laptop, the internal web camera will be sufficient to conduct the video call. If you do not have an internal web camera, one will need to be purchased.

FREE VSEE DOWNLOAD, INSTALL, AND REGISTRATION INSTRUCTIONS

1. Click on the link below to start the process in downloading the Free VSee software
    a. http://www.vsee.com
2. Enter the following required information to register
    a. Enter a valid E-mail Address b. Click Free Sign up
3. A pop up will appear informing you that you will receive an e-mail to the e-mail address you provided
4. At this time you will receive an e-mail with the link to Complete Signup.
    a. Enter First Name
    b. Enter Last Name
    c. Enter a Password
    d. Click Next
    e. Invite at least one person to join you on VSee
    f. Enter at least one e-mail address you would like to Video Conference with and click next
    g. You will see a pop-up on the bottom of your screen with Run, Save, or Cancel
    h. Click Run to install VSee
5. The VSee window will appear on your screen
    a. Enter the Email and Password you used to register for VSee
    b. Click Login
6. Setup Your Video and Audio
    a. At this point you will be asked to Plug in your USB webcam if you are using a Desktop and continue setup.
    b. Test Video
    c. Test Audio through external or internal desktop speaker
    d. Test Microphone
    e. Click Done
    f. Quick Startup Guide will Appear, click Done
    g. If you are using a Laptop and have an internal Webcam you will perform the same steps as above

See below to get started with the Video Conference Software setup on your smart device. If you are using an IPad, IPhone or Android device it will need a camera in order to conduct video calls.

IPAD AND IPHONE USERS

- Go to the App Store, download and install VSee App.
- If you already registered for VSee, open the VSee App and login with the e-mail/password you created previously.
- If you have not registered for VSee yet, register on your iPhone/iPad using your Safari browser with the Instructions above.

ANDROID USERS INCLUDING ANDROID TABLETS

- Go to the Google Play Store, download and install VSee App.
- If you already registered for VSee, open the VSee App and login with the e-mail/password you created previously.
- If you have not registered for VSee yet, register on your Android device using your respective browser with the Instructions above.

EVD Symptom Monitoning Log

Name
Address
Age (yrs.)
City
Sex
Telephone

Date of last contact with the case (mm/dd/yyyy)

Date traveler last in affected area (mm/dd/yyyy)

Day number (after last contact/last in affected area)	1		2		3		4		5		6		7		8		9		10		11		12		13		14		15		16		17		18		19		20		21	
Date																																								
Time AM																																								
Temperature AM																																								
Time PM																																								
Temperature PM																																								
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Vomiting																																								
Diarrhea																																								
Unexplained bleeding1																																								
Headache																																								
Muscle aches																																								
Abdominal pain																																								
Weakness																																								
Other																																								
Fever/Pain Reducers[2]																																								

1: Unexplained bleeding means bleeding from your mouth or nose, bloody diarrhea, or coughing up blood, or bruising under the skin
2: Aspirin, Tylenol (acetaminophen), or Motrin (ibuprofen). If yes, please indicate in Additional Notes Section.

Enter Date and Any Additional Notes:

Guidance for Contacts of Ebola Patients and for Travelers to Areas where Ebola is Widespread

This guidance is to help you closely monitor your health for up to 21 days because you have been potentially exposed to an Ebola patient or traveled to an area where Ebola is widespread. This does NOT mean that you have Ebola or that you will get sick with Ebola.

Why are you being asked to monitor your temperature and symptoms for this 21-day time period?

You are being asked to closely monitor your health for 21 days after your last known potential exposure to Ebola to determine if you have been infected. Twenty-one days is the longest time between when you may have been exposed to Ebola and when symptoms may begin. It is very important for you to monitor your health during this time period so that you can be taken care of and tested quickly if you get sick.

What are the signs and symptoms of Ebola?

The most common signs and symptoms of Ebola are fever, headache, fatigue, muscle aches, abdominal pain, diarrhea, vomiting, or unexplained bruising or bleeding. One or more of these symptoms may occur at any time during your monitoring period. These symptoms may also be caused by many other common illnesses. If you develop a fever or any symptoms, it doesn't mean that you have Ebola. However, if you develop a fever and feel sick, you need follow up medical care and testing.

How should you monitor your health during this time period?

At the airport, you should have received a thermometer to take your temperature and a form to use to record your temperature and possible symptoms. You will report this information twice daily to your health department. They may also schedule regular visits with you during your monitoring period. The health department will tell you which day you should stop monitoring yourself for fever and symptoms.

