PART IV

ACUTE COMMUNICABLE DISEASES

LIST OF REPORTABLE DISEASE COVERED IN B-73

- Amebiasis
- Anaplasmosis
- Anisakiasis
- Anthrax
- Botulism
- Brucellosis
- Campylobacteriosis
- Chagas Disease
- Chickenpox (outbreaks, fatal and hospitalized cases)
- Cholera
- Coccidioidomycosis
- Cryptosporidiosis
- Cysticercosis (Taeniasis)
- Dengue
- Diphtheria
- *E. Coli* 0157:H7 Infection and HUS
- Ehrlichiosis
- Encephalitis, Acute Viral
- Encephalitis, Arthropod-borne (arboviral)
- Foodborne Disease
- Gastroenteritis, Viral (outbreaks)
- Giardiasis
- *Haemophilus influenzae*, Invasive Disease
- Hantaviral Pulmonary Syndrome
- Hepatitis, Type A (HAV, infectious hepatitis)
- Hepatitis, Type B (HBV)
- Hepatitis, Type B, Perinatal
- Hepatitis C
- Influenza
- Legionellosis
- Leprosy (Hansen's Disease)
- Leptospirosis
- Listeriosis
- Lyme Borreliosis
- Malaria
- Measles (Rubeola)
- Meningitis, Viral (outbreaks)
- Meningococcal Infections
- Mumps (outbreaks)
- Paratyphoid Fever
- Pediculosis (outbreaks)
- Pertussis (Whooping cough)
- Plague
- Pneumococcal, Invasive Disease
- Poliovirus Infection
- Psittacosis
- Q Fever (Query fever)
- Rabies, Human and Animal
- Relapsing Fever (louseborne, tickborne)
- Respiratory Disease (outbreaks)
- Ringworm of Scalp (outbreaks)
- Rocky Mountain Spotted Fever
- Rubella, Acute or Postnatal (German measles, 3-day measles)
- Rubella, Congenital
- Salmonellosis
- Scabies (outbreaks)
- Severe Acute Respiratory Syndrome (SARS)
- Shigellosis (Dysentery, Bacillary dysentery)
- Smallpox
- Staphylococcal Infections
- Staphylococcal Toxic Shock Syndrome
- Streptococcal Infections, Group A
- Streptococcal Toxic Shock Syndrome (STSS)
- Tetanus
- Toxic Shock Syndrome
- Trichinosis (Trichiniasis, Trichinellosis)
- Tularemia
- Typhoid Fever, Acute
- Typhoid Fever, Carrier
- Typhus, Flea-borne (Murine typhus, endemictyphis)
- Vibriosis, Non-cholera Species
- West Nile Virus
- Yellow Fever
- Yersiniosis

PUBLIC HEALTH NURSING HOME VISIT PROTOCOL

Based on the Los Angeles County Public Health Nursing Practice Manual, the guidelines for home visit by district public health nursing for acute communicable diseases establish a standardized method of follow-up.

The PHN will adhere to the following guidelines outlined in the three documents:

- Public Health Nursing Home Visit Protocol for ACD and STD
- Public Health Nursing Home Visit Required Algorithm
- Public Health Nursing Home Visit As Necessary (HVAN) Algorithm

The list of acute communicable disease on Public Health Nursing Home Visit Protocol for ACD and STD is to clarify State legal mandates per California Code of Regulations. All other diseases listed in B-73 are considered HVAN unless directed by AMD/Supervision.

Public Health Nursing Home Visit Protocol for ACD and STD

ACD

ENTERICS
Per B-73 Guidelines

<u>State legal mandate</u>
(CA Code of Regulations)

Amebiasis – **HVAN**
Salmonellosis – **HVAN**
Shigellosis – **HVAN**
Typhoid Fever, Acute – **R**
Paratyphoid – **R**
Typhoid, Chronic- **R**

<u>Non-regulated Enterics</u>

Cryptosporidiosis – **HVAN**
Giardiasis – **HVAN**
shiga toxin producing E Coli – **HVAN**
Vibriosis – **HVAN**
Yersiniosis – **HVAN**

Diseases that may require **TREATMENT or PROPHYLAXIS** for cases or contacts Per B-73 Guidelines

Diphtheria – **R**
Hepatitis A – **HVAN**
Haemophilus influenzae (< 15 yrs of age) – **R**
Measles – **R**
Meningococcal Infections – **R**
Pertussis – **R**
Rabies (Post Exposure Prophylaxis) – **HVAN**

OTHER

Outbreaks (HC or non-HC settings) – **R** (unless waived by AMD)
Non-Standard District request as per CHS Policy #206 - **HVAN**

STD

Child under 12 years with syphilis, gonorrhea, chlamydia, or pelvic inflammatory disease (PID) (suspected child sexual abuse) – **R**

Newborn with gonorrhea / chlamydia conjunctivitis – **R**

(‡) Pregnant/postpartum women with syphilis – **R**

(‡) Pregnant/postpartum women with chlamydia or gonorrhea – **HVAN**

(‡) Pregnant women with PID or HIV – **HVAN**

Infants whose mothers were diagnosed with chlamydia or gonorrhea at delivery – **R**

Mothers whose infants were diagnosed with chlamydia or gonorrhea – **R**

Infants with suspected congenital syphilis in need of evaluation and treatment – **R**

Interview record for investigation/referral of partners of pregnant women with syphilis – **R**

Interview record for investigation/referral of partners of pregnant women with gonorrhea/ chlamydia or HIV- **HVAN**

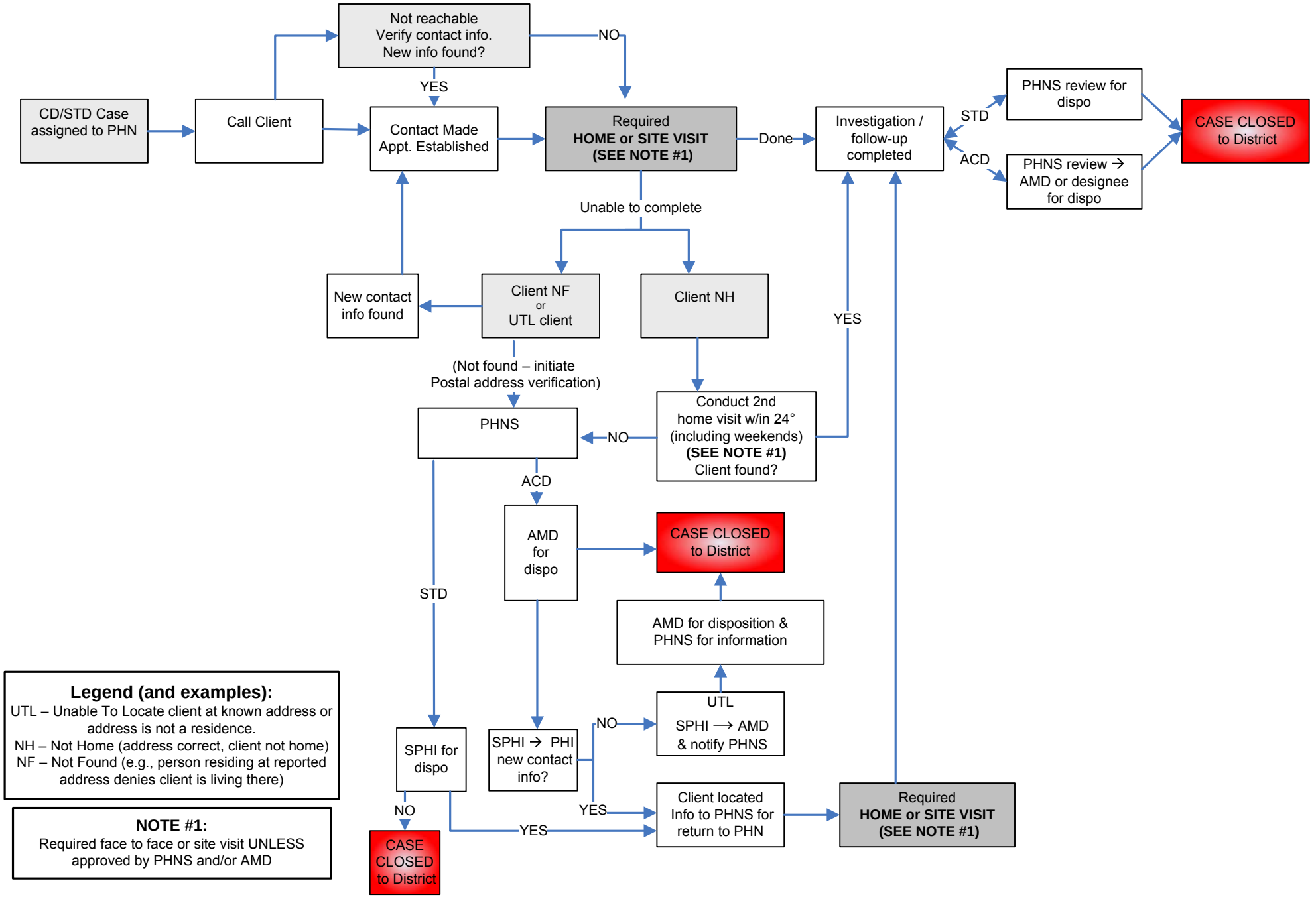
Legend:

HVAN: **HOME VISIT AS NECESSARY** - A face to face interview is conducted as necessary.

R: **REQUIRED** - A face to face interview is required.

(‡): Treatment must be verified with the Medical Provider.

Public Health Nursing Home Visit REQUIRED Algorithm



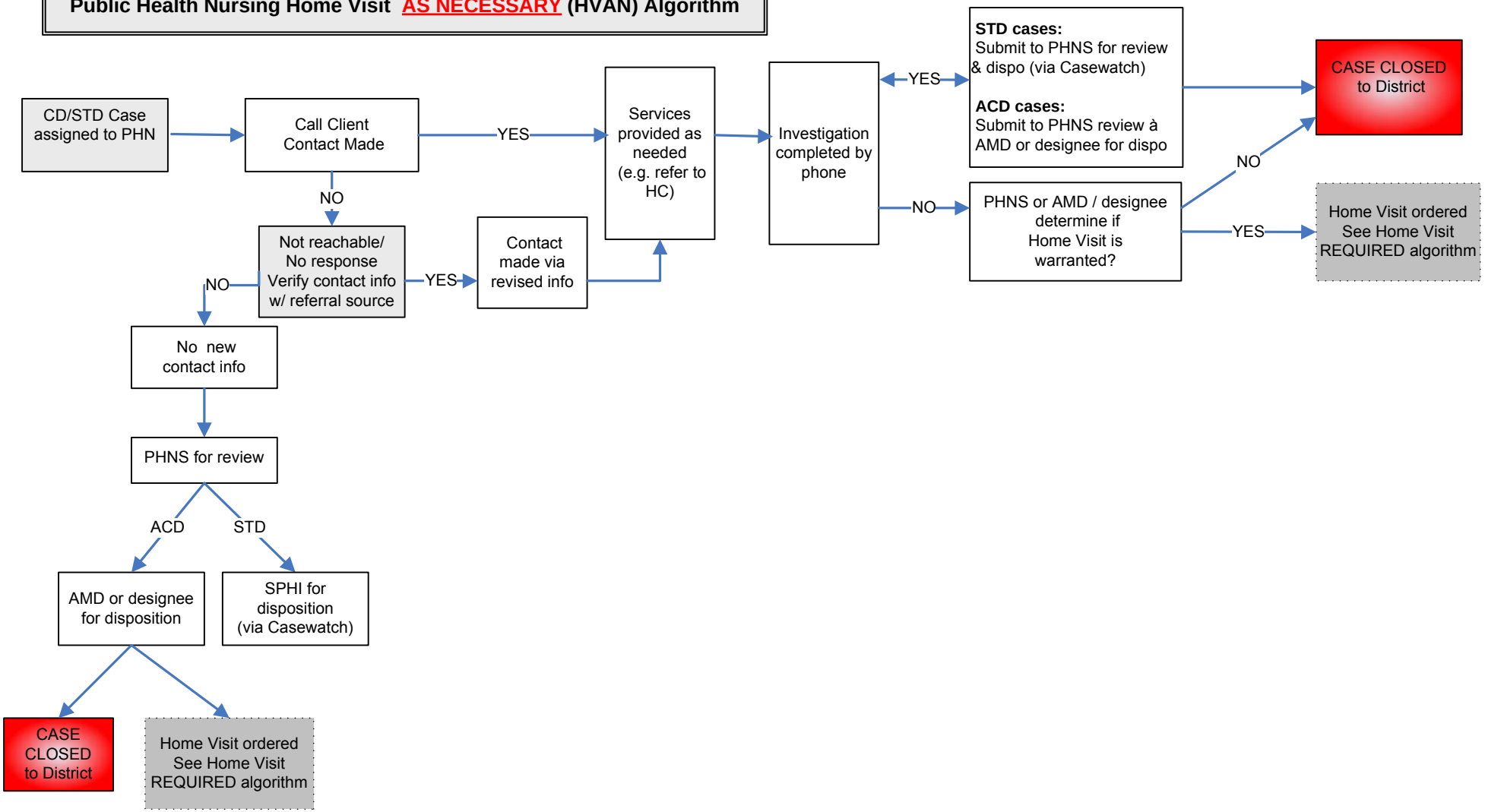
Legend (and examples):

UTL – Unable To Locate client at known address or address is not a residence.
NH – Not Home (address correct, client not home)
NF – Not Found (e.g., person residing at reported address denies client is living there)

NOTE #1:

Required face to face or site visit UNLESS approved by PHNS and/or AMD

Public Health Nursing Home Visit AS NECESSARY (HVAN) Algorithm



AMEBIASIS

1. **Agent**: *Entamoeba histolytica*, a protozoan parasite that exists as a trophozoite and cyst. A related non-pathogenic strain is distinct epidemiologically and biologically from the pathogenic species; this has been renamed *Entamoeba dispar*. *E. dispar* is not pathogenic in humans.

   E. histolytica is not to be confused with non-pathogenic protozoa found commonly in humans, which require no treatment. These include *E. dispar*, *E. hartmanni, E. coli*, *E. polecki*, *Iodamoeba butschlii*, *Endolimax nana*, *Chilomastix mesnili*, *Trichomonas hominis*, *Retortamonas* species, *Enteromonas* species, and usually, *Blastocystis hominis*.

2. **Identification**:

   a. **Symptoms**: Depend on site.

      Intestinal: There are four distinct intestinal clinical syndromes with *E. histolytica*. Asymptomatic colonization (cyst passage), acute amebic colitis, fulminant colitis, and ameboma. Asymptomatic cyst passage usually resolves without treatment; many such cases actually may have *E. dispar*. Patients with acute amebic colitis present with lower abdominal pain and have had frequent bloody stools over a period of several weeks; only about 1/3 have fever. Fulminant colitis is an uncommon presentation, most commonly seen in children. There is diffuse abdominal pain, profuse bloody diarrhea, and fever; concurrent liver abscess is common, and 3/4 may develop colonic perforations. Ameboma is a rare (1%) manifestation that may be without symptoms, or present as a tender mass accompanied by symptomatic dysentery.

      Extra-intestinal: Amebic liver abscess, with either an acute clinical course with symptoms of <10 days, or a subacute course with symptoms lasting up to 6 months. Other sites of involvement include pleura, peritoneum, pericardium, and brain.

   b. **Differential Diagnosis**: Other bacterial, parasitic and viral causes of gastrointestinal illness. Amebic liver abscess should be differentiated from pyogenic abscess.

3. **Incubation period**: Variable, a few days to months; commonly 2-4 weeks.

4. **Reservoir**: Humans.

5. **Source**: Cysts from feces of infected case.

6. **Transmission**: Direct fecal-oral transmission, sexual transmission, ingestion of fecally contaminated food or water, colonic irrigation.

7. **Communicability**: Variable, as long a carrier state persists.

8. **Specific Treatment**: Consult the Medical Letter or Pediatric Red Book for specific drugs and dosages. Only *E. histolytica* requires treatment, but since most laboratories do not perform the test to distinguish it from *E. dispar*, treatment is commonly given to all persons with cysts or trophozoites of *E. histolytica /dispar* complex.

9. **Immunity**: None.

REPORTING PROCEDURES

1. **Reportable**: (Title 17, Section 2500, *California Code of Regulations*.) Report within 1 working day of identification of a case or suspected case.

2. **Report Form**:

   PARASITE EPIDEMIOLOGIC CASE HISTORY FORM (acd-parasite)

3. **Epidemiologic Data**:

   a. Indicate whether case is:
      - Acute (i.e., diarrhea within the past 6 weeks), chronically symptomatic, or asymptomatic carrier.
      - Intestinal or extra-intestinal (e.g., liver, lung abscess or other).

b. Sexual orientation.

c. History of colonic irrigation, when and where.

d. Immigration from or travel to a developing country within 6 months prior to onset. Specific dates and places.

e. Exposure to carrier and other persons with diarrheal illness within incubation period.

f. Occupation of case and household members.

g. Residence in facility for the developmentally disabled.

h. Attendance in day care.

CONTROL OF CASE, CONTACTS & CARRIERS

Contact within 24 hours to determine if sensitive occupation or situation (SOS) involved. Otherwise, investigate within 3 days.

Public Health Nursing Home Visit Protocol:
Home visit as necessary – a face to face interview is conducted as necessary.

Refer to "Public Health Nursing Home Visit AS NECESSARY (HVAN) Algorithm" (B-73 Part IV Public Health Nursing Home Visit Protocol).

CASE:

Precautions: Enteric precautions until clinical recovery.

1. **Sensitive Occupation or Situation**: Applies only to food employees, not other SOS. Remove food employees from work until 3 consecutive feces specimens taken 3 or more days apart are negative by O&P. First specimen may be taken after patient is on medication for 5 days. Alternatively, if the *E. histolytica* EIA test is negative, the patient does not have amebiasis and is no longer a case. See Diagnostic Procedures below.

2. **Non-sensitive Occupation or Situation**: Release after clinical recovery unless household contacts are food employees.

CONTACTS:

Household members or persons who share a common source.

1. **Sensitive Occupation or Situation**:

   a. **Symptomatic**: Treat as a case.

   b. **Asymptomatic**: Clearance not recommended.

2. **Non-Sensitive Occupation or Situation**: Clearance not recommended.

CARRIERS:

Refer for treatment. Release as for case.

PREVENTION-EDUCATION

1. Stress hand washing and personal hygiene.

2. Advise about increased risk with anal and oral-anal sex.

3. Dispose of feces in a safe, sanitary fashion.

4. Take precautions with food and water when traveling to endemic areas.

5. Advise regarding risk associated with colonic irrigation.

6. Protect water supply from fecal contamination.

DIAGNOSTIC PROCEDURES

1. **Microscopic:**

   Container: Feces-Parasite

   Laboratory Form: **Test Requisition Form H-3021 (Rev. 9/07)**

   Examination Requested: Ova & Parasites (O&P) for Amebiasis. Check appropriate boxes on laboratory form.

   Material: Feces. Follow instructions provided with container.

Amount: Walnut size.

Storage: Do not refrigerate; protect from overheating.

Remarks: Mix thoroughly with PVA preservative. Do not collect specimen(s) for 7-10 days after barium, mineral oil, bismuth, antibiotics, anti-malarials or antidiarrheal preparations such as kaolin have been ingested. Specimen must be unpreserved and examined within 24 hours of passage.

Note: This test does not distinguish between *E. histolytica* and nonpathogenic *E. dispar*. A frozen, unpreserved stool sample can be submitted for *E. histolytica* EIA test to distinguish between the two. Please refer to LA County Public Health Laboratory test catalog for more information.

2. **Serology**: (used for extra-intestinal disease only) To California State Department of Health.

   Container: Sterile tube.

   Examination Requested: Amebiasis antibody.

   Material: Serum.

   Amount: 2 ml.

   Storage: Refrigerate.

   Remarks: Consult with Public Health Laboratory for more information about serology testing. Diagnostic titer: ≥1:128 by IHA test. Allow 2 to 4 weeks for results.

ANAPLASMOSIS

(formerly termed ehrlichiosis; human granulocytic ehrlichiosis [HGE])

1. **Agent**: Anaplamosis is caused by *Anaplasma phagocytophila*, an ehrlichial organism formerly known as *Ehrlichia phagocytophila, E. equi*.

2. **Identification**:

   a. **Symptoms**: Human ehrlichiosis/ anaplamosis are newly recognized diseases in USA. The spectrum of disease ranges from mild illness to a severe, life-threatening or fatal disease. Symptoms are usually nonspecific; the most common complaints are fever, headache, anorexia, nausea, myalgia and vomiting. The disease may be confused clinically with Rocky Mountain spotted fever (RMSF) but differs by rarity of a prominent rash.

   Laboratory findings include leukopenia, thrombocytopenia, and elevation of one or more liver-function tests. In hospitalized cases, the laboratory findings may be only slightly abnormal on admission, and become more abnormal during hospitalization.

   b. **Differential Diagnosis**: RMSF, bacterial sepsis, Lyme disease, endemic (murine) typhus, toxic-shock syndrome, gastro-enteritis, viral syndromes, tick-borne encephalitis and other multi-system febrile illnesses.

   c. **Diagnosis**: Preliminary diagnosis of ehrlichiosis/anaplamosis in the USA is based on clinical and laboratory findings. Confirmation is based on: the evaluation of a blood smear, development of serum antibodies to *E. chaffeensis* for ehrlichiosis or *A. phagocytophila* for anaplamosis; immunofluorescence test; PCR.

3. **Incubation**: 7 to 21 days for ehrlichiosis/anaplamosis.

4. **Reservoir**: White-tailed deer are a major host of lone star ticks and appear to represent one natural reservoir for *E. chaffeensis*. Deer, elk, and wild rodents are likely reservoirs of the agent of HGE.

5. **Source**: Ehrlichiosis/anaplamosis in North America has been concentrated in the southeastern and south-central areas of the USA. More than 12 human cases, including 3 deaths, caused by a granulocytic *Ehrlichia*, have occurred in northern Minnesota, Wisconsin, Connecticut, Maryland and Florida. Rarely cases of ehrlichiosis/anaplamosis have been diagnosed in California.

6. **Transmission**: In the United States, ehrlichiae are transmitted by the bite of an infected tick. The lone star tick (*Amblyomma americanum*), the blacklegged tick (*Ixodes scapularis*), and the western blacklegged tick (*Ixodes pacificus*) are known vectors of ehrlichiosis/anaplamosis in the US. *Ixodes ricinus* is the primary vector in Europe. Most patients report a tick bite or association with wooded, tick-infested areas prior to onset of illness.[1]

7. **Communicability**: No evidence of person-to-person transmission.

8. **Specific Treatment:** A tetracycline such as doxycycline; chloramphenicol for pregnant women and children under 8 years of age.

9. **Immunity**: Susceptibility is believed to be general. No data are available on protective immunity in humans from infections caused by these organisms. Re-infection is rare but has been reported.

REPORTING PROCEDURES

1. Reportable within 7 days of diagnosis (Title 17, Section 2500, *California Code of Regulations)*.

2. **Report Form:**
   EHRLICHIOSIS/ANAPLASMOSIS CASE REPORT (CDPH 8573)

3. **Epidemiologic Data**:

   a. Recent travel to endemic areas.

1 See http://www.cdc.gov/anaplasmosis/.

b. History of tick bites.

c. History of possible exposure to ticks in wooded areas.

d. Occupational exposure.

CONTROL OF CASE & CONTACTS:

CASE:

1. **Isolation**: None.

2. **Concurrent disinfection**: Remove any ticks.

CONTACTS: No restrictions.

PREVENTION-EDUCATION

1. Use of tick repellants in endemic areas.

2. Wear protective clothing in wooded areas.

3. Control ticks on domestic animals.

4. Avoid tick-infested areas when possible. Check skin periodically and remove attached ticks immediately.

DIAGNOSTIC PROCEDURES

1. **Serology**: Indirect immunofluorescence.

   Container: Serum separator tube.

   Laboratory Form: State special serology.

   Examination Requested:
   Ehrlichiosis/anaplamosis.

   Material: Whole blood.

   Amount: 10 ml.

   Storage: Refrigerate until transported.

2. **PCR**

   Container: Red top or red-grey top tube.

   Material: Serum.

   Amount: 1 ml.

   Storage: Refrigerate or freeze until transported.

ANISAKIASIS

1. **Agent**: Larval nematodes of the subfamily *Anisa-kinae*, genera *Anisakis,* and *Pseudoterranova*.

2. **Identification**: A parasitic disease of the human gastrointestinal tract usually manifested by cramping, abdominal pain and vomiting, resulting from the ingestion of uncooked or under treated marine fish containing larval nematodes. The motile larvae burrow into the stomach wall producing acute ulceration with nausea, vomiting and epigastric pain, sometimes with hematemesis. They may migrate upward and attach in the oropharynx, causing cough. In the small intestine, they cause eosinophilic abscesses, and the symptoms may mimic appendicitis or regional enteritis. At times they perforate into the peritoneal cavity; they rarely involve the large bowel. Diagnosis is made by recognition of the 2 cmlong larva invading the oropharynx or by visualizing the larva by gastroscopic examination or in surgically removed tissue.

3. **Incubation period**: Gastric symptoms may develop within a few hours after ingestion. Symptoms referable to the small and large bowel occur within a few days or weeks, depending on the size and location of larvae.

4. **Reservoir**: *Anisakinae* are widely distributed in nature, but only certain of those that are parasitic in sea mammals constitute a major threat to humans. The natural life cycle involves transmission of larvae by predation through small crustaceans to squid, octopus or fish, then to sea mammals, with humans as incidental hosts.

5. **Source**: The disease occurs in individuals who eat uncooked and inadequately treated (frozen, salted, marinated, smoked) saltwater fish, squid or octopus. This is common in Japan (sushi and sashimi), the Netherlands (herring), Scandinavia (gravlax) and Latin America (ceviche).

6. **Transmission**: The infective larvae live in the abdominal mesenteries of fish; often after death of their host they invade the body muscles of the fish. When ingested by people and liberated by digestion in the stomach, they may penetrate the gastric or intestinal mucosa.

7. **Communicability**: Direct transmission from person to person does not occur.

8. **Specific Treatment**: Gastroscopic removal of larvae; excision of lesions.

9. **Immunity**: None.

REPORTING PROCEDURES

1. **Reportable**: (Title 17, Section 2500, *California Code of Regulations*). Report within 1 working day of identification of a case or suspected case.

2. **Report Form: OUTBREAK / UNUSUAL DISEASE REPORT (CDPH 8554)** If anisakiasis infection is associated with a foodborne illness, see also foodborne illness reporting. If a prepared commercial food item is the LIKELY source of this infection, a **FOODBORNE INCIDENT REPORT** should be filed. For likelihood determination and filing procedures, see Part 1, Section 7 - Reporting of a Case or Cluster of Cases Associated with a Commercial Food: Filing of Foodborne Incident Reports.

3. **Epidemiologic Data:**

   a. History of food items eaten during the suspect incubation period, and location, where food was consumed.

   b. Listing of all individuals with opportunity to consume suspect food items, whether ill or not. Obtain individual food histories.

   c. For ill individuals: symptoms, onset date and hour, duration, medical treatment and laboratory results.

   d. For suspected food(s): source, date and hour of purchase, when consumed, method of preparation, availability of sample(s).

CONTROL OF CASE, CONTACTS & CARRIERS

CASE: No restrictions.

CONTACTS: Examination of others possibly exposed at the same time may be productive.

PREVENTION-EDUCATION

1. Avoid ingestion of inadequately cooked marine fish. Heating to 60 °C (140 °F) for 10 minutes, blast-freezing to -35 °C (-31 °F) or below for 15 hours or freezing by regular means at -23 °C (10 °F) for at least 7 days kills the larvae. Irradiation effectively kills the parasite.

2. Cleaning (evisceration) of fish as soon as possible after they are caught reduces the number of larvae penetrating into the muscles from the mesenteries.

DIAGNOSTIC PROCEDURES

Consult Public Health Laboratory, Parasitology Section.

ANTHRAX

1. **Agent**: *Bacillus anthracis*, a Gram-positive spore-forming bacillus.

2. **Identification**:

   a. **Symptoms**:

   Cutaneous anthrax: An initial vesicle at site of inoculation develops into a painless black eschar. Progresses to systemic anthrax in 10-20% of cases; systemic anthrax, if untreated, has a fatality rate up to 20%. Fatalities for cutaneous anthrax are <1% if effective antibiotics are given.

   Inhalational anthrax: Initially fever, chills, sweats, malaise, mild cough, dyspnea, nausea, or vomiting followed 3-5 days later by acute onset of respiratory distress, shock; radiologic evidence of mediastinal widening and pleural effusion. Fatality rate is extremely high.

   Anthrax meningitis: hypotension, delirium or coma follow quickly; refractory seizures, cranial nerve palsies, and myoclonus have been reported. Can develop hemorrhagic meningitis with cerebrospinal fluid analysis showing elevated protein, low glucose, and a positive Gram stain and culture. Seventy-five percent of patients died within 24 hours of presentation.

   Gastrointestinal (GI) anthrax: Acute vomiting, abdominal distention, GI bleeding, peritonitis; fatality rate high.

   b. **Differential Diagnosis**: Cutaneous anthrax- includes spider bite, Orf, ulceroglandular tularemia, scrub typhus, ecthyma gangrenosum, cutaneous leshmaniasis rickettsialpox. Inhalational anthrax- includes pnuemonic plague, tularemia, community acquired pneumonia, viral pneumonias, Q fever.

   c. **Diagnosis**: Demonstration of *B. anthracis* by smear, animal inoculation or culture or PCR from blood, CSF, pleural fluid, ascitic fluid, vesicular fluid, or lesion exudate. Serologic test for *B. anthracis* toxin. Histopathology from fresh or frozen tissue.

3. **Incubation**: Within 7 days, usually 2 to 5.

4. **Reservoir**: Soil; infected animals (cattle, sheep, goats, horses, pigs, etc.).

5. **Source**: Spores from soil or contaminated animal products (hides, hair, meat, bones).

6. **Transmission**: Inoculation, inhalation of spores, or ingestion of undercooked, contaminated meat.

7. **Communicability**: Inhalational Anthrax: No evidence of transmission from person to person. Contaminated products and soil remain infective for years. Cutaneous Anthrax: Transmission through non-intact skin contact with draining lesions possible, therefore use Contact Precautions if large amount of uncontained drainage. Handwashing with soap and water preferable to use of waterless alcohol based antiseptics since alcohol does not have sporicidal activity. Environmental: Aerosolizable spore-containing powder or other substance: Until decontamination of environment complete, wear respirator (N95 mask or PAPRs), protective clothing; decontaminate persons.

8. **Specific Treatment**:

   Cutaneous anthrax: ciprofloxacin or doxycycline.

   Inhalation or gastrointestinal anthrax: ciprofloxacin or doxycycline in combination with one or two other active drugs. Penicillin or amoxicillin may be used if strain is susceptible.

9. **Immunity**: Uncertain.

REPORTING PROCEDURES

1. **Report any case or suspect cases by telephone immediately** (Title 17, Section 2500. *California Code of Regulations*).

   a. Call Morbidity Unit during working hours.

b. Call ACDC; after working hours, contact Administrative Officer of the Day (AOD) through County Operator.
c. Any laboratory that receives a specimen for anthrax testing is required to report to the State Microbial Diseases Laboratory immediately (Title 17, Section 2505, *California Code of Regulations).*

d. ACDC must notify the State Division of Communicable Disease Control (DCDC) immediately upon receiving notice of a case of suspected anthrax. ACDC will supervise investigation and control measures.

2. **Report Form**: **ANTHRAX (HUMAN) CASE REPORT (CDPH 8578)**

3. **Epidemiologic Data**:

a. Specify type (cutaneous, inhalational, or gastrointestinal).

b. Occupation: Farmer, dairyman, veterinarian, wool processor, weaver, butcher, slaughterhouse employee, tanner, taxidermist, hunter, or laboratory worker. Also postal workers, politicians and their staff, and members of news media as in the 2001 anthrax letter attacks.

c. Contact with animals or animal products. Determine if veterinary diagnosis was made.

d. Ingestion of undercooked meat.

e. Exposure to animal products (e.g., hair, skins, paint brushes, bongo drums, leather, and wool) imported from outside the USA, especially Haiti and Asia.

f. Bioterrorism: *B. anthracis* has been listed by the CDC as one of the agents most likely to be used in a bioterrorist attack because of the devastating physical and psychological effects of inhalational anthrax and the ability to be weaponized and effectively delivered to a target area. Please see State of California Bioterrorism Surveillance and Epidemiological Response Plan.

CONTROL OF CASE, CONTACTS & CARRIERS

Notify ACDC immediately and open promptly for ACDC review. ACDC will investigate to identify potential association to bioterrorist activity. If deemed to be unaffiliated with bioterrorism, the responsibility for the control of cases, contacts and carriers will be returned to the district where upon action should be initiated within 7 days.

CASE:

Precautions:

1. **Cutaneous**: Wound and skin precautions until lesions are completely healed.

2. **Inhalational**: Standard precautions as in Title 17, Section 2500, *California Code of Regulations*. Section 2518 is recommended until patient recovers.

CONTACTS: No restrictions.

CARRIER: Not applicable.

ANIMAL: Veterinary Public Health will investigate potential animal sources.

PREVENTION-EDUCATION

1. Disinfect animal products prior to processing.

2. Educate workers in high-risk occupations.

3. Double-bag discharges from lesions and soiled articles. Autoclave or burn all infectious material.

4. If anthrax is suspected, necropsy must not be done on the animal.

5. Infected animal carcasses should be burned or deeply buried and covered with calcium oxide (CaO, quicklime).

6. Maintain proper ventilation in high-risk industries.

7. Ensure proper disposal of wastes from rendering plants and factories that process potentially contaminated animal products.

8. A vaccine is available for veterinary and other high-risk occupations.

9. Any possible bioterrorist exposures should be reported immediately to local law enforcement and public health for evaluation.

DIAGNOSTIC PROCEDURES

Specimens: Blood, CSF, pleural fluid, ascitic fluid, vesicular fluid, lesion exudates or other materials for direct examination or culture. Consult the Public Health Laboratory.

BOTULISM

(See also **INFANT BOTULISM** and **WOUND BOTULISM**, below.)

1. **Agent**: Toxin produced by *Clostridium botulinum* (and rarely other clostridium species), a gram-positive bacillus. Most cases due to type A, B or E toxin. Heat-labile toxin is produced under anaerobic conditions extrinsically (food-borne botulism) or intrinsically in the gastrointestinal tract (intestinal botulism, infant botulism) or wound (wound botulism).

2. **Identification**:

   a. **Symptoms**: An intoxication characterized by weakness, extreme dryness of the mouth, headache and constipation (although vomiting and diarrhea may occur), followed by symmetrical cranial nerve motor paralysis, ptosis, visual difficulty, and descending paralysis. Severity appears dose related.

      Death may occur from respiratory failure or superimposed infections.

   b. **Differential Diagnosis**: Guillain-Barré syndrome (Miller-Fisher variant), myasthenia gravis, cerebrovascular accident, tick paralysis, neoplasia, or chemical intoxication.

   c. **Diagnosis**: Demonstration of toxin in feces or serum of the patient or in a suspected food item. Isolation of the organism from feces, wound, or suspected food is indicative of source.

3. **Incubation period**: Usually within 12-36 hours of eating contaminated food, but may occur several days afterward. Wound botulism occurs within days of injury.

4. **Reservoir**: *C. botulinum* spores in soil, water, and the intestinal tracts of animals, including fish.

5. **Source**: Toxins are produced by *C. botulinum* and rarely other clostridium species under anaerobic conditions, usually by improperly home-canned foods, especially low acid food, corn, beans; baked potato or mishandled foods that should have been refrigerated. Also in contaminated, closed wounds, similar to tetanus (*C. tetani*).

6. **Transmission**: Ingestion of toxin or production of toxin in infected wound or GI tract.

7. **Communicability**: Not communicable person to person.

8. **Specific Treatment**: Heptavalent (A-B-C-D-E-F-G) equine-based botulinum antitoxin (HBAT). ACDC or CA Dept. of Public Health (CDPH) must authorize release of antitoxin. Contact the CDC Emergency Operations Center, 770-488-7100 for all such requests. If there is a problem, contact the local CDC Quarantine Station directly at 310-215-2365.

9. **Immunity**: None.

REPORTING PROCEDURES

1. Report any case or suspect case by telephone immediately, Title 17, Section 2500, *California Code of Regulations*.

   a. Call Morbidity Unit during working hours.

   b. Call Chief, ACDC, and Chief, Food and Milk Section if foodborne suspected. After working hours, contact Administrative Officer of the Day (AOD) through County Operator.

   c. Suspected foodborne botulism case to be reported to CDC Emergency Operations Center (770-488-7100) within 4 hours of receipt of initial report. Notification of CDPH is considered a notification of CDC.

2. **Report Form**:

   SUSPECT BOTULISM INTAKE AND CHECKLIST (acd-suspbotulism)

   BOTULISM CASE REPORT (CDPH 8547)

   Upon consultation with the reporting clinician, the AOD is to complete both intake/checklist and the case report (as much of pages 1-3 as possible). AOD is to report to Chief or

Deputy Chief of ACDC to determine actions to follow. Case report to be faxed to CDPH on next business day to 510-620-3425. If the case is confirmed or probable, complete the entire case report pages 1-3 for submission to CDPH, who will contact treating physician to complete pages 4-5 (Antitoxin Treatment; Antitoxin Reactions) after administration of antitoxin.

3. **Epidemiologic Data**:

   a. Date and hour of onset of symptoms. Duration of symptoms. Record symptoms in order of their development.

   b. Food history for past 96 hours and method of food preparation. For instance, did they taste any home-canned foods after opening, but before cooking the food?

   c. Ingestion of improperly home-canned or preserved foods poses a high risk. Commercially canned foods are rarely involved unless mishandled.

   d. Location of remaining suspect food.

   e. Names, addresses, and ages of others that ate suspected food and time this occurred.

   f. For wound botulism - onset of wound infection, how original wound occurred.

CONTROL OF CASE, CONTACTS & CARRIERS

Immediate investigation is required, regardless of time of day. Confiscate suspected food(s) for possible laboratory testing and notify others who may have suspected food in their possession.

CASE:

Precautions: None

1. Immediate hospitalization at hospital with intensive care unit is essential.

2. Use of antitoxin must not await laboratory diagnosis if clinical findings are highly suggestive of botulism. Follow IND protocol carefully for dosage and allergic precautions.

3. A case of suspected foodborne botulism should receive cathartics to hasten elimination of lower intestinal contents.

4. A case of suspected wound botulism must be examined carefully to locate the site of infection for surgical debridement; appropriate antibiotics should be administered.

CONTACTS: Household members or persons who shared a common food source.

1. Search for missed cases and those at risk of illness, and refer them for medical evaluation if symptomatic.
2. For persons known to have eaten suspected food within 96 hours, purge with cathartics, give enemas, and maintain close observation. If symptomatic, treat as case.

CARRIERS: Not applicable

PREVENTION-EDUCATION

1. Follow recommended procedures in canning and preparing foods at home.

2. Boil home-canned vegetables and meat products for at least 10 minutes with thorough stirring, prior to tasting or eating.

3. Avoid contamination of wounds with soil or non-sterile substances.

DIAGNOSTIC PROCEDURES

Prior notification of ACDC required. See **SPECIMEN SUBMISSION GUIDELINES FOR SUSPECTED BOTULISM** for complete instructions on specimen collection and submission. In brief:

1. **Stool Samples**: Submit 10-50 g of unpreserved feces specimen. Sterile water enemas may be necessary to obtain specimens. Fecal specimens should be refrigerated.

   Container: Sterile container with lid.

   Laboratory Form: **Test Requisition Form H-3021.**

Examination Requested: Botulism.

Blood Sample: Treating facility obtains a 10-20 ml blood specimen from patient prior to the administration of antitoxin and submits it to PHL with other clinical specimens. Post-treatment serologic testing of botulism cases and suspects is not indicated.

Food Samples: Must be collected by a Food and Milk environmental specialist under ACDC direction.

Container: Original container or a clean, covered container.

Laboratory Form: **Test Requisition Form H-3021.**

Examination Requested: Botulism.

Material: Suspected food.

Storage: Refrigerate.

2. **Wound Culture**: Treating facility obtains anaerobic cultures of wounds or abscesses for processing by the hospital laboratory. If possible, collect with a laboratorian in attendance for immediate anaerobic processing. Sample any evident wounds, including fracture sites; submit aspirate, excisional biopsy, or swab. Place in anaerobic transport pouch, keeping chilled at all times. If a clostridial species is isolated, consult Public Health Laboratory for instructions on submission.

INFANT (INTESTINAL) BOTULISM

Botulism in infants less than 12 months of age was first described in 1976. Infant botulism, correctly known as intestinal botulism, affects children under 1 year of age almost exclusively but can affect adults who have altered GI anatomy and microflora. Following ingestion of spores, production of toxin occurs within the gut lumen. The illness usually begins with constipation followed by lethargy, listlessness, poor feeding, ptosis, poor head control, and difficulty in swallowing; it has been termed "floppy baby" syndrome. Identified food sources, such as honey and corn syrup, should never be fed to infants.

The local health department's only responsibility is immediate telephone reporting of suspected cases to the CDPH. All suspected cases are investigated by the Infant Botulism Treatment and Prevention Program, in the California Department of Public Health's Division of Communicable Disease Control. Call (510) 231-7600 (24 hours a day, 7 days a week, including holidays). Excellent background information and family materials in English and Spanish are available on the program website at http://www.infantbotulism.org/.

In vivo botulinum toxin production in the non-infant gastrointestinal tract has been rarely reported. This has also been termed adult intestinal or enteric botulism. Persons with intestinal abnormalities such as previous surgery, inflammatory bowel disease or diverticulosis may have a blind intestinal pouch that does not empty normally, allowing GI contents to remain for longer than normal. If spores of *C. botulinum* are present, they may germinate and produce botulinum toxin.

WOUND BOTULISM

Wound botulism results when spores of C. botulinum germinate in a wound, producing botulinum toxin. Previously this was extremely rare and usually associated with traumatic injuries such as punctures or open fractures. Wound botulism attributable to injecting drug use was first reported in 1982 in New York City.

Since 1995, California has seen an explosion of wound botulism among injectors of illicit substances, principally a form of heroin called "black tar." Unlike botulinum toxin, which is destroyed by heating, spores of *C. botulinum*, which may be in the heroin or one of the solvents employed by injecting drug users, are NOT destroyed by briefly boiling the heroin-solvent mixture. In most cases, injection is subcutaneous rather than intravenous, allowing for abscess formation and toxin production in the wound. Wound botulism has also been described in persons with intranasal abscesses who sniff cocaine chronically.

A thorough physical examination for an occult wound is indicated when the food history does not suggest a typical source for botulism. Debridement and drainage of infected wounds plus antibiotic treatment are crucial to stopping further toxin production. Treatment with heptavalent botulinum antitoxin is also indicated.

BRUCELLOSIS

(Undulant fever, Malta fever, Mediterranean fever, Bang's disease)

1. **Agent**: *Brucella* species, gram-negative cocco-bacillus.

2. **Identification**:

   a. **Symptoms**: A systemic infection with acute or insidious onset, characterized by continued, intermittent, or irregular fever, headache, weakness, sweating, chills, arthralgia, and generalized aching. The disease may last for several days, many months, or occasionally several years. Recovery is usual but disability is often pronounced. Relapses occur in about 5% of treated cases up to 3 months after onset. Fatality is 2% or less, and is higher for *B. melitensis* infections. Clinical diagnosis is often difficult.

   b. **Differential Diagnosis**: Febrile illnesses without localizing signs, such as infectious mononucleosis, lymphoma, malaria, and typhoid.

   c. **Diagnosis**: Isolation of organisms by culture from blood, bone marrow, etc.; four-fold rise in complement fixation titer in paired sera or agglutination titer of ≥1:160.

3. **Incubation**: Variable, usually 5-60 days; occasionally several months.

4. **Reservoir**:

   Brucella abortus B Cattle
   B. suis - Pig
   B. melitensis - Sheep, goat
   B. canis - Dog

5. **Source**: Any unpasteurized milk product; tissues, blood, urine, vaginal discharge, aborted fetuses (especially placentas) from infected animals.

6. **Transmission**: Direct contact, inhalation, or ingestion.

7. **Communicability**: No evidence of transmission from person to person.

8. **Specific Treatment**: Rifampin plus doxycycline.

   Alternatives: Tetracycline or TMP/SMX. Use streptomycin or gentamicin for endocarditis or serious infection.

9. **Immunity**: Duration uncertain.

REPORTING PROCEDURES

1. **Reportable.** *California Code of Regulations*, Section 2500.

2. **Report Form**:

BRUCELLOSIS CASE REPORT (CDPH 8607)

3. **Epidemiologic Data**

   a. Relapses

   b. Recent undiagnosed illness.

   c. Occupation and location: farmer, dairyman, slaughterhouse worker, butcher, veterinarian, kennel workers, and persons handling animals and animal by-products.

   d. Contact with cattle, swine, goats, sheep, horses, and dogs.

   e. Use and source of unpasteurized milk, other dairy products or imported foods, especially cheese.

   f. Travel history for 10 months prior to onset.