Instructions for monitoring your temperature and symptoms

- Take your temperature orally (by mouth) with a digital thermometer ***2 times a day in: once in the morning and again in the evening.*** Try to take your temperature at about the same time every day. If you are monitoring the temperature of an infant or young child, a tympanic (ear) thermometer may be used.
- Write down your temperature on the form twice a day (every morning and evening).
- If you are taking aspirin, Tylenol® (acetaminophen), ibuprofen, or any fever-reducing medicine, take your temperature before taking your next dose.
- If you forget to take your temperature, take it as soon as you remember.
- If your temperature is elevated or you experience any symptoms listed on the monitoring form, immediately call:

NAME_____; PHONE_____

What should I do if I become ill during this monitoring period?

Your health department will make arrangements to transport you to a local hospital. DO NOT GO to a hospital without first calling your health department at the number provided. If you cannot immediately reach the health department, please call your doctor or your local hospital and inform them that you are being monitored by the health department for potential exposure to Ebola and need follow up medical care and testing.

How do I get to the hospital?

Your health department will consult with a local hospital and ambulance company to make arrangements to transport you. If you go by ambulance before contacting your local health department, inform the ambulance staff that you are being monitored by the health department for potential exposure to Ebola and need follow up medical care and testing. DO NOT TAKE PUBLIC TRANSPORTATION (e.g., subway, taxi, train, bus).

What will happen to my pet if I develop Ebola?

If you had contact with a mammalian (warm-blooded) animal after you became ill, it is likely that pet will be placed in quarantine. Pet quarantine for a minimum of 21 days would require substantial resources, including caretakers properly trained in personal protective equipment (PPE). It is also possible that euthanasia would have to be considered if this situation were to arise.

MONITORING AND MOVEMENT (check all that apply)

- ☐ You have no movement restrictions. Travel by commercial conveyance (e.g., airplane, ship, long-distance bus, or train) is allowed during your monitoring period but should be discussed with your health department to assure that monitoring continues in your intended destination.
- ☐ You should not travel by any commercial conveyances (e.g., airplane, ship, long-distance bus, or train). Local use of public transportation (e.g., taxi, bus, subway) and travel should be discussed and coordinated with your health department. If local public transportation is used, you must be able to exit quickly if you feel ill. Travel by private car is approved.
- ☐ Do not go to bars, restaurants, grocery stores, shopping centers, theaters, church, or any public places where you will be sitting or standing less than 3 feet away from others.
- ☐ Do not go to your workplace (telework is permitted).
- ☐ Consider relocating pets (specifically dogs and/or cats) to an alternate location where they can be cared for by someone not being monitored.
- ☐ It is highly recommended that you arrange to relocate pets (specifically dogs and/or cats) to an alternate location and avoid contact with all mammalian (warm-blooded) animals.
- ☐ Additional movement restrictions have been defined by your health department:

_____

_____

_____

STATE OF CONNECTICUT
DEPARTMENT OF PUBLIC HEALTH

Raul Pino, M.D., M.P.H.
Commissioner

Dannel P. Malloy
Governor

Nancy Wyman
Lt. Governor

Attachment N

STATE OF CONNECTICUT

Zika Virus Surveillance and Response Plan, 2016

Ver.1.1, 02/11/2016

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Affirmative Action/Equal Opportunity Employer

STATE OF CONNECTICUT

Zika Virus Surveillance and Response Plan, 2016
Ver.1.1, 02/11/2016

Introduction

The Zika Virus Surveillance and Response Plan is based on the West Nile Virus Surveillance and Response Plan updated in 2012 by the Mosquito Management Program (MMP), an interagency state working group led by the Department of Energy and Environmental Protection (DEEP). The purpose of this Plan is to provide a guide for the state's Zika virus prevention activities. The Plan will be modified and updated as additional information and federal guidance regarding this newly emerging threat becomes available.

Zika virus, first discovered in Uganda in 1947, was limited to Africa and Asia infrequently causing human illnesses. In May 2015, the World Health Organization reported the first local transmission of Zika virus in the Western Hemisphere. As of February 9, 2016, local transmission has been identified in at least 26 countries or territories in the Americas, including Puerto Rico, with further spread to other countries in the region likely but precisely to what extent is currently not known.

In the Western Hemisphere Zika virus is transmitted primarily by *Aedes aegypti*, the mosquito that also spread yellow fever, dengue and chikungunya viruses. *Aedes aegypti* are aggressive daytime biters and can also bite at night. They become infected with Zika virus when they bite a person already infected with the virus and can then transmit the virus when they bite another person. While *Ae. aegypti* is not present in Connecticut a related species, *Ae. albopictus* has been identified in the southwestern area of the state. It is also considered capable of transmission of the virus but the degree to which transmission from this species may occur over time is not known. Of recent concern is also the possibility of spread from a woman to her baby during pregnancy and between sexual partners.

Historically and in the majority of recent case-patients Zika virus causes asymptomatic infections or relatively mild disease syndromes that are rarely fatal. However, an association with Guillain-Barre syndrome has been suggested and, during the current outbreak, an increased in birth defects among infants born to women infected during pregnancy is believed to be associated the virus.

Mosquito Management Program

In 1997, Public Act 97-289, "An Act Concerning Mosquito Control and Aerial Application of Pesticides," (CGS Sec 22a-45b) created the MMP to monitor mosquito breeding populations for the prevalence of infectious agents that can cause disease in humans and to determine when measures to abate a threat are necessary. The original focus of the program was to monitor the threat of Eastern equine encephalitis (EEE) virus. The Act authorizes the necessary measures to abate any pest-borne threat, including prevention and remedial measures, and allows for the application of broad spectrum chemical pesticides to address an imminent peril to the public health, safety, or welfare posed by pests. The Mosquito Management Program is based on an integrated pest management (IPM) approach, which includes a combination of surveillance, education, source reduction, larval and adult mosquito control and personal protection measures.

Based on the multiple modes of potential transmission, severe health consequences to neonates, the role of laboratory testing for diagnosis medical management and heightened public concern, Governor Dannel P. Malloy designated the Department of Public Health (DPH) as the lead agency for the State's response to Zika virus. The DPH will also be responsible for conducting surveillance for human cases of Zika virus associated illnesses and coordinating dissemination of information. The Department of Energy and Environmental Protection (DEEP) will provide technical advice regarding mosquito control to municipalities and The Agricultural Experiment Station will conduct mosquito surveillance and provide entomological expertise.

Surveillance Activities

Public health surveillance is the ongoing and systematic collection, analysis, and interpretation of health data in the process of describing and monitoring a health event. This information is used for planning, implementing, and evaluating public health interventions and programs. Surveillance activities are at the core of the Plan and currently include surveillance for Zika virus in humans and mosquitoes.

Human Surveillance

The surveillance for disease in humans caused by Zika virus is coordinated by the DPH. Zika virus was recently declared a nationally notifiable disease. DPH is adding Zika virus disease to list of mandatory reporting diseases in Connecticut effective Monday, February 15, 2016. Similarly, the lists of Reportable Diseases, Emergency Illnesses and Health Conditions and Reportable Laboratory Findings will be amended to include Zika virus associated illnesses including microcephaly among neonates and Guillain-Barre syndrome As of 2/9/2016 there are no commercially available diagnostic tests; all testing for Connecticut residents is conducted at the Centers for Disease Control and Prevention (CDC). Specimens are submitted to the DPH Laboratory for shipment to the CDC. Required patient demographic, clinical and travel history is collected by the DPH Epidemiology and Emerging Infections Program (EEIP) using a standardized questionnaire. Staff of the EEIP are available 24/7/365 to answer questions and facilitate testing of appropriate specimens.

During the first week after onset of symptoms, Zika virus disease can often be diagnosed by performing reverse transcriptase-polymerase chain reaction (RT-PCR) on serum. Virus-specific IgM and neutralizing antibodies typically develop toward the end of the first week of illness; cross-reaction with related flaviviruses (e.g., dengue and yellow fever viruses) is common and may be difficult to discern. Plaque-reduction neutralization testing can be performed to measure virus-specific neutralizing antibodies and discriminate between cross-reacting antibodies in primary flavivirus infections.

The DPH Public Health Laboratory (PHL) expects to have the ability to conduct RT-PCR for Zika virus by the end of February. Specimens submitted will also be tested for dengue and chikungunya viruses which are circulating in the same geographic areas and transmitted by the same mosquito vector, *Ae. aegypti*. In addition the Laboratory will also offer serologic testing as soon as reagents become available from the CDC and the PHL completes the validation process.