CONTROL OF CASE, CONTACTS & CARRIERS

Investigate within 7 days.

CASE:

Isolation: None

CONTACTS:

No restrictions. Search for others who may have shared possible common exposure.

CARRIER: Not applicable.

PREVENTION-EDUCATION

1. Educate persons working in slaughterhouses, packing plants, butcher shops and farms as to the nature of the disease and how to minimize the risk in handling carcasses or products of animals.

2. Search for infection among livestock by the agglutination reaction. Check with the County or State Veterinarian. Infection among cattle and swine requires slaughter of infected animals.

3. Pasteurize milk and dairy products from cows, sheep, or goats. Boil milk when pasteurization is impossible. Educate public to not consume unpasteurized dairy products.

4. Handle and dispose of discharges and fetuses from animal abortions with care. Disinfect contaminated areas.

5. Inspect meat and condemn carcasses of diseased swine. (Not a useful procedure for cattle or goats.)

6. Advise cases of possible recurrence of symptoms on re-exposure.

DIAGNOSTIC PROCEDURES

1. **Serology**: Agglutination.

   Container: Serum separator tube.

   Laboratory Form: **Miscellaneous (H-378)**.

   Examination Requested: Brucellosis.

   Material: Clotted blood.

   Amount: 8-10 ml.

   Storage: Refrigerate until transported.

2. **Culture**

   Consult Public Health Laboratory before submitting specimen.

CAMPYLOBACTERIOSIS

1. **Agent**: *Campylobacter* is a Gram-negative curved rod. Several species are pathogenic in man. Of these, the two most common causes of gastroenteritis *are C. jejuni* and *C. coli. C. fetus* causes septicemia in immunocompromised persons.

2. **Identification**:

   a. **Symptoms**: Watery or bloody diarrhea, abdominal pain, myalgia, nausea, and fever characterize *Campylobacter* enteritis. May also cause bacteremia, meningitis, septic arthritis, endocarditis, salpingitis and cholecystitis. Guillain-Barré syndrome is an uncommon consequence of *C. jejuni* infection. Post-infectious arthritis sometimes is associated with recent campylobacteriosis.

   Transplacental spread from systemic maternal infection has resulted in abortion, stillbirth, and early neonatal meningitis.

   b. **Differential Diagnosis**: Other enteric pathogens; illness can mimic acute appendicitis.

   c. **Diagnosis**: Isolation of organisms from stool, blood, or other body fluids and tissues.

3. **Incubation**: 1-10 days; usually 3-5 days. Not less than 24 hours.

4. **Reservoir**: Many animal hosts, including poultry, swine, cattle, sheep, puppies, kittens, rodents, and birds.

5. **Source**: Feces of infected animals or persons; contaminated poultry, unpasteurized milk, meat, water or food products.

6. **Transmission**: Ingestion if the organisms in undercooked chicken and pork, contaminated food and water, or raw milk; from contact with infected pets (especially puppies and kittens), farm animals or

   infected infants. People and food may be contaminated from contact with raw poultry juices, especially from cross contamination of common cutting boards or kitchen utensils. Contamination of milk most frequently occurs from fecal-carrier cattle.

7. **Communicability**: Variable, as long as organisms are excreted (usually 2-7 weeks). Person-to-person transmission appears to be uncommon with *C. jejuni.*

8. **Specific Treatment**: Primarily supportive. May consider erythromycin, tetracyclines, or quinolones for gastroenteritis; aminoglycosides for systemic infection. Treatment to eradicate shedding for persons in sensitive occupations or situations may be considered.

9. **Immunity**: Immune mechanisms are not well understood, but lasting immunity to serologically-related strains follows infection.

REPORTING PROCEDURES

1. Report within 1 working day of identification of case or suspected case (Title 17, Section 2500, *California Code of Regulations)*.

2. **Report Form: LAC DHS CAMPYLOBACTERIOSIS (acd-camp)**

   CONTACT ROSTER (contact: acd)

   All 3 pages of form MUST be submitted. The original form should be submitted as soon as the investigation is complete. Original forms should not be held in the district pending completion of "Sensitive Occupation or Situation" (SOS) clearance. District follow-up for SOS can be continued without the original form.

   If a prepared commercial food item is the LIKELY source of this infection, a **FOODBORNE INCIDENT REPORT** (FBIR) should be filed. For likelihood determination and filing procedures, see Part 1, Section 7 – Reporting of a Case or Cluster of Cases Associated with a Commercial Food: Filing of Foodborne Incident Reports.

3. **Epidemiologic Data**:

   a. Specific food history and place of purchase (e.g., unpasteurized milk, poultry product, raw beef, liver, or seafood). This should include high-risk foods cooked at home.

   b. Attendance at group gatherings where food was served and visit to restaurant or commercial food establishments within the incubation period.

   c. Exposure to others with diarrhea in or outside the household.

   d. Contact to a child care center, institution or a baby-sitting group.

   e. Consumption of untreated water or recreational water exposure.

   f. Travel history within incubation period.

   g. Contact with pets (especially puppies) or other animals before onset.

   h. History of recent gastrointestinal procedures (e.g. colonic, barium enema).

   i. Some ethnic food preparation practices may involve undercooking of poultry or other meat.

   j. For infants 30 days of age and under, if source is not identified, culture care givers (even if asymptomatic) to identify possible source.

   k. Food handling and storage techniques in the home, especially of raw poultry or other raw meats.

   l. If an outbreak of campylobacteriosis is identified while investigating an individual case, discuss with supervisor and advise ACDC by telephone.

CONTROL OF CASE, CONTACTS & CARRIERS

Contact within 24 hours to determine if sensitive occupation or situation is involved; otherwise, investigate within 3 days.

CASE:

Precautions: Enteric precautions until clinical recovery.

1. **Sensitive Occupation or Situation**:

   a. **Symptomatic**: Remove from work until asymptomatic. Clearance is not required.

   b. **Asymptomatic**: No restrictions.

2. **Non-Sensitive Occupation or Situation**: No restrictions.

CONTACTS: Household members or persons who share a common source.

1. **Sensitive Occupation or Situation**:

   a. **Symptomatic**: Remove from work until asymptomatic. May culture stool if etiology is uncertain or as part of outbreak investigation.

   b. **Asymptomatic**: No restrictions.

2. **Non-Sensitive Occupation or Situation:** No restrictions.

3. **Presumptive Cases:**

   a. Definition: any person who is epi-linked to a confirmed case, who has diarrhea (more than 2 loose stools in 24 hours) and fever, or diarrhea and at least 2 other symptoms.

   b. Follow up is the same as for a confirmed case (i.e. clearance as needed and submission of a case form for reporting).

PREVENTION-EDUCATION

1. Thoroughly cook all food derived from animal sources.

2. Avoid cross-contamination of other foods: All utensils, including a chopping board, that have been in contact with raw meat or poultry products should be washed before using for preparation of other foods. Properly handle and store raw meats so the juices do not contaminate other foods. After working with raw meat or poultry products, wash hands thoroughly.

3. Avoid the use of unpasteurized milk and milk products.

4. Emphasize hand washing and personal hygiene.

5. Consult veterinarian about ill pets. Properly dispose of their excreta.

6. Properly refrigerate perishable food.

7. Dispose of feces properly; properly clean contaminated inanimate articles.

8. Advise regarding risks associated with colonic irrigation.

9. Avoid exposure to untreated water. When swimming or wading, avoid swallowing water.

DIAGNOSTIC PROCEDURES

1. **Culture**:

   Container: Enterics.

   Laboratory Form: **Test Requisition Form H-3021**

   Examination Requested: Campylobacter.

   Material: Feces. Follow instructions provided with container. Maintain at room temperature.

   Remarks: Mark "SOS" (for sensitive occupation or situation) in red on specimen and laboratory form if appropriate.

2. **Culture for Identification (CI)**:

   Container: Culture for Identification (CI).

   Laboratory Form: **Test Requisition Form H-3021**

   Material: Pure culture on appropriate medium.

   Storage: Same as above.

CHAGAS DISEASE

1. **Agent**: *Trypanosoma cruzi*, a bloodborne protozoan, that occurs in humans as a hemoflagellate (trypomastigote) and as an intracellular parasite (amastogote).

2. **Identification**:

   a. **Symptoms**:

      Acute Disease: is usually an illness of children, but can occur at any age. Only a small proportion of infections are recognized because of the mild and nonspecific nature of most symptoms and because of lack of access to medical care in endemic countries. The first signs occur one week after infection and most commonly present with fever, lymphadenopathy, malaise, and occasional hepatosplenomegaly. In most cases, infection is asymptomatic. A chagoma is an inflammatory reaction at the site of inoculation of the protozoa; this inflammatory reaction can last up to 8 weeks. Overt central nervous system signs manifesting as acute encephalitis are rarely seen with the exception of those with profound immunocompromise (transplant recipients and AIDS patients).

      Chronic Disease: Chronic irreversible sequelae, cardiac and gastrointestinal, are estimated to occur in up to 30% of infected persons years to decades after initial infection. The most frequent cardiac abnormalities include nonspecific electro-cardiographic changes, life-threatening arrythmias, and cardiomyopathy resulting in congestive heart failure; classically, intestinal tract involvement leads to megaesophagus and/or megacolon.

   b. **Diagnosis**: During the acute phase of infection diagnosis can be made through stained blood smear, hemoculture, or xenodiagnosis. Serological testing is utilized most for blood donor screening and clinical diagnostics. An enzyme-linked immunosorbent assay (ELISA) assay for detection of antibodies to *T. cruzi* in serum and plasma approved by the FDA is being utilized in blood donor screening. Confirmatory radioimmunoprecipitation assay (RIPA) testing is carried out with each positive ELISA from blood donor screening programs, however, the RIPA is not FDA approved for serological diagnosis. Polymerase chain reaction (PCR) testing is a promising investigation technique for detecting low-level parasitemia.

3. **Incubation**: 5-14 days after the bite of the vector; 30-40 days after blood transfusion.

4. **Reservoir**: Humans and over 150 domestic and wild mammals species, including dogs, cats, rats, mice, marsupials, rodents, carnivores, primates and other.

5. **Source**: Infected species of Reduviidae (cone-nosed bugs or kissing bugs) especially various species from the genera *Triatoma*, *Rhodnius*, and *Panstrongylus*.

6. **Transmission**:

   Infected Vectors: Infected species of *Reduviidae* have infective trypanosome in their feces which are deposited during feeding and contaminate conjunctiva, mucous membranes, abrasions, or skin wounds. The bugs become infected when they feed on a parasitemic human or other mammal.

   Blood Transfusion: Infected blood units to recipients (especially immunocompromised). Blood is routinely screened for *T. cruzi* in many parts of South and Central America. In 2007, American Red Cross and Blood System, Inc. began routinely screening all donated units of blood in the US by ELISA (Ortho-Clinical Diagnostics, Raritan, NJ).

   Perinatal Transmission: Organisms may cross the placenta to cause congenital infection in 2% to 8% of pregnancies for those infected.

7. **Communicability**: The “kissing bug” becomes infective 10-30 days after biting an infected host with gut infection in the bug persisting for life (up to 2 years). The trypanosome is present in the blood of infected individuals or

mammals during the acute phase of infection and may persist at low levels in symptomatic and asymptomatic hosts.

8. **Specific Treatment**: Treatment options are limited and are most effective during the acute stage of infection. However, treatment is also a consideration for chronic stages. Two parasitic drugs, benznidazole and nifurtimox, are available only through consultation with the Centers for Disease Control and Prevention (CDC) under an investigational new drug protocol. Requests for specific parasitic drugs can be obtained by calling the CDC at 770-488-7774. Additional information regarding Chagas Disease treatment and diagnostics is available at the CDC Chagas disease web page.

REPORTING PROCEDURES

1. Chagas disease is not reportable at the county or state level by either clinicians or laboratories. However, blood banks have been requested to report to positive donors to their local public health department.

   ACDC will investigate all cases related to blood transfusion and those occurring in transplant recipients. ACDC will notify the State Division of Communicable Disease Control immediately upon receiving notice of a case of suspected transplant or transfusion associated Chagas disease, and will supervise the investigation and control measures.

2. **Report Form**: Not applicable

3. **Epidemiologic Data**:

   a. History of travel to or residing in endemic areas within the incubation period.

   b. Transplant and blood transfusion history

CONTROL OF CASE, CONTACTS & CARRIERS

ACDC will supervise investigation and control measures.

PREVENTION-EDUCATION

1. **Infected Blood Donors** are notified by blood banks of the serological positive diagnosis with regards to Chagas disease and the need for medical evaluation. They are informed that they can no longer donate blood to others but they may be able to donate blood to themselves (autologous donation) if the need arises.

2. ACDC will assist with referrals for clinical evaluation of Chagas disease, especially for those without health insurance. ACDC will refer individuals without insurance to the Chagas Center of Excellence for medical evaluation and possible treatment at Olive View Medical Center in Sylmar, California.

CHICKENPOX

1. **Agent**: Varicella-zoster virus (VZV), a member of the herpesvirus family.

2. **Identification**:

   a. **Symptoms:**

   Varicella (chickenpox): Varicella, the primary infection with VZV is an acute, generalized disease that occurs most commonly in children and is characterized by a maculopapular rash (few hours), then vesicular rash (3-4 days), often accompanied by fever. Lesions are typically more abundant on trunk; but sometimes present on scalp, mucous membranes of mouth and upper respiratory tract. Lesions commonly occur in successive crops, with several stages of maturity present at the same time. Lesions are discrete, scattered and pruritic. Mild, atypical and inapparent infections also occur. "Breakthrough" chickenpox which can be seen in previously vaccinated persons, is usually a mild illness characterized by few lesions, most of which are papular or papulovesicular. The most common complications of varicella are secondary bacterial infection of skin lesions, dehydration, pneumonia, and central nervous system involvement. Hospitalization occurs in ~3 per 1,000 cases. The overall death rate is ~1 per 60,000 cases. Complications increase with age; death rates as high as 25 per 100,000 have been reported for persons in the 30-49 age group.

   Zoster (herpes zoster, shingles): Zoster occurs more often in adults or immunocompromised persons and results from reactivation of latent VZV in sensory ganglia. Grouped vesicular lesions appear unilaterally in the distribution of 1 to 3 sensory dermatomes. Severe pain and paresthesia are common.

   Congenital Varicella Syndrome: Primary varicella infection in the first 20 weeks of gestation is occasionally associated with abnormalities in the newborn that include low birth weight, limb hypoplasia, cicatricial skin scarring, localized muscular atrophy, encephalitis, cortical atrophy, chorioretinitis, and microcephaly.

   Perinatal Varicella: Perinatal varicella occurs within first 10 days of life from a mother infected from 5 days before to 2 days after delivery; it has a 30% fatality rate. The severity of disease results from fetal exposure to the virus without the benefit of passive maternal antibody. Postnatally acquired varicella occurs after 10 days of age and is rarely fatal.

   b. **Differential Diagnosis**: Generalized herpes simplex, impetigo, drug rash, secondary syphilis, smallpox, and other viral exanthems. See **EXANTHEMS—DIFFERENTIAL DIAGNOSIS** in Appendix A.

   c. **Diagnosis**: Serum antibody studies, direct smear and culture of lesion fluid.

3. **Incubation**: Usually 14-16 days but can be as short as 10 or as long as 21 days. May be prolonged after receipt of varicella zoster immune globulin (VariZIG) and in the immunodeficient.

4. **Reservoir**: Human.

5. **Source**: Mucous membranes and vesicles.

6. **Transmission**: Direct contact with patient with varicella or zoster; droplet or airborne spread of vesicle fluid (chickenpox and zoster) or secretions of the respiratory tract (chickenpox); indirectly by contaminated fomites. Scabs are not infectious.

7. **Communicability**: Communicable 5 days before eruption (especially 1-2 days before eruption) and for up to 5 days after onset of lesions. Communicability may be prolonged in persons with altered immunity.

8. **Specific Treatment**:

   For cases: Acyclovir (IV) in susceptible immunocompromised persons, when administered within 24 hours of rash onset,

has been effective in reducing morbidity and mortality associated with varicella. The FDA has licensed oral acyclovir for varicella in otherwise healthy children. The American Academy of Pediatrics considers the use of oral acyclovir appropriate in otherwise healthy persons at increased risk of moderate to severe varicella, such as those older than 12 years, those with chronic skin or pulmonary disorders, those receiving chronic salicylate therapy or short, intermittent or aerosolized corticosteroids or in secondary case-patients that live in the households of infected children.

9. **Immunity**: Infection confers long immunity; second attacks of chickenpox can occur.

REPORTING PROCEDURES

1. Outbreaks associated with an acute health care facility: report immediately by telephone (Title 17, Section 2500, *California Code of Regulations*).

   Report Form: CD OUTBREAK INVESTIGATION ACUTE HEALTH CARE FACILITY (HOSPITAL) (H-1165AHCF)

2. Outbreaks associated with a sub-acute health care facility: report immediately by telephone (Title 17, Section 2500, *California Code of Regulations*).

   Report Form: CD OUTBREAK INVESTIGATION SUB-ACUTE HEALTH CARE FACILITY INVESTIGATION (H-1164-SubAcute).

3. Fatal cases: report immediately by telephone to Immunization Program.

   Immunization Program will file: **VARICELLA DEATH INVESTIGATION WORKSHEET** and must notify the State Division of Communicable Disease Control immediately. See **Instructions** for the Varicella Death Investigation Worksheet.

4. Hospitalized cases (not cases of herpes zoster/shingles): report within 7 calendar days from time of identification by mail, telephone, or electronic report.

   Immunization Program will file: **VARICELLA (CHICKENPOX) HOSPITALIZED CASE REPORT (CDPH 8299).**

5. **Epidemiologic Data**:

   a. Exposure to known case.
   b. History of either varicella or shingles implies immunity from reinfection.

   c. Lack of varicella history is not proof of susceptibility. Obtain serologic tests to determine immune status if indicated.

CONTROL OF CASE, CONTACTS & CARRIERS

Routine investigation of individual cases of chickenpox or shingles is not required.

CASE:

1. Chickenpox (Varicella): Avoid contact with immunologically compromised persons. Exclude from school or work until the 6th day after onset of rash, or sooner if all lesions are dry.

2. Zoster (Shingles): Avoid all contact with immunocompromised persons. Case may work with immunocompetent persons as long as all lesions are covered.

CONTACTS:

Note: The following guidelines apply mainly to chickenpox contacts—contact to a shingles case is defined as direct contact with active lesions.

1. Passive Immunization with VariZIG: Effective in preventing or modifying disease if given within 10 days of first exposure to the case during case's period of communicability. Immunologically normal adults and adolescents should be evaluated on an individual basis. Serologic determination of immune status is advised. Candidates for VariZIG include:

   a. Immunocompromised, susceptible children.

   b. Susceptible pregnant women. Serologic determination of immune status is advised.

   c. Newborn infant of a mother who had onset of chickenpox within 5 days before delivery to 48 hours after delivery.

   d. Hospitalized premature infant (≥28 week gestation) whose mother has no history of

chickenpox or serologic evidence of immunity.

e. Hospitalized premature infants (<28 week gestation or ≤1,000 g), regardless of maternal history.

> Note: The FDA has now approved VariZIG for use in the U.S. as a commercially available product. VariZIG is produced by a Canadian manufacturer and formerly could only be used in the U.S. under investigational new drug (IND) procedures. However, with FDA's recent approval, IND procedures are no longer required for VariZIG. This product is available to DPH through the DPH Pharmacy (213-250-8616). In the event that you need to contact the distributor, call FFF Enterprises at their 24-hour telephone number: 1-800-843-7477.

2. Active Immunization with Varicella Vaccine: Susceptible adults and children should be considered for varicella vaccination. The American Academy of Pediatrics recommends varicella vaccine administration to susceptible children up to 5 days after exposure to prevent or modify disease. The Advisory Committee on Immunization Practices has updated its routine varicella recommendations to add a second dose of varicella vaccine for children 4-6 years of age. Especially during varicella outbreaks, persons who have received only one dose of varicella vaccine should receive their second dose, provided the appropriate minimal interval has elapsed since the first dose (3 months for children 12 months through 12 years and 4 weeks for person 13 years and older). Patients should be advised that some contacts may have been exposed at the same time as the index case and that the vaccine will not protect against disease in such circumstances.

3. Determination of Susceptibility: Contacts with a positive disease history can be considered immune. Those with negative or unknown history should be assumed to be susceptible. If VariZIG is being considered rather than varicella vaccine, test serologically for immunity promptly.

4. Contacts In Health Facilities:

   a. Interview exposed patients and staff about prior varicella disease to determine susceptibility. See above.

   b. Susceptible exposed patients should be discharged, isolated, or cohorted for the same time period. Only immune staff should care for these patients. Exposed, susceptible patients who are immunosuppressed should be given VariZIG if it can be administered within 10 days of first exposure. Varicella vaccine is usually not an option for immunocompromised contacts.

   c. Susceptible exposed employees involved in the care of high-risk patients should not work from the 8th through the 21st day after exposure, even if varicella vaccine is given. If VariZIG was given to an employee, he/she should remain off work from days 8-28 after exposure.

5. Contacts in Non-Healthcare Settings: Contacts for whom varicella vaccine is indicated must be <19 years of age to receive DPH-supplied vaccine. Those ≥19 for whom VariZIG is not appropriate should be referred to their medical provider for varicella vaccine.

OUTBREAK DEFINITION

In general, the threshold for a community outbreak investigation should be 3 or more cases related in place within a 3-week period. In the presence of nosocomial varicella or known or suspected concurrent streptococcal infections, or among populations at high risk for complications (e.g., immunocompromised or susceptible adolescents or adults), the threshold for response could be 1 or 2 cases.

INVESTIGATION AND CONTROL OF SCHOOL OUTBREAKS OF VARICELLA (3 OR MORE CASES)

1. Identify and exclude all acute chickenpox cases from school until all lesions have crusted over (usually 5 days for unvaccinated persons). (Vaccinated persons with varicella may develop macules and papules only; these persons are no longer contagious when the macules and papules have faded. Skin lesions can be in the process of resolving but do not need to be completely resolved.)

2. Identify persons that have had close contact with the case or cases during the time period of two days before, to five days after case had rash onset. (Close contact is defined as direct

physical or face-to-face contact, or one or more hours of room contact with an infectious person.)

3. Identify susceptible persons among the close contacts. (Persons who have a reliable history of varicella disease or a documented history of vaccination or serological evidence of varicella are all considered immune.) Also, identify susceptible close contacts that are at high risk for serious disease or complications if they get varicella and recommend VariZIG for these persons if it can be given within 10 days of first exposure to the varicella case. (For definition of high-risk, see **OUTBREAK INVESTIGATION** section and item 5 under **PREVENTION-EDUCATION section of this document**.)

4. For grades where students are of the age to have been covered by the California school varicella vaccination entry requirement that was implemented on July 1, 2001 and after consultation with Los Angeles County Immunization Program (LACIP) surveillance staff, advise the school to exclude all un-vaccinated children who refuse or are unable for medical reasons to be vaccinated against varicella. These students should be excluded from the start of the outbreak for up to 21 days after the onset of the last case. (Exclude all high-risk susceptible persons, regardless of varicella school entry requirement applicability as soon as a single probable or confirmed case of varicella has been identified.) Previously unvaccinated persons who are vaccinated during an outbreak may return to school two weeks after receipt of one dose of chickenpox vaccine, as long as they have not become ill with chickenpox as a result of the exposure. Such students would still need to receive the second dose of vaccine in order to be in compliance with current varicella vaccine recommendations.

5. As soon as an outbreak has been identified, advise the school to send out notification letters to parents and staff informing them about the outbreak. The letter should recommend that susceptible persons for whom varicella vaccine is not contraindicated be vaccinated as soon as possible (includes a second vaccination for children who did not receive the second dose of varicella vaccine — see item 2 in **"CONTACTS"** section of this document). The letter should also inform all high-risk persons to consult with their health care provider about the chickenpox exposure (pregnant women should inform their prenatal care provider as soon as possible). Based on patterns of transmission, it may only be necessary to notify parents and staff of children in the same classroom where the exposure occurred; however, in other instances it may also be reasonable to notify persons in groups such as the band or sports team with which the case participates. If there is documented transmission among several grade levels, it may even be necessary to notify the entire school. **Templates of notification letters regarding exposures (for schools or other facilities) are available from the LACIP.**

6. District public health nursing should continue to follow the outbreak and provide weekly updates to LACIP surveillance staff until there have been no new cases for 21 days from the last communicable day of the last case. Notify LACIP surveillance staff by phone when the outbreak has been closed.

7. When the outbreak has been closed, complete the outbreak investigation form **VARICELLA (CHICKENPOX) HOSPITALIZED CASE REPORT (CDPH 8299)**, obtain necessary review and approval by SPA medical director, and forward to the Morbidity Central Reporting Unit.

8. District public health nursing should notify the LACIP surveillance staff of any outbreak reports or 1-2 cases among high risk populations that may have been directly relayed to the district by the facility, rather than through LACIP.

Note: For outbreaks involving Los Angeles Unified School District (LAUSD) schools, work with the LAUSD nursing services office when initiating the investigation and when conducting follow-up activities.

PREVENTION-EDUCATION

1. Children entering kindergarten, as well as children 18 months and older entering or already in childcare are required to show proof of vaccination or physician documentation of prior varicella disease, as of July 1, 2001.

2. Keep fingernails short and control scratching of lesions.

3. Alert patient to possible complications: viral pneumonia, encephalitis, secondary infections, Reye syndrome.

4. Children with varicella should **not** receive aspirin or medication containing salicylate, which is associated with development of Reye syndrome.

5. Greatest risk for complications is for immunocompromised persons (e.g., those with leukemia, cancer, HIV/AIDS, etc.), as well as those on steroids or other immunosuppressive drugs.

6. Disinfect fomites soiled with discharges of nose, throat, and lesions.

7. VZV vaccine was licensed in 1995 in the USA for use in healthy children (>12 months) and most adults. This vaccine should not be used to immunize women who are pregnant or who intend to become pregnant within one month. If a pregnant woman is inadvertently immunized call the Varicella Vaccination in Pregnancy registry (1-800-986-8999).

DIAGNOSTIC PROCEDURES

Laboratory diagnosis of varicella is not routinely required. However, with the decreased incidence of varicella as a result of widespread vaccination, it should be considered in confirming outbreaks, especially if some of the cases have previously been vaccinated and are experiencing breakthrough disease. In addition, hospitalized and fatal varicella cases must be confirmed so as to rule out the rare possibility of smallpox; see chapter on SMALLPOX. Serological testing is helpful in confirming current or past disease, or susceptibility to future disease. Clinical and epidemiological history is required to aid the laboratory in test selections.

1. **Serology for diagnosis**: Paired sera required (IgG).

   Note: Testing for IgM antibody is not indicated since commercially available methods lack sensitivity and specificity.

   Container: VR SEROLOGY—contains a serum separator tube (SST, a red-gray top vacutainer tube).

   Laboratory Form: Test Requisition and Report Form H-3021

   Examination Requested: VZV Serology.

   Material: Whole clotted blood.

   Amount: 8-10 ml.

   Storage: Refrigerate.

   Remarks: Collect first blood specimen as early as possible. Collect the second approximately 2 weeks after the first. Send each specimen as it is collected. Do not store.

2. **Serology to Determine Immunity Status**: Submit single blood specimen as outlined above for IgG testing.

3. **Microscopy (Smear)**: When doing smear of lesion(s), collect swab for culture at the same time.

   Container: Two clean slides in a holder.

   Laboratory Form: **Test Requisition and Report Form H-3021**

   Examination Requested: VZV DFA.

   Material: Cellular material from base of lesions. Use sterile cotton swab (viral culturette) to break open early-stage vesicles (before crusting state), absorb fluid, and scrape cells from the base of the lesion. Spread material evenly onto clean slides in circular areas about the size of a dime. Make at least 1 slide with 2 smears—2 slides if possible. Air-dry and submit in closed slide container, then place swab back into culturette for culture (see below).

   Storage: Ambient temperature.

4. **Culture**:

   Container: Viral culturette or capillary tube with holder.

   Laboratory Form: **Test Requisition and Report Form H-3021**

Examination Requested: VZV Culture.

Material: Fluid and cellular material from early-stage lesion. Collect vesicular fluid in capillary tube and place in holder or collect fluid and cellular material with culturette swab as above for smears and place swab back into the culturette transport tube.

Storage: Keep refrigerated at 4°C and deliver to the Virus Laboratory within 72 hours. Do not freeze any specimen when the clinical background suggests VZV, CMV, or RSV.

CHOLERA (See also **VIBRIOSIS, NON-CHOLERA**)

1. **Agent**: *Vibrio cholerae* serogroup O1, gram-negative curved bacilli.

2. **Identification:**

   a. **Symptoms**: An acute intestinal disease characterized by sudden onset, profuse watery ("rice water") stools; occasional vomiting, rapid dehydration, and circulatory collapse. Mild cases with only diarrhea are common, especially in children. Asymptomatic infection is more frequent than clinical illness. In severe, untreated cases, death may occur within a few hours of onset.

   b. **Differential Diagnosis**: Acute febrile enteric disorders characterized by profuse diarrhea and vomiting. Other *Vibrio* species and *V. cholerae* of other serogroups must be considered. "Non-O1 *V. cholerae*@ refers to organisms which do not agglutinate *Vibrio* O-group 1 antiserum; these are also referred to as non-agglutinable vibrios (NAG) or non-cholera vibrios (NCV). Follow-up testing may identify serogroups O2 to O139.

   c. **Diagnosis**: Confirmed by culturing *V. cholerae* serogroup O1 or O139 from feces, rectal swabs, or vomitus or by demonstrating a significant (four-fold or greater) rise in titer of vibriocidal or bacterial agglutinating antibodies in acute and convalescent sera.

3. **Incubation**: Few hours to 5 days, usually 2-3 days.

4. **Reservoir**: Humans, environment (contaminated water).

5. **Source**: Feces and vomitus of infected person, brackish waters.

6. **Transmission**: Ingestion of food or water contaminated with feces or vomitus of cases, and occasionally feces of carriers. Consumption of raw or improperly cooked seafood, and other foods contaminated with seawater. Low person-to-person transmission risk.

7. **Communicability**: Usually until 2-3 days after recovery; however, carrier state may persist for months.

8. **Specific Treatment**: Replacement of fluids and electrolytes; tetracycline will decrease period of communicability. With proper treatment, fatality rate is below 1%.

9. **Immunity**: Antibodies impart resistance to reinfection, which lasts longer against the homologous serotype. Immunity to serotype O1 has not protected against infection by type O139.

REPORTING PROCEDURES

1. Confirmed or suspected cases should be reported by telephone immediately, *California Code of Regulations,* Sections 2500 and 2556.

   a. Call Morbidity Unit during working hours.

   b. Call ACDC; after working hours, contact the Administrative Officer of the Day through the County Operator.

2. **Reporting Form**:

   CHOLERA AND OTHER VIBRIO ILLNESS CASE REPORT (CDPH 8587)

   CDC CHOLERA AND OTHER VIBRIO ILLNESS SEAFOOD INVESTIGATION REPORT FORM [CDC 52.97 (E)]

3. **Epidemiologic Data:**

   a. Most cholera is acquired outside the United States, such as by recent travel to and/or visitors from endemic areas. Include dates and specific areas visited. Describe reasons for trip (visit relatives, business, tourism, missionary work, etc.) and lodging arrangements (hotel, camping, with relatives, etc.)

   b. Ingestion of contaminated water, milk, food, or raw seafood, especially oysters and crabs.

c. Exposure to symptomatic persons.

d. Inquire concerning water sources (spring, tap, well, bottled, etc.)
e. Any pre-existing medical conditions or medical treatments (antibiotics, antacids, steroids, etc.) which might increase susceptibility.

CONTROL OF CASE, CONTACTS & CARRIERS

Immediate investigation required. ACDC will supervise investigation and control measures.

CASE:

1. Remove from sensitive situation until asymptomatic and one negative stool.

2. If patient dies, refer to **Part III, MORTICIANS AND CEMETERIES**.

CONTACTS:

Household contacts or co-travelers from endemic area.

1. Immediate surveillance of household and intimate contacts. Surveillance should be maintained for 5 days from last exposure.

2. Remove from sensitive situation until asymptomatic and one negative stool, weekly stools until case cleared or contact broken. If symptomatic or stool positive, treat as case.

3. Stool cultures should be obtained on asymptomatic contacts only if source is in doubt.

CARRIER:

Consult ACDC.

PREVENTION-EDUCATION

1. Stress food and water precautions while traveling in endemic areas.

2. Dispose of feces, vomitus and fomites properly.

3. Cholera vaccination provides marginal protection for short periods only, and is not routinely recommended for travel; current vaccines are derived from *V. cholerae* O1, and thus do not protect against *V. cholerae* O139. Travel-associated cases are rare. Extremely large inoculum (10 million organisms) are required to cause infection.

DIAGNOSTIC PROCEDURES

Consult with the Bacteriology Section of Public Health Laboratory.

COCCIDIOIDOMYCOSIS

(Valley fever, desert fever, desert rheumatism, coccidioidal granuloma.)

1. **Agent**: *Coccidioides immitis*, a dimorphic fungus.

2. **Identification:**

   a. **Symptoms**: A systemic mycosis that begins as a respiratory illness.

      Primary infection: May be asymptomatic or present as an acute respiratory illness with fever, chills, cough and pleural pain. About 5% of clinically recognized infections develop erythema nodosum. Primary infection may heal completely; may leave fibrosis or calcified pulmonary lesions, or a persistent thin walled cavity; or may progress to disseminated disease.

      Disseminated disease (coccidioidal granuloma): A progressive, rare granulomatous disease with high mortality characterized by lung lesions and diffuse single or aggregated abscesses, especially in subcutaneous tissues, skin, bone, peritoneum, testes, thyroid, and central nervous system. Coccidioidal meningitis resembles tuberculous meningitis.

   b. **Differential Diagnosis**: Influenza, viral infections with generalized rashes, other fungal infections, tuberculosis, and conditions associated with erythema multiforme or erythema nodosum.

   c. **Diagnosis**: Microscopic examination of sputum or pus, or by culture. Skin testing (for delayed hypersensitivity) and serologic tests, (immunodiffusion, EIA, complement fixation) are also available.

3. **Incubation**:

   Primary: 1-4 weeks.

   Disseminated disease: Develops insidiously.

4. **Reservoir**: Soil from endemic areas (mostly southwestern United States and northern Mexico). San Fernando and San Joaquin Valleys in southern California.

5. **Source**: Soil and dust.

6. **Transmission**: Inhalation of spores from dust, soil, and in laboratories from cultures of the mold form.

7. **Communicability**: Not directly transmissible from animal or person to person. After 7-10 days, *C. immitis* on dressings may become infectious.

8. **Specific Treatment**: None for uncomplicated respiratory infection. Amphotericin B in disseminated infection. Fluconazole is the agent of choice for meningeal infection

9. **Immunity**: Permanent.

REPORTING PROCEDURES

1. Report within seven calendar days, *California Code of Regulations*, Title 17, Sections 2500 and 2558.

2. **Epidemiologic Data:**

   a. Residence in or travel to endemic areas.

   b. Occupation.

   c. Similar illness in co-workers.

   d. Skin test results.

   e. Obtain any laboratory results and skin tests to confirm diagnosis of coccidioidomycosis (e.g., culture, serology).

   f. Indicate whether case is **primary** or **disseminated.**

   g. Determine date of onset.

   h. Travel history during incubation period (including dates and places) to endemic areas (see Reservoir section) where cases might have been exposed to dust.

i. Occupational history, especially individuals working outdoors in endemic areas. Give dates of working and job description.

j. Similar illness in co-workers.

k. Outdoor recreational activities during the incubation period where cases might have been exposed to dust from endemic areas. Include date, type of activity, and place.

CONTROL OF CASE, CONTACTS, & CARRIERS

Investigate within 7 days.

CASE:

Isolation: None.

CONTACTS: No restrictions.

PREVENTION-EDUCATION

1. Emphasize dust control in endemic areas. Spores are most prevalent in the top four inches of the soil layer.

2. Disinfect discharges and fomites.

3. Laboratory cultures should be sealed before disposal and technicians should not "sniff" fungus cultures.

DIAGNOSTIC PROCEDURES

1. **Microscopic Identification and Culture of Sputum:**

   Container: Mycology. Sterile specimen collection cup (50 ml Falcon Conical #2070).

   Laboratory Form: Mycology (H-377).

   Examination Requested: Fungus Exam - Clinical Material.

   Amount: 2 ml minimum.

   Storage: Refrigerate. Specimen must be received within 24 hours of collection.

2. **Microscopic Identification and Culture of Other Specimens:** Call Public Health Laboratory.

3. **Serology:**

   Material: Whole clotted blood

   Container: Serum Separator Tube (SST).

   Laboratory Form: Test Requisition and Report Form H-3021

   Examination Requested: Coccidioides antibodies

   Amount: 8-10 ml.

   Storage: Refrigerate.

   Material: CSF

   Container: Sterile tube.

   Laboratory Form: Test Requisition and Report Form H-3021

   Examination Requested: Coccidioides antibodies

   Amount: 1 ml (minimum 0.2 ml).

   Storage: Refrigerate.

CRYPTOSPORIDIOSIS

1. **Agent**: *Cryptosporidium parvum*, a protozoan parasite that exists as a trophozoite and oocyst.

2. **Identification**: A parasitic disease of humans and animals.

   a. **Symptoms**: Principally diarrhea, which can be watery and profuse, and with cramping abdominal pain. Children may have anorexia and vomiting, but these are less common in adults; fever, malaise, and nausea are less common in all ages. In the immunocompromised, e.g. HIV disease, illness can be unremitting and ultimately fatal due to chronic malabsorption and wasting.

   b. **Differential Diagnosis**: Other diarrheal diseases, including parasitic, viral, and bacterial.

   c. **Diagnosis**: Examination of stool for oocysts, after special concentration and staining; detection of various life cycles in intestinal biopsy. Difficult to detect unless looked for specifically.

3. **Incubation**: Average of 7 days; range 1-12 days, but not precisely known.

4. **Reservoir**: Humans and animals, including domestic cattle, dogs, and cats.

5. **Source**: Oocysts survive for prolonged periods of time in environment after excretion by animals or humans.

6. **Transmission**: Fecal-oral, person-to-person, waterborne, animal-to-person.

7. **Communicability**: Oocysts appear in stool at onset of symptoms, and continue for several weeks after recovery. May survive for months under proper humidity and temperature.

8. **Specific Treatment**: Generally self-limited in the immunocompetent person. Nitzoxanide approved for treatment of diarrhea in immunocompetent. Improved immune status of immunosuppressed will decrease symptoms of cryptosporidiosis.

9. **Immunity**: None known.

REPORTING PROCEDURES

1. Report within 1 working day of identification of a case or suspected case, *California Code of Regulations*, Title 17, Section 2500.

2. **Report Form**:

   PARASITE EPIDEMIOLOGIC CASE HISTORY (acd-parasite)

3. **Epidemiologic Data**:

   a. Exposure to animals.

   b. Sexual orientation.

   c. History of colonic irrigation. When and where.

   d. Emigration from or travel to a developing country within 6 months prior to onset. Specify dates and places.

   e. Exposure to carrier and other persons with diarrheal illness within incubation period.

   f. Occupation of case and household members.

   g. Consumption of or exposure to nonpotable water: pools, lakes, rivers, etc. Specify dates and places.

CONTROL OF CASE, CONTACTS & CARRIERS

Public Health Nursing Home Visit Protocol:
Home visit as necessary – a face to face interview is conducted as necessary.

Refer to "Public Health Nursing Home Visit AS NECESSARY (HVAN) Algorithm" (B-73 Part IV Public Health Nursing Home Visit Protocol).

Contact within 24 hours to determine if sensitive occupation or situation (SOS) involved. Otherwise, investigate within 3 days.

CASE:

1. **Sensitive Occupation**: Restrictions should be individualized based on case=s hygiene and severity of symptoms. If severely symptomatic, remove from SOS until diarrhea is reduced. Clearance specimens are not mandated. Chronically immunosuppressed patients are unlikely to recover; permanent removal from SOS may be appropriate only for cases that demonstrate poor hygiene and no ability to improve their practice.

2. **Non-sensitive Occupation or Situation**: Case may be closed without release specimens, provided household contacts are not symptomatic and in sensitive occupations.

CONTACTS:

Household members or persons who share a common source exposure should be tested only if symptomatic. If positive, handle as a case. If negative or asymptomatic, no restrictions.

CARRIERS:

Immunosuppressed patients remain infected chronically.

PREVENTION-EDUCATION

1. Stress hand washing and personal hygiene.

2. Advise about increased risk with genital-anal and oral-anal sex.

3. Dispose of feces in a safe, sanitary fashion.

4. Take precautions with food and water when traveling to endemic areas.

5. Advise regarding risk associated with colonic irrigation.

6. Protect water supply from fecal contamination.

DIAGNOSTIC PROCEDURES

1. **Microscopic:**

   Container: Feces-Parasite.

   Laboratory Form: Test Requisition Form H-3021

   Examination Requested: Cryptosporidium. Check appropriate boxes on laboratory form.

   Material: Feces. Follow instructions provided with container.
   Amount: 20-30 ml liquid stool.

   Storage: Do not refrigerate; protect from overheating.

   Remarks: Mix thoroughly with PVA preservative. Do not collect specimen(s) for 7-10 days after barium, mineral oil, bismuth, antibiotics, antimalarials or antidiarrheal preparations such as kaolin have been ingested.

2. **Antigen Detection:**

   Container: Feces-Parasite.

   Laboratory Form: Test Requisition Form H-3021

   Examination Requested: Cryptosporidium.

   Material: Feces in 10% formalin.

   Amount: 20-30 ml.

   Storage: Do not refrigerate; protect from overheating.

CYSTICERCOSIS

1. **Agent:**

   Cysticercosis: Disease caused by *Cysticercus cellulosae*, the tissue or larval stage of *Taenia solium.*

   Taeniasis: Intestinal infection with the adult stages of either of the tapeworms, *Taenia solium*, the pork tapeworm, or *Taenia saginata*, the beef tapeworm.

2. **Identification:**

   a. **Symptoms:**

      Cysticercosis: Larvae in muscle tissue may cause muscular pain, weakness, fever, and eosinophilia; involvement in brain may produce symptoms of hydrocephalus, meningoencephalitis or epilepsy. Many cases are asymptomatic or manifest minor disease.

      Taeniasis: Mild gastrointestinal complaints.

   b. **Differential Diagnosis:**

      Cysticercosis: Tuberculosis (tuberculoma), brain tumor, and other neurologic or psychiatric disorders.

      Taeniasis: Other causes of gastroenteritis.

   c. **Diagnosis:**

      Cysticercosis: Confirmed by biopsy or CT scan. Serologic and cerebrospinal fluid tests are highly specific and sensitive (Western blot).

      Taeniasis: Ova and parasite exam for proglottid (tapeworm segments) or eggs. The "scotch tape pinworm paddle" (Swube) impression of perianal area has also been used to detect eggs.

3. **Incubation:**

   Cysticercosis: Highly variable, from a few weeks to months or years.

   Taeniasis: 8-14weeks for the adult tapeworm to mature after consumption of a larva.

4. **Reservoir:**

   Cysticercosis: Individuals infected with the adult tapeworm shed eggs that are consumed by self or others. Humans are the definitive host for the adult worm.

   Taeniasis: Swine (*T. solium*) or cattle (*T. saginata*).

5. **Source:**

   Cysticercosis: Feces containing eggs or proglottid of *T. solium*; eggs of *T. solium* are directly infectious for man.

   Taeniasis: Raw or undercooked pork or beef containing larvae of either species.

6. **Transmission:**

   Cysticercosis: Fecal-oral transmission of eggs via contaminated food, possibly water. Direct person-to-person transmission may occur. Autoinfection from feces to hand to mouth. Retrograde passage of eggs from the jejunum into the stomach. (The latter mode is not proven.)

   Taeniasis: Via consumption of larvae in raw or undercooked pork or beef.

7. **Communicability**: Persons with *T. solium* tapeworm infections are infectious to others. Persons with cysticercosis (larval form) may also be infected with the adult worm and would then be infectious to others. **An individual with cysticercosis without adult tapeworm infection is not infectious to others.**

8. **Specific Treatment:**

   Cysticercosis: Dependent on clinical status and radiographic classification. Anticonvulsants, steroids, analgesics are employed. Praziquantel (Biltricide[7]), an antihelminthic, and surgery are of value in some circumstances.

Taeniasis: Niclosamide (Niclocide®) or praziquantel. Purging is not recommended.

9. **Immunity**: Short lived.

REPORTING PROCEDURES

1. **Reportable:** Report within seven calendar days, *California Code of Regulations*, Title 17, Section 2500.

2. **Report Form**:

   CYSTICERCOSIS/TAENIASIS CASE REPORT FORM (CDPH 8581)

   CYSTICERCOSIS (TAENIASIS) CONTACT WORK SHEET (acd-cysticercosis_worksheet)

3. **Epidemiologic Data:**

   a. Residence or travel in endemic areas.

   b. Symptoms or other cases among household members.

   c. Consumption of raw or undercooked meat, especially outside of the USA, or illegally imported meat.

CONTROL OF CASE, CONTACTS, & CARRIERS

Investigate within 3 days.

CASE:

Case must be evaluated for adult tapeworm infection. If the diagnosing physician has not evaluated the case's stool for infection, O&P specimens should be obtained. Food handlers with the pork tapeworm should be removed from work until one week after treatment.

CONTACTS:

Household and sexual contacts should be evaluated for infection with adult tapeworm, as they may be the source of infection. Multiple (3) stool specimens for O&P exam should be obtained. Food handlers positive for the pork tapeworm should be managed as above.

PREVENTION-EDUCATION

1. Explain transmission of disease.

2. Emphasize personal hygiene and sanitary disposal of human excrement.
3. Advise thorough cooking of pork and beef products.

DIAGNOSTIC PROCEDURES

CASE:

1. **Cysticercosis:**

   a. Biopsy

   b. Computed tomographic (CT) or magnetic resonance imaging (MRI) scan.

   c. Serologic testing (enzyme-linked immunoelectrotransfer blot assay [EITB, Western blot]). Contact Public Health Laboratory for instructions.

2. **Taeniasis:**

   a. **Microscopic examination of feces:**

      Container: Feces-Parasite.

      Laboratory Form: **PARASITOLOGY (H-383)**.

      Examination Requested: Taenia eggs.

      Submission Requirements: Follow instructions in container.

   b. **Worm or Segment Identification:**

      Container: Tuberculosis tube (50 ml centrifuge tube).

      Laboratory Form: **PARASITOLOGY (H-383)**.

      Examination Requested: Worm identification.

      Submission Requirements: Place worm or worm segment in water or saline solution; seal lid securely and refrigerate until transport.

DENGUE

1. **Agent**: Dengue 1, 2, 3, and 4, four serologically related viruses.

2. **Identification:**

   a. **Symptoms**: Acute onset with fever, headache, body ache and often a maculopapular rash. Illness generally is self-limited and lasts about one week. Minor or severe bleeding manifestations occasionally occur. Dengue hemorrhagic fever, also called dengue shock syndrome, is a distinct clinical entity seen mostly in children with plasma leakage as its major finding. A platelet count < 100,000 and evidence of hemoconcentration are required for the diagnosis. Dengue shock syndrome frequently is fatal unless supportive treatment is given.

   b. **Differential Diagnosis**: Dengue is easily confused in non-epidemic situations with common viral illnesses, e.g., enterovirus infection, influenza, measles, and rubella. Dengue can also resemble endemic WNV fever and flea-borne murine typhus. Dengue may be confused with chikungunya fever in travelers returning from chikungunya fever-endemic or outbreak areas. Dengue hemorrhagic fever (dengue shock syndrome) may resemble bacterial sepsis, e.g., meningococcemia or rickettsial disease.

   c. **Diagnosis**: Virus may be isolated from acute serum or detected by PCR; demonstration of a 4-fold antibody rise by testing paired sera (EIA hemagglutination inhibition, complement fixation) may also confirm the diagnosis.

3. **Incubation**: Usually 4-7 days, range 3-14 days.

4. **Reservoir**: Humans and mosquitoes, and perhaps monkeys in the jungle of the Malay Peninsula.

5. **Source**: The mosquito becomes infectious 8-12 days after the viremic blood meal and remains so for life.

6. **Transmission**: Dengue virus is transmitted by the bite of infected *Aedes* mosquitoes, principally *A, aegypti*. *A. albopictus*, recently introduced to the U.S. from Asia, has the potential to become an important vector in this hemisphere.

7. **Communicability**: Not directly communicable from person to person. Patients are usually infective for mosquitoes from shortly before to the end of the viremic period, an average of about 3-5 days.

8. **Specific Treatment**: None. Aspirin may exacerbate bleeding symptoms. Patients with dengue shock syndrome should be hospitalized and treated vigorously with fluid support.

9. **Immunity**: Permanent immunity for a specific virus, but infection with other serotypes can occur.

REPORTING PROCEDURES

1. Report any cases or suspected cases by telephone immediately to ACDC or Morbidity Unit (Title 17, Section 2500, *California Code of Regulations*).

2. **Report Forms:**

   DENGUE CASE REPORT (CDPH 8670)

3. **Epidemiologic Data:**

   a. Place of residence (be specific with regard to address, city and state) and travel history during the 2 weeks prior to onset of illness. A history of travel is important in interpreting results of serologic test.

   b. History of mosquito bites, noting time of day of bites. (*Aedes* mosquitoes are daytime biters.)

   c. Additional cases among household members, neighbors, fellow travelers.

d. Previous dengue infections, and yellow fever and Japanese B encephalitis vaccination status.

CONTROL OF CASE, CONTACTS & CARRIERS

Investigate within 24 hours so that information can be shared with appropriate state or international vector control agencies. Telephone ACDC.

CASE:

Precautions: Patients should be kept in a screened room for at least 5 days after onset.

CONTACTS: No specific measures other than case finding and education. No vaccine is presently available.

PREVENTION-EDUCATION

1. Reduce exposure to mosquitoes by using protective clothing, repellents, and avoid outdoor exposure at dawn and dusk.

2. Remove water on a regular basis from potential mosquito larval habitats, e.g., potted plants, old tires and pet watering dishes.

DIAGNOSTIC PROCEDURES

Clinical and epidemiologic history is required to aid the laboratory in test selections.

1. **Serology**: Paired acute and convalescent venous or capillary sera required.

   Collection: serum separator tube.

   Test Requisition and Report Form H-3021

   Procedure: Collect first (acute) blood as early as possible, preferably within 7 days after onset of rash. Collect second (convalescent) blood 10-14 days after first blood is drawn. Label all specimens with name of patient.

   Storage: Refrigerate if necessary. Send each specimen to the Public Health Laboratory as soon as possible.

   Amount: 8-10 ml.

2. **Virus Identification**: Blood samples collected within the first 5 days of illness must be transported immediately under refrigeration to the Public Health Laboratory for shipment to the State

   Collection: Red top tube.

   Laboratory Form: **Test Requisition and Report Form H-3021**

   Storage: Refrigerate immediately. If unable to deliver within 48 hours, centrifuge and freeze serum (-70^{o}C is preferable). Keep frozen until delivered to Public Health Laboratory.

DIPHTHERIA

1. **Agent**: *Corynebacterium diphtheriae*, a Gram-positive bacillus (Klebs-Loeffler).

2. **Identification**:

   a. **Symptoms**: An acute disease of pharynx, tonsils, larynx or nose, occasionally other mucous membranes or skin, characterized by an adherent grayish membrane. Symptoms include sore throat, large tender cervical lymph nodes, and marked swelling and edema of neck ("bull neck"). A toxin is responsible for the systemic manifestations. Late effects of the toxin include cranial and peripheral motor and sensory nerve palsies, myocarditis, and nephropathy. Cutaneous diphtheria (wounds, burns) usually appears as a localized ulcer.

   b. **Differential Diagnosis**: Bacterial and viral pharyngitis, Vincent's angina, infectious mononucleosis, syphilis, and candidiasis.

   c. **Diagnosis**: Culture of *C. diphtheriae* from nasopharyngeal, throat or membrane swabs.

3. **Incubation**: 2-5 days, occasionally longer.

4. **Reservoir**: Human.

5. **Source**: Discharges from nose, throat, skin, eye and other lesions of infected persons.

6. **Transmission**: Contact with patient or carrier; fomites. Raw milk has served as a vehicle.

7. **Communicability**: Variable until virulent bacilli disappear; usually 2 weeks or less, seldom more than 4 weeks. Effective antibiotic therapy reduces communicability to less than 4 days. Carriers may shed organisms for 6 months or more.

8. **Specific Treatment**:

   a. **Case**: Diphtheria antitoxin (DAT) should be given on the basis of clinical diagnosis; do not wait for bacteriological confirmation. Currently, the only DAT available in the U.S. is a product made in Brazil. This product is available to U.S. physicians under an FDA-approved Investigational New Drug (IND) protocol. Physicians requesting DAT should contact the LA County Immunization Program (IP) at 213-351-7800 during normal working hours to arrange for its release from the CDC Quarantine Station at Los Angeles International Airport. After working hours, contact the Administrative Officer of the Day through the County Operator at 213-974-1234.

   Appropriate antibiotic therapy with erythromycin or penicillin should be given in conjunction with antitoxin to eradicate the organism and reduce the period of communicability.(Treatment regimens can vary; consultation with infectious disease experts is recommended).

   b. **Carriers**: Appropriate antibiotic therapy as for all primary contacts to case (see section 2. under contacts below).

9. **Immunity**: None.

REPORTING PROCEDURES

1. Report confirmed or suspected case immediately by telephone (Title 17, Section 2500, *California Code of Regulations)*. Call IP during working hours (213-351-7800). After working hours, contact the Administrative Officer of the Day through County Operator (213-974-1234).

2. **Report Form**: **DIPHTHERIA CASE REPORT (CDPH 8579).**

3. **Definitions**:

   a. Case: has an upper respiratory tract illness characterized by sore throat, low-grade fever, and an adherent membrane of the tonsil(s), pharynx, and/or nose, without other apparent cause and is culture positive for virulent *C. diphtheriae*. A patient with a negative culture and classical symptoms may be considered a case.

c. Carrier: is an asymptomatic primary contact with positive culture.

d. Chronic carrier: has been free from the symptoms of diphtheria for 4 weeks or longer and who harbors virulent diphtheria bacilli. Consider as a case.

NOTE: When *C. diphtheriae* or other diphtheroids are seen on smears from colonies on the Loeffler's medium, the Laboratory reports this as positive. However, confirmation requires further biochemical studies. The ultimate test of significance is a virulence test.

4. **Epidemiologic Data**:

a. Date of onset.

b. Clinical history, signs and symptoms, nature and location of membrane, history of contact.

c. Laboratory data.

d. Immunization history of case: dates, dose, and type.

e. Identification of household contacts.

f. Treatment: antitoxin, date, hour, units, route administered, manufacturer. Other medications; dosage dates.

g. Travel history 2 weeks prior to onset, contact with travelers or immigrants (within incubation period).

h. Probable source.

CONTROL OF CASE, CONTACTS & CARRIERS

Public Health Nursing Protocol:
Home visit is required – a face to face interview is required.

Refer to "Public Health Nursing Home Visit REQUIRED Algorithm" (B-73 Part IV Public Health Nursing Home Visit Protocol).

Immediate investigation required.

CASE OR SUSPECT:

1. **Isolation**: Strict.

2. Release after 2 negative nose and throat cultures, taken not less than 24 hours apart and at least 24 hours after antibiotic treatment stopped.

3. Isolation may be terminated if bacilli are not virulent (*California Code of Regulations*, Section 2566).

4. If case dies, refer to **Part III, MORTICIANS AND CEMETERIES**.

CONTACTS:

Persons who have had face-to-face contact to a case within 5 days of case's onset.

1. Members of the family and intimate contacts should be examined, cultured (nose and throat) and placed under modified quarantine. (See **Part I, Section 13, Quarantine**.) Area Medical Director notifies Public Health Investigation. All household and close contacts should be given a diphtheria toxoid booster, (DTaP, DT or Td).

2. A fully immunized person exposed to a case or carrier should be given a booster dose of a preparation containing diphtheria toxoid, if they have not received one within 5 years. Close contacts, regardless of their immunization status, should receive antimicrobial prophylaxis with oral erythromycin (40-50 mg/kg per day for 7days, maximum 2 g/day) or a single IM dose of penicillin G benzathine (600,000 U for persons weighing less than 30 kg and 1.2 million U for persons weighing 30 kg or more).

3. All under-immunized contacts (defined as having received less than 3 doses of diphtheria toxoid or whose immunization status is unknown) should be immunized according to the Advisory Committee on Immunization Practice's requirement for their age. They should also receive antibiotic prophylaxis with oral erythromycin (40-50 mg/kg per day for 7 days, maximum 2 g/day) or a single IM dose of penicillin G benzathine (600,000 U for persons weighing less than 30 kg and 1.2 million U for persons weighing 30 kg or more).

4. Search for unreported and atypical cases among contacts; restrict and treat.

5. A nurse or physician visits all contacts under quarantine daily to observe and detect suspect cases. Symptomatic contacts are isolated until cultures rule out diphtheria. Begin antitoxin at first signs of illness.

6. Release 7 days after last exposure to case or carrier.

7. Contacts who work in a sensitive occupation and school children should be removed from work or school until adequately prophylaxed as above.

CARRIERS:

Routine and Chronic.

1. If carrier is a contact to a virulent case, isolate until carrier's virulence is determined. Carriers with positive virulence should be handled as a case.

2. A carrier with negative virulence or whose contact was to an avirulent case may be treated with antibiotic therapy as for all primary contacts and released after 7 days from case's onset.

PREVENTION-EDUCATION

1. Stress importance of routine immunization of all. Immunization required for school entry. California law requires exclusion from school if immunization status does not comply with *California Code of Regulations*, Title 17, regulations.

    a. An assessment of immunization levels in the community should be initiated. Special outreach clinics and increased health education should be made available to susceptible populations. Immunize high-risk groups including household or intimate contacts, personnel working with cases or carriers, hospital personnel including nurses and medical students, school contacts.

    b. Primary immunization advised for cases and carriers who have received antitoxin.

2. Use pasteurized milk.

3. Disinfect fomites and discharges from lesions.

DIAGNOSTIC PROCEDURES

1. **Culture**: Call Public Health Laboratory, General Bacteriology Section.

    Container: Diphtheria Culture Kit.

    Laboratory Form: **Test Requisition and Report Form H-3021**

    Examination Requested: Diagnosis or release.

    Material: Nose and throat swab submitted on separate slants. Inoculate slant and discard swab. For symptomatic cases, material should be obtained from beneath the membrane, or a portion of the membrane should be submitted for culture.

    Hand carry to Public Health Laboratory as soon a possible, within 8 hours after inoculation. Indicate time specimen was inoculated.

    If above not possible, incubate at 35^{o}C (95^{o}F) for 18-24 hours, then hand-carry to Public Health Laboratory. Indicate hours incubated.

2. **Virulence Testing**:

    a. Noncutaneous Case: If *C. diphtheriae* is found on cultures of nose or throat specimens, isolate should be sent to the State Laboratory for virulence testing.

    b. Cutaneous Case: Virulence testing is not recommended. Organisms isolated from recent cases of cutaneous diphtheria in the United States have been nontoxigenic.

    c. Carrier: If carrier is a contact to a virulent case, then carrier's specimen should be sent to the State Laboratory for virulence testing. Virulence testing is not recommended for specimens obtained from a carrier whose contact was to an avirulent case.

EBOLA VIRUS DISEASE

Ebola Virus Disease (EVD) is one of numerous Viral Hemorrhagic Fevers. It is a severe, often fatal disease (50%-90% fatality) in humans and nonhuman primates (such as monkeys, gorillas, and chimpanzees). In 2014, the West African countries (Guinea, Liberia, Sierra Leone, Lagos, Nigeria) have experienced the largest outbreak of EVD.

1. **Agent**: Ebola HF is caused by infection with a virus of the family *Filoviridae*, genus *Ebolavirus*

2. **Identification**:

   a. **Symptoms**: Initial signs and symptoms are nonspecific and may include fever, chills, myalgias, and malaise. Fever, anorexia, weakness are the most common signs and symptoms. Patients may develop a diffuse erythematous maculopapular rash by day 5 to 7 (usually involving the face, neck, trunk, and arms) that can desquamate. Patients can progress from the initial non-specific symptoms after about 5 days to develop gastrointestinal symptoms such as severe watery diarrhea, nausea, vomiting and abdominal pain. Other symptoms such as chest pain, shortness of breath, headache or confusion, may also develop. Patients often have conjunctival injection. Seizures may occur, and cerebral edema has been reported. Bleeding is not universally present but can manifest later in the course as petechiae, ecchymosis/bruising, or oozing from venipuncture sites and mucosal hemorrhage. Frank hemorrhage is less common. Pregnant women may experience spontaneous miscarriages.

   b. **Differential Diagnosis**: Due to these nonspecific symptoms particularly early in the course, EVD can often be confused with other more common infectious diseases such as malaria, typhoid fever, meningococcemia, and other bacterial infections (e.g., pneumonia).

   c. **Diagnosis**: A case is defined by meeting the CDCs definition:

Person Under Investigation (PUI)
A person who has both consistent symptoms and risk factors as follows:

1) Clinical criteria, which includes fever of greater than 38.6 degrees Celsius or 101.5 degrees Fahrenheit, and additional symptoms such as severe headache, muscle pain, vomiting, diarrhea, abdominal pain, or unexplained hemorrhage; **AND**

2) Epidemiologic risk factors within the past 21 days before the onset of symptoms, such as contact with blood or other body fluids or human remains of a patient known to have or suspected to have EVD; residence in—or travel to—an area where EVD transmission is active; or direct handling of bats, rodents, or primates from disease-endemic areas.

Probable Case
A PUI who is a contact of an EVD case with either a high or low risk exposure (see page 3)

Confirmed Case
A case with laboratory confirmed diagnostic evidence of ebola virus infection.

3. **Incubation**: Usually 8-10 days (range 2 to 21 days).

4. **Reservoir**: unknown. However, on the basis of available evidence and the nature of similar viruses, researchers believe that the virus is zoonotic (animal-borne) with bats being the most likely reservoir. Four of the five subtypes occur in an animal host native to Africa.

5. **Source**: Blood, sweat, vomit, saliva, urine, feces, semen, breast milk of EVD cases. Infected bats, rodents, or primates from disease-endemic areas.

6. **Transmission**: Direct contact (through broken skin or mucous membranes) with bodily fluids from an EVD infected person,

such as blood, sweat, vomit, saliva, urine, feces, semen, or through contact with contaminated objects (i.e., needles, etc). Direct handling of bats, rodents, or primates from disease-endemic areas.

7. **Communicability**: A person with EVD becomes infectious to others at the onset of symptoms.

8. **Specific treatment**: Standard treatment for EVD is limited to treating the symptoms as they appear and supportive care, such as balancing the patient's fluids and electrolytes, maintaining their oxygen status and blood pressure, and treating them for any complicating infections.

9. **Immunity:**

REPORTING PROCEDURES

1. **Report any case or suspect cases by telephone immediately** (Title 17, Section 2500. *California Code of Regulations*).

   a. ACDC will notify the CDC Emergency Operations Center at (770) 488-7100.

   b. ACDC will notify the CA Dept. of PH Division of Communicable Disease Control (CDPH DCDC) by calling the Duty Officer at (510) 620-3434/After-hours pager (800) 971-9631.

   c. Notify appropriate ACDC staff

   d. Notify Public Health Lab

2. **Report Form:**

   a. **CDC/CDPH CASE REPORT FORM**

   b. **EBOLA VIRUS DISEASE INTAKE CHECKLIST** (for internal ACDC use)

   c. **EBOLA VIRUS DISEASE SCREENING FORM** (for internal ACDC use)

   Upon consultation with the reporting clinician, the AOD is to complete both the EVD intake/checklist and the screening form. AOD is to report to Chief or Deputy Chief of ACDC to determine actions to follow.

3. Epidemiological Data:

   a. Travel to EVD affected areas (as of 8/18/14: Guinea, Liberia, Sierra Leone, Lagos, Nigeria) within 21 days of onset of symptoms.

   b. Employment in a healthcare facility or other healthcare setting in the EVD affected areas.

   c. Direct contact with body fluids of a known EVD patient.

   d. Caretaker or household member of a person infected with EVD.

   e. Laboratory worker handling specimens from an EVD patient.

   f. Direct exposure to human remains of a person with EVD without wearing appropriate personal protection equipment

   g. Direct handling of bats, rodents, or primates from the EVD affected areas

CONTROL OF CASES & CONTACTS

CASE:

1. If the clinician and public health have a high index of suspicion for EVD, the patient should be placed immediately in isolation. Private room, private bathroom, door closed. Ensure proper standard, contact, droplet precaution. If any aerosolizing procedures needed, place patient in airborne isolation room.

2. Interview case to obtain the names of all persons in contact with patient before the implementation of isolation precautions (ex. emergency medical services, emergency room personnel, family/household members, other patient contacts, etc).

3. Maintain log of all staff and visitors to room. Ensure only necessary personnel enter room. Keep log of all staff, visitors (with contact numbers) who may have had interaction/contact with patient prior to proper isolation of patient.

4. Utilize Personal Protective Equipment at all times when in patient rooms. **At all times:** gloves, gown (impermeable or fluid resistant), facemask, eye protection (goggles or face shield). If needed: double glove, shoe covers, leg covers. If performing aerosolizing procedures: N95 mask.

5. Prior to discharge: contact LAC Department of Public Health (DPH) Acute Communicable Disease Control (ACDC) Program at (213) 240-7941. Physicians at ACDC are available 24 hours/day for consultation

CASES/CONTACTS: Obtain CDC Contact Investigation Form (pending release).

Locate and interview each case/contact to confirm exposure risk to the EVD case and to determine presence or absence of symptoms in the contact.

ACDC will coordinate with CHS for daily monitoring of persons placed on conditional release* and controlled movement**

1. High risk exposure includes:
- Percutaneous (e.g., the needle stick) or mucous membrane exposure to body fluids of EVD patient
- Direct care or exposure to body fluids of an EVD patient without appropriate personal protective equipment (PPE)
- Laboratory worker processing body fluids of confirmed EVD patients without appropriate PPE or standard biosafety precautions
- Participation in funeral rites which include direct exposure to human remains in the geographic area where outbreak is occurring without appropriate PPE

a. Symptomatic: Admit and isolate patient, perform Ebola virus testing, and contact tracing.

b. Asymptomatic:
   - Conditional release*****
   - Controlled movement****** for 21 days after last exposure

2. Low risk exposure includes:
- Household member or other casual contact (being within approximately 3 feet or within the room or care area for a prolonged period of time while not wearing recommended PPE or having direct brief contact (e.g., shaking hands) with an EVD case while not wearing recommended PPE with an EVD patient.
- Providing patient care or casual contact without high-risk exposure with EVD patients in health care facilities in EVD outbreak affected countries.
- Bat, rodent, or primate exposure in affected area

a. Symptomatic:
   - Admit and isolate patient according to procedures outlined below; perform Ebola virus testing
   - Conditional release with monitoring by DPH and consideration of home isolation. Twice-daily self-monitoring for fever.

b. Asymptomatic:
   - Conditional release*
   - Controlled movement** for 21 days after last exposure with EVD case. No travel by commercial conveyances.

3. No risk exposure includes:
- No known low-risk or high-risk exposure
- Symptomatic:
   - *Hospitalized:* No Ebola testing required now. Patient to be isolated according to procedures outlined below.
   - *Discharged:* ACDC to coordinate with Community Health Services (CHS) for daily check-in. Patient to take temperature twice daily.

Asymptomatic: Patient to self-monitor for fever/symptoms. No ACDC follow up.

***Conditional release**: Daily monitoring by public health authority; twice daily self-monitoring for fever; notify public health authority if fever or other symptoms develop

****Controlled movement**: Notification of public health authority; no travel by commercial conveyances (airplane, ship, train, bus, taxi); timely access to appropriate medical care if symptoms develop

Isolation and Quarantine

ACDC Chief/Deputy Chief will determine if legal orders are necessary and contact Public Health Investigations (PHI).

DIAGNOSTIC PROCEDURES

Notify the Public Health Lab prior to any testing for EVD (562-658-1300 or 658-1360)

Refer to CDC website for the Interim Guidance for Specimen Collection, Transport, Testing, and Submission for Patients with Suspected Infection with Ebola Virus Disease:

http://www.cdc.gov/vhf/ebola/hcp/interim-guidance-specimen-collection-submission-patients-suspected-infection-ebola.html

Within a few days of symptom onset:
- Antigen-capture enzyme-linked immunosorbent assay (ELISA) testing
- IgM ELISA
- Blood for Polymerase chain reaction (PCR)
- Blood for Virus isolation

Later in disease course or after recovery:
- Blood for IgM and IgG antibodies

Retrospectively in deceased patients:
- Tissue for Immunohistochemistry testing
- Blood for PCR
- Blood for Virus isolation

PREVENTION-EDUCATION

1. Reinforce the importance of ensuring strict infection control practices in healthcare facilities and among healthcare personnel.

   For guidance refer to the Infection Prevention and Control Recommendations for Hospitalized Patients with Known or Suspected Ebola Hemorrhagic Fever in U.S. Hospitals on the CDC website:

   http://www.cdc.gov/vhf/ebola/hcp/infection-prevention-and-control-recommendations.html

2. Regarding Environmental Infection Control for hospitals taking care of patients with suspected or confirmed EVD:

   a. Environmental services staff must wear recommended PPE including, at a minimum, disposable gloves, gown (fluid resistant/ impermeable), eye protection (goggles or face shield), and facemask to protect against direct skin and mucous membrane exposure of cleaning chemicals, contamination, and splashes or spatters during environmental cleaning and disinfection activities.
   b. Use a U.S. Environmental Protection Agency (EPA)-registered hospital disinfectant with a label claim for a non-enveloped virus (e.g., norovirus, rotavirus, adenovirus, poliovirus) to disinfect environmental surfaces in rooms of patients with suspected or confirmed Ebola virus infection
   c. Avoid contamination of reusable porous surfaces that cannot be made single use.
   d. To reduce exposure among staff to potentially contaminated textiles (cloth products) while laundering, discard all linens, non-fluid-impermeable pillows or mattresses, and textile privacy curtains as a regulated medical waste.
   e. For full guidance, see: http://www.cdc.gov/vhf/ebola/hcp/environmental-infection-control-in-hospitals.html

3. Educate healthcare staff on the importance of strict adherence to proper use of standard, contact, droplet and airborne precautions.

4. Utilize Personal Protective Equipment at all times when in patient rooms:
   - Gloves, gown (impermeable or fluid resistant), facemask, eye protection (goggles or face shield). If needed: Double glove, shoe covers, leg covers. If performing aerosolizing procedures: N95 mask

5. Educate healthcare workers on the safe specimen handling for routine laboratory diagnostics.
   a. Minimize routine blood and specimen draws.
   b. Clean equipment according to manufacturer's instructions.

Refer to CDC guidance for more information and Guidance for Specimen Collection, Transport, Testing, and Submission for Patients with Suspected Infection with Ebola Virus Disease:

http://www.cdc.gov/vhf/ebola/hcp/interim-guidance-specimen-collection-submission-patients-suspected-infection-ebola.html

OTHER RESOURCES:
[Future CDC guidance to be inserted as it becomes available]

EHRLICHIOSIS

(new term is anaplasmosis; also called human monocytic ehrlichiosis [HME])

1. **Agent**: The majority of cases of human monocytic ehrlichiosis (HME) found in the USA are caused by *E. chaffeensis*.

2. **Identification**:

   a. **Symptoms**: Human ehrlichiosis/ anaplamosis are newly recognized diseases in USA. The spectrum of disease ranges from mild illness to a severe, life-threatening or fatal disease. Symptoms are usually nonspecific; the most common complaints are fever, headache, anorexia, nausea, myalgia and vomiting. The disease may be confused clinically with Rocky Mountain spotted fever (RMSF) but differs by rarity of a prominent rash.

   Laboratory findings include leukopenia, thrombocytopenia, and elevation of one or more liver-function tests. In hospitalized cases, the laboratory findings may be only slightly abnormal on admission, and become more abnormal during hospitalization.

   b. **Differential Diagnosis**: RMSF, bacterial sepsis, Lyme disease, endemic (murine) typhus, toxic-shock syndrome, gastro-enteritis, viral syndromes, tick-borne encephalitis and other multi-system febrile illnesses.

   c. **Diagnosis**: Preliminary diagnosis of ehrlichiosis/anaplamosis in the USA is based on clinical and laboratory findings. Confirmation is based on: the evaluation of a blood smear, development of serum antibodies to *E. chaffeensis* for ehrlichiosis or *A. phagocytophila* for anaplamosis; immunofluorescence test; PCR.

3. **Incubation**: 7 to 21 days for ehrlichiosis/anaplamosis.

4. **Reservoir**: White-tailed deer are a major host of lone star ticks and appear to represent one natural reservoir for *E. chaffeensis*. Deer, elk, and wild rodents are likely reservoirs of the agent of HGE.

5. **Source**: Ehrlichiosis/anaplamosis in North America has been concentrated in the southeastern and south-central areas of the USA. More than 12 human cases, including 3 deaths, caused by a granulocytic *Ehrlichia*, have occurred in northern Minnesota, Wisconsin, Connecticut, Maryland and Florida. Rarely cases of ehrlichiosis/anaplamosis have been diagnosed in California.

6. **Transmission**: In the United States, ehrlichiae are transmitted by the bite of an infected tick. The lone star tick (*Amblyomma americanum*), the blacklegged tick (*Ixodes scapularis*), and the western blacklegged tick (*Ixodes pacificus*) are known vectors of ehrlichiosis/anaplamosis in the US. *Ixodes ricinus* is the primary vector in Europe. Most patients report a tick bite or association with wooded, tick-infested areas prior to onset of illness.[1]

7. **Communicability**: No evidence of person-to-person transmission.

8. **Specific Treatment:** A tetracycline such as doxycycline; chloramphenicol for pregnant women and children under 8 years of age.

9. **Immunity**: Susceptibility is believed to be general. No data are available on protective immunity in humans from infections caused by these organisms. Re-infection is rare but has been reported.

REPORTING PROCEDURES

1. Reportable within 7 days of diagnosis (Title 17, Section 2500, *California Code of Regulations)*.

   EHRLICHIOSIS/ANAPLASMOSIS CASE REPORT (CDPH 8573)

2. **Epidemiologic Data**:

   a. Recent travel to endemic areas.

   b. History of tick bites.

   c. History of possible exposure to ticks in wooded areas.

1 See http://www.cdc.gov/ehrlichiosis/.

d. Occupational exposure.

CONTROL OF CASE & CONTACTS:

CASE:

1. **Isolation**: None.

2. **Concurrent disinfection**: Remove any ticks.

CONTACTS: No restrictions.

PREVENTION-EDUCATION

1. Use of tick repellants in endemic areas.

2. Wear protective clothing in wooded areas.

3. Control ticks on domestic animals.

4. Avoid tick-infested areas when possible. Check skin periodically and remove attached ticks immediately.

DIAGNOSTIC PROCEDURES

1. **Serology**: Indirect immunofluorescence.

   Container: Serum separator tube.

   Laboratory Form: State special serology.

   Examination Requested:
   Ehrlichiosis/anaplamosis.

   Material: Whole blood.

   Amount: 10 ml.

   Storage: Refrigerate until transported.

2. **PCR**

   Container: Red top or red-grey top tube.

   Material: Serum.

   Amount: 1 ml.

   Storage: Refrigerate or freeze until transported.

ESCHERICHIA COLI, SHIGA TOXIN PRODUCING, INCLUDING 0157:H7 AND HUS

1. **Agent**: Any *Escherichia coli* serotype that produces shiga-like (vero) toxin including but not limiited to O157:H7, O111, O102. Also known as STEC, VTEC, and enterohemorrhagic *E. coli*. (EHEC).

2. **Identification**:

   a. **Symptoms**: An intestinal infection of varying severity characterized by diarrhea that is often bloody, and cramping abdominal pain. Fever, usually not high, is present in fewer than one-third of patients. Illness may be complicated by the hemolytic uremic syndrome (HUS) or thrombotic thrombocytopenic purpura (TTP). Asymptomatic infections occur. Children and the elderly are often more severely affected.

   b. **Differential Diagnosis**: Other causes of diarrhea, intestinal bleeding, or acute abdominal pain, including infections, neoplasms, appendicitis and other surgical conditions.

   c. **Diagnosis**: STEC can be identified through culture and serotyping. It can also be identified by enzyme immunoassay (EIA), a method that demonstrates the presence of Shiga-like toxins. A special laboratory request is usually required.

3. **Incubation period**: Median 3 to 4 days with a range of 1 to 10 days.

4. **Reservoir**: Cattle, possibly other ungulates such as deer; humans may serve as a reservoir for person-to-person transmission.

5. **Source**: Feces of infected animals and persons; undercooked beef products (primarily ground beef); unpasteurized milk; contaminated produce, drinking water supply and recreational water exposure.

6. **Transmission**: Ingestion of contaminated food, milk or water; also directly person-to-person in households, daycare, and long-term care facilities.

7. **Communicability**: Variable as long as organisms excreted, usually 1 to 3 weeks.

8. **Specific Treatment**: Supportive; replacement of fluids, electrolytes. Role of antibiotics is controversial. There is some evidence to suggest that treatment with trimethoprimsulfamethoxazole (TMP-SMX) may increase risk of HUS or TTP.

9. **Immunity**: Unknown.

REPORTING PROCEDURES

1. **Reportable**: (Title 17, Section 2500, *California Code of Regulations*.) Report immediately by telephone of a case or suspected case to ACDC and Morbidity Unit. Bacterial isolates must be forwarded to LA County Public Health Laboratory for confirmation.

2. **Report Form**: **E. Coli O157, OTHER STEC, SHIGA TOXI POSITIVE FECES, AND/OR HUS CASE REPORT (CDPH 8555)**

   Supplemental food history forms at request of ACDC.

3. **Epidemiologic Data**:

   a. Specific food history within 7 days prior to onset, including place of purchase (e.g., poorly cooked beef products, unpasteurized dairy products, unpasteurized apple cider and juice, melons, lettuce and sprouts).

   b. Specific restaurant history 7 days prior to onset. Give name and location of restaurant(s).

   c. Exposure to others with diarrhea in or outside of household.

   d. Contact with farm animals before onset.

   e. Contact to a child care center or institution.

   f. Recreational water exposures.

g. Travel up to 3 weeks prior to onset.

h. Occupation.

CONTROL OF CASE, CONTACTS & CARRIERS

Public Health Nursing Home Visit Protocol:
Home visit as necessary – a face to face interview is conducted as necessary.

Refer to "Public Health Nursing Home Visit AS NECESSARY (HVAN) Algorithm" (B-73 Part IV Public Health Nursing Home Visit Protocol).

CASE:

Investigate within 24 hours.

1. **Precautions**: Enteric precautions until clinical recovery.

2. **Sensitive Occupation or Situation**: Remove from work until 2 successive negative feces specimens are obtained, at least 24 hours apart and taken at least 48 hours after cessation of antimicrobial therapy.

3. **Non-sensitive Occupation or Situation**: Release after clinical recovery unless household contact in SOS. Then release after obtaining 2 negative feces specimens as for case in SOS.

CONTACTS:
Household members or persons who share a common source.

1. **Sensitive Occupation or Situation**:

   a. **Symptomatic**: Remove from work until negative specimens as for case. Then weekly negative specimens until case released or contact with case broken.

   b. **Asymptomatic**: Remove from work until 1 negative feces specimen. Then, weekly negative specimens until case released. Released after 2 successive negative specimens if contact with case is broken.

2. **Non-Sensitive Occupation or Situation**: Obtain stool specimen if symptomatic.

PREVENTION-EDUCATION

1. Thoroughly cook beef, especially ground beef, to an internal temperature of 155°F (68°C) until center is no longer pink and juices run clear.

2. Avoid the use of unpasteurized milk or other products.

3. Avoid cross-contamination of other foods. All utensils, including chopping board, that have been in contact with raw meat should be washed before using for preparation of other food. After working with raw meat, the hands should be washed before preparing other foods.

4. Instruct family members about the importance of frequent hand washing with soap and water, especially after using the bathroom, disposal of soiled diapers and human waste, and before preparation of food and beverages.

DIAGNOSTIC PROCEDURES

1. **Microscopic:**

   Container: Enterics.

   Laboratory Form: **Test Requisition Form H-3021 (Rev. 9/07)**

   Examination Requested: *E.coli* O157:H7, including other entero-hemorrhagic *E. coli*.

   Material: Feces. Follow instructions provided with container.

   Storage: Protect from overheating. Maintain at room temperature.

   Remarks: Mark "SOS" (sensitive occupation or situation) in red on container if appropriate.

2. **Culture for Identification (CI)**:

   Container: Enteric CI

   Laboratory Form: Test Requisition Form H-3021.

   Material: Pure culture on sorbitol-containing medium.

   Storage: Same as above.

ENCEPHALITIS, Acute Viral

(See also **ENCEPHALITIS**, **Arboviral**, and **WEST NILE VIRUS**)

1. **Agent**: Many viruses can produce this syndrome, including mumps, varicella zoster, herpes simplex I and II, measles, rabies, influenza (A and B) and a variety of enteroviruses. Rarely, live virus vaccines may result in acute encephalitis. A specific etiologic agent may be difficult to identify.

2. **Identification**: Clinical signs of encephalitis can occur as a primary manifestation, as an associated illness, or as a complication.

   a. **Symptoms**: Variable; headache, high fever, meningeal signs, altered level of consciousness, spasticity, convulsions, and tremors. If the spinal cord is also affected, the condition is called *encephalomyelitis*; if the meninges are inflamed, the condition is called *meningoencephalitis*.

   b. **Differential Diagnosis**: Arthropod-borne encephalitides, post-infectious encephalo-myelitis, other causes of inflammatory encephalopathy.

   c. **Diagnosis**: Presence of viral-specific IgM antibodies in cerebrospinal fluid or acute-phase serum suggests recent infection. A 4-fold rise in viral-specific antibodies in paired acute and convalescent sera by neutralization, complement fixation, indirect fluorescent antibody, ELISA, or other serologic tests. Isolation of the virus from brain tissue or, rarely, from blood or CSF, or demonstration of viral antigen in brain tissue by immunofluorescence. Viral-specific PCR testing of CSF is available commercially and through public health laboratories.

REPORTING PROCEDURES

1. **Reportable**. (Title 17, Section 2500, *California Code of Regulations*).

   Report Form: For individual cases: no report form is required.

   For outbreaks:
   OUTBREAK/ UNUSUAL DISEASE REPORT (CDPH 8554)

   An outbreak of viral encephalitis is defined as at least two cases outside of the immediate family from a suspected common source. Outbreaks of encephalitis are investigated by Acute Communicable Disease Control Program.

2. **Epidemiologic and Clinical Data**:

   a. Other illnesses 3 to 4 weeks prior to onset.

   b. Immunization 3 to 4 weeks prior to onset: note dates, types, and sources.

   c. Results of the first spinal tap (CSF). Note the total WBC with differential, total RBC, and total protein and glucose and Gram stain.

   d. Results of all viral studies performed including antibody tests (serum and CSF), PCR-based diagnostics of CSF, and viral and bacterial cultures of CSF if completed.

   e. Results of other appropriate clinical studies (e.g., head CT, MRI, EEG).

CONTROL OF CASE, CONTACTS & CARRIERS

Follow-up depends on etiology, if known.

CASE: Isolation depends on communicability of etiologic agent. If unknown or enteroviral etiology is suspected, standard precautions are recommended. If respiratory virus is suspected then aerosol droplet isolation should also be followed.

CONTACTS: No restrictions.

CARRIERS: Not applicable.

PREVENTION-EDUCATION

Immunization against childhood disease. Use of good hygiene, especially hand washing.

DIAGNOSTIC PROCEDURES

Clinical and epidemiologic history is required to aid the laboratory in test selection.

1. **Antibodies**: Paired sera required.

   Container: Serum separator tube (SST).

   Test Requisition and Report Form H-3021 or online request if electronically linked to the Public Health Laboratory.

   Test Requested: Encephalitis panel and/or enteroviral serology.

   Material: Whole clotted blood, CSF.

   Amount: 8-10 ml of blood, 1-2 ml CSF.

   Storage: Refrigerate immediately.

   Remarks: Collect first (acute) blood specimen as soon as possible. Collect second (convalescent) blood approximately 2 weeks after the first. Send each specimen to Public Health Laboratory as it is collected.

2. **Culture**: Depends on stage of illness. Consult the Public Health Laboratory, Virology Section.

   Container: Sterile, 30 ml. wide-mouth screw-cap bottle, viral culturette, sterile test tube.

   Laboratory Form: **Test Requisition and Report Form H-3021**

   Examination Requested: Viral Culture.

   Material: 2-3 grams of stool (no preservative) required; NP swab (using viral transport media) and CSF recommended.

   Storage: Refrigerate and deliver to Public Health Laboratory within 48 hours of collection, or freeze immediately after collection at -70^{o}F and keep frozen until delivery.

   Remarks: Specimens for isolation attempts must be collected as soon as possible after the onset of symptoms.

3. **PCR**: Useful for the diagnostic of enterovirus and herpes viruses (including HSV I, HSVII, varicella zoster virus) which can cause acute viral encephalitis.

   Container: sterile test tube.

   Laboratory Form: **Test Requisition and Report Form H-3021**

   Examination Requested: PCR of CSF for enterovirus, HSVI, HSVII, varicella zoster virus.

   Material: 1-2 cc CSF (no preservatives).

   Storage: Keep chilled and deliver to the virology laboratory as soon as possible. If unable to deliver within 48 hours, freeze immediately after collection at -70^{o}C and keep frozen until delivered to the virology laboratory.

ENCEPHALITIS, Arboviral

(See also **ENCEPHALITIS, Acute Viral**.)

1. **Agent**: A group of acute inflammatory viral diseases involving brain, spinal cord and meninges caused by specific viruses. St. Louis encephalitis virus (SLE), West Nile virus (WNV), Western equine encephalitis virus (WEE), and California encephalitis (CE) virus are found in California.

2. **Identification**:

   a. **Symptoms**: Acute meningoencephalitis with variations in severity, ranging from asymptomatic to mild (fever and headache, aseptic meningitis) to severe (acute onset of headache, high fever, meningeal signs, altered level of consciousness, tremors, muscle rigidity, muscle weakness, paralysis, convulsions, coma and death). SLE, WNV, and WEE more likely to produce clinical disease in elderly while CE is more common in children. WEE and WNV may affect all age groups.

   b. **Differential Diagnosis**: Other infectious causes of meningoencephalitis (e.g., tuberculosis, other bacteria, and fungi, certain parasites), stroke, systemic lupus and other autoimmune processes.

   c. **Diagnosis**: Viral-specific IgM antibodies in cerebrospinal fluid or acute-phase serum suggests recent infection. A 4-fold rise in viral-specific antibodies in paired acute and convalescent sera by neutralization, complement fixation, indirect fluorescent antibody, ELISA, or other serologic tests. Isolation of virus from brain tissue, or rarely, from blood or CSF, demonstration of viral antigen in brain tissue by immunofluorescence or demonstration of specific nucleic acid sequencing by PCR.

3. **Incubation**: Usually 5-15 days. (SLE 4-21 days, WEE 5-10 days, CE 5-15 days, WNV 3-15 days). Incubation period can be prolonged for up to 30 days for individuals with underlying immunocompromising conditions.

4. **Reservoir**: Dependent on specific virus; amphibians, bats, birds, reptiles, rodents, and others. Birds are the primary reservoir for SLE, WEE, and WNV viruses.

5. **Source**: Infective arthropod, usually a mosquito. WNV is also potentially transmitted through infected blood products and organ tissue.

6. **Transmission**: Bite of infective arthropod.

7. **Communicability**: Not transmitted person to person.

8. **Specific Treatment**: Supportive.

9. **Immunity**: Permanent for specific virus.

REPORTING PROCEDURES

1. **Reportable**. (Title 17, Section 2500 *California Code of Regulations*). Telephone report of case or suspect case to ACDC and Morbidity Unit.

2. **Report Form**:

   ENCEPHALITIS CASE HISTORY FORM (acd-enceph).

   WEST NILE VIRUS CASE HISTORY FORM (acd-westnile).

3. **Epidemiologic and Clinical Data**:

   a. If case was bitten by mosquitoes or was in a mosquito-infested area during incubation period, identify as precisely as possible (address, city, zip) the area where the exposure occurred. Note outdoor activities during dusk.

   b. Increased mortality of horses in area may indicate the presence of WEE; increased mortality of crows or other corvid species may indicate WNV.

   c. Presence of other human cases.

   d. Travel up to 3 weeks prior to onset.

   e. Occupation and hobbies.

f. Results of the first spinal tap (CSF). Note the total WBC with differential, total RBC, and total protein and glucose and Gram stain.

g. Results of any viral studies performed including antibody tests (serum and CSF), PCR-based diagnostics of CSF, and viral and bacterial cultures of CSF if completed.

h. History of organ transplantation or receipt or donation of blood products within 4 weeks of symptom onset.

i. Results of WNV, WEE, SLE serum and CSF antibodies, if available.

CONTROL OF CASE, CONTACTS & CARRIERS

Investigate within 3 days. If encephalitis is due to arboviral etiology (e.g. WNV), ACDC will alert appropriate mosquito abatement district where case resides.

CASE: No restrictions.

CONTACTS: No restrictions.

CARRIERS: Not applicable.

PREVENTION-EDUCATION

1. Prevent mosquito bites by using screens on windows, and wear protective clothing and repellents if outdoor activity in areas with mosquito infestation is necessary.

2. Eliminate mosquito-breeding sites by emptying containers with stagnant water (i.e., bird baths, old tires, planters and other containers).

3. Control adult mosquito population by applying appropriately labeled pesticides. Control of larva and eliminating large breeding areas should be referred to mosquito abatement agencies.

4. Proper use of DEET-based insect repellant—no more than 35% DEET for adults and 10% for children. DEET based products are safe for children ages 2 months and older. Parents should apply insect repellent to their children. Picaridin and oil of lemon eucalptus have also shown to offer long-lasting protection against mosquito bites (approved for children ages 3 years and above.