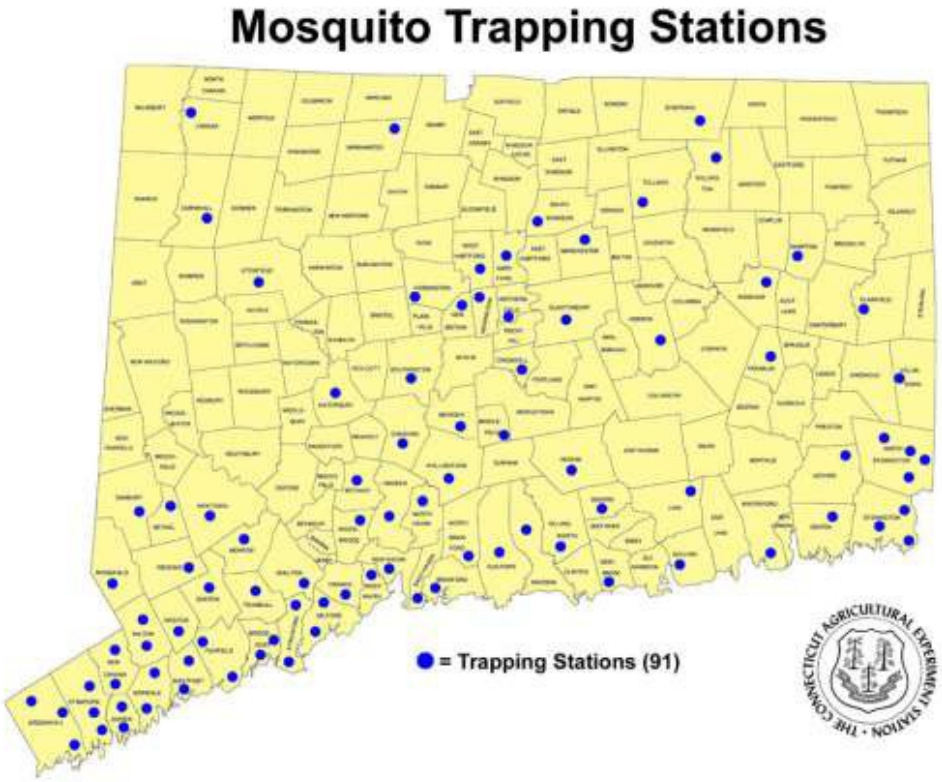
Recommendations for testing are evolvingng. The emphasis is currently on testing of specimens from pregnant women with a history of travel to areas where Zika virus is circulating in the prior 2-12 weeks. As testing becomes available at public health, hospital and commercial laboratories and more is learned about transmission and the spectrum of illnesses caused by Zika viruses testing protocols will be modified.

Should spraying of pesticides be conducted to reduce adult mosquito populations in response to Zika, WN or EEE viruses, the DPH also conducts surveillance for possible health effects of pesticide exposure. Physicians are encouraged to report to the DPH Environmental and Occupational Health Assessment Program possible pesticide-related health effects. The DPH compiles and summarizes this information and reports significant findings to the local health departments and other agencies as appropriate. This system is based on National Institute for Occupational Safety and Health classification of acute pesticide- related illness. The DPH assists local health departments monitor calls from the general public regarding health complaints and reports unusual clustering of complaints in terms of location or time to the DEEP Division of Pesticides for investigation of possible misapplication of pesticide.

Mosquito and Virus Surveillance

Surveillance for Zika virus in mosquitoes is integral to the public health response in Connecticut. The Connecticut Agricultural Experiment Station (CAES) maintains a network of 91 fixed mosquito-trapping stations located in 72 municipalities throughout the state providing information that includes mosquito species composition and abundance in the community, seasonal and spatial distribution of mosquito vectors, and prevalence of virus infections mosquitoes. One-third of the sites are located in southern Fairfield and New Haven counties where the highest levels of West Nile virus (WNV) activity in mosquitoes and humans have been detected in previous years. Transmission of WNV is primarily by *Culex pipiens* mosquitoes which like *Ae. albopictus* lays its eggs in small containers of water often found near homes.