DIAGNOSTIC PROCEDURES

Clinical and epidemiologic history required to aid the laboratory in test selection.

1. **Antibodies**: Paired acute and convalescent sera required; CSF.

   Container: Serum separator tube (SST).

   Test Requisition and Report Form H-3021

   Test requested: Arbovirus Serology. (SLE, WEE, WNV)

   Material: Whole clotted blood, CSF.

   Amount: 8-10 ml of blood, 1-2 ml. CSF.

   Storage: Refrigerate immediately.

   Remarks: Collect first (acute) blood specimen as soon as possible. Collect second (convalescent) blood approximately 2 weeks after the first. Send each specimen to Public Health Laboratory as soon as it is collected.

2. **Culture**: Arbovirus isolation not offered. See **ENCEPHALITIS, Acute Viral** for isolation of other potential viral agents.

   All CSF specimens for arboviral testing must by accompanied by serum specimens.

3. **PCR**: Useful for the diagnostic of enteroviruses and herpes viruses (including HSVI, HSVII, varicella) which can cause acute viral encephalitis.

   Container: sterile test tube.

   Laboratory Form: Test Requisition and Report Form H-3021 or online request if electronically linked to the Public Health laboratory.

   Examination Requested: PCR of CSF for enterovirus, HSVI, HSVII or varicella.

   Material: 1-2 cc CSF (no preservatives).

FOODBORNE DISEASE (See also **GASTROENTERITIS, VIRAL**)

1. **Agent**: "Foodborne disease" is a generic term applied to illness of acute onset, usually gastrointestinal in nature, and acquired through consumption of contaminated food. A variety of agents can cause foodborne disease, including bacteria, viruses, and parasites. The term also applies to intoxications caused by chemical contaminants; toxins produced by bacterial growth (e.g. botulinal, or staphylococcal toxins) and a variety of organic substances that may be present in foods such as certain mushrooms, oysters, mussels and other seafood.

2. **Identification:**

   a. **Symptoms**: Symptoms vary by etiologic agent. They may include nausea, vomiting, diarrhea, cramps, fever, and headache. Precise clinical history is important in the identification of suspect etiologies.

   b. **Differential Diagnosis**: Other known routes of transmission for particular etiologic agents. See the following tables in the appendix:

      Table 1. VIRAL GASTROENTERITIS -- DIFFERENTIAL DIAGNOSIS

      Table 2. BACTERIAL GASTROENTERITIS -- DIFFERENTIAL DIAGNOSIS

      Table 3. PARASITIC GASTROENTERITIS -- DIFFERENTIAL DIAGNOSIS

      Table 4. FOOD POISONING ASSOCIATED WITH NATURALLY OCCURRING TOXINS IN SEAFOOD

   c. **Diagnosis**: Based on the clinical history of patients and laboratory results from patient and/or suspected food items.

   d. Many etiologic agents of disease can potentially be transmitted by food. For disease-specific information, refer to the individual disease sections.

REPORTING PROCEDURES

1. Reportable, *California Code of Regulations,* Section 2500.

2. Immediate telephone report of case or suspect case is required to:

   a. Morbidity Unit during working hours; or

   b. Chiefs, Food and Milk and ACDC (or their representatives). After working hours contact via the County Operator.

3. Morbidity Unit assigns an episode number.

4. **Report Form**: Depends on route of transmission as determined by investigation

   SUSPECTED FOOD-BORNE ILLNESS REPORT (H-26) (completed by Morbidity Unit)

   EPIDEMIOLOGICAL QUESTIONNAIRE OF FOOD POISONING EPISODE (H-482) (completed by Food & Milk Program)

   INVESTIGATION OF A FOODBORNE OUTBREAK (CDC 52.13)

   WATERBORNE DISEASES OUTBREAK REPORT (CDC 52.12)

   OUTBREAK / UNUSUAL DISEASE REPORT (DHS 8554)

   If the etiologic agent of infection is reportable as an individual case, **separate epidemiologic forms must be filed for each case**, in addition to the outbreak summary report.

5. **Epidemiologic Data:**

   a. History of food items eaten during the suspect incubation period; location where food was consumed.

   b. Listing of **all individuals** with opportunity to consume suspect food items. Obtain individual food and illness histories.

c. **For ill individuals**: symptoms, onset date and hour, duration, medical treatment, and laboratory tests performed.

d. **For suspected food(s)**: source, date, and hour of purchase, time consumed, method of preparation, holding temperature, potential for cross contamination and availability of sample(s).

e. **Secondary Transmission**: obtain information regarding illness in the non-food consuming contacts to ill individuals. Account for leftovers taken from the principle outbreak location.

CONTROL OF CASE, CONTACTS & CARRIERS

Botulism investigation must be initiated immediately upon notification (see **BOTULISM**). When no specific agent is known or suspected to be involved, investigate within one day of report or within 3 days if episode is reported late.

Follow-up, isolation, restriction, and release of case, contacts, and/or carriers as for specific disease known or suspected to be involved in foodborne disease episode (amebiasis, hepatitis A, salmonellosis, shigellosis, trichinosis, typhoid, etc.)

1. **Chief, Food and Milk Program**

   a. Investigates and clarifies the original account of episode.

   b. Determines the course of field investigation to be made, including source of food, methods of food handling, preparation, and storage.

   c. Collects relevant food specimens. The Chief, Food and Milk, determines the relevance of food specimens under the direction of Chief, ACDC.

   d. Maintains written reports of Food and Milk Registered Environmental Health Specialists investigations.

2. **Chief, Acute Communicable Disease Control**

   a. Coordinates investigation and control of large outbreaks, multi-area episodes and episodes occurring outside working hours.

   b. Notifies involved district and Chief, Food and Milk Program, of pertinent epidemiologic findings.

3. **District Health Officer (DHO)** has ultimate authority and responsibility to investigate and control a foodborne illness or known hazardous condition in involved district.

PREVENTION-EDUCATION

1. Obtain food from safe sources.

2. Handle, prepare, and store foods properly. Store foods at an appropriate temperature (below 41^{o}F or above 140^{o}F).

3. Avoid cross contamination.

4. Use good personal hygiene. Wash hands after using the bathroom, changing diapers, and before preparing food.

5. Can foods according to recommendations of the State Department of Agriculture.

DIAGNOSTIC PROCEDURES

Submit clinical specimens as requested by DHO or Chief, ACDC.

Food Samples: Unless emergency exists, only a Food and Milk sanitarian accepts or collects food specimens. If a food specimen is brought to district, obtain information necessary for completion of **SUSPECTED FOOD-BORNE ILLNESS REPORT (H-26)** and instruct complainant to refrigerate sample (in such a way that it will not be consumed by others) and await evaluation by Food and Milk Sanitarian. When it is necessary to take the specimen away from complainant, obtain signed **SPECIMEN RELEASE (H-137)**, for specimen.

Container: Original or clean, covered container.

Laboratory Form: Miscellaneous (H-378). Identify with foodborne poisoning episode number or outbreak number. Provide laboratory with a

brief summary of pertinent facts about the episode.

Material: Suspected food (state type of food).

Examination Requested: Indicate suspected organisms.

Storage: Keep specimen at temperature appropriate for suspect organism. Contact ACDC or the Public Health Laboratory for information on storage temperature.

GASTROENTERITIS, VIRAL (Outbreaks only)

(Both epidemic and sporadic viral gastroenteritis. See also **FOODBORNE DISEASE**)

1. **Agent**: Noroviruses—formerly named Norwalk-like viruses (NLV)—a family of serologically related viruses; rotaviruses; astroviruses; enteric adenoviruses; other viruses.

2. **Identification**:

   a. **Symptoms**: Symptoms may vary by etiologic agent and population; see Appendix B for details. [MMWR Guidelines for Confirmation of Foodborne-Disease Outbreaks.*]

      Norovirus: Nausea, vomiting, diarrhea, abdominal pain, headache, and low-grade fever lasting about 24-48 hours. Present in children and adults.

      Rotavirus: Diarrhea, vomiting and fever, often in infants and young children. Often leads to significant dehydration.

   b. **Differential Diagnosis**: See Appendix B

3. **Incubation**: Varies by agent; See Appendix B.

4. **Reservoir**:

   a. **Noroviruses**: Man.

   b. **Rotavirus**: Probably man.

   c. **Other viruses**: Probably man.

5. **Source**: Norovirus: feces and vomitus of infected individuals; Rotavirus: feces and potentially respiratory secretions of infected individuals.

6. **Transmission**: Noroviruses are found in the stool (feces/poop) or vomit of infected people. People can become infected by ingestion of the virus in several ways, including:

   a. Eating food or drinking liquids that are contaminated with norovirus.

   b. Touching surfaces or objects contaminated with norovirus, and then placing their hand in their mouth

   c. Having direct contact with another person who is infected and showing symptoms (for example, when caring for someone with illness, or sharing foods or eating utensils with someone who is ill)

   d. Persons working in day-care centers, elderly residential facilities, or skilled nursing homes should pay special attention to children or residents who have gastrointestinal illness. Norovirus is very common in these settings. Due to high contagiousness, a single case can spread illness rapidly throughout such environments.

7. **Communicability**: During the acute stage of disease while virus shedding continues. May continue for days after recovery.

8. **Specific Treatment**: None. For dehydrated patients, implement supportive treatment with correction of fluid and electrolyte deficits.

9. **Immunity**:

   a. **Norovirus**: Short-term immunity lasting up to 14 weeks.

   b. **Rotavirus**: By three years of age most individuals are immune. Vaccines for infants were approved in 2006 and 2008.

   c. **Other viruses**: Short-term immunity may occur.

REPORTING PROCEDURES

1. Individual cases not reportable. Outbreaks reportable, *California Code of Regulations*, Section 2502.

Note: Investigated by CHS: Outbreaks in sub-acute health care facilities (SNF) and other community outbreaks.
Investigated by ACDC: Outbreaks in acute care facility/hospital settings and outbreaks transmitted via commercial food or recreational, drinking water.

* CDC. Appendix B: Guidelines for confirmation of foodborne-disease outbreaks. MMWR 2006; 55(SS11):38–42. Available at: www.cdc.gov/mmwr/preview/mmwrhtml/ss5510a3.htm

2. **Report Form**: Depends upon mode of transmission or outbreak location see Table 1. ***For Gastrointestinal outbreaks, final reports only, no interim epi report forms needed***

CHS INVESTIGATED SITUATIONS

For sub-acute health care facility (SNF)
CD OUTBREAK INVESTIGATION-SUB-ACUTE HEALTH CARE FACILITY (H-1164-Sub-Acute)

CD OUTBREAK INVESTIGATION SUB-ACUTE HEALTH CARE FACILITY (INSTRUCTIONS)

Gastrointestinal Illness Outbreak Linelist – Patients and Employees (12/12)

All other settings:
OUTBREAK/UNUSUAL DISEASE REPORT (CDPH 8554)

ACDC INVESTIGATED SITUATIONS

For acute care facility (hospital)
CD OUTBREAK INVESTIGATION—ACUTE HEALTH CARE FACILITY (HOSPITAL)(H-1164) (ACDC Use Only)

For Foodborne:
FOODBORNE DISEASE OUTBREAK REPORT (CDPH 8567)

INSTRUCTIONS FOR CDPH 8567 FORM

If a prepared commercial food item is the LIKELY source of this infection, a **FOODBORNE INCIDENT REPORT** (FBIR) should be filed. Available at: https://www.visualcmr.net/webvcmr/pages/public/pub_FBI_Report.aspx.

For likelihood determination and filing procedures, see Part 1, Section 7 in this manual - Reporting of a Case or Cluster of Cases Associated with a Commercial Food: Filing of Foodborne Incident Reports. http://publichealth.lacounty.gov/acd/procs/b73/B73p1.pdf

For waterborne:

CDC NORS-Waterborne Diseases Outbreak Report Form (CDC 52.12) (See Form Instructions):
- **Treated Recreational Water**
- **Untreated Recreational Water**
- **Water Intended for Drinking**
- **Water Not Intended for Drinking or Water of Unknown Intent**

3. **Epidemiologic Data**:

   a. Identify additional cases among persons attending a common gathering or setting. In common point-source outbreak situations, look for secondary cases, especially in households.

   b. Possible food and water (potable, recreational) sources.

CONTROL OF CASE, CONTACTS & CARRIERS

Investigate outbreaks within 24 hours.

CASE:

Precautions: Enteric precautions. Food handlers should be removed from work until 48 hours after symptoms end.

CONTACTS:

Search for other cases among individuals at the same setting. Secondary cases may occur among household members to case. Symptomatic food handlers should be managed as a case.

PREVENTION/EDUCATION

1. Implement hygienic measures applicable to diseases transmitted via fecal-oral route, or contaminated fomites route.

2. Prevent exposure of infants and young children to individuals with acute gastroenteritis.

3. For more information on norovirus see the ACDC website at http://www.publichealth.lacounty.gov/acd/Norovirus.htm and the CDC norovirus website at: http://www.cdc.gov/norovirus/index.html

DIAGNOSTIC PROCEDURES

Clinical and epidemiological history will determine tests to be performed. Research laboratory protocols can identify norovirus in stools.

1. **Norovirus**: Testing is for epidemiological use only and not for diagnostic purposes. Individual results will not be released to patients. Two laboratory positive specimens are needed to confirm a diagnosis of norovirus in an outbreak situation. To maximize the potential to confirm an outbreak as norovirus, 5 specimens should be collected for a norovirus-suspected outbreak, but no more than 10.

   Test: Norovirus reverse transcriptase by polymerase chain reaction (RT-PCR), performed by the PHL Molecular Epidemiology Unit. Positive specimens are characterized by DNA sequence analysis to determine norovirus genotype.

   Container: Sterile, 30 oz. wide-mouth, screw-capped bottle.

   Laboratory Form: **Norovirus Test Request Form**

   Note: Check "other" box and write-in "Norovirus." As a molecular epidemiological test, Norovirus PCR and genotyping is not available for online Sunquest ordering.

   Material: 2-3 grams whole stool (no preservatives). Obtain as soon as possible, preferably within 48 hours of onset, but no later than 7 days, while stool is still liquid or semi-solid.

   Storage: Keep refrigerated at 4°C, not frozen, and deliver to the laboratory as soon as possible. Transport on cold pack.

Please Note: Selected specimens will be sent to the California Department of Public Health Viral and Rickettsial Diseases Laboratory for other viral gastrointestinal agents.

TABLE 1. GASTROINTESTINAL DISEASE OUTBREAK FORMS

NON-HEALTHCARE FACILITY – CHS Lead (OB - designation)	REPORT FORM
○ Congregate-Living (e.g., jail, juvenile hall, camps, assisted living center) ○ Community-Based (e.g., school, daycare center)	OUTBREAK/UNUSUAL DISEASE REPORT FORM (CDPH 8554)
SUB-ACUTE HEALTHCARE FACILITY – CHS Lead (HF - designation)	**REPORT FORM**
○ Skilled nursing facility ○ Intermediate care facility ○ Psychiatric facility	CD OUTBREAK INVESTIGATION — SUB-ACUTE HEALTH CARE FACILITY (H-1164-SubAcute) CD OUTBREAK INVESTIGATION SUB-ACUTE HEALTH CARE FACILITY (INSTRUCTIONS) GASTROINTESTINAL ILLNESS OUTBREAK LINELIST HEALTH CARE FACILITY
FOODBORNE INCIDENT - ACDC Lead	**REPORT FORM**
Illness associated with a commercially available food item	FOODBORNE DISEASE OUTBREAK REPORT FORM (CDPH 8567) INSTRUCTIONS FOR CDPH 8567 FORM
WATERBORNE INCIDENT – ACDC Lead	**REPORT FORM**
Illness associated with drinking water or recreational water exposure.	**CDC NORS-Waterborne Diseases Outbreak Report Form (CDC 52.12) (See Form Instructions):** -Treated Recreational Water -Untreated Recreational Water -Water Intended for Drinking -Water Not Intended for Drinking or Water of Unknown Intent

GIARDIASIS

1. **Agent**: *Giardia intestinalis, (*formerly *G. lamblia*), a protozoan parasite that exists as trophozoite and cyst.

2. **Identification**:

   a. **Symptoms**: Infection principally of the upper small bowel. Often asymptomatic or mildly symptomatic. A variety of intestinal symptoms may occur and include chronic and recurrent diarrhea; steatorrhea; abdominal cramps; bloating; frequent loose, pale, fatty, malodorous stools; fatigue; and weight loss. Malabsorption of fats or of fat-soluble vitamins may occur.

   b. **Differential Diagnosis**: Other enteric infections and parasites.

   c. **Diagnosis**: Microscopic examination of fecal specimens. Three specimens taken 2-3 days apart will identify 80-90 percent of infections. Antigen detection by direct fluorescent antibody (DFA) assay is available. Examination of duodenal fluid (by aspiration or by string test) and mucosal biopsy may be more sensitive, but are rarely necessary.

3. **Incubation**: Variable; may be a few days to several months; most common 5-25 days.

4. **Reservoir**: Humans and many other animals, including cats, dogs, cattle, beavers, rodents, and birds. *Giardia* species are not host specific.

5. **Source**: Feces of humans and other animals.

6. **Transmission**: Transmission is fecal-oral through direct person-to-person contact or via water and, less commonly, food vehicles.

7. **Communicability**: Variable; months to years; as long as carrier state persists.

8. **Specific Treatment**:

   Recommended: Metronidazole, tinidazole, or nitazoxanide

   Alternatives: Furazolidone; paromomycin for treatment of severe symptomatic disease in pregnant women.

   Treatment of asymptomatic cyst passers is not recommended except possibly to prevent transmission from a toddler to a pregnant woman; also in patients with cystic fibrosis or hypo-gammaglobulinemia.

9. **Immunity**: Short lived.

REPORTING PROCEDURES

1. Report within 7 calendar days from identification, *California Code of Regulations,* Title 17, Section 2500.

2. **Report Form**:

   PARASITE EPIDEMIOLOGIC CASE HISTORY (acd-parasite)

3. **Epidemiologic Data**:

   a. Travel history.

   b. Child contact, particularly diapered children in child care situations.

   c. Consumption of untreated surface water.

   d. Sexual orientation and recent sexual behavior.

   e. Animal contact.

   f. Exposure to known cases.

   g. History of colonic irrigation, when and where.

   h. Problems with water or septic system.

   i. Occupation of case and occupation of household members.

   j. Recreational water use

CONTROL OF CASE, CONTACTS & CARRIERS

Public Health Nursing Home Visit Protocol:
Home visit as necessary – a face to face interview is conducted as necessary.

Refer to "Public Health Nursing Home Visit AS NECESSARY (HVAN) Algorithm" (B-73 Part IV Public Health Nursing Home Visit Protocol).

Investigation is required for outbreaks and for single cases. Initiate investigation within 3 days.

CASE:

1. **Sensitive Occupation**: If symptomatic, remove from work or day care until asymptomatic and on therapy. Release specimens are not mandated.

   For cases in day care, question operator about symptoms among staff and other children. Symptomatic children and staff should be excluded, screened, and treated if necessary.

   Asymptomatic persons should not be screened since treatment is not indicated for asymptomatic carriers.

2. **Non-sensitive Occupation or Situation**: Case may be closed without release specimens provided household contacts are not symptomatic and in sensitive occupations.

CONTACTS:

Household members or persons who share a common-source exposure should be tested only if symptomatic. If positive, handle as a case. If negative or asymptomatic, no restrictions.

CARRIER:

Refer to treatment above. Release as for case.

PREVENTION-EDUCATION

1. Stress hand washing and personal hygiene.

2. Dispose of feces properly.

3. Boil or disinfect water (chlorine or iodine tablets) of unknown potability, e.g., during international travel and when hiking or camping.

4. Advise about the risk of anal intercourse and oral-anal sexual practices.

5. Stress importance of proper hygiene regarding handling and disposal of pet feces.

6. Stress bathing before recreational water use, avoid accidental swallowing of recreational water.

DIAGNOSTIC PROCEDURES

1. **Microscopic**:

   Container: Feces-Parasite.

   Laboratory Form: **TEST REQUISITION FORM H-3021**

   Examination Requested: Giardiasis. Check appropriate boxes on laboratory form.

   Material: Feces. Follow collection instructions provided with container.

   Storage: Do not refrigerate; protect from overheating.

   Remarks: Mix thoroughly with PVA preservative. Do not collect specimen(s) for 7-10 days after barium, mineral oil, bismuth, antibiotics, antimalarials, or antidiarrheal preparations such as kaolin have been ingested.

2. **Antigen Detection**:

   Container: Feces-Parasite

   Laboratory Form: **TEST REQUISITION FORM H-3021**

   Examination Requested: Giardiasis. Check appropriate boxes on laboratory form.

   Material: Feces in 10% formalin.

   Storage: Do not refrigerate; protect from overheating.

GLANDERS and MELIOIDOSIS

1. **Agent**: A non-motile gram negative bacilli, *Burkholderia mallei* (glanders) and *Burholderia pseudomallei* (melioidosis)

2. **Identification**:

   a. **Symptoms**:

   Pulmonary Infection
   Symptoms may present as acute febrile, necrotizing pneumonia with or without sepsis, with necrosis of tracheobronchial tree.

   Glanders – often manifests itself as pulmonary infection; pneumonia, pulmonary abscesses, and pleural effusion can occur. Chest X-rays will show localized infection in the lobes of the lungs.

   Melioidosis – often manifests as a mild bronchitis to severe pneumonia. The onset usually presents with high fever, headache, anorexia, and general muscle soreness. Chest pain is also common. A characteristic of pulmonary infection is a nonproductive or productive cough with normal sputum. Cavitary lesions may be seen on chest X-ray, similar to those in pulmonary tuberculosis.

   Localized-Cutaneous Infections
   Glanders – most often presents as a cut or scratch in the skin with localized infection and ulceration developing at the site where the bacteria entered the body. Swollen lymph nodes may also be apparent. Cutaneous infection can lead to systemic or septicemic infection if untreated.

   Melioidosis – most often presents as an ulcer, nodule, skin abscess, pain and swelling at the site of introduction. Fever and muscle aches too. Infection may remain local or spread rapidly through the bloodstream.

   Septicemia
   Can occur with our without pneumonia and can affect multiple organ systems including liver, spleen, prostate, and kidney, Mortality rate is 90%.

   Chronic
   Can present with multiple abscesses or re-activation pneumonia.

   Glanders does not occur naturally in the United States (US), and ANY case of glanders is evidence for bioterrorism until proven otherwise. If glanders were used as a weapon, it would be most effective as an aerosol and thus would present primarily in the pulmonic or systemic forms.

   b. **Differential Diagnosis**:
   Pulmonary glanders and melioidosis – include mycoplasma pneumonia, Legionnaire's disease, psittacosis, plague, tularemia, invasive group A streptococcal pneumonia, Q fever, histoplasmosis, coccidiomycosis, and anthrax.
   Cutaneous glanders and melioidosis – include insect bite, brown recluse spider bite, ulceroglandular tularemia, scrub typhus, rickettsial spotted fevers, ecthyma gangrenosum, plague, Orf, staphylococcal lymphadenopathy, cutaneous leishmaniasis, cat scratch fever.

   c. **Diagnosis**: Isolation of organism from blood, urine, sputum, skin lesions, or abscesses; or by detection of antibody response to the bacteria. Blood cultures are usually negative for B. mallei (glanders) but often positive for B. pseudomallei (melioidosis)

3. **Incubation**:
   Pulmonary Infection:
   Glanders: 10-14 days
   Melioidosis: more difficult to determine, 1-21 days or could be extended months to years

   Localized-Cutaneous Infections:
   Glanders: 1-5 days
   Melioidosis: difficult to determine

4. **Reservoir**:
   Glanders: no natural occurring cases of glanders in the US since 1940's

Melioidosis: Soil and water in the tropics, endemic in Southeast Asia and northern Australia

5. **Source**:
   Glanders: most common in horses, also donkeys, mules, goats, cats, and dogs

6. **Transmission**:

   Glanders – contact with tissues or body fluids of infected animal through skin cuts or abrasions and through mucosal surfaces such as the eyes and nose. Inhalation via infected aerosols or dust contaminated by infected animals. Sporadic cases have been documented in veterinarians, horse caretakers, and laboratorians.

   Melioidosis - inhalation of dust, ingestion of contaminated water, and contact with contaminated soil especially through skin abrasions.

7. **Communicability**: No person-to-person transmission; possible transmission by cutaneous contact with skin lesions.

   Both are highly infectious organisms and have caused laboratory-acquired infections. If B. mallei or B, pseudomallei are suspected, it requires precautions by microbiologists and is usually referred to a BSL-3 lab.

8. **Specific treatment**: Human cases of glanders are rare. Treatment varies depending on type and severity of clinical presentation: trimethoprim-sulfamethoxazole (TMP-SMX), doxycycline, amoxicillin/clavulanate. For severe disease: ceftazidime or imipenem or meropenem

REPORTING PROCEDURES

1. **Report any case or suspect cases by telephone immediately** (Title 17, Section 2500. *California Code of Regulations*).

2. **Report Form:**
   OTHER REPORTABLE DISEASE or DISEASE OF UNUSUAL OCCURANCE (CDPH 8554)

   MELIOIDOSIS INTAKE FORM (For ACDC Internal Use)

CONTROL OF CASE, CONTACTS & CARRIERS

CASE:

1. Provide necessary antibiotic treatment as soon as disease is confirmed. Standard precautions indicated.

2. **For Laboratory Exposure**: see Management of Laboratory Exposed to *B. mallei* and *B. pseudomallei*

3. **ANIMAL**: Los Angeles County Department of Public Health (LAC DPH)'s Veterinary Public Health Program will investigate potential animal sources.

CONTACTS:

Avoid contact with bloody or body fluids of an infected person.

Management of Laboratory Exposure to *B. mallei* and *B. pseudomallei:*

Laboratory workers that have worked with cultures of the organism are at risk of developing disease. Laboratories that have handled the specimen should conduct an exposure risk assessment on their lab employee.

If there are any potential laboratory exposures (high or low), the worker should be evaluated by the lab facility's occupational health physician as part of the laboratory health and safety plan.

CDC recommends symptom watch for 21 days as well as baseline and follow-up serology on employees with lab exposure (regardless of high or low risk).

The following Emerging Infectious Disease article by Peacock et al.,can be used as guidance on the Management of Accidental Laboratory Exposure to *Burkholderia pseudomallei* and *B. mallei*: http://wwwnc.cdc.gov/eid/article/14/7/07-1501_article.htm

PREVENTION-EDUCATION

Glanders:

1. No vaccine available

2. Identification and elimination of infection in the animal population in countries where glanders is endemic in animals.

3. Use of Standard Contact Precaution in Health Care Settings.

Laboratory personnel handling specimens from persons who might have glanders must wear appropriate Personal Protection Equipment.

Melioidosis:

1. Currently, no vaccine available

2. Decrease risk of exposure in areas where the disease is endemic (Southeast Asia and northern Australia):

    a. Avoid contact with contaminated soil or water, especially persons with open wounds, cuts, or scrapes and persons with immunocompromised conditions
    b. Agricultural workers should wear boots to prevent infection through feet or lower leg
    c. Health care workers should use standard contact precaution

DIAGNOSTIC PROCEDURES

If glanders or melioidosis is suspected, contact the LAC DPH Public Health Laboratory for consultation at:
213-250-8619 or 213-974-1234

HAND FOOT AND MOUTH DISEASE (HFMD)
(Outbreaks only)

1. **Agent**: Hand, foot, and mouth disease (HFMD) is caused by viruses belonging to the Enterovirus genus. Coxsackievirus A16 is the most common cause of HFMD in the United States, but other coxsackieviruses and enterovirus 71 have been associated with the illness. HFMD is a common viral illness that usually affects infants and children younger than 5 years old but adult cases can occur. Outbreaks of HFMD typically occur during summer and autumn months.

2. **Identification**:

   a. **Symptoms**: HFMD usually starts with a fever, poor appetite, malaise, and sore throat. One or 2 days after fever starts, painful sores usually develop in the mouth (herpangina); beginning as small red spots often in the back of the mouth that often blister and ulcer. A skin rash develops over 1 to 2 days as flat or raised red spots, sometimes with blisters. Characteristically, the rash is on the palms of the hands and soles of the feet; but it may also appear on the knees, elbows, buttocks or genital area. Symptomatic illness is usually seen in young children; outbreaks occurring in nursery schools and daycare centers are common. Infection in older children and adults is often asymptomatic.

   b. **Differential Diagnosis**: HFMD is one of many infections that cause mouth sores. Health care providers can usually tell the difference between mouth sores caused by HFMD and other causes by considering age of cases, symptoms, and rash/mouth sore characteristics.

3. **Incubation**: 3-5 days.

4. **Reservoir**: Human: Virus can be found in nose and throat secretions, blister fluid, and feces of case.

5. **Transmission**: Exposure to the virus can occur in several ways, including:
   a. Respiratory secretions (saliva, sputum, nasal mucous), feces.
   b. Persons working with young children should pay special attention to environmental hygiene. HFMD is common in these settings and the virus can spread rapidly.
   c. Close personal contact with infected individuals, such as, caring for individuals with illness, diaper changing, or sharing contaminated toys.
   d. Touching surfaces or objects contaminated with virus, and then placing their hand in their eyes, nose or mouth. Enterovirus can remain on environmental surfaces long enough to allow transmission via fomites.

6. **Communicability**: Most contagious during illness symptomatic phase while case is shedding virus via respiratory route, blister fluid, and feces; virus may persist in feces for days or weeks after symptoms resolve.

7. **Specific Treatment**: None. For dehydrated patients, implement supportive treatment with correction of fluid and electrolyte deficits. Cases may have difficulty swallowing due to painful mouth sores. Most illness recovers in 7-10 days without medical treatment. Children should not receive aspirin or medication with salicylate.

8. **Immunity**: Virus specific immunity of unknown duration occurs with infection.

REPORTING PROCEDURES

1. Individual cases not reportable. Outbreaks reportable, *California Code of Regulations*, Section 2500.

2. **Report Form**: **OUTBREAK/UNUSUAL DISEASE REPORT FORM (CDPH 8554)**

3. **Epidemiologic Data**:

   a. Other cases among persons attending a common facility (e.g., daycare or preschool)
   b. Linelisting of cases noting onset date, symptom history and common exposure(s).

c. Epidemiologic curve can be helpful in visualizing course of outbreak.

CONTROL OF CASE, CONTACTS & CARRIERS

Investigate outbreaks only within 24 hours.

CASE:

Precautions: Respiratory and enteric precautions. Limit group settings exposure. Symptomatic cases should not attend group activities. Children with HFMD should be kept home from daycare or school until their fever goes away and their mouth sores have healed.

CONTACTS:

Search for other cases among individuals at the same setting. Increase personal hygiene.

PREVENTION/EDUCATION

1. Implement hygienic measures applicable to diseases transmitted via respiratory, fecal-oral, or contaminated fomites route.
2. Particular attention should be given to handwashing and personal hygiene, especially during diaper changing.
3. Shared toys can be vehicles for transmission. Wash or discard articles (toys) soiled with respiratory secretions, vesicle fluid or feces.
4. Disinfect surfaces that may be contaminated with virus.
5. Prevent exposure of infants and young children to individuals with acute illness.
6. Site visit to observe conditions and cleaning procedures can be particularly helpful, especially in large or ongoing outbreaks

For more information on the CDC HFMD website at:
http://www.cdc.gov/hand-foot-mouth/index.html

DIAGNOSTIC PROCEDURES

Laboratory diagnosis of HFMD is not routinely required or sought. Clinical and epidemiological history will determine tests to be performed. After consultation with AMD, please contact ACDC if unusual circumstances exist, such as more severe clinical complications or hospitalizations.

Enteroviruses Two laboratory positive specimens are needed to confirm a diagnosis of an outbreak. To maximize the potential to confirm an outbreak, at least 5 specimens need to be collected for an outbreak, but no more than 10.

1. **Culture or direct detection by PCR**.

Laboratory Form: Test is performed at the State Laboratory. Please use the following: 1) Public Health Laboratory Test Requisition and Report Form H-3021. **Note:** On Form H-3021. Check "other" box and write-in "Enterovirus". Forms available at PHL website http://publichealth.lacounty.gov/lab/labforms.htm 2) State VRDL General Purpose Specimen Submittal Form and 3) Hand, Foot and Mouth Disease Outpatient Case Report form. State VRDL forms are available at their website. http://www.cdph.ca.gov/programs/vrdl/Pages/CurrentVRDLSpecimenSubmittalforms.aspx

Material & Container: Acceptable specimens for testing include respiratory specimens (nasopharyngeal, oropharyngeal or throat swabs) in M4 viral transport media; vesicular specimens including vesicle swab or fluid in M4 viral transport media; and fecal specimens including 2-4 g stool in sterile 30 mL screw-cap container or rectal swab in M4 viral transport media. Fecal specimens are less desirable.

Storage: Keep specimens refrigerated at 4-8^{o}C and deliver to the Public Health Laboratory as soon as possible. If unable to deliver within 72 hours, freeze immediately after collection at -70^{o}C and transport on dry ice. Do not freeze any specimen if the clinical background suggests VZV, CMV, or RSV.

Haemophilus influenzae, Invasive Disease (including Type B)

1. **Agent**: *Haemophilus influenzae*, a small Gram-negative rod. Numerous serotypes and non-typeable strains exist; immunization or prophylaxis prevents only serotype b (Hib) infection.

2. **Identification**:

   a. **Symptoms**: Vary depending on the type of invasive illness. Onset of meningitis is usually sudden; symptoms include fever, vomiting, lethargy and meningeal irritation consisting of bulging fontanelle in infants or stiff neck and back in older children. Otitis media or sinusitis may be a precursor. *H. influenzae* may also cause septicemia, pneumonia, epiglottitis, cellulitis, pericarditis, peritonitis, or septic arthritis.

   b. **Differential Diagnosis**: Other bacterial or viral agents of meningitis, sepsis, or pneumonia. Other *H. influenzae* serotypes (a, c-f) and non-typeable strains cause identical clinical picture.

   c. **Diagnosis**: Isolation of organisms from cerebrospinal fluid, blood, joint aspirate or other normally sterile site. Diagnosis can also be made by several rapid methods for capsular antigen detection.

3. **Incubation**: Short, within 2-4 days.

4. **Reservoir**: Human.

5. **Source**: Nose and throat secretions of case and/or carriers.

6. **Transmission**: Person-to-person through infected droplets of respiratory secretions, often from asymptomatic carrier.

7. **Communicability**: As long as organisms are present in nose and throat. Ampicillin and chloramphenicol reduce communicability within hours following initiation and throughout treatment, but do not eliminate carriage.

8. **Specific Treatment**:

   a. **Case**: Therapy with chloramphenicol or an effective third-generation cephalosporin (cefotaxime or ceftriaxone) should be begun immediately. Ampicillin-resistant strains are now common throughout the USA; thus, patients with life-threatening illness in which *H. influenzae* may be the etiologic agent should not receive ampicillin as initial therapy. Treatment course is usually 10-14 days.

      Rifampin should be given to all persons with Hib prior to discharge to eradicate the nasal carrier state if they will be returning to a school or child care center with children under four years of age.

   b. **Contacts**: In certain instances, the suspect case may not be completely protected against Hib thereby increasing the probability that his/her disease may be due to Hib.

      If serotyping is pending or has not been obtained on the **suspect case** AND the suspect case meets one of the following criteria, **start chemoprophylaxis on contacts per the instructions under the section labeled Contacts, on page 2, in this manual**:

      i. Suspect case is under four years of age and not completely immunized against Hib,
      ii. Suspect case is under one year of age and appropriately immunized for age but has not completed the primary Hib vaccine series.

   c. If chemoprophylaxis is required, give:

      Rifampin: Adults and children > 1 month old: 20 mg/kg per dose once daily (maximum daily dose 600 mg) for 4 days.

      Neonates ≤ 1 month: 10 mg/kg once daily for 4 days (suggested but not established).

      Package insert has instructions for making one- percent syrup suspension for those too young to take capsules. Contents of

capsule can also be mixed with applesauce.

NOTE: Rifampin is not approved for use in pregnant women, and no alternative medication for this indication has been studied. Persons on rifampin should be advised that the medication stains contact lenses and turns urine red.

NOTE: Serotypes other than type b are now the most common organisms found in invasive *Haemophilus* disease. Only type b (i.e., Hib) demands prophylaxis.

9. **Immunity**: Immunity is age-dependent and associated with the presence of circulating bacterial antibody. Vaccination with any of the polysaccharide Hib vaccines is highly effective in preventing invasive infections.

REPORTING PROCEDURES

1. **Reportable (with all serotypes)**. (Title 17, Section 2500, *California Code of Regulations*). Report within 1 working day of identification of case or suspected case by mail, telephone, fax, or electronic transmission. **Ordinarily, only suspected cases under 15 years of age are to be investigated. In some instances, the state will recommend investigation of a case that is older.**

2. **Report Form**: **INVASIVE *HAEMOPHILUS INFLUENZAE* DISEASE CASE REPORT (PM 401).**

   Also, complete the ***HAEMOPHILUS INFLUENZAE TYPE B* VACCINE AND EXTENDED INFORMATION WORKSHEET**

3. **Epidemiologic Data**:

   a. Source of specimen.

   b. Serotype of isolate.

   c. Type of infection.

   Hib immunization history only for cases under age ten years and known to be due to serotype b, including manufacturer and lot number of each vaccine dose.

CONTROL OF CASE, CONTACTS & CARRIERS

Public Health Nursing Protocol:
Home visit is required – a face to face interview is required.

Refer to "Public Health Nursing Home Visit REQUIRED Algorithm" (B-73 Part IV Public Health Nursing Home Visit Protocol).

Investigate cases of invasive Hib disease on the day of report. Non-invasive cases including conjunctivitis and positive sputum culture without pneumonia or epiglottitis, and cases confirmed not to be serotype b do not require investigation.

CASE:
Precautions: Respiratory secretion precautions should be taken until 24 hours after initiation of appropriate treatment.

CONTACTS:

See **Case Report Form (PM 401).** In summary:

1. **Household**: In any household in which a case of Hib disease has occurred, the following guidelines should be followed to determine if rifampin chemoprophylaxis is indicated.

   a. If a household contact is less than 1 year of age (regardless of Hib vaccination status), all household contacts should receive rifampin chemoprophylaxis.

   b. If at least one household contact aged 1 through 3 years is inadequately immunized for Hib, all household contacts should receive rifampin chemoprophylaxis even if there are no children less than 1 year of age in the home.

   c. If ALL household contacts aged 1 through 3 years are adequately immunized for Hib AND there are no children less than 1 year of age in the home, rifampin chemoprophylaxis is not indicated for household contacts. A child is considered fully immunized against Hib disease according to age as follows: 1) child received at least one dose of conjugate vaccine if 1st dose was given at 15-59 months of age , or 2) child received two doses of conjugate vaccine if first dose was given at 12-14 months of age, or 3) child received two doses of conjugate vaccine at <12 months of age, followed by a booster

dose at ≥12 months of age if first dose was given at 7 through 11 months of age, or 4) child received three doses of conjugate vaccine (only 2 doses if PedvaxHib product used), followed by a booster dose at 12 months of age or older if first dose given at 2 through 6 months of age.

d. If at least one household contact under four years of age is immunocompromised and adequately immunized, all household contacts should still receive rifampin because of concern that the vaccination may have been ineffective.

2. **Family Day care (Baby-sitting) groups:** Rifampin prophylaxis should be given to all the children in a family day care group and to all the members of the babysitter's household if the case attended a group with other susceptible children (e.g., children less than one year of age or inadequately immunized children 1 through 3 years of age) for 25 hours or more during the week before onset of illness.

3. **Child Care Centers**: Each child care situation should be evaluated on an individual basis by the Area Medical Director. The following are general guidelines for follow-up of child care center contacts:

   In child care centers attended by children less than 2 years of age, the occurrence of one case of Hib justifies written notification to all parents that their children are at slightly increased risk. The notice should list the symptoms and recommend prompt medical attention if symptoms occur. Chemoprophylaxis is not recommended in instances when there is only a single case.

   However, when 2 or more cases occur within 60 days of each other and unimmunized or incompletely immunized children attend the facility, administration of rifampin prophylaxis to all children and staff in the classroom (even those completely immunized against Hib) may be recommended. If prophylaxis is recommended, it must be done promptly. The benefit decreases if more than 14 days have passed since exposure to the index case. Do not recommend prophylaxis unless at least 75% compliance is achievable.

CARRIER:

Nasopharyngeal carriage studies should not be used as a guide for implementation of chemoprophylaxis. Carriage of the disease has not been proven to correlate with risk of the disease. Furthermore, performing such a study would delay implementation of chemoprophylaxis.

PREVENTION-EDUCATION

1. Concurrent disinfection of fomites contaminated with nose and throat discharges. Assure the separation and ventilation of living and sleeping quarters.

2. Several Hib vaccines are licensed for infants beginning at 2 months of age. Follow the recommended vaccine schedule for series and booster doses.

3. Un-immunized or incompletely immunized children, under the age of 24 months who develop invasive Hib disease should complete the recommended vaccine schedule beginning 1-2 months after acute illness.

DIAGNOSTIC PROCEDURES

Few laboratories in LAC perform serotyping of *H. influenzae* isolates any more. Request laboratories to forward all sterile-site isolates from all patients to the Public Health Laboratory for serotyping.

HANTAVIRUS PULMONARY SYNDROME

1. **Agent**: At least nine hantaviruses have been identified in North America, each with a distinct rodent host. Four of these may cause hantavirus pulmonary syndrome. The most common is Sin Nombre virus, the agent responsible for the 1993 epidemic in the Southwestern USA. Other hantaviruses cause a distinct syndrome called hemorrhagic fever with renal syndrome (HFRS); the only such agent in North America is Seoul virus.

2. **Identification**:

   a. **Symptoms**: Fever, myalgia and GI complaints followed by the abrupt onset of respiratory distress and hypotension with rapid progression to severe respiratory failure and cardiogenic shock. The illness can progress rapidly to become clinically compatible with adult respiratory distress syndrome (ARDS).

      Elevated hematocrit, thrombocytopenia, and hypoalbumenia are common laboratory findings. The crude mortality rate is approximately 40%-50%. Rare instances of renal or hemorrhagic disease may occur.

   b. **Differential Diagnosis**: Other types of ARDS.

   c. **Diagnosis**: Serologic tests for specific IgM antibodies using ELISA (enzyme linked immunosorbent assay) or Western blot techniques. PCR analysis of tissue samples or immunohistochemistry can be performed on biopsy specimens or at autopsy.

3. **Incubation period**: Approximately 2 weeks, with a range from 3 days to 6 weeks.

4. **Reservoir**: The major reservoir of Sin Nombre virus appears to be the deer mouse, *Peromyscus maniculatus*. Antibodies have also been found in other *Peromyscus* species, pack rats, chipmunks and other rodents.

5. **Source**: Saliva or excreta of infected rodents.

6. **Transmission**: Aerosol transmission from rodent excreta, bites of infected rodents, direct contact of broken skin or mucous membranes with rodent excreta.

7. **Communicability**: No evidence of spread from person-to-person.

8. **Specific Treatment**: Supportive measures only.

9. **Immunity**: All persons without prior infection are presumed to be susceptible.

REPORTING PROCEDURES

1. **Reportable:** All cases and suspected cases of Hantavirus pulmonary syndrome require immediate notification by telephone to ACDC, *California Code of Regulations,* Section 2500.

   Report forms: Upon notification, ACDC will complete **HANTAVIRUS INFECTIONS CASE REPORT (CDPH 9077)** and notify the State Division of Communicable Disease Control.

   HANTAVIRUS PULMONARY SYNDROME SCREENING FORM (acd-hantavirusscreen)

2. **Epidemiologic Data**:

   a. Exposure to rodents or rodent excreta in the 6 weeks prior to onset. Rural residence with signs of rodent infestation.

   b. Exposure to rarely opened or seasonally closed buildings, such as vacation cabins or storage facilities.

   c. Occupation, job duties.

   d. Travel in previous 6 weeks.

   e. Case finding: Similar illness among co-workers or household members.

CONTROL OF CASE, CONTACTS & CARRIERS

CASES:

Isolation: None

CONTACTS: No restrictions.

CARRIERS: Not applicable.

PREVENTION-EDUCATION

1. Control rodents.

2. Workers in high-risk occupations should wear protective clothing and respirators.

3. Using a disinfectant solution, wet-clean cabins or buildings which are rarely opened, and which have past or present rodent problems.

4. Dispose of potentially infectious waste (rodent feces or carcasses) in double plastic bags.

5. Give disease-specific pamphlet.

DIAGNOSTIC PROCEDURES

Note: serological confirmatory testing is completed at the Viral and Rickettsial Disease Laboratory, California Department of Public Health, after approval by ACDC.

1. **Serology**: Acute serum; convalescent serum drawn at least 21 days after first specimen.

   Container: Red top or red-gray top serum separator tube.

   Laboratory Form: **Test Requisition and Report Form H-3021**

   Examination Requested: Hantavirus.

   Material: Whole blood.

   Amount: Minimum 1 mL (2.5 mL preferred).

   Storage: Refrigerate until transported.

2. **Tissue Examination**: Formalin-fixed or paraffin-embedded tissues. Consult with CDC for testing.

   Material: Lung, kidney, and spleen tissues are preferred.

3. **Storage**: Consult with CDC.

4. **PCR/Virus Isolation**: Consult with CDC for testing.

Material:

Ante-mortem: Biopsy material of the lung or bone marrow aspirate or clot.

Post-mortem: spleen, lung, kidney, liver, lymph nodes, heart, pancreas, pituitary, brain, or liver tissue, or heart blood.

HEPATITIS, TYPE A (HAV, Infectious Hepatitis)

1. **Agent**: Hepatitis A virus (HAV).

2. **Identification:**

   a. **Symptoms**: Onset is usually abrupt, with fever, malaise, anorexia, nausea, and abdominal discomfort, which may be followed by jaundice. Recovery is usually complete, without sequelae. Many cases, especially in children, are mild or asymptomatic.

   b. **Differential Diagnosis**: Other causes of viral and non-viral hepatitis.

   c. **Diagnosis**: Based on positive IgM specific hepatitis A virus antibody test (anti-HAV IgM) and the presence of a discrete onset of clinical symptoms and jaundice or elevated liver enzymes.

3. **Incubation**: 15 to 50 days; commonly about 28-30 days.

4. **Reservoir**: Human.

5. **Source**: Feces, rarely blood.

6. **Transmission**: Fecal-oral; person to person or through vehicles such as food. Drug sharing partners, sexual and household contacts are at increased risk. Transfusion-associated cases have occurred but are extremely rare.

7. **Communicability**: Maximum infectivity occurs during the latter half of incubation period, particularly during the week prior to the onset of jaundice. It is considered non-infectious 1 week after onset of jaundice. There is no carrier state.

8. **Specific Treatment**: None.

9. **Immunity**: Lifelong.

REPORTING PROCEDURES

1. Reportable, *California Code of Regulations,* Section 2500 and 2505.

2. **Report Form**:
   VIRAL HEPATITIS A or E CASE REORT

   If a prepared commercial food item is the likely source of this infection, a FOODBORNE INCIDENT REPORT should be filed. For likelihood determination and filing procedures, see Part 1, Section 7 – Reporting of a Case or Cluster of Cases Associated with a Commercial Food: Filing of Foodborne Incident Reports.

3. **Epidemiologic/Laboratory Data**:

   a. Appropriate laboratory tests to confirm the diagnosis of acute hepatitis A.

   b. Contact with diagnosed or suspect case of hepatitis or jaundice within the incubation period.

   c. Daycare center association (including nursery school or baby-sitting group), either as attendee, employee or household contact to attendee or employee.

   d. Travel history during incubation period (including dates and places) to areas where sanitation may have been a problem (e.g., camping, travel outside of the U.S.).

   e. Occupational history, especially individuals in sensitive occupations or situations. Dates of working and job description.

Call ACDC ASAP if case is SOS (sensitive occupation and/or situation).

f. Ingestion of raw shellfish (clams, oysters, and mussels), and untreated water during 7 weeks prior to onset.

g. Hepatitis A vaccine history.

h. Number of male and female sexual partners

I. Street drug use, injection or otherwise.

CONTROL OF CASE, CONTACTS & CARRIERS

Contact within 24 hours to determine if sensitive occupation or situation involved and need for hepatitis A vaccine or immune globulin (IG) for post-exposure prophylaxis (PEP) for contacts; otherwise, investigate within 3 days.

CASE:

Patient should not engage in a sensitive occupation or situation during illness and for 7 days following onset of jaundice or acute symptoms (if no jaundice).

CONTACTS:

Household Members or Others Who Have Intimate Contact (sexual contacts, sharing of illicit drugs, regular babysitters or caretakers):

1. No restrictions.

2. Emphasize education on hand washing and potential for shedding of virus prior to onset.

3. Advise PEP for contacts who have not already been vaccinated. See below.

Childcare Center Staff, Attendees, and Attendees' Household Members:

In addition to standard infection control education, PEP should be administered to all previously unvaccinated staff and attendees of child care centers or homes if:

1) One or more cases of Hepatitis A are recognized in children or employees, or

2) Cases are recognized in two or more households of center attendees.

In centers that provide care only to older children who no longer wear diapers, PEP need be administered only to classroom contacts of the index case (i.e., not to children or staff in other classrooms).

Infected Food Handler (Call ACDC ASAP)

If a food handler receives a diagnosis of hepatitis A, vaccine or IG should be administered to other food handlers at the same establishment.

Public Notification Food Handler

Because common-source transmission to patrons is unlikely, hepatitis A vaccine or IG administration to patrons typically is not indicated but may be considered if:

1) During the time when the food handler was likely to be infectious, the food handler directly handled uncooked or cooked foods and had diarrhea or poor hygienic practices; and

2) Patrons can be identified and treated ≤2 weeks after the exposure.

In settings in which repeated exposures to HAV might have occurred (e.g., institutional cafeterias), stronger consideration of hepatitis A vaccine or IG use could be warranted.

Schools, Hospitals, and Work Settings

PEP not routinely indicated when a single case occurs in an elementary or secondary school or an office or other work setting, and the source of infection is outside the school or work setting.

When a person who has Hepatitis A is admitted to a hospital, staff should not routinely be administered PEP; instead, careful hygienic practices should be emphasized.

Outbreaks (Consult with ACDC)

If it is determined that Hepatitis A has been spreading for example, among students in a school or among patients and staff in a hospital, in addition to standard infection control education, PEP should be administered to unvaccinated persons who have had close contact with an infected person.

If an outbreak occurs in a childcare center (i.e., Hepatitis A cases in three or more families) in addition to standard infection control education PEP should also be considered for members of households that have diaper-wearing children attending the center.

In the event of a common-source outbreak, PEP should not be provided to exposed persons after cases have begun to occur because the 2-week period after exposure during which IG or hepatitis A vaccine is known to be effective will have been exceeded.

The use of hepatitis A vaccine may be helpful in community-wide ongoing outbreaks, or special outbreak situations.

OPTIONS FOR PEP:

Persons who recently have been exposed to HAV and who previously have not received hepatitis A vaccine should be administered single antigen hepatitis A vaccine or immune globulin (IG) (0.02mL/kg) as soon as possible and within 2 weeks after exposure.

a. For healthy persons 12 months through 40 years of age, Hepatitis A vaccine is preferred to IG.

b. For persons >40 years of age, IG is preferred to vaccine due to lack of information regarding vaccine performance and the more severe manifestations of hepatitis A in this age group. Vaccine can be used if IG cannot be obtained. The magnitude of the risk for HAV transmission from the exposure should be considered in decisions to use IG or vaccine. Persons administered IG for whom HAV is also recommended for other reasons should receive a dose of vaccine simultaneously with IG.

c. For children aged <12 months, immunocompromised persons, persons with chronic liver disease, and persons for whom hepatitis A vaccine is contraindicated (allergic to vaccine or vaccine component), IG should be used.

CARRIERS: Not applicable.

For specific details refer to MMWR October 19, 2007, vol 56. Update: Prevention of Hepatitis A after Exposure to Hepatitis A Virus and in International Travelers. Updated Recommendations of the Advisory Committee on Immunization Practices (ACIP)

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

PREVENTION-EDUCATION

1. Emphasize to the patient the importance of hand washing after using the bathroom and before handling food. Feces are not infectious 1 week after onset of jaundice.

2. Sanitary disposal of fecal matter.

3. Advise patient that persons with a history of viral hepatitis are excluded from blood donor program.

DIAGNOSTIC PROCEDURES

Clinical and epidemiological history required to aid laboratory in test selection.

SEROLOGY:

Container: Serum separator tube (SST, a red-gray top vacutainer tube) and test request form.

Laboratory Form: **TEST REQUISITION FORM (H-3021)**

Examination Requested: Hepatitis A, Anti-HAV IgM.

Material: Whole clotted blood.

Amount: 8-10 ml.

Storage: Refrigerate.

HEPATITIS TYPE B (HBV)

(Serum hepatitis; Australia antigen hepatitis [both terms are obsolete]. See also **HEPATITIS TYPE B, PERINATAL**)

1. **Agent**: Hepatitis B virus (HBV), several subtypes.

2. **Identification**:

   a. **Symptoms**: Onset is often insidious. Symptoms include fatigue, anorexia, vague abdominal discomfort, joint pain, nausea, vomiting, and jaundice; when present, fever may be mild. Many cases are asymptomatic.

   b. **Differential Diagnosis**: Other causes of viral and non-viral hepatitis.

   c. **Diagnosis (new definition as of January 1, 2012)**

      Acute: HBsAg positive and HBc IgM positive (if done) *and* evidence of illness with (1) discreet onset of symptoms *and* (2) jaundice *or* elevated aminotransferase levels >100.

      Chronic/Carrier: No symptoms are required with chronic hepatitis B virus infection. HBc IgM negative AND a positive result on one of the following tests: HBsAg, HBeAg, or HBV DNA positive OR HBsAg or HBV DNA, or HBeAg positive 2 times at least 6 months apart.

3. **Incubation**: From 45-180 days; usually 60-90 days.

4. **Reservoir**: Human.

5. **Source**: Primarily blood to blood and sexual contact.

6. **Transmission**: By parenteral inoculation or mucosal membrane exposure to human blood or blood products. Susceptible sexual partners of infected persons are at risk. Perinatal transmission is likely to unprotected (no HBIG or vaccine) infants of HBsAg-positive mothers.

7. **Communicability**: Blood is potentially infective before and after onset of symptoms. Approximately 2-10 percent of acute adult cases become carriers. Ninety percent of infected infants become carriers.

8. **Specific Treatment**: None for acute stage. Antiviral medications may be beneficial for chronic disease.

9. **Immunity**: Lifelong

REPORTING PROCEDURES

1. Reportable, *California Code of Regulations*, Section 2500 and 2505.

2. **Report Form**:
   VIRAL HEPATITIS B or C CASE REPORT

   In addition, for the rare case associated with administration of blood or blood products during the 6-month period prior to onset, use Supplemental Data Sheet, **TRANSFUSION-ASSOCIATED HEPATITIS CASE RECORD (CDPH 8376)**.

3. **Epidemiologic Data**:

   a. Record results of laboratory tests: HBsAg, IgM anti-HBc, HAV IgM, anti-HCV, ALT levels etc.

   b. Reason for medical visit leading to diagnosis. This may be helpful in determining if case is acute or chronic hepatitis B.

   c. Contact with confirmed or suspected acute or chronic hepatitis B infection.

   d. Patient was treated for a sexually transmitted disease.

   e. Patient or employee of a renal dialysis unit.

   f. Resident of a long-term care facility (e.g. nursing home).

g. Receive fingersticks.

h. Contact with or injection of contaminated blood; accidental inoculation by needle (laboratory), accidental splash into the eye.

i. Transfusions of blood or blood products: places, dates, lot numbers, and manufacturer.

j. Patient has received any IV infusions and/or injections in the outpatient setting.

k. Medical or dental treatment within past 6 months, including types of injections, surgical procedures performed, or any diagnostic medical procedure.

l. Occupational history, especially medical-dental personnel, workers or public safety worker (law enforcement/correctional officer) and those involved in handling blood or blood products.

m. Blood donation, date and location of last donation.

n. Patient has undergone acupuncture.

o. Percutaneous exposure: self-injections (admitted or suspected), tattooing, ear piercing, acupuncture, electrolysis, skin-piercing procedures, etc.

p. Use of injection or non-injection street drugs.

q. For infant or child case, status of mother and other sibling should be evaluated. If pertinent, testing of mother's long-term sexual partner may be considered at the discretion of the mother's physician and child's mother.

r. Number of sexual partners of either gender.

CONTROL OF CASE, CONTACTS & CARRIERS

Investigate acute cases within 3 days. The **VIRAL HEPATITIS B or C CASE REPORT** is for acute cases only. For chronic carriers submit a CMR only.

CASE:

No restrictions.

CONTACTS:

Persons exposed to blood of an infected person, regular sexual partners and household contacts.

1. No restrictions.

2. Hepatitis B immune globulin (HBIG) is indicated in non-immune persons for post-exposure prophylaxis following accidental needle stick or mucosal (eye or mouth) exposure to blood positive for HBsAg. For specific details, refer to *MMWR*, December 26, 1997, Vol. 46, No. RR-18. Immunization of Health-Care Workers: Recommendations of the Advisory Committee on Immunization Practices (ACIP) and the Hospital Infection Control Practices Advisory Committee (HICPAC).

3. Acute hepatitis B or an asymptomatic carrier state during pregnancy or during the first 2 months postpartum is frequently associated with later infections in the newborn infant. Refer to *Recommendations for Use and Storage of Common Immunobiologics and Other Prophylactic Agents* (B-71) for prophylaxis details.

4. Regular sexual partners are at increased risk of acquiring HBV infection. Refer to B-71 *Recommendations for Use and Storage of Common Immunobiologics and Other Prophylactic Agents* for prophylaxis details.

5. Hepatitis B vaccine is part of routine childhood vaccination series. Hepatitis B vaccine is recommended for people in high-risk situations and occupations. Refer to B-71, *Recommendations for Use and Storage of Common Immunobiologics and Other Prophylactic Agents*, for details.

CHRONIC/CARRIERS:

Defined as any person HBsAg or HBV DNA, or HBeAg positive 2 times at least 6 months apart.

1. Pregnant women who test positive for HBsAg should be referred to Perinatal Hepatitis B Prevention Unit.

2. No restrictions. Carriers are not to be excluded from work or school solely on the basis of a positive HBsAg (including health care work).

3. A carrier of HBsAg may or may not be symptomatic.

4. Those with a positive HBsAg test should be informed, evaluated for the presence of liver disease and followed to determine persistence of antigen.

5. Stress routine precautions, such as those applying to prevention of transmission via percutaneous and sexual routes.

6. Recommend evaluation of contacts for immunity and vaccination if needed.

PREVENTION-EDUCATION

1. Advise that disease may be transmitted by shared articles that become contaminated with blood (needles, syringes, razors, toothbrushes).

2. Advise that regular sexual partners may be at increased risk for hepatitis B. Advise of need for HBIG and/or vaccine. Use of condoms may reduce the risk to sexual partners.

3. If high risk contacts to acute hepatitis B cases do not have access to the hepatitis B vaccine through their primary care provider or are uninsured, a county sponsored vaccine program will provide hepatitis B vaccine.

   High risk contacts include:

   -Sex partners and household contacts of HBsAg-positive persons,
   -Residents and staff of facilities of developmentally disabled persons who have potential blood or blood contaminated body fluids contact with the case,
   -Healthcare and public safety workers with reasonable anticipated risk of exposure to blood or blood-contaminated body fluids

4. For recommended vaccine doses, refer to:

http://publichealth.lacounty.gov/ip/providers/B71/2Hepatitis_B_Vaccine_Recombinant_HBV.pdf

5. Advise high risk hepatitis B contacts (sex partners and household contacts) that a serum for HBsAg should be obtained at the same time as administration of the 1st hepatitis B vaccine. This can be obtained through CHS clinic, if a primary medical care provider is not available.

6. Individuals at continued risk for acquiring hepatitis B infection (occupation, male homosexuals) should be recommended to receive hepatitis B vaccine if not immune. See *Recommendations for Use and Storage of Common Immunobiologics and Other Prophylactic Agents* (B-71).

7. Usage of HBIG based on exposure (type and time) and susceptibility.

8. Instruct on sanitary disposal of blood and other body secretions.

9. Advise patient that persons with a history of viral hepatitis are excluded from blood donor programs.

10. Advise case that HBsAg test should be repeated at 3 and 6 months. If still positive after 6 months, then the patient is considered a carrier and should be evaluated for the possibility of active liver disease.

DIAGNOSTIC PROCEDURES

Clinical and epidemiological history required to aid laboratory in test selection.

Serology:

Container: Serum separator tube (SST, a red-gray top vacutainer tube) and test request form.

Laboratory Form: **TEST REQUISITION FORM (H-3021)**

Examination Requested: Hepatitis B (indicate if previously positive). Note that PHL only performs anti-HBc IgM upon special request.

Material: Whole clotted blood.

Amount 8-10 ml.

Storage: Refrigerate.

HEPATITIS B SEROLOGY TERMINOLOGY

Serologic Component	Interpretation
HBsAg= Surface antigen	Infectious, acute or chronic.
anti-HBs = Antibody to surface antigen	Resolved infection or vaccine response.
anti-HBc total = Total antibodies (IgG+IgM) to core protein antigen	Either acute, chronic, or resolved disease.
anti-HBc IgM = IgM antibodies to core protein	Acute or recently infected. Rarely positive in chronic carriers.
HBeAg = e-enzyme antigen	Highly infectious, acute or chronic.
anti-HBe = total antibodies to e-enzyme antigen (no distinction made for IgM and IgG)	Useful only for +HBsAg cases: if anti-HBe present, less infectious.

TABLE 3. Recommended Post-exposure Prophylaxis for Exposure to Hepatitis B Virus

Vaccination and antibody response status of exposed person	Treatment when source is		
	Source HBsAg * positive	Source HBsAg negative	Source unknown or not available for testing
Unvaccinated:	HBIG + x 1; initiate HB vaccine series &	Initiate HB vaccine series	Initiate HB vaccine series
Previously vaccinated:			
Known responder @	No treatment	No treatment	No treatment
Known non-responder	HBIG x 1 and initiate revaccination or HBIG X 2	No treatment	If known high-risk source, treat as if source were HBsAg positive
Antibody response unknown	Test exposed person for anti-HBs ** 1. If adequate @, no treatment is necessary 2. If inadequate @, HBIG x 1 and vaccine booster	No treatment	Test exposed person for anti-HBs 1. If adequate @, no treatment is necessary 2. If inadequate @, administer vaccine booster and recheck titer in 1-2 months

* Hepatitis B surface antigen.
\+ Hepatitis B immune globulin; dose 0.06 mL/kg intramuscularly.
& Hepatitis B vaccine.
@ Responder is defined as a person with adequate levels of serum antibody to hepatitis B surface antigen (i.e., anti-HBs** $\geq$ 10 mIU/mL); inadequate response to vaccination defined as serum anti-HBs <10 mIU/mL.
** Antibody to hepatitis B surface antigen.

MMWR December 26, 1997 / 46(RR-18);1-42. Immunization of Health-Care Workers: Recommendations of the Advisory Committee on Immunization Practices (ACIP) and the Hospital Infection Control Practices Advisory Committee (HICPAC), table 3.

HEPATITIS, TYPE B, PERINATAL (See also **HEPATITIS, TYPE B**)

1. **Agent**: Hepatitis B virus (HBV)

2. **Identification:** California law (Health and Safety Code, Sections 125080-125085) requires healthcare providers test all pregnant women for hepatitis B surface antigen (HBsAg) before or at the time of delivery. All practitioners caring for pregnant women should use a standard prenatal panel that includes HBsAg testing. Repeat HBsAg testing on HBsAg-negative women at the time of delivery if the woman has clinical hepatitis or she was at risk for hepatitis B exposure during pregnancy. Risk factors include recent intravenous drug use, a HBsAg-positive sex partner, more than one sex partner in the past 6 months, or treatment for a sexually transmitted disease. Hospitals should accept only *original laboratory reports* as documentation of mothers HBsAg status.

   a. **Symptoms**: While acute cases of hepatitis B can occur in the prenatal period, most HBsAg-positive prenatal patients will be asymptomatic chronic carriers and identified by their laboratory test only. Infants infected are generally asymptomatic.

   b. **Differential Diagnosis**: Other viral, chemical, and other causes of hepatitis.

   c. **Diagnosis**: Positive confirmed HBsAg test. Maternal anti-HBc IgG will be present in the infant's blood but does not indicate maternal-infant transmission.

3. **Incubation**: From 45-180 days.

4. **Reservoir**: Human.

5. **Source**: For infants, primarily maternal blood or body fluids.

6. **Transmission**: By parenteral inoculation or mucosal membrane exposure of infant to maternal blood or body fluid. Exposure usually occurs during the birth process, but can be transmitted in utero. Vaginal or caesarean deliveries have similar transmission risks.

7. **Communicability**: Maternal blood or body fluids are potentially infectious. Unless infected in utero, infants are usually non-infectious at birth since they will be incubating the disease.

8. **Specific Treatment**: Treatment for chronic hepatitis B infection is available for some patients who meet clinical criteria. Timely administration of hepatitis B vaccine and hepatitis B immune globulin (HBIG) to infant is stressed to prevent maternal-infant transmission of hepatitis B virus.

   a. **Infants of HBsAg-positive mothers**: Infants should receive an intramuscular injection (IM) of hepatitis B vaccine and HBIG at different sites within 12 hours of birth. The effectiveness of HBIG more than 7 days after birth exposure is unknown; delay will compromise effectiveness. Two subsequent hepatitis B vaccine doses are given, one at 1-2 months and one at 6 months of age, at a dosage appropriate for brand of vaccine. This initial hepatitis B vaccine does not count as part of the vaccine series for premature infants weighing less than 2,000 grams. Premature infants weighing less than 2,000 grams will need three additional doses starting at 1-2 months of age.

   b. **Infants of Mothers with Unknown HBsAg Status:** Administer single-antigen hepatitis B vaccine to infants within 12 hours of birth. Premature infants weighing less than 2000 grams (4.4 pounds) should receive hepatitis B vaccine and HBIG within 12 hours of birth. Hospitals should record the date and time of hepatitis B vaccine administration on the infant's medication administration record and immunization record. The mother should have blood drawn as soon as possible to determine her HBsAg status. If the mother is found to be HBsAg-positive, administer HBIG to the infant as soon as possible but within 7 days of birth. Notify the infant's pediatric healthcare provider of the need to provide

follow up if the infant is discharged before the mother's HBsAg test result is available.

c. **Infants of HBsAg-negative Mothers:** Administer a dose of single-antigen hepatitis B vaccine to all full-term infants who are medically stable and weigh at least 2,000 grams (4.4 pounds) prior to hospital discharge. Two subsequent doses of hepatitis B vaccine are given, one at 1-2 months and one at 6 months of age. Preterm infants weighing less than 2,000 grams should receive the first dose of hepatitis B vaccine 1 month after birth or at hospital discharge.

REPORTING PROCEDURES

1. Title 17, California Code of Regulations (CCR), Section 2500 requires healthcare providers to report HBsAg-positive results to the local health department within 7 days.

2. CCR, Title 17, Section 2505 requires laboratories to report HBsAg-positive results (must specify gender) to the local health department within one (1) working day from the time that the laboratory notifies that healthcare provider or other person authorized to receive the report. If the laboratory that makes the positive finding received the specimen from another laboratory, the laboratory making the positive finding shall notify the local health officer of the jurisdiction in which the healthcare provider is located within the time specified above from the time the laboratory notifies the referring laboratory that submitted the specimen. If the laboratory is an out-of-state laboratory, the California laboratory that receives a report of such findings shall notify the local health officer in the same way as if the finding had been made by the California laboratory.

3. Hospitals should report all births to women with a positive or unknown HBsAg status to the Perinatal Hepatitis B Prevention Unit (PHBPU) at the Los Angeles County Department of Public Health Immunization Program within 24 hours of birth. Fax the **HOSPITAL REPORT**, Perinatal Hepatitis B form to (213) 351-2781. This form is available at http://publichealth.lacounty.gov/ip/perinatalhepB/hospreport.pdf (PDF version); http://publichealth.lacounty.gov/ip/perinatalhepB/hospreport.docx (Word version).

4. Hospitals should refer all HBsAg-positive women that deliveried a baby to the PHBPU by instructing patients to call (213) 351-7400 within one week after discharge; document the referral to the PHBPU in the Discharge Summary.

   a. The PHBPU of the Immunization Program will case manage infants born to HBsAg-positive mothers, and sexual and household contacts of the women.

   b. Private and public providers will provide appropriate testing and hepatitis B vaccination.

2. **Report Form**:

   a. PHBPU staff will complete the **CONFIDENTIAL HBsAg+ CASE/HOUSEHOLD MANAGEMENT REPORT (CDPH 8546)**

   b. If the patient is identified as an acute case of hepatitis B, the health districts will conduct additional follow up as described in the Hepatitis B section.

3. **Epidemiologic Data**:

The majority of women identified as HBsAg-positive on their routine prenatal laboratory work-up are hepatitis B carriers. Obtain information to evaluate risk of transmission to infant and sexual and household contacts:

   a. Estimated delivery date and anticipated hospital of delivery.

   b. Anticipated provider of pediatric care.

   c. Evaluate line list of contacts (sexual and/or household) for susceptibility and need for vaccination.

   d. Obtain laboratory tests:

• Household contact(s) -- test for susceptibility to hepatitis B infection; obtain total hepatitis B core antibody (anti-HBc) and HBsAg.

CONTROL OF CASE, CONTACTS & CARRIERS

Investigate infant immediately to ensure receipt of HBIG and HBV vaccine.

CASE:

No restrictions. Follow-up of newborn is a public health priority. Without appropriate protection, up to 90% of newborns will be infected; if infected, 90% become carriers.

Post-Vaccination Serology Testing: Test all infants of HBsAg-positive mothers for both HBsAg and antibodies to HBsAg (anti-HBs) 1-2 months after vaccine series completion, but not before 9 months of age. Revaccinate HBsAg-negative infants with anti-HBs levels less than 10 mIU/mL with a second three-dose vaccine series and retest 1-2 months after the last vaccine dose.

CONTACTS:

Investigate remaining contacts within 2 weeks (persons exposed to blood or body fluid of an infected person, regular sexual partners, and long-term household contacts to a carrier of hepatitis B). "Long-term" contacts are defined as individuals with anticipated continuous household exposure for greater than one year (often limited to nuclear family only).

1. No restrictions.

2. Regular sexual partners are at increased risk. Obtain HBsAg and anti-HBc to evaluate susceptibility. If susceptible, administer hepatitis B vaccine to the contact.

3. Long-term household contacts of all ages are at increased risk. Obtain history of hepatitis B vaccination; if can't document vaccination, obtain serologic screening (anti-HBc and HBsAg) on all contacts, including children, to evaluate status and susceptibility. If susceptible, administer hepatitis B vaccine to the contact.

4. Vaccinate without screening regular sexual partners and long-term household contacts who firmly refuse screening for susceptibility

5. Vaccine dosage depends on the age and vaccine manufacturer. Refer to the vaccine package insert or B 71 ("Recommendations for Use and Storage of Common Immunobiologics and Other Prophylactic Agents").

PREVENTION-EDUCATION

1. Instruct HBsAg-positive prenatal patients on the importance of their newborns receiving hepatitis B vaccine and HBIG within 12 hours of birth for protection against the hepatitis B virus. Infant will need 2 subsequent doses of hepatitis B vaccine.

2. Instruct HBsAg-positive prenatal patients that the hepatitis B vaccine is a routine childhood immunization and that it is very important for infant to complete the full hepatitis B vaccination series.

3. The infant will need a HBsAg test and an anti-HBs test after completion of the vaccine series at age 9-18 months to ensure the effectiveness of the vaccine.

4. Breast-feeding is not contraindicated for infants undergoing hepatitis vaccination.

5. Advise HBsAg-positive patients and contacts to get an evaluation by a liver specialist for possible liver disease and treatment

6. Instruct HBsAg-positive patients on the sanitary disposal of blood and other body secretions. Advise the patient that shared articles contaminated with blood (e.g., needles, syringes, razors, toothbrushes and pedicure equipment) may transmit the disease.

7. Advise the patient that all sexual partners are at increased risk of infection; condoms may reduce their risk. Regular sexual contacts should be evaluated for susceptibility and vaccinated if susceptible.

8. Advise that long-term household contacts are at increased risk of infection. Contacts

HEPATITIS C

1. **Agent:** Hepatitis C virus (HCV).

2. **Identification:**

   a. **Symptoms:** Cases are typically asymptomatic or have mild disease. 20-30% have jaundice. 10-20% have vague symptoms such as anorexia, malaise, or abdominal pain. 70% develop chronic liver disease, 15% develop cirrhosis after 20-30 years, and 5% die from liver cancer or cirrhosis. Fulminant hepatic failure following infection is rare.

   b. **Differential Diagnosis:** Other causes of viral and non-viral hepatitis.

   c. **Diagnosis:**

   Acute:

   - Serumalanine aminotransferase (ALT) levels > 400;
   - Exclusion of hepatitis A and B on a serological basis;
   - Positive serology for HCV antibody (anti-HCV) with an adequate signal to cutoff ratio[1] verified by supplemental test such as recombinant immunoblot assay (RIBA) or detection of viral antigen by polymerase chain reaction (PCR)
   - Evidence of illness with discrete onset of symptoms

   Chronic/Carrier: positive serology for HCV antibody (anti-HCV) with an adequate signal to cutoff ratio[1] or verified by supplemental test such as recombinant immunoblot assay (RIBA) or detection of viral antigen by polymerase chain reaction (PCR).

   All others: close as False

3. **Incubation:** Variable, 2 weeks to 6 months; average 40 days.

4. **Reservoir:** Human.

5. **Source:** Blood or blood products.

6. **Transmission:** By parenteral inoculation or mucous membrane, exposure to human blood or blood products.

7. **Communicability:** From one or more weeks prior to onset; may persist indefinitely. Carrier state is common. Viremia appears to be relatively low.

8. **Specific Treatment:** Multiple antiviral combinations are currently being used for treatment.

9. **Immunity:** Unknown.

REPORTING PROCEDURES

1. Reportable, *California Code of Regulations*, Section 2500, 2505,.

2. **Report Form: VIRAL HEPATITIS B or C CASE REORT**. In addition, for the rare case associated with administration of blood or blood products during the 6-month period prior to onset use Supplemental Data Sheet, **TRANSFUSION-ASSOCIATED HEPATITIS CASE RECORD (CDPH 8376)**.

   Chronic carriers of anti-HCV are not investigated with these forms; submit CMR only.

3. **Epidemiologic Data:**

   a. Record results of laboratory tests: HBsAg, IgM anti-HBc, HAV IgM, anti-HCV, RIBA, PCR, ALT levels etc. For more information see Guidelines for Laboratory Testing and Result Reporting of Antibody to Hepatitis C Virus http://www.cdc.gov/mmwr/PDF/rr/rr5203.pdf.

   b. Reason for medical visit leading to diagnosis. This may be helpful in

[1] Guidelines for Laboratory Testing and Result Reporting of Antibody to Hepatitis C Virus http://www.cdc.gov/mmwr/PDF/rr/rr5203.pdf

determining if case is acute or chronic hepatitis C.

c. Contact with confirmed or suspected acute or chronic hepatitis C infection

d. Patient was treated for a sexually transmitted disease.

e. Patient or employee of a renal dialysis unit.

f. Resident of a long term facility (e.g. nursing home).

g. Receive fingersticks.

h. Contact with or injection of contaminated blood; accidental inoculation by needle (laboratory), accidental splash into the eye.

i. Transfusions of blood or blood products: places, dates, lot numbers, manufacturer.

j. Patient has received any IV infusions and/or injections in the outpatient setting.

k. Medical or dental treatment within past 6 months, including types of injections, surgical procedures performed or any diagnostic medical procedure.

l. Occupational history, especially medical-dental personnel, workers or public safety worker (law enforcement/correctional officer) and those involved in handling blood or blood products.

m. Blood donation, date, and location of last donation.

n. Patient has undergone acupuncture.

o. Percutaneous exposure: self-injections (admitted or suspected), tattooing, ear piercing, acupuncture, electrolysis, skin-piercing procedures, etc.

p. Use of injection or non-injection street drugs.

q. For infant or child case, status of mother and other sibling should be evaluated. If pertinent, testing of mother's long-term sexual partner may be considered at the discretion of the mother's physician and child's mother.

r. Number of sexual partners of either gender.

CONTROL OF CASE, CONTACTS & CARRIERS

Investigate within 3 days. The **VIRAL HEPATITIS B or C CASE REPORT** is for acute cases only. For chronic carriers submit a CMR only.

CASE: No restrictions.

CONTACTS:

1. For persons exposed to blood or sexual secretions of infected person, use of immune globulin has no protective benefit and is not appropriate.

2. No restrictions.

PREVENTION-EDUCATION

1. Refer to appropriate personal health care provider for long term follow-up.

2. Advise the patient that disease may be transmitted by shared articles that become contaminated with blood (needles, syringes, etc.) as well as possibly sexually and perinatally transmitted.

3. Individuals should be counseled about the risk of sexual transmission of HCV if they have multiple sexual partners, and should be advised to use barrier precautions such latex condoms. Since long-term sexual partners are at low risk for acquiring HCV infection, use of barrier precautions should be discussed between the patient and his/her physician.

4. Emphasize sanitary disposal of blood and other body secretions.

5. Advise patient that people with a history of viral hepatitis are excluded from blood donor programs.

6. Advise patient to abstain from alcohol and not to start any new medications, including

over-the-counter and herbal medicines, without first checking with their doctor.

7. For all cases advise vaccination against hepatitis A and hepatitis B.

8. HCV-positive mothers may breast feed, but should abstain if nipples become cracked or bleed.

DIAGNOSTIC PROCEDURES

Clinical and epidemiologic history required to aid laboratory in test selection.

Serology:

Diagnosis is made by the exclusion of hepatitis A (IgM anti-HAV negative) and hepatitis B (IgM anti-HBc negative or HBsAg negative), and a strong positive anti-HCV screening test or an anti-HCV test verified by a supplemental test (otherwise known as confirmation test). The EIA must have a signal-to-cutoff ratio high enough to be indicative of a HCV infection. For any EIA with a low or unknown S/CO level, a positive result is needed on either the recombinant immunoblot assay (RIBA), which confirms HCV antibodies, or the polymerase chain reaction (PCR) which detects HCV nucleotides (DNA or RNA) in serum or blood.

Container: Serum separator tube (SST, a red-gray top vacutainer tube)

Laboratory Form: **TEST REQUISITION FORM (H-3021)**

Examination Requested: Hepatitis B (indicate if previously positive).

Material: Whole clotted blood.

Amount 8-10 ml.

Storage: Refrigerate.

These serological tests are performed by the Public Health Laboratory, as well as by many clinical laboratories and require 10 ml of clotted blood or 5 ml of serum. The Public Health Laboratory performs IgM anti-HAV (MYSYS test code: HAVM) and HBsAg (MYSYS test code: HBSAG) tests and also performs Hepatitis C EIA tests (MYSYS test code HCVAB), but IgM anti-HBc test (unless asked for specially) and HCV PCR is not offered at the Public Health Laboratory.

INFLUENZA (Select Individual Cases and Outbreaks)
(also see Respiratory Disease Outbreaks)

Note: Suspected influenza outbreaks should be initially reported as respiratory outbreaks (unknown) until laboratory testing confirms influenza as the etiology.

1. **Agent**: Influenza viruses. Only influenza A and B are of public health concern since they are responsible for epidemics.

2. **Identification:**

   a. **Symptoms**: New acute onset of fever (≥100°F (38°C), non-productive cough, sore throat, chills, headache, myalgia, and malaise. Can sometimes also cause gastrointestinal (GI) symptoms. Duration is 2-4 days in uncomplicated cases, with recovery usually in 5-7 days. Infection with non-human strains of influenza such as avian influenza viruses theoretically may cause other illness, such as conjunctivitis, gastroenteritis or hepatitis.

   b. **Differential Diagnosis**: Other agents that cause febrile respiratory illnesses or community acquired pneumonia including, but not limited to *Mycoplasma pneumoniae*, adenovirus, respiratory syncytial virus, rhinovirus, parainfluenza viruses, *Legionella* spp, and coronavirus.

   c. **Diagnosis**: Confirmed by viral isolation, PCR, rapid antigen test, or a DFA/IFA test, and compatible symptoms.

3. **Incubation**: 1-4 days; average 2 days.

4. **Reservoir**: Humans, swine, and migratory birds.

5. **Source**: Mostly droplet spread by nasal or pharyngeal secretions and sometimes fomites.

6. **Transmission**: Large droplet spread from infective persons or sometimes contaminated fomites. Airborne spread possible, but unlikely.

7. **Communicability**: People infected with flu shed virus and may be able to infect others from 1 day before getting sick to 5 to 7 days after. This can be longer in some people, particularly and people with weakened immune systems

8. **Specific Treatment**: Supportive care (e.g., rest, antipyretics, fluids, etc.). Antiviral medications may reduce the severity and duration of influenza illness if administered within 48 hours of onset. These same medications may be useful for hospitalized patients or those who are immunocompromised or if vaccine does not cover circulating strain.

   Streptococcal and staphylococcal pneumonias are the most common secondary complications and should be treated with appropriate antibiotics.

9. **Immunity**: Permanent for a specific strain.

REPORTING PROCEDURES

1. **Outbreaks reportable:**

   Under Title 17, Section 2500, *California Code of Regulations* all suspected outbreaks are reportable.

   Note: Suspected influenza outbreaks should be initially reported as respiratory outbreaks (unknown) until laboratory testing confirms influenza as the etiology.

   Health care institutions associated with long term health care (i.e., skilled nursing facilities, intermediate care facility, and intermediate care for developmentally disabled)**:** At least **one case** of laboratory-confirmed influenza in the setting of a cluster of ILI within a 72-hour period.

   Non healthcare-associated institutions defined as prison, jail, university dormitory and overnight camps: At least two cases of ILI within 48-72 hour period; OR at least one case of ILI with laboratory confirmation for influenza or other respiratory pathogen in the setting of a cluster of ILI.

   Congregate Settings defined as schools and day camps (excluding pertussis): At

least 10% of average daily attendance absent with ILI sustained over a 3-day period; OR 5 or more cases of AFRI in an epidemiologically-linked group (i.e., single classroom, sports team or after-school group) sustained over a 3-day period.

2. **Single cases reportable**.

   a. Under Title 17, Section 2500, California Code of Regulations, all cases due to "novel" influenza A (for example due to avian or swine influenza) are reportable.

   b. In Los Angeles County, influenza associated deaths at *any* age are reportable. Influenza-associated deaths must have had: 1) confirmed influenza by laboratory testing; 2) a clinical syndrome consistent with influenza or complications of influenza (pneumonia, ARDS, apnea, cardio-pulmonary arrest, myocarditis, Reye syndrome or acute CNS symptoms (e.g., seizures, encephalitis) and 3) a clear progression from onset of illness to death. These Los Angeles County specific reporting requirements may change as circumstances change.

3. **Report Forms: SEE TABLE 1**

   a. Use the following forms for outbreaks at various settings:

      i. **Non-healthcare facility**
      For initial report of influenza outbreaks:

      INITIAL ASSESSMENT OF RESPIRATORY OUTBREAK REPORT

      For final report of an influenza outbreak (if outbreak continues after initial report has been filed):

      Line List-Non-Healthcare Facility for Students, Staff or Residents

      FINAL ACUTE FEBRILE RESPIRATORY ILLNESS OUTBREAK REPORT FORM (CDPH 9003 08/14)

      ii. **Sub-acute healthcare facility**
      For initial and final reports of influenza outbreaks:

      CD OUTBREAK INVESTIGATION — SUB-ACUTE HEALTH CARE FACILITY (H-1164-SubAcute, fillable)

      For final report of a respiratory outbreak (if outbreak continues after initial report has been filed):

      Line List - Respiratory Outbreak for Residents and Staff

      FINAL ACUTE FEBRILE RESPIRATORY ILLNESS OUTBREAK REPORT FORM (CDPH 9003 08/14)

   b. Use the following forms to report a single cases of fatal influenza:

      INFLUENZA FATALITY CASE REPORT FORM (acdc-influ 2/14)

4. **Epidemiologic Data for Outbreaks:**

   a. Establish a case definition (i.e., fever [measured or reported] and either cough, sore throat, or stuffy nose): include pertinent clinical symptoms and laboratory data (if appropriate).

   b. Confirm etiology of outbreak using laboratory data (rapid test, culture, or PCR). **At least 1 patient must have tested positive for influenza in an outbreak to call it an "influenza" outbreak.** Otherwise call it a "respiratory outbreak of unknown origin."

   c. Create a line list that could include:
      i. names of cases
      ii. dates of onset
      iii. symptoms
      iv. age
      v. hospitalization status
      vi. results of laboratory tests
      vii. prior immunization history
      viii. travel history, if relevant
      ix. epi links to other cases (room #s, grades in school, etc)
      x. avian or swine exposure, if relevant

   d. Create an epi-curve, by date of onset. Only put those that meet the case definition on the epi-curve.

e. Maintain surveillance for new cases until rate of influenza is down to "normal" or no new cases for 1 week.

f. **Note:** At least 1 patient must have tested positive for influenza in an outbreak to call it an "influenza" outbreak. Otherwise call it a "respiratory outbreak of unknown origin."

CONTROL OF CASE, CONTACTS & CARRIERS

CASE:

Precautions: None. Advise patients to stay away from work, schools, camps, and mass gatherings for at least 24 hours after resolution of fever. Limit exposure to others, especially those at high risk for complications.

Advise cases who work in health care settings not to return to work until 7 days after symptom onset or 24 hours after resolution of symptoms, whichever is longer.

As of 2010, there are two FDA approved drugs for the prevention and treatment of influenza A and B: **oseltamivir** (Tamiflu®) and **zanamivir** (Relenza®). Possible antiviral resistance should be considered before prescribing antivirals.

To follow current recommendations for treatment and prevention of influenza or for additional information about the use of antivirals for treatment and prophylaxis see:
http://www.cdc.gov/flu/antivirals/index.htm

CONTACTS: No restrictions.
Prophylaxis with appropriate antiviral medication during outbreaks is advised for high-risk patients who have not been vaccinated or when the vaccine is of questionable efficacy.

CARRIERS: Not applicable.

GENERAL CONTROL RECOMMENDATIONS FOR OUTBREAKS

1. Reinforce good hand hygiene among all (including visitors, staff, and residents/students).
2. Emphasize respiratory etiquette (cover cough and sneezes, dispose of tissues properly).
3. Reinforce staying home when sick.
4. Provide posters and health education about hand hygiene and respiratory etiquette.
5. Discourage sharing water bottles.
6. Emphasize importance of early detection of cases and removing them from contact with others.
7. Encourage standard environmental cleaning with EPA registered disinfectant appropriate for influenza viruses.
8. Consider isolation and/or cohorting and/or quarantine for congregate-living facilities.
9. Consider canceling group activities.
10. Consider using influenza vaccine to control situation (consult with ACDC).
11. Consider post-exposure prophylaxis with antiviral medications for high-risk contacts (consult with ACDC).
12. Provide educational materials to facility-including posters, handouts, etc. Go to this website to order influenza and respiratory virus health education:
http://publichealth.lacounty.gov/acd/HealthEdFlu.htm

Note: The decision on what antiviral to use needs to be made on a case by case basis, depending on the strain of influenza causing the outbreak.

Consider the additional recommendations for congregate-living facilities, especially with high risk patients:

1. Close facility or affected areas to new admissions until 1 week after last case.
2. Suspend group activities until 1 week after last case.
3. If possible, separate staff that cares for sick from staff that cares for well patients.
4. Institute droplet precautions for symptomatic patients.
5. Refer to California Department of Public Health, *Recommendations for the Prevention and Control of Influenza in California Long-Term Care Facilities.*
6. Strongly consider using antiviral post-exposure prophylaxis or vaccine to control outbreak (consult with ACDC or AMD).

Note: The decision on what antiviral to use needs to be made on a case by case basis,

depending on the strain of influenza causing the outbreak.

DIAGNOSTIC PROCEDURES

Clinical and epidemiologic histories are required to aid in laboratory test selection.

Nasopharyngeal (NP) or nasal swab, and nasal wash or aspirate. PHL recommends Dacron or Nylon flocked swabs, do NOT use wooden swabs. NP swabs are preferred because the specimens can be tested for influenza and a variety of other respiratory pathogens using PCR based technology. All other specimens can only be tested for influenza. Samples should be collected within the first 4 days of illness. Collect specimens from **at least 2 separate symptomatic individuals** and up to 5 symptomatic individuals for any community-based outbreak and select those individuals with the most recent onset for specimen collection.

1. Diagnostic tests available for influenza include viral culture, serology, rapid antigen testing, polymerase chain reaction (PCR), and immunofluorescence assays

2. **NOTE:** Culture should not be attempted when avian influenza is suspected. Contact Public Health Laboratory (PHL) or ACDC for instructions.

   Container: Viral Culturette with M4 viral transport medium.

   Laboratory Form: **Reference Examination for Influenza A, B and/or Other Respiratory Viruses** or online request if electronically linked to the PHL.

   Examination: Testing algorithm is determined by the PHL.

   Material: Nasopharyngeal swab preferred; nasal swab can be used if necessary. See

   And: Los Angeles County Department of Public Health Standardized Nursing Procedures: NP Competency Checklist (5/6/2009).

   Storage: Keep refrigerated and upright. Deliver to PHL as soon as possible.

PREVENTION/EDUCATION

1. All persons >6 months are recommended to receive an annual influenza vaccine.

2. Practice good personal hygiene, avoid symptomatic persons during outbreaks, and do not go to work or school when ill with a respiratory disease.

3. Do not give aspirin to children with influenza and other viral illnesses.

4. Postpone elective hospital admissions during epidemic periods, as beds may be needed for the ill.

5. Sick visitors and staff should not be allowed in the facility.

ADDITIONAL RESOURCES

Additional information on the control of influenza during outbreaks, especially in healthcare facilities:

CDC. Infection Control for the Prevention and Control of Influenza in Health Care Facilities.

California Department of Public Health. *Recommendations for the Prevention and Control of Influenza in California Long-Term Care Facilities*.