Traps are set and attended by CAES staff every 10 days at each site on a regular rotation from June through October. At least two trap types are used at all trapping to trap host-seeking adult female mosquitoes (all species), and a Gravid Mosquito Trap designed to trap previously blood-fed adult female mosquitoes (principally *Culex* and container breeding *Aedes* species). Mosquitoes are transported alive to the laboratory each morning where they are identified to species. Mosquitoes are grouped (pooled) according to species, collecting site, and date and then frozen. Aliquots of each mosquito pool are inoculated into Vero cell cultures for detection of mosquito-borne arboviruses of public health importance. Isolated viruses are identified by Real Time (TaqMan) PCR or standard RT-PCR using virus-specific primers. All of the virus isolation work is conducted in a certified Bio-Safety Level 3 laboratory at the CAES. Weekly test results are reported to the CDC electronically via ArboNet and to the DPH for dissemination to other state agencies, local health departments, the media, and neighboring states.



Prevention Activities

Environmental Control

The primary mode of transmission is by mosquito bites. Therefore, pre-emptive mosquito control is the most effective way to prevent transmission of Zika virus and other mosquito-borne viruses. The most effective and economical way to control mosquitoes is by larval source reduction through local abatement programs that monitor mosquito populations and initiate control before disease transmission occur. With similar preferences for breeding habitat efforts to reduce *Culex pipiens* populations for control of WNV will also reduce populations of *Ae. albopictus*. In Connecticut, municipalities are responsible for coordination of mosquito control activities on municipal and private lands in their jurisdictions, working with state agencies on behalf of residents, and enforcement of abatement requirements of mosquito breeding areas if necessary. Technical advice regarding source reduction is available for municipalities from the DEEP Wetlands Habitat and Mosquito Management Program.

Prevention activities in Connecticut adapted from CDC national recommendations include:

<u>Before mosquito season</u>

- Conduct public mosquito education campaigns focusing on reducing or eliminating larval

habitats for *Ae. albopictus* (DEEP, municipalities)
- DEEP Mosquito Management Program will update and maintain the state's web site: www.ct.gov/mosquito with information on mosquito-borne illness in humans, mosquito surveillance and control options.
- Conduct surveys to determine abundance, distribution, and type of containers; large numbers of containers may translate into high mosquito abundance and high risk (municipalities with technical assistance/training provided by DEEP).
- Cover, dump, modify or treat large water-holding containers with long-lasting larvicides (municipalities, property owners)
- DEEP Pesticide Management Program will prioritize registration of products and the issuance of permits needed for the commercial application of pesticides and insecticides.
- DEEP Solid Waste Program will assist with outreach and education efforts and will prioritize coordination with local officials to address blight and illegal disposal of materials such as tires. Will pursue enforcement actions involving large-scale tire disposal areas.

Beginning of mosquito season
- Continue public education campaigns focusing on reducing or eliminating larval habitats for *Ae. Albopictus*.
- Develop and distribute mosquito education materials about *Ae. albopictus* and personal protection measures (DPH, LHDs).
- Initiate *Ae. albopictus* community-wide surveys (municipalities with technical assistance from DEEP and CAES) to:
    - determine presence or absence
    - estimate relative abundance
    - determine distribution
    - develop detailed vector distribution maps
    - evaluate the efficacy of source reduction and larvicide treatment
- Initiate adult sampling to identify or confirm areas of high adult mosquito abundance (CAES)
- Consider preventive adult control to reduce adult populations targeting areas of high mosquito abundance (Municipalities)

Single or several imported cases
- Begin public mosquito containment education campaigns aimed at preventing or minimizing contact between vectors and human cases, especially during the first week of illness when an infected person is viremic and can infect mosquitoes, thereby possibly triggering a local outbreak
    - Educate the public to continually dispose of water holding containers to eliminate larval habitats.
    - Treat with long-lasting larvicide (see larvicide options on next page) any water-holding containers that cannot be dumped, covered, discarded, or otherwise modified.
    - Eliminate larval habitats within 100-200 yards/meters around the affected property.
- Consider community source reduction, adult mosquito, and case containment initiatives to minimize the spread of infected mosquitoes
- Educate the public about reported cases of disease and urge them to use:
    - Insect repellents
    - Window and door screens to prevent mosquitoes from entering the house
    - Air conditioning