Hospital Association of Southern California. *Recommended Management Actions to Prepare Hospitals for Overflow Situations 2006-2007 Winter Season*

LAC. Acute Communicable Disease Control Program.

Seasonal Influenza in Adults and Children—Diagnosis, Treatment, Chemoprophylaxis, and Institutional Outbreak Management: Clinical Practice Guidelines of the Infectious Diseases Society of America. Clinical Infectious Diseases 2009; 48:1003–32.

AVIAN INFLUENZA

Avian flu refers to the disease caused by infection with avian (bird) influenza (flu) Type A viruses. These viruses occur naturally among wild aquatic birds worldwide and can infect domestic poultry and other bird and animal species. Avian flu viruses do not normally infect humans. However, sporadic human infections with avian flu viruses, including H5N1 and H7N9, have occurred.

For more information about avian influenza, visit: http://www.cdc.gov/flu/avianflu

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SWINE INFLUENZA

Swine flu refers to the disease caused by infection with swine (pig) influenza (flu) Type A viruses. These viruses occur naturally among domesticated swine. Swine flu viruses do not normally infect humans but secondary human infections may occur from time to time. When it occurs, the strain of influenza is called “variant” to identify that it is not a “normal” human virus. However pigs can be infected with swine, avian, and human viruses at the same time. When this occurs, genes may be swapped between the different types of viruses resulting in the development of a new viral strain that is easily transmitted between humans. This occurred in 2009 with the development of the 2009 pandemic H1N1.

For more information about swine influenza see http://www.cdc.gov/flu/swineflu/

TABLE 1. RESPIRATORY DISEASE OUTBREAK FORMS

NON-HEALTHCARE INSTITUTIONS	INITIAL REPORT	FINAL REPORT
○ Congregate Settings-Schools and day camps ○ Non healthcare-associated institutions(i.e. jail, juvenile hall, camps, university dormitory, and overnight camps)	**INITIAL ASSESSMENT OF RESPIRATORY OUTBREAK REPORT**	**FINAL Acute Febrile Respiratory Illness Outbreak Report Form (CDPH 9003 08/14)** **Line List - Respiratory Outbreak for Students, Staff, or Residents**
SUB-ACUTE HEALTHCARE INSTITUTION	**INITIAL REPORT**	**FINAL REPORT**
○ Skilled nursing facility ○ Intermediate care facility ○ Intermediate care for developmentally disabled ○ Psychiatric facility	**CD OUTBREAK INVESTIGATION — SUB-ACUTE HEALTH CARE FACILITY (H-1164-SubAcute, fillable) (instructions)**	**FINAL Acute Febrile Respiratory Illness Outbreak Report Form (CDPH 9003 08/14)** **Line List - Respiratory Outbreak for Residents and Staff** **CD OUTBREAK INVESTIGATION — SUB-ACUTE HEALTH CARE FACILITY (H-1164-SubAcute, fillable)**

Respiratory Outbreak Flow Chart

Respiratory Outbreak Suspected

If influenza or pertussis is suspected see appropriate B-73 chapter

By default all respiratory outbreaks should be opened as "**OUTBREAK-UNK. RESP**" until lab tests confirm a pathogen

Non-Healthcare Institutions

Congregate settings (e.g., schools, daycare)
5 or more cases in a similar setting (e.g., same classroom)*

Non healthcare-associated institutions (e.g., jail, juvenile hall, camps, assisted living) 2 or more cases

Sub-Acute Healthcare Institutions

Skilled nursing facility, intermediate care facility, intermediate care for developmentally disabled, psychiatric facility

Note: One confirmed case of influenza in this setting should prompt infection control measures

Initial Assessment of Respiratory Outbreak Report

Fill out initial form; PHNS or AMD review within 24 hours

CD OUTBREAK INVESTIGATION — SUB-ACUTE HEALTH CARE FACILITY (H-1164-SubAcute, fillable)

Collect NP or nasal swabs within 4 days of onset of illness from at least 2 symptomatic cases (up to 5)

Fill out line list and final forms; PHNS or AMD review

Line List for Students, Staff, or Residents

FINAL Acute Febrile Respiratory Illness Outbreak Report Form (CDPH 9003 08/14)

Line List for Residents or Staff

FINAL Acute Febrile Respiratory Illness Outbreak Report Form (CDPH 9003 08/14)

CD OUTBREAK INVESTIGATION — SUB-ACUTE HEALTH CARE FACILITY (H-1164-SubAcute, fillable)

*If school is LAUSD ensure school district is notified by phone

LISTERIOSIS

1. **Agent**: *Listeria monocytogenes*, a gram-positive rod-shaped bacterium; serotypes 1/2a, 1/2b, and 4b are most frequently isolated.

2. **Identification:**

   a. Symptoms: A bacterial disease manifested as septicemia and/or acute meningoencephalitis. The most susceptible persons are neonates, the elderly, pregnant women, and immunocompromised individuals. Onset of meningoencephalitis may be sudden with fever, headache, nausea, vomiting, and signs of meningeal irritation. Endocarditis, granulomatous lesions in liver and other organs, localized internal or external abscesses, and pustular or papular cutaneous lesions may also occur.

   b. **Differential Diagnosis**: In the normal host, listeriosis may be an acute, mild, febrile illness with influenza-like symptoms. In the pregnant woman, infection of the fetus is likely with severe consequences such as abortion, stillbirth, premature delivery or sepsis. The postpartum course in the mother is uneventful. Case fatality rate is approximately 30% in newborns and other immunocompromised hosts.

   c. **Diagnosis**: Isolation of the organism from cerebrospinal fluid, blood, amniotic fluid or other sterile sites of infection. Care must be taken to distinguish *L. monocytogenes* from other gram-positive rods, particularly diphtheroids.

3. **Incubation**: 3 days to 3 months, average 31 days. The fetus is usually infected in utero within several days (average 5 days) after maternal disease, as in group B streptococcal disease.

4. **Reservoir**: Mud, silage, water, domestic and wild mammals, fowl, and humans. Asymptomatic fecal carriage exists in man and animals.

5. **Source**: Ingestion of contaminated vegetables, raw or contaminated milk, soft cheese, seafood, or undercooked meat, and direct contact with infectious material or soil contaminated with infected animal feces.

6. **Transmission**: Infection is transmitted from mother to fetus in utero or during passage through a contaminated birth canal. Person-to-person transmission is possible through sexual contact, and infection from inhalation of the organism has been reported. Papular lesions on hands and arms may occur from direct contact with infectious material; nosocomial transmission has occurred.

7. **Communicability**: Mothers of infected infants may shed the agent in vaginal discharge or urine for 7-10 days after delivery; fecal carriage can last for months. Period of person-to-person communicability is unknown.

8. **Specific Treatment**: One of the following:

   Penicillin or ampicillin together with aminoglycosides; ampicillin alone; tetracycline; chloramphenicol; or erythromycin.

   Ampicillin is recommended for maternal-fetal listeriosis.

   Tetracycline is contraindicated for children less than 8 years of age.

9. **Immunity**: None.

REPORTING PROCEDURES

1. **Reportable**. *California Code of Regulations*, Section 2500.

2. **Report Form**: **LISTERIOSIS CASE REPORT (CDPH 8296)**. CHS to use partly completed form attached in vCMR by ACDC.

3. **Epidemiologic Data:**

   a. Food history with particular emphasis on ingestion of soft cheeses, unpasteurized dairy products, raw fruits and vegetables,

undercooked meat, or seafood and food from delicatessens.

b. History of underlying immune deficiency or immunosuppressive medications.

CONTROL OF CASE, CONTACTS & CARRIERS

Investigate all cases within 3 days. (Delay for 1 week is acceptable where fetal/neonatal death has occurred.)

CHS to use partly completed form attached in vCMR by ACDC.

CASE:

Precautions: Enteric precautions, especially around immunocompromised persons, the elderly, and pregnant women.

CONTACTS: No restrictions

PREVENTION-EDUCATION

1. High risk individuals should avoid raw dairy products, soft cheeses, food from delicatessens, and undercooked or raw meat or seafood.

2. Veterinarians and farmers that handle aborted fetuses should take proper precautions.

3. Human or animal excrement should not be used for fertilizer.

DIAGNOSTIC PROCEDURES

1. Submit specimens for isolation of infectious agent. Call the Bacteriology Section of the Public Health Laboratory.

2. Food: Must be submitted by a Food and Milk Sanitarian. See section on **FOOD POISONING**.

LEGIONELLOSIS

1. **Agent**: *Legionella* species are weakly staining Gram-negative bacilli, which do not grow on standard bacteriologic media. More than 30 species have been identified, but *Legionella pneumophila* is responsible for 80-90% of clinical infections. Six serogroups of *L. pneumophila* are known to cause disease in humans, but serogroup 1 is most commonly associated with disease.

2. **Identification**: Two clinically and epidemiologically distinct syndromes: pneumonia (Legionnaires' disease) and Pontiac fever.

   a. **Symptoms**:

      Legionnaires' disease: Clinical manifestations and severity may vary between individuals. Typical presentation is subacute onset of malaise, fever, headache, muscle aches, and non-productive cough, followed in 24-48 hours by rapidly rising temperature, relative bradycardia, chills, progressive pneumonia, and evidence of multi-system involvement including diarrhea, changes in mental status, hyponatremia, and abnormal kidney and liver function tests. Initial chest X-rays commonly show patchy bilateral infiltrates, with rapid progression to consolidation.

      Pontiac fever: An acute, self-limiting flu-like illness, with headache, sore throat, fever, and myalgia, without pneumonia.

   b. **Differential Diagnosis**: Other known causes of pneumonia and febrile respiratory disease.

   c. **Diagnosis**: High index of suspicion; failure of pneumonia to respond to therapy with penicillins, cephalosporins, or aminoglycosides; isolation of organism on special media; 4-fold rise in indirect fluorescent antibody (IFA) titer to >1:128 taken within first 7 days of illness and 3-6 weeks later; direct fluorescent antibody (DFA) stain of lung tissue or sputum; urinary antigen testing by enzyme immunoassay (EIA) or immunochromatography; DNA probe testing of clinical specimens. A single elevated antibody titer does not confirm a case of Legionnaires' disease because IFA titers ≥1:256 are found in 1-20% of healthy adults.

3. **Incubation**: Legionnaires' disease: 2-10 days, usually 5-6 days. Pontiac fever: 5-66 hours, usually 24-48 hours.

4. **Reservoir**: *Legionella* organisms are common inhabitants of aquatic environments. Excavated soil, humidifiers, and air conditioning evaporative condensers and cooling towers have been implicated epidemiologically. The organism has also been isolated from hot and cold water taps and showers, and from creek and pond water and surrounding soil.

5. **Transmission**: Inhalation of aerosols of water contaminated with *Legionella* sp. are the primary mechanisms by which these organisms enter a patient's respiratory tract; aspiration of contaminated potable water or pharyngeal colonization.

6. **Communicability**: Person-to-person transmission has not been documented.

7. **Specific Treatment:** Quinolones are now the treatment of choice: levofloxacin 500 mg intravenously daily or ciprofloxacin 400 mg intravenously every 12 hours. Other treatment options include intravenous azithromycin 500 mg daily or erythromycin 2 g to 4 g intravenous daily with the addition of rifampin 600 mg daily for the first 3-5 days for more severe cases. The standard length of therapy is from 14 to 21 days depending of disease severity.

   Note: Rifampin stains contact lenses and turns urine orange-red. It is not recommended for use during pregnancy. It also may decrease the effectiveness of oral contraceptives.

8. **Immunity**: Apparently lifelong to specific strains.

REPORTING PROCEDURES

1. **Reportable**. (Title 17, Section 2500 and 2505, *California Code of Regulations*).

2. **Report Form**: **LEGIONELLOSIS CASE REPORT (CDPH 8588)**. ACDC will complete it.

3. **Epidemiologic Data:**

   a. Occupation.

   b. History of travel, convention attendance, or hospital stays or visits during the 2 weeks before onset of illness.

   c. Recent renovation, remodeling, construction, presence of air conditioning cooling towers at home or office.

   d. History of any chronic disease, alcohol use, smoking, organ transplant, dialysis, or any form of immunodeficiency.

CONTROL OF CASE, CONTACTS & CARRIERS

CASE: Precautions: None.

CONTACTS: No restrictions.

CARRIERS: Carrier state not demonstrated to date.

Investigations of outbreaks will be coordinated by ACDC.

In any healthcare setting, when a single case of laboratory-confirmed definite nosocomial (i.e., after ≥10 days of continuous inpatient stay) or possible nosocomial (i.e., within 2--9 days of inpatient stay) Legionnaires' disease is identified, the setting will be investigated further. This may include an epidemiologic investigation including a 6-month retrospective review of microbiologic, serologic, and post-mortem data to identify previous cases, and prospective surveillance for additional cases of healthcare-associated Legionnaires' disease for at least 2 months.

PREVENTION-EDUCATION

For prevention and control of healthcare associated Legionnaires' disease, refer to: Guidelines for Preventing Health-Care—Associated Pneumonia, 2003, Recommendations of CDC and the Healthcare Infection Control Practices Advisory Committee, MMWR, March 26, 2004 / 53(RR03); 1-36. Available at:

http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5303a1.htm

DIAGNOSTIC PROCEDURES

1. Culture of respiratory secretions and/or tissue is the preferred method of diagnosis. Culturing permits identification of the specific *Legionella* species and sero-group. It is essential where outbreaks are suspected so that environmental sources can be linked to patient isolates. Culturing requires specialized media; consult the Public Health Laboratory.

2. Urinary antigen detection by EIA is a very sensitive test for *L. pneumophila* serogroup 1 and is readily available through commercial laboratories and the Public Health Laboratory.

3. Direct fluorescent antigen (DFA) detection on respiratory secretions or tissue specimens can be performed at the Public Health Laboratory.

4. Serologic diagnosis by immunofluorescent antibody test (IFA) requires both acute and convalescent sera to make the diagnosis of legionellosis. Submit refrigerated spun sera to specialized commercial laboratory or the Public Health Laboratory for testing. The first specimen should be taken within the first 7 days of illness and the second specimen 3 to 4 weeks after onset of symptoms.

LEPROSY (Hansen Disease)

1. **Agent**: *Mycobacterium leprae*, an acid-fast, gram-positive bacillus.

2. **Identification**:

   a. **Symptoms**: Lesions of skin, often enlargement of peripheral nerves, with consequent anesthesia, muscle weakness and contractures. Major types:

      Lepromatous (LL): Many bacilli present, decreased cell-mediated immunity (CMI), diffuse skin lesions, invasions of upper respiratory tract, lymphoid system and some viscera. Erythema nodosum leprosum (ENL) and Lucio reaction may occur.

      Borderline (BL, BB, BT): Bacilli present and CMI unstable; includes features of both major types.

      Tuberculoid (TT): Few bacilli present, increased CMI, usually localized with discretely demarcated lesions, early in nerve involvement; may heal spontaneously in 1-3 years.

      Indeterminate: A benign form, relatively unstable, seldom bacteriologically positive. These cases may evolve toward lepromatous form or the tuberculoid form, or may remain unchanged indefinitely.

      Arrested leprosy: Under control with adequate medication.

      Complications: Residual paralysis and anesthesia leading to trophic ulcers; amyloid renal disease; chronic glomerulonephritis. Reversal reactions may destroy tissue abruptly.

   b. **Differential Diagnosis**: Other peripheral neuropathies, chronic dermatological lesions, tuberculosis, syphilis, yaws, lymphoma, vetiligo, psoriasis, cutaneous leishmaniasis, etc.

   c. **Diagnosis**: Characteristic tissue changes, nerve enlargement, history of immigration from endemic area, identification of acid-fast bacilli in tissue.

3. **Incubation**: Average 3-6 years; range, 7 months to 20 years.

4. **Reservoir**: Human. Wild armadillos have been found infected; transmission to humans is uncertain.

5. **Source**: Not established. Presumed to be nasal discharges, skin lesions.

6. **Transmission**: Not established. Presumed to be via nasal discharges to the skin and respiratory tract of close contacts. Close household contact, genetic factors and immune response thought to be important.

7. **Communicability**: Mildly communicable as long as solid viable bacilli are demonstrable. A single dose of rifampin makes the case non-communicable.

8. **Specific Treatment**: Multidrug therapy with dapsone (DDS); rifampin or rifampicin; clofazimine (B663). Dapsone resistance develops with mono-therapy, so multidrug chemotherapy is always used. Rifampin or dapsone may be used as prophylaxis for contacts.

9. **Immunity**: None.

REPORTING PROCEDURES

1. **Reportable**. Sections 2500 and 2582, *California Code of Regulations*.

2. **Report Forms:**

   LEPROSY SURVEILLANCE (CDC 52.18) required for all new cases.

   LEPROSY CASE/CONTACT SURVEILLANCE (H-1442)

   a. **CASE**:

      Submit **LEPROSY SURVEILLANCE (CDC 52.18)** immediately on all types (LL, BL, BB, TT, indeterminate and arrested leprosy) to ACDC.

Refer Hansen case/suspect to federally-sponsored Hansen's Disease Clinic for initial evaluation.

Los Angeles Hansen's Disease Clinic
LAC+USC Medical Center
1200 N. State St.
Clinic Tower A5B123
Los Angeles, CA. 90033
PH: (323)409-5240
Fax: (323) 441-8152
Physician - Thomas Rea, MD
email: rea@hsc.usc.edu
Public Health Nurse - Helen Mora RN
email: hmora@dhs.lacounty.gov

b. **CONTACTS:**

Household Contacts as defined in Contact section in this chapter should be referred to Los Angeles Hansen's Disease Clinic (see above). The need for further follow-up will be determined by the Clinic.

3. **Epidemiologic Data**:

a. Establishment of rapport with patient takes precedence over obtaining routine epidemiologic data.

b. Aliases, occupation, current symptoms.

c. Contact with persons with leprosy.

d. Place of birth, travel/residence in endemic areas from birth to present. Dates of entry into United States and California.

e. Type of leprosy, active/inactive.

f. Pertinent Medical Records to include biopsy date, results, history of treatment.

g. Disability or deformity.

h. Current medical supervision.

i. List of family members and other close household contacts and refer to Los Angeles Hansen's Disease Clinic (see above).

CONTROL OF CASE, CONTACTS & CARRIERS

1. Investigate within 14 days. Review record of LL, BL, and BB cases semi-annually in June and December for need to visit or telephone for initial two years of treatment. Send forms only for patient that are not compliant. Send initial contact registry only to ACDC.

2. All cases should be closed to public health two years after treatment initiation

CASE:

1. All LL, BL, and BB to remain under medical supervision by Los Angeles Hansen's Disease Clinic or private practitioner until treatment is completed.

2. All TT, BT, indeterminate and arrested leprosy to remain under medical supervision by Los Angeles Hansen's Disease Clinic or private practitioner until released by their physician.

CONTACTS:

Contacts are defined as persons who have been in close, continuous household contact for a month or more within 5 years prior to diagnosis or during any period of inadequate treatment. Persons residing with cases in areas of endemicity are particularly vulnerable. Secondary cases acquired in California are rare.

1. Contacts to all types of leprosy should be referred to the Los Angeles Hansen's Disease Clinic for evaluation.

CARRIER: Not applicable.

PREVENTION/EDUCATION

CASE & CONTACTS:

1. Clarify misconceptions regarding leprosy.

2. Encourage patient to remain under medical care.

CASE:

1. Emphasize importance of taking prescribed medications and following treatment plan.

2. Emphasize importance of watching for drug reactions and reporting to Los Angeles Hansen's Disease Clinic or treating physician.

3. Dispose of nasal and lesion discharges in a sanitary manner.

4. Explain the relationship of anesthetic areas to possible injury.

5. Teach daily examination of stocking-glove (foot-hand) anesthetic area.

6. Teach safety measures to prevent burns, ulcers, injuries, etc.

7. Inform patient of availability and importance of rehabilitation and reconstructive surgery when indicated.

8. Encourage hospitalization when recommended.

DIAGNOSTIC PROCEDURES

Specimen: Biopsy or smear taken from active lesion for examination of acid-fast bacilli.

LEPTOSPIROSIS

(Weil's disease, canicola fever, hemorrhagic jaundice, mud fever, swineherd's disease)

1. **Agent**: *Leptospira interrogans*, a spirochete with over 170 known serovars, e.g., icterohemorrhagiae, canicola.

2. **Identification:**

   a. **Symptoms**: Variable manifestations with fever, headache, chills, malaise, vomiting, myalgias, skin rash, conjunctivitis, meningeal irritation. Jaundice, renal insufficiency, hemolytic anemia, and cutaneous hemorrhages occur infrequently.

   b. **Differential Diagnosis**: Viral hepatitis, mononucleosis, typhoid fever, dengue, malaria, other causes of aseptic meningitis, rickettsial infections, hantavirus, as well as many other conditions.

   c. **Diagnosis**: Serologic Agglutination test; culture on special media (Fletcher's) of *leptospira* in blood during the acute illness or in urine after the first week; inoculation of guinea pigs. Immunofluorescence and EIA (enzyme linked immunosorbent assay) tests are also available.

3. **Incubation**: 4-19 days; usually 10 days.

4. **Reservoir**: Cattle, dogs, swine, rats, other rodents and a number of other wild animals.

5. **Source**: Urine or tissues of infected animals.

6. **Transmission**: Contact with water contaminated with urine of infected animals, as in swimming or accidental immersion; direct contact with infected animals. Organism presumably enters the body through broken skin or mucosal surfaces.

7. **Communicability**: Leptospires may be secreted in urine for up to 11 months. Transmission from person to person is rare.

8. **Specific** Treatment: Doxycycline, penicillin G.

9. **Immunity**: Short lived.

REPORTING PROCEDURES

1. **Reportable**. *California Code of Regulations*, Title 17, Section 2500.

2. **Report Form**:

   LEPTOSPIROSIS CASE REPORT (CDPH 8577)

3. **Epidemiologic Data:**

   a. A history of drinking, swimming in, wading in, or accidental immersion in a pond or lake, where there is the possibility of contamination by animal urine.

   b. Close contact with domestic or farm animals.

   c. Occupational exposure likely in farmers, miners, veterinarians, sewer workers, rice field workers, fish and game wardens, abattoir employees.

CONTROL OF CASE, CONTACTS & CARRIERS

Investigate within 7 days.

CASE: Isolation: None.

CONTACTS: No restrictions.

CARRIERS: Not applicable.

PREVENTION-EDUCATION

1. Control rodents.

2. Protect workers in high risk occupations by providing boots and gloves.

3. Avoid wading or swimming in farm ponds accessible to domestic and farm animals.

DIAGNOSTIC PROCEDURES

1. **Serology**: To California State Department of Health.

Container: Serum separator tube.

Laboratory Form: **State Special Serology (Lab 413)**.

Examination Requested: Leptospira agglutination.

Material: Whole clotted blood.

Amount: 8-10 ml.

Storage: Refrigerate.

Remarks: Take first specimen as early as possible; mandatory second specimen 2 weeks later.

2. **Culture**: Consult the Public Health laboratory.

LISTERIOSIS

1. **Agent**: *Listeria monocytogenes*, a gram-positive rod-shaped bacterium; serotypes 1/2a, 1/2b, and 4b are most frequently isolated.

2. **Identification:**

   a. Symptoms: A bacterial disease manifested as septicemia and/or acute meningoencephalitis. The most susceptible persons are neonates, the elderly, pregnant women, and immunocompromised individuals. Onset of meningoencephalitis may be sudden with fever, headache, nausea, vomiting, and signs of meningeal irritation. Endocarditis, granulomatous lesions in liver and other organs, localized internal or external abscesses, and pustular or papular cutaneous lesions may also occur.

   b. **Differential Diagnosis**: In the normal host, listeriosis may be an acute, mild, febrile illness with influenza-like symptoms. In the pregnant woman, infection of the fetus is likely with severe consequences such as abortion, stillbirth, premature delivery or sepsis. The postpartum course in the mother is uneventful. Case fatality rate is approximately 30% in newborns and other immunocompromised hosts.

   c. **Diagnosis**: Isolation of the organism from cerebrospinal fluid, blood, amniotic fluid or other sterile sites of infection. Care must be taken to distinguish *L. monocytogenes* from other gram-positive rods, particularly diphtheroids.

3. **Incubation**: 3 days to 3 months, average 31 days. The fetus is usually infected in utero within several days (average 5 days) after maternal disease, as in group B streptococcal disease.

4. **Reservoir**: Mud, silage, water, domestic and wild mammals, fowl, and humans. Asymptomatic fecal carriage exists in man and animals.

5. **Source**: Ingestion of contaminated vegetables, raw or contaminated milk, soft cheese, seafood, or undercooked meat, and direct contact with infectious material or soil contaminated with infected animal feces.

6. **Transmission**: Infection is transmitted from mother to fetus in utero or during passage through a contaminated birth canal. Person-to-person transmission is possible through sexual contact, and infection from inhalation of the organism has been reported. Papular lesions on hands and arms may occur from direct contact with infectious material; nosocomial transmission has occurred.

7. **Communicability**: Mothers of infected infants may shed the agent in vaginal discharge or urine for 7-10 days after delivery; fecal carriage can last for months. Period of person-to-person communicability is unknown.

8. **Specific Treatment**: One of the following:

   Penicillin or ampicillin together with aminoglycosides; ampicillin alone; tetracycline; chloramphenicol; or erythromycin.

   Ampicillin is recommended for maternal-fetal listeriosis.

   Tetracycline is contraindicated for children less than 8 years of age.

9. **Immunity**: None.

REPORTING PROCEDURES

1. **Reportable**. *California Code of Regulations*, Section 2500.

2. **Report Form**: **LISTERIOSIS CASE REPORT (CDPH 8296)**.

3. **Epidemiologic Data:**

   a. Food history with particular emphasis on ingestion of soft cheeses, unpasteurized dairy products, raw fruits and vegetables, undercooked meat, or seafood and food from delicatessens.

   b. History of underlying immune deficiency or immunosuppressive medications.

CONTROL OF CASE, CONTACTS & CARRIERS

Investigate all cases within 3 days. (Delay for 1 week is acceptable where fetal/neonatal death has occurred.)

CASE:

Precautions: Enteric precautions, especially around immunocompromised persons, the elderly, and pregnant women.

CONTACTS: No restrictions

PREVENTION-EDUCATION

1. High risk individuals should avoid raw dairy products, soft cheeses, food from delicatessens, and undercooked or raw meat or seafood.

2. Veterinarians and farmers that handle aborted fetuses should take proper precautions.

3. Human or animal excrement should not be used for fertilizer.

DIAGNOSTIC PROCEDURES

1. Submit specimens for isolation of infectious agent. Call the Bacteriology Section of the Public Health Laboratory.

2. Food: Must be submitted by a Food and Milk Sanitarian. See section on **FOOD POISONING**.

LYME DISEASE

1. **Agent**: *Borrelia burgdorferi*, a spirochete first identified in 1982.

2. **Identification:**

   a. **Symptoms**: Lyme borreliosis generally occurs in stages.

   Early Lyme Borreliosis: Although stages may overlap or occur alone, illness may begin with a characteristic skin lesion called erythema migrans (EM) in 60% of cases. This rash appears as a red macule or papule that expands in an annular manner, sometimes with multiple similar lesions. Fever, malaise, fatigue, headache, stiff neck, myalgia, migratory arthralgias, and lymphadenopathy may accompany or precede EM.

   Neurologic Manifestations: Weeks to months after the onset of early Lyme disease, neurologic abnormalities may develop in untreated patients. The typical pattern is fluctuating meningoencephalitis with superimposed cranial (particularly facial) nerve palsy and peripheral radiculo-neuropathy.

   Cardiac Manifestations: Within several weeks after onset, about 8% of untreated patients develop cardiac involvement (most commonly fluctuating degrees of atrioventricular block that resolves spontaneously).

   Arthritis: Weeks to years after the original illness, about 50% of untreated patients develop arthritis. Early involvement typically is manifested by migratory pain, often without swelling. Frank arthritis may develop subsequently with marked swelling and pain in one or more joints, primarily large joints, e.g., the knee.

   b. **Differential Diagnosis:**

   Early disease: Aseptic meningitis, hepatitis, mononucleosis, ehrlichiosis.

   Late disease: Rheumatic fever, disseminated gonococcal infection, multiple sclerosis, Guillain-Barré syndrome, Reiter's syndrome, rheumatoid arthritis, oligoarticular form of juvenile rheumatoid arthritis.

   c. Diagnosis: Based on clinical findings. Serological testing (EIA or IFA) may be useful but lacks sensitivity, especially in early disease. A two-step testing procedure using flagellar protein-based EIA followed by IgM and IgG Western blot of all positive and equivocal specimens is recommended. Culture from biopsy at the outer margins of EM lesion is 90% sensitive. PCR is available from research laboratories.

3. **Incubation**: 7-10 days average, range 3-32 days.

4. **Reservoir**: Wild animals; e.g., *Neotoma* spp. (wood rat) and deer are important in California.

5. **Source**: Infected *Ixodes* species ticks; other arthropods have been found containing *B. burgdorferi*, but their ability to transmit is questionable.

6. **Transmission:** Bite of *Ixodes* tick. 36-48 hours of attachment is usually required for transmission.

7. **Communicability:** Not transmitted from person to person.

8. **Specific Treatment**: Amoxicillin is a good treatment for adults or children with early disease. Doxycycline in adults and phenoxymethyl penicillin for children with early disease resolves illness and reduces the likelihood of later complications. Intravenous penicillin or ceftriaxone is effective for meningitis, late stage, and refractory illness.

REPORTING PROCEDURES

1. Report any cases or suspected cases within 7 calendar days to ACDC or Morbidity Unit. *California Code of Regulations,* Title 17, Section 2500.

2. **Report Form**: **LYME DISEASE CASE REPORT (CDPH 8470)**.

3. **Epidemiologic Data:**

   a. Travel 30 days prior to onset of erythema migrans or early disease.

   b. History of tick bite.

   c. History of possible exposure to ticks, e.g., hiking in chaparral, dogs with ticks, etc.

   d. Occupational exposure.

CONTROL OF CASE, CONTACTS & CARRIERS

Investigation not required by district staff. Advise ACDC regarding suspect cases; ACDC will supply diagnosing physician with appropriate form or investigate. Initiate investigation within 7 days of notification.

CASE: Isolation: None.

CONTACTS: No restrictions.

CARRIERS: Not applicable.

PREVENTION-EDUCATION

1. Use tick repellents.

2. Wear protective clothing in wooded areas.

3. Control ticks on domestic animals.

4. Avoid tick-infested areas when feasible.

5. Check periodically for and carefully remove attached ticks after return from tick-infested areas.

DIAGNOSTIC PROCEDURES

Serology: Done by commercial laboratories. No longer run at State Laboratory or LAC Public Health Laboratory. Can be run at CDC with prior approval.

Container: Serum separator tube

Laboratory Form: N/A

Examination Requested: IFA, EIA, Western blot.

Material: Clotted whole blood.

Amount: 8-10 ml.

Storage: Refrigerate.

Remarks: Serologic tests for Lyme borreliosis lack sensitivity and are not standardized, so interpretation of test results is difficult. Only confirmed cases are reported to the CDC. Confirmed cases are patients that present with EM with a known exposure, or with clinical findings in addition to appropriate laboratory evidence including: 1) positive culture for *B.burgdorferi* from a clinical specimen, 2) two-tier testing using an EIA or IFA screening test followed by Western blot interpreted using established criteria, or 3) IgG Western blot using established criteria.

The case history form must accompany the specimen(s).

MALARIA

1. **Agent**: Protozoan parasites *Plasmodium falciparum*, *P. malariae*, *P. ovale*, and *P. vivax*.

2. **Identification:**

   a. **Symptoms**: Acute or subacute febrile disease, usually with episodes of chills and fever every 2-3 days, separated by afebrile periods. Malaria caused by *P. falciparum* may progress to jaundice, shock, renal failure, coma, and death.

   b. **Differential Diagnosis**: Other febrile illnesses associated with international travel, e.g., brucellosis, typhoid fever, and yellow fever.

   c. **Diagnosis**: Demonstration of parasites in thick or thin blood smears.

3. **Incubation**: Variable; 8-12 days for *P. falciparum*, 18 days or up to years for *P. malariae*, and 12-18 days for *P. ovale* and *P. vivax*. Inadequate or inappropriate prophylaxis may extend the incubation period.

   Note: *P.* vivax strains can occurs 8-12 month after exposure, due to dormant forms remaining in liver.

4. **Reservoir**: Human.

5. **Source**: Infected female mosquitoes of the genus *Anopheles*.

6. **Transmission**: Bite of infective anopheles female mosquito, blood transfusion from infected persons, congenital and parenteral transmission.

7. **Communicability:**

   a. **Mosquito infection**: When gametocytes are present in blood of patient.

   b. **Parenteral transmission**: When trophozoites are present in blood.

8. **Specific Treatment:**

   a. *Plasmodium ovale*, *P. vivax*: Chloroquine for acute malaria, primaquine for prevention of relapses (sometimes called "radical cure"). "Terminal prophylaxis" refers to primaquine treatment after leaving regions endemic for these species. Consult CDC yellow book or ACDC physician for details.

   b. *Plasmodium falciparum*, *P. malariae*: Chloroquine for non-resistant strains. Patients with resistant *P. falciparum* malaria may require alternative treatment; consult ACDC.

   c. Infection by any species transmitted by transfusion, parenteral, or congenital route: chloroquine or consult ACDC physician for suspected resistant strain.

9. **Immunity**: Partial immunity for individuals with continuous exposure in endemic areas, e.g., Africa, Central America and Southeast Asia.

REPORTING PROCEDURES

1. **Reportable**. *California Code of Regulations,* Sections 2500, 2586. Malaria smears in local laboratories, must be sent to LAC PHL for confirmation of species.

   Report Form: **MALARIA CASE REPORT (CDPH 8657)**.

2. **Epidemiologic Data** (as noted in case report form):

   a. Residence in or travel to areas endemic for malaria 4 years prior to onset. List countries and cities, dates of stay, and any prophylactic medication.

   b. Transfusion of blood or blood products 2 years prior to onset. Include dates, places, lot numbers, and manufacturer. ***Notify ACDC at once for assistance in follow-up.***

   c. History of blood donation.

   d. Use of parenteral drugs.

e. Surveillance of travel contacts and persons sharing intravenous drug paraphernalia for symptoms of malaria.

f. Follow-up examination of asymptomatic mothers of infant cases, and asymptomatic infants born to mothers with malaria.

CONTROL OF CASE, CONTACTS & CARRIERS

1. ACDC will review suspect reports and refer to district.

2. Case investigation to be completed by district staff.

3. Investigation should be initiated within 7 days of notification.

CASE: Isolation: None.

CONTACTS: No restrictions.

CARRIERS: Not applicable.

PREVENTION-EDUCATION

1. Appropriate chemoprophylaxis for travelers to areas endemic for malaria.

2. Avoid outdoor exposure during hours of peak mosquito activity, i.e., between dusk and dawn.

3. Use mosquito repellent (DEET-based up to 35% protective clothing, and mosquito netting at bedtime when traveling to areas with endemic malaria.

4. Exclude persons with malaria from blood donor programs for 3 years after becoming asymptomatic and after therapy stopped. Asymptomatic U.S. donors not on anti-material chemoprophylaxis may donate 6 months after returning from an endemic area.

5. IV drug users may acquire malaria by sharing paraphernalia.

6. Several episodes of locally acquired (autochthonous) malaria have been reported in several states since 1996. Vector mosquitoes (*An. quadrimaculatus*) have a wide range in central and eastern USA, and *An. freeborni* in the western USA.

7. Pregnant woman should avoid travel to malaria endemic areas unless absolutely necessary.

DIAGNOSTIC PROCEDURES

1. **Microscopic Container**: Hematology-differential (slide holder).

   Laboratory Form: **Test Requisition and Report Form H-3021**

   Examination Requested: Malaria.

   Material: Blood smears, 2 thick and 2 thin on standard slides.

   Remarks: Obtain smears midway between febrile episodes, if possible.

2. **Serology**: IFA available through the CDC only if blood smears are negative. No testing of well persons. Send to California Department of Health Services Laboratory.

   Container: State Special Serology.

   Laboratory Form: **State Special Serology** (Lab 413).

   Examination Requested: Malarial IFA.

   Material: Clotted blood and negative blood smears.

   Amount: 10 ml.

   Storage: Refrigerate.

   Remarks: Diagnostic titer is $\geq$1:64. Elevated titers may persist after therapy without subsequent exposure; allow 1-2 months for results.

MEASLES (Rubeola)

(Red measles, hard measles, 10-day measles, morbilli)

1. **Agent**: Measles (rubeola) virus.

2. **Identification**:

   a. **Symptoms**: Acute, highly communicable febrile illness with cough, high fever, conjunctivitis, coryza, and Koplik's spots on buccal mucosa. Erythematous, maculopapular rash first appears on face (commonly around ears and hairline) about 2-4 days following onset of prodrome. Rash usually spreads to other parts of body and becomes confluent in about 4-7 days. Complications include otitis media, pneumonia, dehydration, convulsions (with or without fever), and acute encephalitis. Subacute sclerosing panencephalitis (SSPE) is extremely rare.

   b. **Differential Diagnosis**: Distinguish from Kawasaki disease, rubella, scarlet fever, and other childhood exanthems. See **EXANTHEMS—DIFFERENTIAL DIAGNOSIS** (Appendix A).

   c. **Diagnosis**: A presumptive diagnosis is based on clinical and epidemiological grounds. The presence of measles IgM antibody in a person with a febrile rash illness usually confirms the diagnosis of measles and is preferred. (IgM antibodies can also be detected in individuals recently vaccinated against measles for up to 6 weeks after vaccination.) A four-fold or greater increase in specific hemagglutination-inhibition (HI) or complement fixation (CF) IgG antibody titers between acute and convalescent specimens also confirms the diagnosis.

3. **Incubation**: About 10 days, varying from 8-13 days from exposure to onset of fever; average 14 days until rash appears; rarely as long as 21 days. Encephalitis can occur 2-6 days after rash.

4. **Reservoir**: Human.

5. **Source**: Respiratory tract secretions and fomites.

6. **Transmission**: Direct contact with infectious droplets or less commonly, by airborne spread. Measles is one of the most readily transmitted communicable diseases.

7. **Communicability**: From 4 days before beginning of rash to 4 days after its appearance. Patients with SSPE are not contagious.

8. **Specific Treatment**: Supportive care; no antiviral agent available.

9. **Immunity**: Lifelong. Persons can be considered immune to measles only if they have had a documented history of physician-diagnosed measles, have laboratory evidence of immunity, or have documented 2 doses of a measles-containing vaccine on or after the first birthday. Birth before 1957 is not a reliable indicator of immunity, particularly in healthcare personnel.

REPORTING PROCEDURES

1. **Reportable**. Section 2500, *California Code of Regulations*. Report by telephone immediately at time of identification of case or suspected case by calling 888-397-3993 (for Los Angeles County). **Do not wait for laboratory confirmation before reporting a suspected measles case to the local health department.**

2. **Report Form**: **MEASLES (RUBEOLA) CASE REPORT (CDPH-8345).**

   MEASLES EXPOSURE INTERVIEW FORM

3. **Epidemiologic Data**:

   a. History of immunization. Number of doses of measles vaccine and dates administered.

   b. History of exposure(s), 8-21 days prior to rash onset.

   c. Travel history, with dates of exit from and re-entry into the United States. Include

travel history with dates of travel to other counties or states.

d. **Case finding**: Identify rash illnesses among household members, neighbors, schoolmates, and other household visitors, especially "out-of-country" visitors, etc.

e. Immune status of household and other close contacts.

f. List of primary and secondary group contacts.

CONTROL OF CASE, CONTACTS & CARRIERS

Public Health Nursing Protocol:
Home visit is required – a face to face interview is required.

Refer to "Public Health Nursing Home Visit REQUIRED Algorithm" (B-73 Part IV Public Health Nursing Home Visit Protocol). For contact investigation, use Measles Exposure Interview Form.

Investigation of measles cases will be a collaborative effort between the Immunization Program and the public health district wherein the case resides. A district public health nurse home visit will be made on all measles cases. The initial interview of the measles case (or guardian) will be conducted by Immunization Program staff, or jointly by Immunization Program staff and the district public health nurse in the event that the case (or guardian), cannot be contacted prior to the scheduled home visit. Investigate case, primary contacts, and secondary contacts within 24 hours so effective prophylactic measures can be taken for contacts. Prompt reporting of cases provides opportunity for better outbreak control.

CASE:

Precautions:

1. Respiratory precautions during prodrome and for 4 days after appearance of rash.

2. Keep out of school or work and avoid social contacts.

3. Disinfect fomites soiled with nose and throat secretions and urine.

4. With hospitalized patients, prompt airborne isolation is required for 4 days after onset of rash. In immunocompromised patients, isolation should be maintained for the duration of the illness.

CONTACTS:

1. **PRIMARY CONTACTS**: Identify all individuals exposed to patient from 4 days before to 4 days after rash onset. A measles exposure is defined as sharing the same air space with a communicable measles case, e.g., same classroom, home, clinic waiting room, airplane, etc., or having been present in these areas within two hours of a communicable measles case. Susceptible contacts are those who in addition to being born in 1957 or after and having contact with the case during the infectious period, lack a written record showing dates of receipt of at least two doses of measles-containing vaccine (i.e., MMR or MR) received on or after the first-birthday, or a written record of measles seropositivity.

   Immunize susceptible contacts to limit the spread of disease as follows: for persons ≥ 6 months of age with one **or no** documented doses of MMR, give MMR if < 72 hours of exposure (if vaccine not contraindicated). No harm has been noted if vaccine is given later in incubation period; however, vaccination at a time when it will not prevent measles, can complicate the diagnosis of measles if adverse events to the vaccination occur (i.e., rash, fever). Also, recently vaccinated persons will have a positive IgM for measles. Unvaccinated persons who cannot be vaccinated < 72 hours after exposure, should be scheduled for vaccination after the 21 day surveillance period has ended, unless they develop measles in which case they will be immune. (Advise women of childbearing age to avoid becoming pregnant for one month if MMR or MR vaccine is administered.)

   If MMR vaccine is contraindicated, immune globulin (IG) given in the first 3 days after exposure will usually prevent disease; given within 6 days of exposure, it may prevent or modify disease. IG should be used as post-exposure prophylaxis to protect susceptible

persons who are at risk for severe complications if they develop measles. It should not be used in an attempt to control measles outbreaks.

In post-exposure prophylaxis, IG should be administered to infants less than 12 months of age as follows: 0.5 mL/kg of body weight of IG given intramuscularly (IGIM), maximum dose of 15mL. Susceptible pregnant women should receive 400 mg/kg of IG given intravenously (IGIV). Severely immunocompromised individuals (see note below), irrespective of evidence of measles immunity, should receive 400 mg/kg of IG given intravenously (IGIV). For persons already receiving IGIV therapy, >400 mg/kg <3 weeks before the measles exposure should be sufficient to prevent infection. IGIM (0.5 mL/kg of body weight, max dose=15 mL can be given to other persons who do not have evidence of measles immunity but priority should be given to persons exposed in settings with intense, prolonged, close contact.

Because post-exposure immunization or administration of IG is not completely effective, the recipient should be considered infectious from 5 to 21 days after exposure. Measles vaccine should not be given for at least 5 months after the administration of IG.

Note: Severely immunocompromised patients include patients with severe primary immunodeficiency; patients who have received a bone marrow or stem cell transplant until at least 12 months after finishing all immunosuppressive treatment, or longer where the patient has developed graft-versus-host disease; patients on treatment for ALL within and until at least six months after completion of immunosuppressive chemotherapy; and patients with a diagnosis of AIDS or HIV-infected persons with CD4 percent <15% (all ages) or CD4 <200 lymphocytes /mm3 (age >5 years) and those who have not received MMR vaccine since receiving effective ART; some experts would include HIV-infected persons who lack recent confirmation of immunologic status or measles immunity.

2. **SECONDARY CONTACTS**: Defined as contacts to susceptible household or other close, susceptible primary contact. Identify all secondary contacts during follow-up of primary contacts. Contact and arrange immunization if susceptible. Do not offer IG to eligible secondary contacts unless primary contact has developed signs of disease. Ask susceptible individual contacts (primary contacts who may be incubating measles) about groups with which they had or may have contact within 8-21 days after case's rash onset to identify secondary contacts. If the primary contact develops measles, this information can be used by Immunization Program to assist in subsequent investigations and to link future cases epidemiologically. Establish a liaison (team coach, clinic manager, church secretary, etc.) for each group to assist in determining persons exposed, number of susceptibles exposed, and to help monitor for illness among group contacts.

   If a primary contact becomes ill with measles, include the secondary contact information with *a* telephone report of spread case(s) to the Immunization Program. This will then be forwarded to other health district(s) for investigation of the spread case(s).

3. **SURVEILLANCE OF CONTACTS**: All contacts, both primary and secondary, should be followed for signs and symptoms of measles for 21 days after exposure. Any contacts (primary or secondary) that develop measles should be reported to the Immunization Program and investigated using a separate investigation form and investigation number.

CARRIERS: Not applicable.

INSTITUTIONS: If exposure occurs in an institution, all occupants of same quarters, ward, or classroom are considered primary contacts. Carry out investigation and preventive measures as above. Report all institutional exposures immediately to Immunization Program.

School Exclusion of Un-Immunized Contacts: If a case is reported at a school, the Immunization Program will exclude from school any children on medical or personal beliefs waiver. These children will be excluded until 21 days after last case was at school while infectious, unless child is immunized or shows proof of immunization within 2 days.

PREVENTION-EDUCATION

1. **Immunization (General)**: In Los Angeles County public clinics, the first dose of live-attenuated MMR (measles, mumps, and rubella) vaccine is given at 12 months; the second dose of MMR is given to children 4-6 years old or at kindergarten entry. Children through 18 years of age who have not previously received the second dose of MMR should be immunized. The interval between doses should be at least one month. Students entering college or university within 6 months should be immunized with second dose of MMR (if not previously received). A person whose most recent dose of measles vaccine was given before the first birthday should be considered un-immunized and given another dose of MMR. Approximately 95% or more of susceptible individuals develop serum antibody after initial dose; this increases to more than 99% after second dose.

   a. Indications for Immunization: MMR vaccine is indicated for all individuals susceptible to measles, unless otherwise contraindicated (see item "b" below). Two doses of live MMR vaccine are recommended for all persons born after 1956. All health care workers, especially, require documentation that they are immune to measles or that they have received two doses of MMR vaccine. All foreign travelers who are not immune to measles should be vaccinated, ideally 2 weeks prior to travel. Unvaccinated Infants 6 months of age and older should be vaccinated if they are traveling out of the country.

   b. Contraindications to Use of Live Vaccines: If a woman is pregnant or intends to become pregnant in the next one month, MMR vaccine is contraindicated. As a general rule, live vaccines should not be given to pregnant women.

   c. Other Contraindications for MMR Vaccine:

      - Anaphylaxis due to gelatin, neomycin, or severe reaction to prior MMR.
      - Patients with immune deficiency diseases (except HIV; see “d” below) or suppressed immune responses from leukemia, lymphoma, or generalized malignancy, or from therapy with corticosteroids, irradiation, alkylating drugs, or antimetabolites should not receive live vaccine of any kind.
      - Patients with a high fever or severe illness should be deferred immunization with MMR until recovery.

   d. Other Considerations: Measles disease can be severe in HIV-infected persons. MMR vaccine is recommended for all measles-susceptible, asymptomatic HIV-infected persons and should be considered for susceptible symptomatic persons who are not severely immunosuppressed. Data indicate that vaccination with MMR has not been associated with severe or unusual adverse events in such individuals.

      Tuberculosis patients may be immunized after therapy has begun.

      Vaccine should be given 14 days before or deferred for 3 to 11 months after immune globulin or blood transfusion depending on the product received. Contact Immunization Program for specific intervals.

   e. Education: Public education by health departments and private physicians should encourage measles vaccine for all susceptible infants, children, adolescents, and adults. IG should be used to protect susceptible individuals for whom vaccine is not appropriate or is contraindicated and who are exposed to measles. IG should not be given with measles vaccine.

2. **Immunization Requirement for School Attendance**: Measles immunization requirement for school attendance (from day-care center through college) is an important and effective means of measles control in the USA. In California, all children attending day-care centers and public/private schools (K-12) are required by state law to show proof of receiving a measles immunization on or after the first birthday or else have on file a formal parental waiver before being allowed entry

into school. Children entering kindergarten and 7th grade are required to show proof of having received 2 doses of a measles-containing vaccine, one of which is MMR.

DIAGNOSTIC PROCEDURES

1. **Serology**: Clinical and epidemiological histories are required to aid the laboratory in test selections. There are two serologic tests available, IgM and IgG. If possible, both tests should be performed on the acute sample. Although IgM antibody is generally detectable from 2-3 days to 2-3 weeks after rash onset, the currently recommended IgM EIA is often positive at the time the patient first presents for medical evaluation. With some test kits that still might be in use, serum collected earlier than 3 days after rash onset can be falsely negative; in such instances when measles is suspected, the test should be repeated.

   Paired sera, an acute specimen taken within 7 days after the onset of the rash and a convalescent specimen taken 14-28 days later, are examined for IgG. A four-fold or greater rise in measles IgG titer is indicative of recent infection. Presence of IgG in the acute specimen indicates prior exposure to measles, either naturally or by immunization.

   Container: Serum separator tube (SST, red-gray rubber stopper or gold plastic stopper).

   Laboratory Form: **Test Requisition and Report Form H-3021**

   Procedure: Collect the acute specimen as early as possible, preferably within 7 days of onset of rash. Collect second (convalescent) specimen approximately 14-28 days after first blood is drawn. (If the IgM is positive in the acute specimen, a second specimen is not routinely necessary.)

   Amount: For venous blood, ideally 8-10 ml in serum separator tube (SST, red-gray rubber stopper or gold plastic stopper). (With prior notification and consent of the testing laboratory, three 0.5ml capillary tubes for serum collection can be used for finger-stick specimens).

   Material: Whole clotted blood.

   Storage: Send to Public Health Laboratory as soon as possible at 4°C and ship cold with ice packs; if not able to send on same day, refrigerate. Sera should be stored for no longer than 7 days before testing.

   Note: In instances where serological testing has already been performed by a private laboratory, Immunization Program staff will request that the original specimen be sent to the Public Health Laboratory for confirmation.

2. **Virus Isolation**: Within 4 days of rash onset obtain nasopharyngeal (preferred over throat) or throat swab and place in tube of viral transport medium and collect urine specimen in sterile container. If after 4 days, but within 10 days of rash onset, collect only urine specimen. Keep specimens on wet (water) ice and send to Public Health Lab as soon as possible. Viral isolation permits epidemiological comparison with other isolates.

   Container: Viral culturette for NP or throat specimens; sterile specimen container for urine.

   Laboratory Form: **Test Requisition and Report Form H-3021**

   Examination Requested: Measles culture and PCR.

   Material: Nasopharyngeal or throat swab, urine.

   Storage: Store at 4°C and ship cold with ice packs as soon as possible. If unable to ship within 48 hours, freeze specimen immediately at -70°C (except for urine which should not be frozen). Avoid repeat freeze-thaw cycles, and transport on dry ice.

GLANDERS and MELIOIDOSIS

1. **Agent**: A non-motile gram negative bacilli, *Burkholderia mallei* (glanders) and *Burholderia pseudomallei* (melioidosis)

2. **Identification**:

   a. **Symptoms**:

   Pulmonary Infection
   Symptoms may present as acute febrile, necrotizing pneumonia with or without sepsis, with necrosis of tracheobronchial tree.

   Glanders – often manifests itself as pulmonary infection; pneumonia, pulmonary abscesses, and pleural effusion can occur. Chest X-rays will show localized infection in the lobes of the lungs.

   Melioidosis – often manifests as a mild bronchitis to severe pneumonia. The onset usually presents with high fever, headache, anorexia, and general muscle soreness. Chest pain is also common. A characteristic of pulmonary infection is a nonproductive or productive cough with normal sputum. Cavitary lesions may be seen on chest X-ray, similar to those in pulmonary tuberculosis.

   Localized-Cutaneous Infections
   Glanders – most often presents as a cut or scratch in the skin with localized infection and ulceration developing at the site where the bacteria entered the body. Swollen lymph nodes may also be apparent. Cutaneous infection can lead to systemic or septicemic infection if untreated.

   Melioidosis – most often presents as an ulcer, nodule, skin abscess, pain and swelling at the site of introduction. Fever and muscle aches too. Infection may remain local or spread rapidly through the bloodstream.

   Septicemia
   Can occur with our without pneumonia and can affect multiple organ systems including liver, spleen, prostate, and kidney, Mortality rate is 90%.

   Chronic
   Can present with multiple abscesses or re-activation pneumonia.

   Glanders does not occur naturally in the United States (US), and ANY case of glanders is evidence for bioterrorism until proven otherwise. If glanders were used as a weapon, it would be most effective as an aerosol and thus would present primarily in the pulmonic or systemic forms.

   b. **Differential Diagnosis**:
   Pulmonary glanders and melioidosis – include mycoplasma pneumonia, Legionnaire's disease, psittacosis, plague, tularemia, invasive group A streptococcal pneumonia, Q fever, histoplasmosis, coccidiomycosis, and anthrax.
   Cutaneous glanders and melioidosis – include insect bite, brown recluse spider bite, ulceroglandular tularemia, scrub typhus, rickettsial spotted fevers, ecthyma gangrenosum, plague, Orf, staphylococcal lymphadenopathy, cutaneous leishmaniasis, cat scratch fever.

   c. **Diagnosis**: Isolation of organism from blood, urine, sputum, skin lesions, or abscesses; or by detection of antibody response to the bacteria. Blood cultures are usually negative for B. mallei (glanders) but often positive for B. pseudomallei (melioidosis)

3. **Incubation**:
   Pulmonary Infection:
   Glanders: 10-14 days
   Melioidosis: more difficult to determine, 1-21 days or could be extended months to years

   Localized-Cutaneous Infections:
   Glanders: 1-5 days
   Melioidosis: difficult to determine

4. **Reservoir**:
   Glanders: no natural occurring cases of glanders in the US since 1940's

Melioidosis: Soil and water in the tropics, endemic in Southeast Asia and northern Australia

5. **Source**:
   Glanders: most common in horses, also donkeys, mules, goats, cats, and dogs

6. **Transmission**:

   Glanders – contact with tissues or body fluids of infected animal through skin cuts or abrasions and through mucosal surfaces such as the eyes and nose. Inhalation via infected aerosols or dust contaminated by infected animals. Sporadic cases have been documented in veterinarians, horse caretakers, and laboratorians.

   Melioidosis - inhalation of dust, ingestion of contaminated water, and contact with contaminated soil especially through skin abrasions.

7. **Communicability**: No person-to-person transmission; possible transmission by cutaneous contact with skin lesions.

   Both are highly infectious organisms and have caused laboratory-acquired infections. If B. mallei or B, pseudomallei are suspected, it requires precautions by microbiologists and is usually referred to a BSL-3 lab.

8. **Specific treatment**: Human cases of glanders are rare. Treatment varies depending on type and severity of clinical presentation: trimethoprim-sulfamethoxazole (TMP-SMX), doxycycline, amoxicillin/clavulanate. For severe disease: ceftazidime or imipenem or meropenem

REPORTING PROCEDURES

1. **Report any case or suspect cases by telephone immediately** (Title 17, Section 2500. *California Code of Regulations*).

2. **Report Form:**
   OTHER REPORTABLE DISEASE or DISEASE OF UNUSUAL OCCURANCE (CDPH 8554)

   MELIOIDOSIS INTAKE FORM (For ACDC Internal Use)

CONTROL OF CASE, CONTACTS & CARRIERS

CASE:

1. Provide necessary antibiotic treatment as soon as disease is confirmed. Standard precautions indicated.

2. **For Laboratory Exposure**: see Management of Laboratory Exposed to *B. mallei* and *B. pseudomallei*

3. **ANIMAL**: Los Angeles County Department of Public Health (LAC DPH)'s Veterinary Public Health Program will investigate potential animal sources.

CONTACTS:

Avoid contact with bloody or body fluids of an infected person.

Management of Laboratory Exposure to *B. mallei* and *B. pseudomallei:*

Laboratory workers that have worked with cultures of the organism are at risk of developing disease. Laboratories that have handled the specimen should conduct an exposure risk assessment on their lab employee.

If there are any potential laboratory exposures (high or low), the worker should be evaluated by the lab facility's occupational health physician as part of the laboratory health and safety plan.

CDC recommends symptom watch for 21 days as well as baseline and follow-up serology on employees with lab exposure (regardless of high or low risk).

The following Emerging Infectious Disease article by Peacock et al.,can be used as guidance on the Management of Accidental Laboratory Exposure to *Burkholderia pseudomallei* and *B. mallei*: http://wwwnc.cdc.gov/eid/article/14/7/07-1501_article.htm

PREVENTION-EDUCATION

Glanders:

1. No vaccine available

2. Identification and elimination of infection in the animal population in countries where glanders is endemic in animals.

3. Use of Standard Contact Precaution in Health Care Settings.

Laboratory personnel handling specimens from persons who might have glanders must wear appropriate Personal Protection Equipment.

Melioidosis:

1. Currently, no vaccine available

2. Decrease risk of exposure in areas where the disease is endemic (Southeast Asia and northern Australia):

    a. Avoid contact with contaminated soil or water, especially persons with open wounds, cuts, or scrapes and persons with immunocompromised conditions
    b. Agricultural workers should wear boots to prevent infection through feet or lower leg
    c. Health care workers should use standard contact precaution

DIAGNOSTIC PROCEDURES

If glanders or melioidosis is suspected, contact the LAC DPH Public Health Laboratory for consultation at:
213-250-8619 or 213-974-1234

MENINGITIS, VIRAL

(Aseptic meningitis, nonbacterial meningitis, serous meningitis, lymphocytic meningitis)

1. **Agent**: Various viruses, many associated with other specific diseases, can cause meningitis. A third or more of cases have no demonstrable agent identified. In the US, most cases are caused by enteroviruses; other agents include arboviruses (especially WNV), measles, herpes simplex types I and II, varicella, mumps, and lymphocytic choriomeningitis (LCM) virus.

2. **Identification**:

   a. **Symptoms**: A clinical syndrome characterized by acute onset of febrile illness with signs and symptoms of meningeal inflammation, including headache, stiff neck and back, and photophobia. In young children, fever, irritability, and lethargy are common. CSF reveals pleocytosis, usually mononuclear (polymorphonuclear in very early stages), mildly elevated protein, normal or slightly low glucose, and absence of bacteria by Gram stain and culture. Illness seldom exceeds 10 days. Recovery from enteroviral and most other viral meningitides is usually complete but weakness, muscle spasm, insomnia and personality changes lasting less than a year are occasionally reported.

   b. **Differential Diagnosis**: Partially treated bacterial meningitis; poliomyelitis; leptospirosis; tuberculosis; fungal, amebic, or chemical meningitis; cerebrovascular syphilis; viral (including vector-borne) encephalitis. Among the enteroviruses, certain Coxsackie and ECHO viruses may produce a rubella-like rash.

   c. **Diagnosis**: Rule out bacterial causes. Isolation of virus from throat, stool, or CSF; 4-fold rise in specific viral antibody titer in acute and convalescent sera. PCR-based diagnostics are also available for enteroviruses and herpes viruses.

3. **Incubation**: Varies with the specific infectious agents. One to thirty days.

4. **Reservoir**: Varies with the specific infectious agents.

5. **Source**: Varies with the specific infectious agents.

6. **Transmission**: Varies with the specific infectious agents.

7. **Communicability**: Varies with the specific infectious agents.

8. **Specific Treatment**: Varies with the specific infectious agents.

9. **Immunity**: Varies with the specific infectious agents.

REPORTING PROCEDURES

1. **Reportable**. All cases of meningitis are reportable within one working day under *California Code of Regulations,* Section 2500.

2. **Report Form**: For individual cases: no report form required.

   For outbreaks:
   OUTBREAK/ UNUSUAL DISEASE REPORT (CDPH 8554)

   An outbreak of viral meningitis is defined as at least two cases outside of the immediate family from a suspected common source. Outbreaks of meningitis are investigated by Community Health Services.

3. **Epidemiologic Data**:

   a. Clinical history and pertinent laboratory information.

   b. Recent illness: other viral diseases.

   c. Similar illness in household or community.

   d. Immunizations for poliomyelitis, influenza, or other viral diseases within past 30 days.

   e. History of travel away from home within past month, or contact with visitors.

f. History of mosquito bites.

CONTROL OF CASE, CONTACTS & CARRIERS

Individual cases do not require investigation. Investigate within 3 days when clustering occurs.

CASE:

Precautions: Specific diagnosis depends upon laboratory data that is not usually available until recovery has occurred. Therefore, isolate all patients during febrile period. Enteric and respiratory secretion (standard) precautions recommended while hospitalized.

CONTACTS:

No restrictions; except as applicable for specific preceding viral disease. If etiology is unknown, restrict only if symptomatic, and then as for case.

CARRIER: Not applicable.

PREVENTION-EDUCATION

1. See section on specific disease.

2. Stress hand washing and personal hygiene to limit fecal-oral transmission of enterovirus.

3. Disinfect utensils and fomites soiled by secretions and excretions of patient.

4. Alert family and contacts to possible secondary cases.

DIAGNOSTIC PROCEDURES

Clinical and epidemiological history is required to aid the laboratory in test selections.

1. **Serology**: Paired sera required.

   Container: Serum separator tube (SST, a red/gray top Vacutainer tube).

   Laboratory Form: **Test Requisition and Report Form H-3021.**

   Examination Requested: Viral (aseptic) meningitis. The laboratory evaluation will vary depending on the specific infectious agents suspected.

   Material: Whole clotted blood.
   Amount: 8-10 ml.

   Storage: Refrigerate.

   Remarks: Collect first blood specimen as early as possible (acute) and second about 2 weeks after the first (convalescent). Send each as it is collected to the Public Health Laboratory.

2. **Culture**: Enterovirus diagnosis dependent on recovery of virus from stool, throat or CSF.

   Container: Sterile, 30 ml wide-mouth, screw-capped bottle; viral culturette; sterile test tube.

   Laboratory Form: **Test Requisition and Report Form H-3021.**.

   Examination Requested: Viral (aseptic) meningitis. Varies with the specific infectious agents suspected.

   Material: 2-3 g stool (no preservatives) required; throat swab and CSF (no preservatives) recommended.

   Storage: Keep chilled and deliver to the virology laboratory as soon as possible. If unable to deliver within 48 hours, freeze immediately after collection at -70^{o}C and keep frozen until delivered to the virology laboratory.

   Remarks: Specimens for isolation attempts must be collected as soon after onset as possible. Consult the Public Health Laboratory, Virology Division.

MENINGOCOCCAL INFECTIONS

1. **Agent**: *Neisseria meningitidis*, a Gram-negative diplococcus.

2. **Identification**:

   a. **Symptoms**: In cases of meningococcemia, sudden onset of fever, headache, nausea, vomiting, lethargy, and irritability; headache, nausea, vomiting, and stiff neck in cases of meningitis. A petechial rash is seen frequently. Delirium and coma are not uncommon. Fulminant cases may present with ecchymosis and shock.

   b. **Differential Diagnosis**: Other bacterial or viral agents of meningitis, rickettsial diseases (e.g., Rocky Mountain spotted fever), and anaphylactoid purpura.

   c. **Diagnosis**: Positive culture from a normally sterile site, e.g., blood or cerebrospinal fluid; also Gram-negative diplococci or positive bacterial antigen test on CSF. A clinical diagnosis or clinically compatible presentation, in the absence of laboratory confirmation, must be investigated.

3. **Incubation**: 2-10 days; commonly 3-4 days.

4. **Reservoir**: Human.

5. **Source**: Nose and throat secretions of case and/or carriers.

6. **Transmission**: Direct contact with an infected person, often an asymptomatic carrier; also droplet spread.

7. **Communicability**: Until meningococci are no longer present in nose or throat, usually 24 hours after the initiation of effective therapy. Treatment may not eradicate organism from nasopharynx; in such cases, communicability returns following completion of treatment.

8. **Specific Treatment**:

   Case: Parenteral penicillin, chloramphenicol, cefotaxime, ceftriaxone. If not already used for therapy, an antibiotic effective for prophylaxis (see below) should be given to all cases prior to discharge to eradicate nasal carrier state.

9. **Immunity**: Type-specific; unknown duration.

REPORTING PROCEDURES

1. **Reportable immediately**. *California Code of Regulations,* Section 2500.

2. **Report Form**: **MENINGOCOCCAL DISEASE CASE REPORT (CDPH 8469)**

   MENINGOCOCCAL DISEASE CONTACT ROSTER (acd-meningocontact)

   MENINGOCOCCAL CASE SUPPLEMENTAL FORM (acd-meningosupp)

3. **Epidemiologic Data**:

   a. Household and intimate contacts.

   b. Childcare center contacts.

   c. Social or athletic contacts (e.g., nightclubs, parties or competitive sports).

   d. Persons who recently shared drinks or smoking materials (e.g., tobacco, marijuana, pipe)

   e. Recent illness among contacts.

   f. Prophylaxis prescribed or received.

   g. Residence in closed institution prior to onset.

CONTROL OF CASE, CONTACTS & CARRIERS

Public Health Nursing Protocol:
Home visit is required – a face to face interview is required.

Refer to "Public Health Nursing Home Visit Required Algorithm" (B-73 Part IV Public Health Nursing Home Visit Protocol).

Investigate the day of report.

CASE: Droplet precautions in addition to standard precautions until 24 hours after start of antibiotic therapy.

1. Immediate hospitalization.

2. If hospitalization refused, droplet precautions until end of febrile period and until acute symptoms subside.

3. If treatment refused, patient to remain under droplet precautions until released by the PH Medical Director.

4. Not all antibiotics eradicate carriage; an effective prophylactic drug is strongly recommended prior to discharge. (See prophylaxis for contacts.)

CONTACTS:

Prophylaxis: Indicated for household members, others who frequently eat or sleep in the same dwelling, childcare center contacts, and anyone having direct contact with case's oral secretions (e.g., via social or sports settings in which beverages or cigarettes are shared, or intimate behavior results in exposure to oral or nasal secretions) during the 7 days prior to onset of illness. In these instances, prophylaxis should be given immediately and no later than 10 days after last exposure.

Rifampin:

≤1 month of age: 5 mg/kg by mouth every 12 hours for 2 days.

>1 month of age: For children (1-12 years), 10 mg/kg (maximum 600 mg) every 12 hours for 2 days.

For adults: 20 mg/kg (maximum 600 mg) orally every 12 hours for 2 days.

Note: Rifampin stains contact lenses and turns urine orange-red. It is not recommended for use during pregnancy. It also may decrease the effectiveness of oral contraceptives as well as some seizure and anticoagulation medications.

Ceftriaxone:

≤15 years: 125 mg in a single IM injection.

>15 years: 250 mg in a single IM injection.

Note: Safe during pregnancy and more effective than rifampin for treatment of carriers of group A meningococcus.

Ciprofloxacin:

≥18 years: 500 mg orally in a single dose. Not recommended for pregnant women. Not routinely recommended for children but might be considered in the setting of mass chemoprophylaxis. Consult with ACDC.

Surveillance: Contacts should be carefully observed for 10 days following their last exposure to the index case, regardless of prophylaxis. The Area Medical Director may require prophylactic treatment of household contacts under medical supervision prior to release (*California Code of Regulations*, Section 2590b).

1. The most important recommendation for the management of contacts is close surveillance even if chemoprophylaxis is given. Chemoprophylaxis does not ensure that disease will not occur.

2. If fever or other symptoms and signs of meningococcal illness develop, refer immediately for medical evaluation.

3. Chemoprophylaxis for other than those individuals with whom the patient had intimate or household contact is generally not recommended.

4. Contact school or daycare center to provide education and notification of exposure, as well as to conduct surveillance.

5. Discontinue surveillance after 10 days.

6. Surveillance of carriers requires individual evaluation. Routine culturing of nasopharynx is not indicated.

OUTBREAKS

A meningococcal disease outbreak is defined by the occurrence of at least three confirmed or probable primary cases of meningococcal disease in ≤ 3 months, with a resulting primary attack rate of ≥ 10 cases/100,000 for the

population at risk. (This definition is based on the national experience with serogroup C outbreaks but it is felt to be applicable to outbreaks caused by other serogroups as well). The population at-risk is defined as a group of persons who, in addition to close contacts, are considered to be at increased risk for *N. meningitidis* when compared with the risk for this disease in the general U.S. population. This group is usually defined on the basis of organizational affiliation or community affiliation.

Meningococcal vaccines may be recommended for use in control of *N. meningitidis* outbreaks caused by vaccine preventable serogroups (see **PREVENTION-EDUCATION** section).

PREVENTION-EDUCATION

1. Mass prophylaxis generally is not indicated.

2. Special attention should be given to school, institutional, and military settings.

3. Concurrently disinfect fomites contaminated with nose and throat secretions. Encourage adequate ventilation of living and sleeping quarters.

4. Vaccination

   a. Three meningococcal vaccines are available in the US; all three vaccines can prevent meningococcal disease caused by N. meningitidis serogroups A, C, Y, and W-135.

      Meningococcal polysaccharide vaccine
      - MPSV4 or Menomune® (licensed for persons aged 2 years and older).

      Meningococcal conjugate vaccines
      - MenACWY-D or Menactra® (licensed for persons aged 9 months through 55 years).
      - MenACWY-CRM or Menveo® (licensed for persons aged 2 years through 55 years).

      Meningococcal conjugate vaccine is the preferred vaccine for persons aged 2 years through 55 years of age who are at increased risk for meningococcal disease (see section b, below). Only MenACWY-D is licensed for high risk persons aged 9 months through 23 years. For persons aged 2 years through 55 years, the two conjugate vaccines are interchangeable when booster doses are required.

      Vaccination with meningococcal conjugate vaccine is routinely recommended for all persons 11 years through 18 years of age. A primary dose is given during the pre-adolescent immunization visit at 11-12 years of age and a booster dose at 16 years.

      Persons 56 years of age and above who are in a high risk group should receive meningococcal polysaccharide vaccine (MPSV4).

   b. Persons at high risk for meningococcal disease include:

      - Travelers to countries in which *N. meningitidis* is hyper-endemic or epidemic, particularly if contact with the local population will be prolonged.
      - Persons with anatomic or functional asplenia (require 2 dose primary series and booster doses every 5 years).
      - Persons with terminal complement deficiency (require 2 dose primary series and booster doses every 5 years).
      - Persons infected with HIV (require 2 dose primary series).
      - Military recruits.
      - Research, industrial, and clinical laboratory workers who are routinely exposed to *N. meningitidis* in solutions that may be aerosolized.

   c. Meningococcal conjugate and polysaccharide vaccines can be used for control of meningococcal disease outbreaks that are caused by vaccine preventable serogroups of *N meningitidis*. A conjugate vaccine is the preferred vaccine for persons 2-55 years.

DIAGNOSTIC PROCEDURES

Consult with Public Health Laboratory.

Submit isolate to Public Health Laboratory for further testing and typing.

MUMPS

1. **Agent**: Mumps virus.

2. **Identification**:

   a. **Symptoms**: An acute viral disease characterized by fever and by swelling and tenderness of one or more salivary glands (usually the parotid, occasionally the sublingual or submaxillary glands). The most common complication in postpubertal males is orchitis (testicular inflammation). Some degree of testicular atrophy may result; however, sterility is rare. Other complications include meningitis, encephalitis, pancreatitis, and deafness. As many as 30% of cases are subclinical.

   b. **Differential Diagnosis**: Anterior cervical or preauricular lymphadenitis, suppurative parotitis, parotid duct stone, mixed tumors of the parotid gland, Mikulicz's syndrome and uveoparotid fever. Parotitis is often due to other viruses including parainfluenza, influenza A, and coxsackie.

   c. **Diagnosis**: Clinical syndrome, serological, or virological evidence of infection. Note: In previously vaccinated persons, the IgM response can be non-existent or delayed and the IgG response can become quite elevated.

3. **Incubation**: Usually 16-18 days, but cases may occur from 12 to 25 days after exposure.

4. **Reservoir**: Human.

5. **Source**: Saliva of infected persons; respiratory tract secretions.

6. **Transmission**: Airborne transmission or through direct contact with infected droplets or saliva.

7. **Communicability**: greatest 2 days before through 5 days after parotid gland swelling.

8. **Specific Treatment**: None.

9. **Immunity**: After infection, lifelong.

REPORTING PROCEDURES

1. **Reportable**. *California Code of Regulations*, Section 2500. Individual cases are reportable, but not investigated; submit CMR and any available laboratory results. Investigate outbreaks. Report case or suspect case within 7 calendar days from the time of identification by mail, telephone, fax, or electronic report.

2. **Report Form:**

   MUMPS CASE REPORT (CDPH-8690).

   For Outbreaks: OTHER OUTBREAK / OTHER REPORTABLE DISEASE OR DISEASE OF UNUSUAL OCCURRENCE (CDPH 8554).

3. **Notify Immunization Program immediately of**:

   a. Outbreaks of 2 or more cases occurring within 4 week period at day-care, school, college, or university; or

   b. Sustained transmission (2 or more transmission cycles) occurring at a day-care, school, college or university.

4. **Epidemiologic Data**:

   a. Known exposure to another case within incubation period.

   b. Immunization history.

   c. Knowledge of incidence in classroom, school, county, etc.

CONTROL OF CASE, CONTACTS & CARRIERS

Clinical Case definition: an illness with acute onset of unilateral or bilateral tender, self-limited swelling of the parotid or other salivary gland(s), lasting at least 2 days and without other apparent cause.

Investigate outbreaks only. Initiate investigation within 2 days of notification.

CASE:

Precautions: Exclude from school, day-care, work, and public gatherings until 5 days after the onset of parotitis.

CONTACTS:

Exposure is defined as: 1) unprotected face-to-face contact (less than 3 feet) for at least 5 minutes with an infectious case (2 days before through 5 days after onset of parotid gland swelling in the mumps case); or 2) direct contact with respiratory, oral, or nasal secretions from an infectious mumps case.

Evidence of Immunity is defined as two documented doses of mumps-containing vaccine or serologic evidence of immunity.

Immunize all susceptible contacts immediately. Mumps vaccination has not been shown to be effective in preventing mumps in persons already infected; it will prevent infection from subsequent exposure.

In outbreaks, children with immunization waivers should be excluded from school for 26 days after the onset of parotitis in the last person in the school who develops mumps. The child may return to school immediately if they receive immunization. In outbreaks, other catergories of individuals (such as non-immune health care workers) who have been exposed to mumps, may need to be excluded from sensitive work settings, from the 9th day after the first exposure through the 26th day after the last exposure. Consult with the LA County DPH Immunization Program for guidance in such instances.

Conduct surveillance of contacts for 25 days after exposure.

PREVENTION-EDUCATION

1. Immunize all susceptibles, especially contacts to recent case. Adolescent and adult males are of special concern.

2. Discuss involvement of ovaries and testicles in persons past puberty.

3. Discuss possible CNS, pancreatic, and testicular involvement early or late in the disease.

4. Disinfect utensils and fomites soiled with nose and throat secretions and urine.

5. Implement droplet precautions, in addition to standard precautions.

DIAGNOSTIC PROCEDURES

Clinical and epidemiological histories are required to aid the laboratory in test selections.

1. **Culture/PCR**: Buccal specimen for PCR or viral isolation, best within 3 days to optimize opportunity for viral detection but no later than 10 days after symptoms. (Massage parotid gland area, then use Dacron swab to obtain buccal specimen by rubbing inside of each cheek with same swab.) Specimen should be transported to Public Health Laboratory for forwarding to State VRDL.

   Container: Place swab in a tube containing 2-3 mls of viral transport medium (e.g., M4 media).

   Laboratory Form: **Test Requisition and Report Form H-3021. In addition, work with Immunization Program to complete any forms needed by State VRDL.**

   Examination Requested: Mumps Viral Culture and PCR.

   Material: Buccal specimen

   Storage: Store at 4° C and ship cold with ice packs. If more than 1 day delay in shipping, preserve at -70° C and ship on dry ice. Avoid freeze-thaw cycles.

   If shipment contains both serum and viral samples, ship together by overnight service on cold packs (do not freeze serum).

   Remarks: Urine samples may also be collected although they are less likely than buccal specimens to contain sufficient viral copies or virus-infected cells and are therefore not preferred.

Serology: Paired sera (mumps IgG and mumps IgM or if known to be previously unvaccinated, one acute sera for mumps IgM).

Container: VR SEROLOGY gold top serum separator tube).

Laboratory Form: **Test Requisition and Report Form H-3021. In addition, work with Immunization Program to complete any forms needed by State VRDL.**

Examination Requested: Mumps Serology.

Material: Whole clotted blood.

Amount: 8-10 ml.

Storage: Send to Public Health Laboratory as soon as possible. Store at 4° C and ship cold with ice packs.

Remarks: For paired sera collect first blood specimen as early as possible. Collect the second approximately 2 weeks after the first. Send each specimen as it is collected; do not store. IgM antibodies are best detected 5-10 days after onset but can be absent or delayed in previously vaccinated persons. If the acute specimen is IgM negative, then a second sample should be collected for IgM testing.

PARATYPHOID FEVER

(See also TYPHOID FEVER, SALMONELLOSIS)

1. **Agent**:

   a. *S.* Paratyphi A .

   b. *S.* Paratyphi B tartrate negative .

   c. *S.* Paratyphi C.

   (Please note: *S.* Paratyphi B tartrate positive [formerly *S.* Java] is NOT followed as paratyphoid fever)

2. **Identification:** Same as for typhoid fever but disease is usually milder.

3. **Incubation**: 1-3 weeks for enteric fever; 1-10 days for gastroenteritis.

4. **Reservoir**: Human, rarely animals.

5. **Source**: Feces or urine of infected persons.

6. **Transmission**: Fecal-oral route. Ingestion of contaminated food, milk, water, raw shellfish from contaminated water.

7. **Communicability**: As long as organisms are excreted, which is from appearance of prodromal symptoms, throughout illness, and for periods up to several weeks or months but commonly 1-2 weeks after recovery. May become chronic carriers.

8. **Specific Treatment**: For enteric fever or septicemia only; a floroquinolone (ciprofloxacin, levofloxacin), chloramphenicol, ampicillin, trimethoprim-sulfa.

9. **Immunity**: Some species-specific immunity.

REPORTING PROCEDURES

1. Reportable. *California Code of Regulations*, Section 2500.

2. **Report Form**: **TYPHOID AND PARATYPHOID FEVER CASE REPORT (CDPH 8567).** All pages including the contact roster MUST be submitted. Adjust sections of form dealing with incubation/exposure period to reflect the correct incubation period for Paratyphoid Fever.

   Note: Due to the delay in serotyping of *Salmonella* isolates, most paratyphoid fever cases will be initially reported as salmonellosis with serotype pending. Once ACDC receives information identifying the case as *S.* Paratyphi, ACDC will notify the district and work with the district to complete the appropriate forms. District staff will continue with assessment and recommended clearance for case and household contacts.

3. **Epidemiologic Data:** Same as for typhoid fever. Contact to other persons with illness and identifying unknown carriers is most important.

   a. Date and source of first positive culture.

   b. Onset, symptoms, birthplace, travel history within incubation period, and treatment of case.

   c. Household contact roster. Include visitors within incubation period, especially those who may have cooked for the case. Include: name, address, relationship, occupation, and dates of contact. Describe history of paratyphoid or exposure or similar illness; and if so, where and when. Identify those persons in SOS.

   d. Travel itinerary during incubation period. Include places and dates. If homes visited, obtain information as in "c" above. If travel out of country, include mode of travel. If possible, identify suspect food or beverage ingested, where it was obtained and how it may have been contaminated.

   e. If case occurred in commercial travel group, investigate all members of group.

CONTROL OF CASE, CONTACTS & CARRIERS

Public Health Nursing Protocol:
Home visit is required – a face to face interview is required

Refer to "Public Health Nursing Home Visit REQUIRED Algorithm" (B-73 Part IV Public Health Nursing Home Visit Protocol).

Contact within 24 hours to determine if SOS involved; otherwise, investigate within 3 days. For definition of **SOS,** see B-73, **Part I**, Section 12. Individuals living in a group setting, including a skilled nursing or intermediate care facility, are considered to be in a sensitive situation.

Protection of the public health is a priority in the management of SOS. Reasonable efforts to contact the case must be made by the PHN. If unable to locate or the case is uncooperative, refer to PHI in a timely manner to assist in locating case and determining SOS.

Note: Case cannot be released from supervision until cleared according to B-73. For paratyphoid fever, clearance of cases and contacts is the same as for typhoid fever cases.

Prior written approval from the Area Medical Director, after consultation with ACDC, is required before admission to a skilled nursing or intermediate care facility (B-73, **Part II**, Section 2A).

CASE:

Same as for typhoid fever.

1. **Precautions**: Blood or body fluid and enteric precautions until clinical recovery.

2. **Sensitive Occupation or Situation**: Clear as for typhoid fever.

3. **Non-Sensitive Occupation or Situation**: As with typhoid fever, except do not remove from work.

CONTACTS:

Household members or persons who share a common source.

1. **Sensitive Occupation or Situation:** Same as for typhoid fever.

   a. **Symptomatic**: Confirm diagnosis. If positive, follow as a case. If negative, remove from work until 2 feces and urine cultures, taken at least 24 hours apart, are negative. Then, weekly negative specimens until case released or contact with case broken. If contact to carrier, consult ACDC.

   b. **Asymptomatic**: Remove from work until 2 feces and urine cultures, taken at least 24 hours apart, are negative. Then, weekly negative specimens until case release or contact with case broken. If contact to carrier, consult ACDC.

2. **Non-Sensitive Occupation or Situation**: May continue to work. Obtain 2 feces and urine cultures at least 24 hours apart for additional case finding or identification of unidentified carriers.

CARRIERS:

Do Not Report to State. Otherwise, identification and management is the same.

PREVENTION-EDUCATION

(Same as *Salmonella* with emphasis on preventing exposure to human fecal material).

1. Emphasize hand washing, cleaning fingernails and personal hygiene.

2. Dispose of feces, urine, and fomites properly.

3. Avoid the use of unpasteurized milk or the ingestion of raw or undercooked eggs or meat.

4. Avoid cross-contamination of other foods. All utensils, including chopping boards that have been in contact with raw meat or poultry products, should be washed before using for preparation of other food. After working with raw meat or poultry products, the hands should be washed before preparing other foods.

5. Wash fresh produce before cutting or consuming.

6. Recommend removal of known or suspected animal sources (e.g., pet turtles and iguanas).

7. Thoroughly cook all food derived from animal sources.

8. Properly refrigerate perishable food.

DIAGNOSTIC PROCEDURES

1. **Culture**: (Same as *Salmonella*.)

   Container: Enterics.

Laboratory Form: **Test Requisition and Report Form H-3021**

Examination Requested: Salmonella.

Material: Feces and urine. Urine only if original positive culture was the urine. Follow instructions provided with container.

Storage: Protect from overheating. Maintain at room temperature. Specimen should be delivered to the Public Health Laboratory no later than 4 days after collection.

Remarks: Mark "SOS" (sensitive occupation or situation) in red on specimen, if appropriate.

2. **Culture for Identification (CI)** (Same as salmonellosis.)

   Container: Enteric

   Material: Pure culture on appropriate medium.

   Storage: Same as above.

PEDICULOSIS (Outbreaks only)

1. **Agent**: *Pediculus humanus capitis*, the head louse; *Phthirus pubis*, the crab louse; *Pediculus humanus corporis*, the body louse.

2. **Identification**:

   a. **Symptoms**: Itchiness (or may be asymptomatic) or infestation of the scalp or the hairy parts of the body (including eyebrows) with adult lice, larvae, or nits (eggs). Patients with pubic lice may have bluish-colored macules on chest, abdomen, or thighs (maculae ceruleae).

   b. **Differential Diagnosis**: Scabies, eczema, impetigo, and insect bites.

   c. **Diagnosis**: Visualization of nits or lice microscopically or clinically.

3. **Incubation**: From egg to first nymph is 6-9 days. It takes 2-3 weeks from hatching of eggs to mature lice capable of reproduction.

4. **Reservoir**: Human.

5. **Source**: Infested person.

6. **Transmission**: Direct contact with hair of infested person; less commonly, indirect contact with their personal belongings, especially head coverings, clothing, combs, brushes, helmets, and head phones.

7. **Communicability**: While viable lice and eggs remain on infested person and clothing. (Head lice survive only 1-2 days away from the scalp.)

8. **Specific Treatment**: Permethrin (Nix® Creme rinse), or pyrethrin (RID®, A-200®, R&C®, generic) pediculicidal shampoo can be used to treat both head and pubic lice. Retreatment may be necessary for pubic lice.

   Benzyl Alcohol Lotion 5% (Ulesfia® Lotion) applied to the scalp or scalp hair is a new prescription medication for treatment of head lice in children over 6 months of age and adults.

   Treatment with malathion (Ovide®) may be considered when treatment failures occur with permethrin and pyrethrin based products.

   Lindane (Kwell®) can no longer be obtained in California.

   The most effective control measure for head lice is to comb through hair every day with a metal nit comb until all lice and nits are removed.

   Body lice need no specific treatment except improving hygiene and cleaning clothes.

9. **Immunity**: None.

REPORTING PROCEDURES

1. **Outbreaks reportable**. *California Code of Regulations*, Section 2502.

2. **Report Form: OUTBREAK/UNUSUAL DISEASE REPORT (CDPH 8554)** (outbreaks only).

3. **Epidemiologic Data**:

   a. Site of infestation.

   b. Contact with infested persons or fomites.

   c. School or other group contacts should be identified (e.g., day-care centers).

CONTROL OF CASE, CONTACTS & CARRIERS

CASE:

1. Delouse person, clothing, and other personal articles (possible fomites).

2. For head or body lice, exclude from sensitive situations, school and all public gatherings until patient is adequately treated and infested clothing has been decontaminated.

CONTACTS: Household members may need to be treated prophylactically if they share bedding, toilet articles, clothing, etc.

PREVENTION-EDUCATION

1. Discuss the recognition of infestation, especially with school nurses or aides.

2. Instruct infested individuals or family to delouse head or body according to medical or label instructions.

3. Report skin irritations from sensitization or over-treatment to physician.

4. Launder bed linens, towels, and clothing at proper temperature (130°F) then dry on hot cycle for at least 20 minutes; or dry clean or place items in tightly closed plastic bag for 2 weeks. Disinfest toilet articles (combs, brushes, hair bands and barrettes, etc.) by boiling for 5 minutes or by soaking them in rubbing alcohol or Lysol® disinfectant for 1 minute. Vacuum rugs and upholstered furniture. Insecticide sprays are not recommended.

5. Reapplication of pediculicide in 7-10 days may be necessary to kill any nits that have hatched. Use of nit comb is recommended to remove dead nits from hair.

6. Advise parents to check child's scalp for lice and/or nits for 2 weeks following treatment.

   California Department of Public Health school recommendations are: early detection of head lice infestations through routine screening, distribution of educational materials regarding head lice to school staff and parents, nit combing and treatment, treatment of children with lice infestation, and a no-lice policy. For more information see Guidelines on Head Lice Prevention and Control for School Districts and Child Care Facilities, 2009.

7. There is no convincing scientific evidence to support the use of products such as vinegar or other agents to dissolve the glue on nits or kill them. Also, there is no scientific data to support the claim that mayonnaise, oils, or any other product on the hair will suffocate nits and lice.

DIAGNOSTIC PROCEDURES

None other than clinical observation.

PERTUSSIS (Whooping Cough)

1. **Agent**: *Bordetella pertussis*, a Gram-negative pleomorphic bacillus.

2. **Identification**:

   a. **Symptoms**: Acute bacterial disease of the tracheobronchial tree. Insidious onset of mild upper respiratory tract symptoms (catarrhal stage) for 1-2 weeks followed by a cough which becomes paroxysmal within 1 to 2 weeks, usually lasting 1 to 2 months (paroxysmal stage). Paroxysms are characterized by repeated violent cough episodes without inhalation followed by characteristic high-pitched inspiratory whoop, frequently ending with expulsion of clear, tenacious mucus. Fever is usually absent or minimal if present. Cases may not show typical paroxysms or whoop. Post-tussive vomiting is commonly seen and infants can present with apnea.

   b. **Differential Diagnosis**: A whooping cough syndrome may also be caused by *Bordetella parapertussis, Mycoplasma pneumonia, Chlamydia trachomatis, Chlamydia pneumoniae, Bordetella bronchiseptica (although rarely),* and certain adenoviruses. *Bordetella parapertussis* may cause a portion of the clinical cases of pertussis, especially milder cases, and has been reported as the single agent or as a dual infection with *B pertussis* in laboratory-confirmed cases.

   c. **Diagnosis**: Clinical syndrome, isolation of organism from nasopharyngeal swab on Bordet-Gengou media, or Regan-Lowe agar plates. Strikingly elevated white blood cell count with a lymphocytosis occurs in 80% of the cases but may result from other causes. Serological tests may support a probable diagnosis, but only a positive culture, or positive polymerase chain reaction (PCR) test result in someone with the clinical syndrome, confirms the diagnosis of pertussis.

3. **Incubation**: Usually 7-14 days, rarely as short as 5 days or as long as 21 days.

4. **Reservoir**: Human.

5. **Source**: Respiratory tract secretions of infected persons.

6. **Transmission**: Principally respiratory by droplet spread; indirect spread through articles soiled with discharges is possible.

7. **Communicability**: Greater in the catarrhal stage before paroxysms. Tapers off until 21 days after onset of paroxysms, if untreated; only 5 days if treated. There exists a 70-100% secondary attack rate for susceptible household contacts.

8. **Specific Treatment**: Antibiotic treatment may shorten period of communicability but must be given early to modify clinical manifestations. Initiating treatment 3 or more weeks after cough onset has limited benefit to the patient. See section under “Contacts” for medications and recommended dose and duration for each of these agents. Dosage and duration of treatment is the same for treatment and post-exposure prophylaxis.

9. **Immunity**: Immunity due to natural infection has been shown to wane in adolescence and adulthood. Immunity conferred by the pertussis component of the DTP/DTaP vaccine decreases over time with little or no protection 5 to 10 years following the last dose. Even with full immunizations some exposed infants and children may still develop disease, although much milder.