Single or several local mosquito-acquired cases
- All measures above for Single or several suspected/confirmed imported/ cases
- Adult mosquito control
    - Treat the outdoors within 100–200 yards/meters around a case's home
    - Initiate/maintain adult sampling to estimate adult mosquito abundance and evaluate

effectiveness of insecticide treatments

Outbreak - clusters cases

- Divide the outbreak area into operational management areas where control measures can be effectively applied to all buildings and public areas within a few days; repeat as needed to reduce mosquito density
- Conduct door-to-door inspections and mosquito control in an area-wide fashion
- Identify and treat, modify, or remove mosquito-producing containers
- Organize area/community clean-up campaigns targeting disposable containers (source reduction), including large junk objects that accumulate water (broken washing machines, refrigerators, toilets) in buildings, public areas, etc.
- Combine outdoor spatial or residual spraying with source reduction and larviciding (including residual spraying of container surfaces and adjacent mosquito resting areas). Don't forget to treat storm drains, roof gutters and other often overlooked cryptic water sources

Insecticides

Larvicides can be used to control mosquitoes in the aquatic stage before they become biting adults. This type of control using insecticides generally is the most effective at controlling mosquitoes and has the least effect on non-target species and the environment. Ideally, use of larvicides is started early in the mosquito season repeated as necessary. The use of larvicides may require a permit from the DEEP, and the product must be registered for use in Connecticut. Depending upon the type of product used, or for commercial applications, the applicator must be licensed by the DEEP Pesticide Division to apply mosquito pesticides. Recommended larvicide use is as per Strategies for the Application of Larvicides to Control Mosquitoes in Response to West Nile Virus in Connecticut (updated and approved by DEEP, DPH, CAES, DoAG in January, 2014). The following options are available.

- Products containing the biological agents Bacillus sphaericus (Bs) or Bacillus thuringiensis var. israelensis (Bti). B. sphaericus comes in a granular, wetable powder, slow release briquette or water-soluble packet formulation. Also available are dual-action formulations of Bs and Bti. The bacterial strains in Bs are more specific to *Culex* larvae than Bti. Bs and Bti are bacterial agents and must be ingested by the filter-feeding mosquito larvae and as such, these products will not affect mosquito pupae or adults. The use of Bti or Bs on municipal or individual homeowner property does not require any special licensing by the CT DEEP.
- S-methoprene (trade name Altosid®). Methoprene is an insect growth regulator and comes in a variety of liquid, granular, pellet and briquette formulations. If using Altosid for catch basins a pellet, 30-day or 150-day briquette formulation is recommended. Methoprene will not affect pupae or adults. Connecticut regulations specify that the use of methoprene requires that the applicator be licensed and a permit be obtained from the DEEP prior to application. Also, PA 13-197 prohibits certain uses of methoprene in the coastal zone (http://www.cga.ct.gov/2013/ACT/PA/2013PA-00197-R00HB-06441-PA.htm).
- The biological agent Saccharopolyspora spinosa or Spinosad (trade name Natular®). Spinosad comes in a variety of formulations and works on all mosquito species. Natular will not affect mosquito pupae or adults. Although it is a bacterial agent, because of its mode of action, Connecticut regulations specify that the use of spinosad requires that the applicator be licensed and a permit be obtained from the DEEP prior to application.
- The Larvasonic® Acoustic Larvacide Device emits sound waves to kill mosquito larvae (www.newmountain.com). The Larvasonic works on all species of mosquitoes. Mosquito larvae must be present for the Larvasonic to be effective and as such, requires more intensive larval surveillance. Since this device works by emitting sound waves, it is not considered a pesticide and therefore is exempt from pesticide regulations.

Adulticides can be used to kill adult mosquitoes when a quick reduction of mosquitoes is needed. Currently available adulticides may be applied by hand-held, backpack or truck-mounted Ultra Low Volume (ULV) foggers, or by fixed-wing or rotary aircraft. These materials have advantages and disadvantages that will influence which material is most appropriate for a given situation, and all must be applied according to regulations and label directions. Weather and logistical conditions are important factors influencing the

ability to effectively control adult mosquito as well as the preferred habitat and feeding habits of the target mosquito species.

Preventing Mosquito Bites

There is no available vaccine to prevent Zika virus infection and no specific treatment for Zika virus related illnesses. Prevention depends on avoiding mosquito bites. When travelling to countries where Zika virus or other viruses spread by mosquitoes are found people should take the following steps:

- Weather permitting wear long-sleeved shirts and long pants
- Stay in places with air conditioning or that use window and door screens to keep mosquitoes outside
- Sleep under a mosquito bed net if you are overseas or outside and are not able to protect yourself from mosquito bites
- Use Environmental Protection Agency (EPA)-registered insect repellents. When used as directed, EPA-registered insect repellents are proven safe and effective, even for pregnant and breast-feeding women.
    - DEET
    - Picaridin (also known as KBR 3023)
    - Oil of lemon eucalyptus (OLE) or PMD (Products containing OLE include Repel and Off! Botanicals)
    - IR3535
    - Always follow the product label instructions
    - Reapply insect repellent as directed
    - Do not spray repellent on the skin under clothing
    - If you are also using sunscreen, apply sunscreen before applying insect repellent
- If you have a baby or child:
    - Do not use insect repellent on babies younger than 2 months of age
    - Dress your child in clothing that covers arms and legs, or
    - Cover crib, stroller, and baby carrier with mosquito netting
    - Do not apply insect repellent onto a child's hands, eyes, mouth, and cut or irritated skin
    - Adults: Spray insect repellent onto your hands and then apply to a child's face.
- Treat clothing and gear with permethrin or purchase permethrin-treated items
    - Treated clothing remains protective after multiple washings - see product information to learn how long the protection will last
    - If treating items yourself, follow the product instructions carefully
    - Do not use permethrin products directly on skin
- If you have Zika, protect others from getting sick, avoid mosquito bites during the first week of illness

Prevention of Sexual Transmission of Zika Virus

Sexual transmission of Zika virus is possible, and is of particular concern during pregnancy. Current information about possible sexual transmission of Zika is based on reports of three cases. At present, Zika virus testing for the assessment of risk for sexual transmission is of uncertain value, because current understanding of the incidence and duration of shedding in the male genitourinary tract is limited to one case report in which Zika virus persisted longer than in blood. At this time, testing of men for the purpose of assessing risk for sexual transmission is not recommended. As we learn more about the incidence and duration of seminal shedding from infected men and the utility and availability of testing in this context, recommendations to prevent sexual transmission of Zika virus will be updated.

Recommendations for men and their pregnant partners –

Men who reside in or have traveled to an area of active Zika virus transmission who have a pregnant partner should abstain from sexual activity or consistently and correctly use condoms during sex (i.e., vaginal

intercourse, anal intercourse, or fellatio) for the duration of the pregnancy. Pregnant women should discuss their partner's potential exposures to mosquitoes and history of Zika-like illness with their health care provider; providers can consult CDC's guidelines for evaluation and testing of pregnant women.

Recommendations for men and their non-pregnant sex partners –

Men or women who reside in or have traveled to an area of active Zika virus transmission who are concerned about sexual transmission of Zika virus might consider abstaining from sexual activity or using condoms consistently and correctly during sex. Couples considering this personal decision should take several factors into account. Most infections are asymptomatic, and when illness does occur, it is usually mild with symptoms lasting from several days to a week; severe disease requiring hospitalization is uncommon. The risk for acquiring vector-borne Zika virus in areas of active transmission depends on the duration and extent of exposure to infected mosquitoes and the steps taken to prevent mosquito bites (http://www.cdc.gov/zika/prevention). After infection, Zika virus might persist in semen when it is no longer detectable in blood.

Important State Phone Numbers and Websites

State Mosquito Management Program Website — http://www.ct.gov/mosquito

Department of Public Health — http://www.ct.gov/dph

- Office of Communications — (860) 509-7270
  -Media inquiries
- Epidemiology and Emerging Infections Program — (860) 509-7994
  - Zika virus infections in people, laboratory testing of human specimens
- Environmental and Occupational Assessment Program — (860) 509-7740
  - Effects of pesticides on people
- Public Health Laboratory — (860) 920-6500
  - Technical questions regarding testing and shipping of human specimens from physicians, hospitals, laboratories

Department of Energy and Environmental Protection — http://www.ct.gov/deep

- Communications Division — (860) 424-4100
  - State mosquito control policy and programs
- Wetlands Habitat and Mosquito Management Program — (860) 642-7630
  - Technical questions regarding mosquitoes, mosquito control measures
- Pesticide Management Program — (860) 424-3369
  - Technical questions regarding safe pesticide use and chemical make-up. Also, persons who wish to be specifically notified prior to a pesticide application or those who are chemically sensitive to pesticides should contact the Pesticide Pre-Notification Registry at this number

Connecticut Agricultural Experiment Station — http://www.ct.gov/caes

- Center for Vector Biology & Zoonotic Diseases — (203) 974-8510
  - Technical questions regarding mosquito trapping and testing