REPORTING PROCEDURES

1. **Reportable**: *California Code of Regulations*, Section 2500. Report within 1 working day of identification of case or suspected case by mail, telephone, fax, or electronic transmission. Do not wait to report until lab confirmation is available.

   Report Form: **PERTUSSIS CASE REPORT (CDPH 8258)**

   PERTUSIS DEATH WORKSHEET (CDC Appendix 12)

2. **Epidemiologic Data (Guidance for Health Districts)**:

   a. Onset and duration of cough, clinical history, complications. Wait to do final interview at least 14 days after cough onset.

   b. Laboratory reports.

   c. Immunization status of patient: date(s) of administration, type of vaccine, vaccine manufacturer(s), lot number(s), reason for non-vaccination.

   d. For infants <12 months of age: determine hospital of birth, whether or not mother received Tdap during the pregnancy, and record highest WBC counts along with percent lymphocytes and test date.

   e. Exposure to people with cough.

   f. Clinical and immunization status of household and other contacts. Complete a case report/"epi" form" for every contact that has a cough of any duration with at least one of the following: (paroxysms, inspiratory whoop, or post-tussive vomiting). Consult with Immunization Program if there are any questions about the identification of new/presumptive cases.

   g. Additional data for hospitalized patients require obtaining hospital discharge summaries.

CONTROL OF CASE, CONTACTS, AND CARRIERS

Public Health Nursing Protocol:
Home visit is required – a face to face interview is required.

Refer to "Public Health Nursing Home Visit REQUIRED Algorithm" (B-73 Part IV Public Health Nursing Home Visit Protocol).

Investigate within 24 hours.

CASE:

Precautions: If untreated, institute respiratory precautions for 21 days after onset of paroxysms. Separate from young children and infants, especially when un-immunized, until case has received at least 5 days of an appropriate antibiotic and agrees to complete the full course.

A case admitted to a hospital ward before diagnosis or effective treatment should be kept in respiratory isolation for at least 5 days after the start of a course of appropriate anti-microbial therapy.

CONTACTS:

Exposure to a case is defined as 1) shared confined space such as a closed classroom in close proximity for a prolonged period of time (i.e., ≥ 1 hour with a symptomatic case); 2) direct face-to-face contact for any length of time with a symptomatic case; or 3) direct contact with respiratory, oral, or nasal secretions from a case in any setting. Only the following asymptomatic contacts should receive antibiotic prophylaxis (see sections 1 and 2 immediately below):

1. All asymptomatic **household** contacts should be given post-exposure antibiotic prophylaxis, regardless of age or immunization status. However, the initiation of antibiotic prophylaxis for contacts that were exposed to a pertussis case more than 3 weeks ago has limited benefit and should not be routinely done unless the contacts are at high risk for developing severe disease if they develop pertussis (e.g., infants or persons with severe lung disease) or unless they are health-care workers (or others) who are routinely exposed to high risk persons. In these instances, prophylaxis can be given for up to 6 weeks after exposure.

2. In addition to household contacts, any other asymptomatic contacts with pre-existing conditions that may be worsened by pertussis (i.e., immunocompromised persons, persons with chronic lung disease, persons with severe asthma, infants, women in their third trimester of pregnancy) should, also, be offered post-exposure antibiotic prophylaxis.

3. Monitor other asymptomatic close contacts who did not receive antibiotic prophylaxis for respiratory symptoms for 21 days after last contact with case during infectious period.

Exclude symptomatic contacts from school/ daycare pending physician evaluation.

School Exposures:

Classroom (not daycare) and other school related contacts to the pertussis case (i.e., band, sports teams) **who develop signs and symptoms of pertussis** should be referred to a health care provider for evaluation and if assessed to have pertussis, excluded from school for 21 days after their last exposure to a communicable pertussis case, or until they have received 5 days of an antibiotic regimen effective against pertussis and agree to complete the antibiotic regimen if the complete regimen is longer than 5 days. **Asymptomatic** close contacts for whom antibiotic prophylaxis is recommended because they have a preexisting condition that may be worsened by pertussis, can remain in school while completing antibiotic prophylaxis. If such asymptomatic children refuse prophylactics, they should be monitored for signs and symptoms of pertussis and if they develop such signs and symptoms, they should be handled as symptomatic school contacts as described in the first sentence of this paragraph. Based on recommendations from both the California Department of Public Health and the Centers for Disease Control and Prevention, asymptomatic close contacts that are **unimmunized or under-immunized against pertussis will not** be routinely excluded from school merely because of the pertussis exposure. Such persons will be monitored for symptoms of pertussis and referred for clinical evaluation and antibiotic treatment as appropriate. If such persons are assessed to have pertussis, they will be excluded from school for 21 days after their last exposure to a communicable pertussis case or until they have received 5 days of an antibiotic regimen effective against pertussis and agree to complete the antibiotic regimen if the complete regimen is longer than 5 days. Because unimmunized or under-immunized children have been shown to be at risk for severe disease if they get pertussis, as compared to fully immunized children, it is reasonable to offer asymptomatic unimmunized or under-immunized children one course of post-exposure antibiotic prophylaxis. However, if they refuse antibiotic prophylaxis and are asymptomatic, they should not be routinely excluded from school.
Refer to the posted exposure notification template letters for school settings. Consult with Immunization Program for notification letters in other settings with school-aged children.

Daycare Exposures:

Because daycare settings are “closed settings” similar to family/home settings, all asymptomatic daycare center contacts to a pertussis case should be offered post-exposure antibiotic prophylaxis. However, an asymptomatic daycare center contact who refuses prophylaxis should not be excluded from daycare **unless the daycare center contact is unimmunized or under-immunized (for age) for pertussis**, in which case he/she can be excluded from daycare for 21 days since the last exposure to a communicable pertussis case until he/she has received 5 days of antibiotic prophylaxis. Consult with Immunization Program to obtain exposure notification template letters for daycare settings.

Hospital and Skilled Nursing Facility (SNF) Exposures:

Hospital or SNF staff with close (face-to-face or direct) personal contact with a communicable pertussis case and patients who have shared a room with a communicable pertussis case should receive antibiotic prophylaxis to interrupt further transmission. These patients and staff should also be cohorted in (i.e., restricted to) the involved ward and there should be no new admissions to the ward of inadequately immunized patients or of any patients less than 1 year of age, until all exposed patients and staff members have been on antibiotic prophylaxis for at least 5 days.

Consult with the Immunization Program regarding exposures in any other settings.

If more than one case of pertussis is identified in a facility, notify the Immunization Program as soon as possible.

Contacts Vaccination:

Un-immunized and under-immunized contacts should be immunized. If an infant or child under age 7 is un-immunized or has received less than 4 doses of DTP/DTaP, they should have pertussis immunization initiated or continued according to the recommended schedule. Children under age 7 who received their third dose 6 months or more before exposure should

be given a fourth dose as soon as possible. Those who have received only 4 doses DTP/DTaP should receive a booster dose unless a dose has been given within the last 3 years or they are more than 6 years old. Persons 7 years of age and older who are unimmunized are not eligible to receive DTaP and should, therefore, receive Tdap, followed by two doses of Td in accordance with the Advisory Committee on Immunization Practices catch-up immunization schedule. Persons 10 years of age and older who received all required pertussis containing vaccine doses recommended for children less than 7 years of age and who have not yet received Tdap are eligible for Tdap and should receive it.

Treatment and Antibiotic Prophylaxis:

The recommended antibiotic prophylaxis and treatment regimens (which are the same) are listed below. Please be aware that current CDC guidelines recommend the exclusive use of azithromycin in infants under one month of age due to fewer adverse events compared to erythromycin. This is an "off-label" use of azithromycin.

a. **Azithromycin**:

- **Adults**: 500 mg orally in one dose on day 1, then 250 mg orally once a day on days 2-5.
- **Infants and Children ≥ 6 months**: 10 mg/kg (maximum: 500 mg/day) orally as one dose on day 1, followed by 5 mg/kg/day orally (maximum: 250 mg/day) once daily on days 2-5.
- **Infants <6 months**: 10 mg/kg/day orally once daily on days 1-5.
- Note: when initiating azithromycin prophylaxis or treatment, ask the individual for whom the antibiotic is prescribed (or guardian if person is a minor) if he/she is currently taking medications metabolized by the cytochrome P450 enzyme system of the liver (ex., benzodiazepines, theophylline, Elavil, Prozac, Paxil, Ketoconazole, Cimetidine, protease inhibitors) or other drugs such as digoxin, triazolam, and ergot alkaloids. If the answer is yes, advise the person (or guardian) that if he/she experiences heart palpitations or chest pain, they should stop taking azithromycin and contact their health care provider immediately.

b. **Erythromycin**:

- **Adults**: 2 g/day, orally in 4 divided doses each day X 14 days.
- **Children ≥1 month**: 40 to 50 mg/kg/ day (maximum, 2 g/ day) orally in 4 divided doses each day X 14 days.
- Erythromycin should be avoided in persons on medications that inhibit the CYP3A hepatic pathway.

c. **Trimethoprim-sulfamethoxazole (TMP-SMX)** (preferable for persons taking medications that inhibit the CYP3A hepatic pathway) (not for children under 2 months of age):

- **Adults**: 2 regular strength tablets or one double strength (DS) tablet orally BID X 14 days.
- **Children ≥2 months**: TMP-8 mg/kg/day and SMX-40 mg/kg/day orally in 2 divided doses each day X 14 days.
- (See pregnancy category C note for Clarithromycin below.)

d. **Clarithromycin**:

- Adults: 500 mg orally twice a day X 7 days
- Infants and Children ≥ 1 month: 15 mg/kg/day orally (maximum: 1 g/day) in 2 divided doses each day X 7 days.
- Clarithromycin should be avoided in persons on medications that inhibit the CYP3A hepatic pathway.

Note: both Clarithromycin and TMP-SMZ are classified by the FDA as pregnancy category C drugs because animal studies indicate an adverse effect on the fetus and no adequate studies exist in humans.

PREVENTION-EDUCATION

1. Recommend immunization with DTP or DTaP for children under 7 years of age. Immunization required for school entry. California law allows exclusion from school during disease outbreaks if immunization status does not comply with *California Code*

of Regulations, Title 17. An acellular pertussis vaccine, combined with tetanus and diphtheria toxoids, (Tdap) has been approved and is now recommended to replace the Td booster once for persons 11 years of age and older. However, pregnant women are recommended to receive a single dose of Tdap **with each** pregnancy, preferably between the 27th and 36th week of the pregnancy. Health care workers and other adults that have close contact with infants are especially recommended to receive a single dose of Tdap as soon as feasible.

2. Proper cleaning or disposal of fomites soiled with nose and throat secretions.

DIAGNOSTIC PROCEDURES

Organism is most likely to be isolated during catarrhal stage and first 1-2 weeks of paroxysmal cough stage; nasopharyngeal specimen should be obtained as soon as possible before antibiotic therapy begins and submitted for bacterial culture. (Special media required. Consult Public Health Laboratory to obtain appropriate media if not available onsite. Guidelines on obtaining a nasopharyngeal specimen are available from the Los Angeles County Immunization Program.) The PCR test is available commercially and can be used for lab confirmation in patients meeting the clinical criteria for pertussis. Fluorescent antibody (FA) tests as well as other direct antigen tests can yield rapid results but are often unreliable and **should not** be accepted for laboratory confirmation. Serological tests are available commercially but are often difficult to interpret due to lack of standardization and the inability to obtain acute specimens for comparison to convalescent specimens.

Viral serologic test to exclude adenoviral illness may be considered.

PLAGUE

1. **Agent**: *Yersinia pestis*, a Gram-negative bacillus.

2. **Identification**:

   a. **Symptoms**:

   Bubonic plague: Presents as acute lymphadenitis in lymph nodes that drain the site of a fleabite. Occur more often in inguinal nodes, less commonly in axillary and cervical nodes. Involved nodes become swollen and tender, and may suppurate. Fever is usually present.

   Septicemic plague: All forms of plague, including those without lymphadenopathy, may progress to septicemic plague with dissemination by the bloodstream to diverse parts of the body.

   Pneumonic plague: Often occurs secondarily to hematogenous dissemination of bubonic plague, resulting in pneumonia with mediastinitis or pleural effusion. Inhalation of respiratory droplets or artificially generated aerosols (bioterrorism) can cause primary plague pneumonia, a highly communicable disease that may lead to localized outbreaks. Pneumonia Plague is thought to be the most likely presentation in the event of a biological attack.

   Untreated bubonic plague has a fatality rate of 50%. Pneumonic and septicemic plagues are invariably fatal if not treated.

   b. **Differential Diagnosis**:

   Bubonic: Tularemia, granuloma inguinale, staphylococcal or streptococcal lymphadenitis, cat-scratch fever, incarcerated hernia, acute appendicitis, tuberculosis adenitis.

   Septicemic: enteric fever, meningococcemia.

   Pneumonic and meningitis: other bacterial causes of pneumonia and meningitis.

   c. **Diagnosis:** Confirmed by culture of *Y. pestis* from bubo aspirate, blood, CSF or sputum, or a fourfold or greater change in serum antibody between acute and convalescent specimens. Presumptive diagnosis made by positive EIA (enzyme linked immunosorbent assay), fluorescent antibody test or visualization of bipolar staining dumbbell-shaped organisms on smear of bubo aspirate, blood, spinal fluid or sputum.

3. **Incubation**: 1-7 days for bubonic plague; primary plague pneumonia in 1-6 days.

4. **Reservoir**: Wild rodents, e.g., ground squirrels. Lagomorphs (rabbits and hares) and domestic cats can serve as a source of infection to people.

5. **Source**: Infected fleas and blood or tissue from an animal infected with *Y. pestis*; respiratory droplets and sputum from patients or animals with pneumonic plague. Intentional release as an agent of bioterrorism.

6. **Transmission**:

   Bubonic: Bite from an infected flea, or by handling tissues of an infected animal.

   Pneumonic: Contact with droplets or sputum from an infected patient or animal, Intentional release by terrorist(s).

7. **Communicability**: Human to human only in pneumonic form. Fleas may remain infective for months.

8. **Specific Treatment**: Tetracyclines or sulfonamides. For detailed treatment for pregnant women and children see Terrorism Agent Information and Treatment Guidelines for Hospitals & Clinicians..

9. **Immunity**: Temporary.

REPORTING PROCEDURES

1. **Reportable**. *California Code of Regulations*, Title 17, Sections 2500, 2696. All suspect cases should be reported **immediately by**

phone to the Los Angeles County Department of Public Health (LAC DPH) Acute Communicable Disease Control (ACDC) Program at: During business hours (M-F 8:00 AM-5:00 PM) (213) 240-7941. After hours report to County operator (213) 974-1234 and ask to speak with the Public Health Physician on Call.

Laboratory work with clinical specimens must be done under Bio-safety level (BSL)-2-condition. Call ACDC to arrange for submission of specimen for confirmations testing.

ACDC must notify the State Division of Communicable Disease Control immediately upon receiving notice of a case of suspected plague.

ACDC will supervise investigation and control measures.

2. **Report Form**: **PLAGUE (HUMAN) CASE INVESTIGATION REPORT (CDPH 8549).**

3. **Epidemiologic Data**:

   a. History of travel to or residing in endemic areas within the incubation period.

   b. Detailed information regarding method of travel (i.e., hiking, mule ride, camping, etc.) and itinerary.

   c. History of flea bites.

   d. Contact with sick or dead animals, (e.g., domestic cats, ground squirrels, rabbits). Location of hunting or trapping.

   e. Occupation and exact address of workplace.

4. **Bioterrorism**: *Yersinia pestis* has been listed by the CDC as one of the agents most likely to be used in a bioterrorist attack because of its devastating physical and psychological effects and its ability to be weaponized and effectively delivered to a target area.

CONTROL OF CASE, CONTACTS & CARRIERS

Immediate investigation required. ACDC will supervise investigation and control measures.
CASE OF BUBONIC PLAGUE:

1. Contact and standard precautions.

2. Use an effective insecticide to eliminate all fleas from the patient, clothing, and living quarters.

CASE OF PNEUMONIC PLAGUE:

1. Droplet precautions and standard precautions.

2. **Isolation**: Patients should be place in a private room; persons entering should wear gown gloves and mask. Negative air pressure isolation rooms are not indicated.

3. Immediate hospitalization required; arrangements to be made by the ACDC duty officer.

4. Eliminate all fleas with an effective insecticide from the patient, clothing, and living quarters.

5. If case dies, refer to **Part III, MORTICIANS & CEMETERIES**. See also Terrorism Agent Information and Treatment Guidelines for Hospitals & Clinicians.

CONTACTS: Persons exposed to the aerosolized *Yersina pestis* or have been in close physical contact with a case or animal that has or is suspected of having plague.

1. Institute immediate, complete quarantine of household and contacts (including domestic animals) until disinfestations and 6 days of surveillance completed. Consult with the ACDC duty officer.

2. Close contacts should receive chemoprophylaxis with either tetracyclines or sulfonamides. All prophylactic antibiotic therapy should continue for 7 days from last exposure to the case.

CARRIERS: None applicable.

PREVENTION-EDUCATION

1. Control and monitor rodent and flea populations for evidence of infection.

2. When camping in or near endemic areas, use insect repellents, sleep off the ground, and protect pets from fleas. Consult with forest ranger for identification of endemic areas. Do

not handle sick or dead animals but report them to park officials.

3. Seek immediate medical evaluation for suspected cases that have a history of visits into wilderness areas of California within 6 days of the onset of symptoms.

4. Disinfect articles contaminated with blood, sputum or purulent discharges from suspected case.

5. Review Terrorism Agent Information and Treatment Guidelines for Hospitals & Clinicians.

DIAGNOSTIC PROCEDURES

1. Diagnosis is confirmed by isolating *Y. pestis* by culture in fluid from buboes, blood, spinal fluid, or sputum.

2. Direct visualization of stained smear is presumptive diagnosis.

3. A serologic test for plague is also available. Diagnosis is based on a fourfold rise in titer between acute and convalescent sera. Consult with Public Health Laboratory.

PNEUMOCOCCAL, INVASIVE DISEASE

1. **Agent**: *Streptococcus pneumoniae* (pneumococcus), a gram-positive diplococcus. A major cause of pneumonia, bacteremia and meningitis. There are at least 90 known serotypes but 23 cause approximately 90% of the bacterial infections in the US.

2. **Identification:**

   a. **Symptoms**: Sudden onset of shaking chills, fever, pleural pain, difficulty breathing, rapid breathing, a cough productive of "rusty" sputum, malaise, weakness, and anorexia. In the elderly, onset may be less abrupt while infants and young children may have initial symptoms of fever, vomiting, and convulsions.

   b. **Differential Diagnosis**: Other bacterial infections that can cause pneumonia, sepsis, or meningitis.

   c. **Diagnosis**: Positive culture of *Streptococcus pneumoniae* from a normally sterile site, e.g., blood or cerebrospinal fluid.

3. **Incubation**: Not well determined; may be as short as in the 1-3 days.

4. **Reservoir**: Humans. Asymptomatic carriage is common.

5. **Source**: Respiratory secretions.

6. **Transmission**: Droplet spread, direct oral contact, or indirectly, articles soiled with respiratory secretions. Autoinoculation in persons carrying the bacteria in their upper respiratory tract occurs. Person to person transmission is common but illness among casual contacts and attendants is infrequent.

7. **Communicability**: Unit pneumococci are no longer present in nose or throat in significant numbers, ususally 24-48 hours after the initiation of effective therapy.

8. **Specific Treatment**: Parenteral penicillin G, cephalosporins or fluoroquinolones if case is allergic to penicillin. For meningitis cases, initial treatment with vancomycin may be warranted until susceptibilities can be determined. Because of the emergence of resistance to penicillin and other antimicrobials, the sensitivites of strains should be determined to guide treatment.

9. **Immunity**: Specific for infecting serotype, usually follows an attack and may last for years.

REPORTING PROCEDURES:

1. **Reportable**: LAC-DPH.

2. **Reporting Form: LAC-DHS INVASIVE PNEUMOCOCCAL DISEASE FORM (acd-Invas Pneumo)**

3. **Epidemiologic Data:**

   a. Sex, age, race, ethnicity.

   b. Outcome of illness, date of death if case died.

   c. Hospitalization, name of hospital, admission and discharge dates, hospital transfers and transfer date.

   d. Vaccination status if ≥65 years or <5 years old. If <5 years, number of doses.

   e. Laboratory data: date specimen collected, specimen type, antibiotic susceptibilities .

CONTROL OF CASES, CONTACTS & CARRIERS: Not applicable.

PREVENTION-EDUCATION:

1. Respiratory isolation for hospitalized cases may be warranted for patients with antibiotic resistant infections who may transmit it to other patients at high risk of pneumococcal disease.

2. Special attention should be given to institutional and military outbreaks.

3. The 13-valent pneumcococcal conjugate vaccine (Prevnar 13) is replacing the heptavalent pneumococcal conjugate vaccine

(Prevnar®) in 2010 and is recommended by the Advisory Committee on Immunization Practices (ACIP) for all children at age 6 weeks to 5 years, and children at age 24 - 71 months who are at high risk of invasive pneumococcal infections. The 23-valent pneumococcal polysaccharide vaccines (Pnu-Imune® and Pneumovax®) are recommended for all adults > 65 years and people over age 6 years (71 months) who are at high risk of invasive pneumococcal disease. See individual product labeling for information on dosing and scheduling of the vaccines.

DIAGNOSTIC PROCEDURES:

Diagnosis of infection with *Streptococcus pneumoniae* generally relies on isolation of the organism from blood or other normally sterile body sites.

POLIOVIRUS INFECTION

1. **Agent**: Poliovirus, an enterovirus with antigenic types 1,2,3. Type 1 is most often the etiologic agent in paralytic illnesses, type 3 less so and type 2 least commonly. Type 1 most frequently causes epidemics. Most vaccine-associated cases are due to type 3 or 2. The last case of poliovirus infection caused by wild poliovirus in the Americas was reported in 1991 from Peru.

2. **Identification**:

   a. **Symptoms**: Acute viral illness, severity ranging from in-apparent infection to paralytic disease. Over ninety percent of cases are asymptomatic or only result in nonspecific fever. Symptoms include fever, headache, nausea and vomiting, stiffness in neck and back, with or without paralysis. Paralysis is typically flaccid, asymmetric, and most commonly affecting the lower extremities. Case fatality (paralytic cases) is 2%-10% in epidemics and increases with age. Non-paralytic poliovirus infection can present as aseptic meningitis, also common in other enterovirus infections.

   b. **Differential Diagnosis**: Other types of aseptic meningitis, bacterial meningitis, tuberculous or fungal meningitis, brain abscess, leptospirosis, lymphocytic meningitis, encephalitis due to infectious or toxic agents, tick paralysis. Guillain-Barrè syndrome may initially resemble poliovirus infection as can West Nile Virus neurological disease. Other enteroviruses can cause acute flaccid paralysis simulating paralytic poliovirus infection..

   c. **Diagnosis**: Isolation of poliovirus from stool or pharynx early in the course of the disease is presumptive evidence of poliovirus infection. At least 2 stool specimens taken 24 hours apart are recommended to increase probability of poliovirus isolation. Recipients of oral live-attenuated polio vaccine (OPV) can excrete virus in feces for several weeks; however, OPV is no longer commercially available in the U.S. Isolation of virus in CSF, when accomplished, is diagnostic of CNS disease. CSF shows excess cells; lympho-cytes predominate. Neutralizing and complement-fixing antibodies appear during the first two weeks of illness.

3. **Incubation**: Range 3-6 days for abortive polio (non-specific febrile illness)—typically 7-21 days for paralytic polio, but occasionally as short as 4 days.

4. **Reservoir**: Humans, most frequently in-apparent cases, especially children.

5. **Source**: Pharyngeal secretions; feces of infected persons.

6. **Transmission**: Intimate contact with infected persons. Where sanitation is good, oral-oral, and respiratory may be more important than fecal-oral spread; it rarely occurs through milk and water where good sanitary conditions prevail. Transmission from mother to newborn has been reported. Immunodeficient patients may excrete virus for prolonged periods. In temperate climates, poliovirus infections are most common in the summer and fall.

7. **Communicability**: Virus demonstrable in pharynx from 36 hours to approximately 1 week after exposure; in feces, from 72 hours to 6 weeks after exposure and occasionally for months. Infectivity is greatest 7-10 days before and after onset of symptoms.

8. **Specific Treatment**: Supportive.

9. **Immunity**: Type-specific of long duration.

REPORTING PROCEDURES

1. **Reportable**. *California Code of Regulations*, Section 2500. **Immediate telephone report of case or suspected case is required**.

   a. Call Morbidity Unit during working hours.

   b. Call Immunization Program. After hours, contact ACDC through the county operator.

2. **Report Form**: **POLIOVIRUS INFECTION OR POLIOMYELITIS CASE REPORT (CDPH 8421)**.

If vaccine-associated:
VACCINE ADVERSE EVENT REPORTING SYSTEM (VAERS).

3. **Epidemiologic Data**:

   a. Clinical information: Date of onset of paralysis and weakness; signs, symptoms; sites of paralysis, degree and extent of involvement.

   b. Immunization history on case, household and other close contacts who received oral polio vaccine less than or equal to 75 days before onset of case's symptoms. Record date, type of vaccine, and person or agency that administered each immunization. Include vaccine manufacturer and lot number if available.

   c. Travel history of case and close contacts and information on visitors during incubation period. Consider international travel or foreign visitors in a 30-day period before onset.

   d. History of contact with any known cases of polio and the date of contact, if applicable.

CONTROL OF CASE, CONTACTS & CARRIERS

Investigate on the day of report.

CASE: Hospitalization at a facility capable of strict isolation is recommended. For patients suspected of excreting wild poliovirus, enteric precautions are indicated for the duration of hospitalization or until virus can no longer be recovered from the feces. Implement respiratory isolation for 7 days from onset.

CONTACT: Identify family, playmates, relatives, babysitters, day-care center staff and large group contacts.

Restrictions only if symptomatic—then treat as case.

The oral polio virus vaccine (OPV) is no longer commercially available in the United States. However, this vaccine is still recommended for control of polio outbreaks—and the CDC stockpiles the vaccine for that purpose. Any outbreaks of polio (transmission from even one case) must be managed in consultation with the Immunization Program.

Unvaccinated and incompletely immunized children who are contacts to a polio case should receive the number of doses of enhanced potency inactivated polio vaccine (IPV) required to complete the immunization series for their age. School-aged children and adolescents who completed a primary series in the past can be given an additional dose of IPV to further decrease their already very small risk of becoming infected. Unvaccinated adults (including adults without a written record of vaccination) should receive the 3 dose primary series. Incompletely immunized adults who previously received less than a full primary series of OPV or IPV should receive the remaining required doses of IPV regardless of the interval since the last dose and the type of vaccine that was received. Adults who previously completed a primary immunization series against polio can receive a single dose of IPV.

CARRIERS: Long-term carriers have not been found.

PREVENTION-EDUCATION

1. Enhanced potency inactivated polio vaccine (IPV) is recommended for routine use in the USA. All children should receive four doses of IPV at ages 2, 4, and 6-18 months and 4-6 years. Survivors of polio are susceptible to infection by the remaining antigenic types. These individuals should receive the appropriate polio immunization for their age.

2. Routine polio vaccination of adults (persons ≥ 18 years of age) living in the United States is not necessary. Most are immune as a result of vaccination during childhood. Adults unvaccinated as children should be vaccinated against polio, however, if they are at greater risk for exposure to polio than the general population. These include travelers to areas or countries where polio is endemic or epidemic; members of population groups with disease caused by polio; laboratory workers who handle specimens that might contain polio virus, and health-care workers who have close contact with patents who might be excreting polio virus.

3. California law requires exclusion from school if conditions for admission are not fulfilled or if a pupil who is not completely immunized is

exposed to polio case. See *California Code of Regulations*, Title 17.

DIAGNOSTIC PROCEDURES

Clinical and epidemiological histories are required to aid the laboratory in test selections.

1. **Serology**: Paired sera required.

   Container: Serum separator tube (SST, a red-gray top vacutainer tube).

   Laboratory Form: **Test Requisition and Report Form H-3021**

   Examination Requested: Polio.

   Material: Whole clotted blood.

   Amount: 8-10 ml.

   Storage: Refrigerate.

   Remarks: Specimens should be obtained from all patients with paralytic disease suspected to be caused by poliovirus. Collect first blood specimen as early as possible. Collect the second approximately 3 weeks after the first. Send each specimen as it is collected. Do not store.

2. **Culture**: Isolation should always be attempted to identify illness due to other enteroviruses, mimicking polio. Stool specimen required; throat swab and CSF recommended.

   Container: Sterile, 30-oz, wide-mouth, screw-capped bottle; viral culturette; sterile test tube.

   Laboratory Form: **Test Requisition and Report Form H-3021**

   Examination Requested: Polio Culture.

   Material: 2-3 g of stool (no preservative), throat swab in viral culturette, CSF in sterile tube (no preservative). Collect 2 stool specimens and 2 throat swabs 24 hours apart as early as possible in the course of the disease, ideally within 14 days of onset of paralytic disease.

   Storage: Keep chilled and deliver to the Virus Laboratory as soon as possible. Specimens must be delivered to the Virus Laboratory within 48 hours of collection.

   Remarks: Specimens for isolation attempts must be collected as soon after onset as possible. Consult with the Virus Laboratory. Laboratories should forward positive isolates to CDC for intratypic differentiation to determine whether the poliovirus isolate is wild or vaccine-derived. CSF, although diagnostic, is rarely of value for the isolation of poliovirus, but is significant for the recovery of other enteroviruses.

PSITTACOSIS

1. **Agent**: *Chlamydophila psittaci* (previously *Chlamydia psittaci*) is an obligate intracellular bacterial pathogen.

2. **Identification**:

   a. **Symptoms**: Infections range from asymptomatic to systemic illness with severe pneumonia. Cases usually have an acute onset of fever, chills, headache, malaise, and myalgias, with or without respiratory symptoms. A non-productive cough usually develops and pneumonia is not uncommon, with chest x-ray findings of a lobar, patchy, or interstitial infiltrates. As many as 80% of recognized persons with psittacosis may be hospitalized. Pericarditis, myocarditis, endocarditis, superficial thrombophlebitis, hepatitis, and encephalopathy are rare complications.

   b. **Differential Diagnosis**: Psittacosis-related pneumonia should be differentiated from other unusual causes of community-acquired pneumonia including *Coxiella burnetii*, *Mycoplasma pneumoniae*, *Chlamydia pneumoniae*, *Legionella* species, and respiratory viruses such as influenza.

   c. **Diagnosis**: Most diagnoses are established by serologic methods in which paired sera are tested for chlamydial antibodies by complement fixation (CF). Acute-phase serum specimens should be obtained as soon as possible after onset of symptoms, and convalescent-phase serum specimens should be obtained at least 2 weeks after the first specimen. Micro-immunofluorescence (MIF) and polymerase chain reaction (PCR) assays can be used to distinguish *C. psittaci* infection from infection with other chlamydial species. The infectious agent also can be isolated from the patient's sputum, pleural fluid, or clotted blood during acute illness and before treatment with antimicrobial agents; however, culture of *C. psittaci* is performed by few laboratories because of technical difficulty and safety concerns.

3. **Incubation**: Usually 5-14 days, but longer periods have been reported.

4. **Reservoir**: Wild and domestic birds, especially psittacine birds (parrots and cockatoos), budgerigars (parakeets), pigeons, and some poultry (primarily turkey and ducks; not much in chickens).

5. **Transmission**: Infection occurs by inhalation of the organism, typically in dust from dried bird droppings. Over 70% of cases reported to CDC over a 10-year period were the result of exposure to pet, caged birds. Movement of birds in their cage can generate dust, but cage cleaning is probably a bigger problem. Workers may be exposed to contaminated dust during the clean-up/removal of pigeon droppings. Pet bird owners have also become infected when bitten by large psittacine birds. Veterinarians or bird pathologists have been infected by handling carcasses or performing necropsies on infected birds. Occupational exposure may take place in poultry processing or rendering plants where aerosols are generated by handling/processing of poultry viscera.

6. **Communicability**: Person-to-person spread has been suggested but not proven. The extent of such transmission is negligible if not nil.

7. **Specific Treatment**: Tetracyclines are the drugs of choice. Most patients respond to oral therapy (100mg of doxycycline administered twice a day or 500 mg of tetracycline hydrochloride administered four times a day). For initial treatment of severely ill patients, doxycycline hyclate can be divided into two infusions per day (up to 100mg per dose). Remission of symptoms usually is evident within 48—72 hours. However, relapse can occur, and treatment must continue for at least 10—14 days after fever abates. Erythromycin probably is the best alternative agent in patients for whom tetracycline is contraindicated (e.g., children aged <9 years and pregnant women).

8. **Immunity**: There are many strains of *C. psittaci* that can cause human disease, and cross-immunity is limited or non-existent.

Even immunity to homologous strains is at best transient. New infections and clinical disease can develop within months or treatment and recovery, should the individual be re-exposed.

REPORTING PROCEDURES

1. Report any cases or suspected cases within 7 calendar days (Title 17, Section 2500, *California Code of Regulations*).

2. **Report Forms**:

   PSITTACOSIS CASE REPORT (CDPH 8583)

3. **Epidemiologic Data**:

   a. Place of residence (be specific with regard to address, city and state).

   b. History of bird contact/ownership, occupations that would bring the case into contact with wild or domestic fowl or their droppings, or avocational pursuits that would result in these exposures.

   c. Additional cases among other persons who may have had similar exposures (e.g., family, co-workers).

   d. If the source of infection is a pet bird, obtain the history of ownership, date and place of acquisition, and the bird's health history. Provide the information to Veterinary Public Health. Veterinary Public Health staff will determine if testing of birds or environment, quarantine and treatment of the bird(s), or investigation of the source of a recently purchased bird, are warranted.

CONTROL OF CASE, CONTACTS & CARRIERS

Investigate within 7 days. Investigated by ACDC.

CASE:
Precautions: Standard precautions are recommended.

CONTACTS: No specific measures other than case finding and education. No vaccine is presently available.

PREVENTION–EDUCATION

1. All birds suspected to be the source of human infection should be seen by a veterinarian for evaluation and management. Birds with *C. psittaci* infection should be isolated and treated with appropriate antimicrobial agents for at least 45 days. Birds suspected of having infection that have died or have been euthanized should be sealed in an impermeable container and transported on dry ice to a veterinary laboratory for testing. All potentially contaminated caging and housing areas should be disinfected thoroughly and aired before reuse, because these areas may contain infectious organisms. *C. psittaci* is susceptible to most household disinfectants and detergents, including 70% alcohol, 1% Lysol, and 1:100 dilution of household bleach. People cleaning cages and other bird housing areas should avoid scattering the contents. People exposed to common sources of infection should be observed for development of fever or respiratory tract symptoms; early diagnostic tests should be performed and therapy should be initiated if symptoms appear.

2. If prevention and education information related to animal care or testing is requested or required, this information should be provided by Veterinary Public Health staff.

DIAGNOSTIC PROCEDURES

Laboratory confirmation

1. Isolation of Chlamydophila psittaci from respiratory specimens (e.g., sputum, pleural fluid, or tissue), or blood, or
2. Fourfold or greater increase in antibody (Immunoglobulin G [IgG]) against C. psittaci by complement fixation (CF) or microimmunofluorescence (MIF) between paired acute- and convalescent-phase serum specimens obtained at least 2-4 weeks apart , or
3. Supportive serology (e.g. C. psittaci antibody titer [Immunoglobulin M (IgM)] of greater than or equal to 32 in at least one serum specimen obtained after onset of symptoms), or
4. Detection of C. psittaci DNA in a respiratory specimen (e.g. sputum, pleural fluid or

tissue) via amplification of a specific target by polymerase chain reaction (PCR) assay.

Serologic diagnosis

Collection: serum separator tube.

Test Requisition and Report Form H-3021

Procedure: Collect first (acute) blood as early as possible, preferably within 7 days after onset of rash. Collect second (convalescent) blood at least 2 weeks later. Label all specimens with name of patient.

Storage: Refrigerate if necessary. Send each specimen to the Public Health Laboratory as soon as possible.

Amount: 8-10 ml.

Bacterial Identification: Sputum, pleural fluid, or clotted blood samples collected during acute illness and before treatment with antimicrobial agents must be transported immediately under refrigeration to the Public Health Laboratory for shipment to the State.

Collection: Red top tube.

CASE CLASSIFICATION

Probable: An illness characterized by fever, chills, headache, cough and myalgia that has either:

1. Supportive serology (e.g. C. psittaci antibody titer [Immunoglobulin M, IgM] of greater than or equal to 32 in at least one serum specimen obtained after onset of symptoms), or
2. Detection of C. psittaci DNA in a respiratory specimen (e.g. sputum, pleural fluid or tissue) via amplification of a specific target by polymerase chain reaction (PCR) assay.

Confirmed: An illness characterized by fever, chills, headache, cough and myalgia, and laboratory confirmed by either:

1. Isolation of Chlamydophila psittaci from respiratory specimens (e.g., sputum, pleural fluid, or tissue), or blood, or
2. Fourfold or greater increase in antibody (Immunoglobulin G [IgG]) against C. psittaci by complement fixation (CF) or microimmunofluorescence (MIF) between paired acute- and convalescent-phase serum specimens obtained at least 2-4 weeks apart.

Q FEVER (Query Fever)

1. **Agent**: *Coxiella burnetii* (previously *Rickettsia burnetii*), a small, pleomorphic, obligate intracellular coccobacillus.

2. **Identification:**

   a. **Symptoms**: An acute febrile disease; onset may be sudden, with chills, retrobulbar headache, weakness, malaise and severe sweats; much variation in severity and duration. A pneumonitis occurs in many cases, with mild cough, scanty expectoration, chest pain, minimal physical findings and little or no upper respiratory involvement. Chronic endocarditis, acute hepatitis and inapparent infections have been reported.

   b. **Differential Diagnosis**: Viral pneumonia, psittacosis, so-called "atypical" pneumonia, pulmonary mycotic disease, endocarditis, hepatitis, adenovirus infection.

   c. **Diagnosis**: A four-fold or greater rise in serum antibody on acute and convalescent sera.

3. **Incubation**: Varies with infecting dose; usually 2-3 weeks, although may be up to 6 weeks.

4. **Reservoir**: Domestic animals: cats, cattle, sheep, and goats. Wild animals: many feral rodents, ticks.

5. **Source:** Dust, straw, and wool contaminated by infected animals; infected bodies or carcasses; placental tissues, fetal membranes, and amniotic fluid; unpasteurized milk.

6. **Transmission**: Commonly by airborne dissemination in dust. This agent has the ability to survive for long periods of time in a dry environment in or near premises contaminated by placental tissues and birth fluids of infected animals, in establishments processing infected animals or their by-products, and in necropsy rooms. Also by direct contact with infected animals or other contaminated materials such as wool, straw, fertilizer, and the laundry of exposed persons. Ingestion of contaminated, unpasteurized milk may be responsible for some cases.

7. **Communicability**: Rarely from person to person.

8. **Specific Treatment**: Tetracycline or doxycycline are the drugs of choice; chloramphenicol may be used in children. For chronic endocarditis, add rifampin, trimethoprim-sulfamethoxazole, or ciprofloxacin.

9. **Immunity**: Lifelong.

REPORTING PROCEDURES

1. **Reportable**. *California Code of Regulations,* Title 17, Section 2500.

2. **Report Form**:
   Q FEVER CASE REPORT (CDPH 8548)

3. **Epidemiologic Data:**

   a. Exposure to cattle, sheep, goats, animal by-products (wool, fertilizer, birth products, etc.), and dust from contaminated corrals.

   b. Consumption of unpasteurized milk or milk products.

   c. Occupation and address. Laboratory technicians; veterinarians; farmers; dairymen; packing house; stock-yard; rendering plant; wool-processing workers and other engaged in related fields; rural construction workers; laundry workers; undertakers.

   d. Travel within areas of concentration of cattle, sheep, and goats.

CONTROL OF CASE, CONTACTS & CARRIERS

Investigate within 7 days. Immediate investigation indicated if clustering of cases occurs.

CASE:

Precautions: None.

CONTACTS: No restrictions.

PREVENTION-EDUCATION

1. Direct control measures aimed toward limitation of exposure to infectious agent.

    a. Dispose of birth fluids and placentas of domestic animals properly.

    b. Use strict hygiene measures when working around cows, sheep and barns (dust, urine, feces, rodents) during epizootics.

    c. Educate public on sources of infection and necessity of pasteurization of milk.

2. Discuss availability of medical services and immunization for people engaged in activities associated with farm animals, their body wastes and by-products.

3. Disinfect soiled articles from patients. Dispose of sputum and blood properly. Use precautions at postmortem examination.

DIAGNOSTIC PROCEDURES

Clinical and epidemiological history required to aid the laboratory in test selections.

Serology: Paired sera required.

Container: VR SEROLOGY - contains a serum separator tube.

Examination Requested: Q fever Serology.

Material: Whole clotted blood.

Amount: 8-10 ml.

Storage: Refrigerate.

Remarks: Collect first blood specimen as early as possible. Collect the second approximately 2 weeks after the first. Send each specimen as it is collected. Do not store. A third specimen (30-40 days after onset) may be necessary if early therapy with antibiotics has been instituted.

RABIES, HUMAN & ANIMAL

1. **Agent**: Rabies virus.

2. **Identification:**

   a. **Symptoms**: An acute encephalomyelitis of mammals, especially carnivores, characterized by central nervous system involvement leading to paralysis and death.

   b. **Differential Diagnosis**: Other causes of encephalitis, tetanus, tick paralysis, ascending myelitis, lead encephalopathy, anti-NMDA (N-methyl D-aspartate) receptor encephalitis, and various forms of acute meningitis.

   c. **Diagnosis:** Suggested by a history of exposure to wild mammal with known risk of rabies infection. Several tests are necessary to diagnose rabies ante-mortem (before death) in humans; no single test is sufficient. Tests are performed on samples of saliva, serum, spinal fluid, and skin biopsies of hair follicles at the nape of the neck. Saliva can be tested by virus isolation or reverse transcription followed by polymerase chain reaction (RT-PCR). Serum and spinal fluid are tested for antibodies to rabies virus. Skin biopsy specimens are examined for rabies antigen in the cutaneous nerves at the base of hair follicles.

3. **Incubation:** In humans, from 10 days to greater than 1 year; in the majority of cases, 14 to 56 days. Period tends to shorten as severity of exposure increases. In animal, generally 15 to 50 days, but variable and in rare cases even several months or longer.

4. **Reservoir**: Wild and domestic animals of the *Canidae* family, including dog, coyote, fox, wolf; also bobcat, skunk, raccoon, mongoose, ferret, and other biting carnivores; bats.

5. **Source**: Introduction of virus-laden saliva into bite wound or (rarely) by saliva entering scratch, other break in skin, or mucous membranes.

6. **Transmission**: Normally by bite or lick. Transmission from person to person remotely possible. Transmission can occur by ingestion of infected material or by inhalation of contaminated air (e.g., in caves where bats roost). Transplant of corneas and other organs and tissues from unsuspected rabies cases.

7. **Communicability**: In dogs and cats for 3-5 days before onset of clinical signs and during course of disease. Wild animals such as skunks, bats, and foxes may have virus present in saliva for long periods before onset of clinical symptoms.

8. **Specific Treatment**: None. See **Recommendations for Use and Storage of Immunobiologics and Other Prophylactic Agents** (B-71) and **Control of Communicable Diseases Manual** for specific instructions.

9. **Immunity**: None known. Uniformly fatal.

REPORTING PROCEDURES

1. **Reportable**. *California Code of Regulations*, Title 17, Sections 2500, 2604, and 2606 Los Angeles County Ordinance 10.72.010.

   a. Immediately telephone report of human case or suspect to Morbidity Unit.

   b. Call ACDC. After working hours, contact Administrative Officer of the Day through County Operator.

   c. Immediately report wild or foreign animal bites to Veterinary Public Health.

2. **Report Form**:

   HUMAN RABIES CASE REPORT (CDPH 8526).

   RABIES EXPOSURE QUESTIONNAIRE FOR HEALTHCARE WORKER (acd-rabiesexpHCW) (to be completed by ACDC)

3. **Epidemiologic Data:**

a. Date person bitten; severity and location of bite; first signs of abnormal animal behavior.

b. Location and identification of biting animal and owner.

c. History of circumstances of bite, e.g., was animal provoked, was an attempt made to hold or pick up an injured animal. Feeding or playing with wildlife.

d. Vaccination status of biting animal.

e. Recent travel history of case and biting animal.

f. Occupational association with domestic and wild animals.

g. Vaccination status of case and other exposed contacts.

h. Recent surgery, particularly organ or tissue transplantation.

CONTROL OF CASE, CONTACTS & CARRIERS

FOR POST-EXPOSURE PROPHYLAXIS

Public Health Nursing Home Visit Protocol:
Home visit as necessary – a face to face interview is conducted as necessary.

Refer to "Public Health Nursing Home Visit AS NECESSARY (HVAN) Algorithm" (B-73 Part IV Public Health Nursing Home Visit Protocol).

Investigate the day of report.

Consult with Acute Communicable Disease Control regarding investigation.

HUMAN CASE:

1. **Precaution**: Contact precautions, especially for saliva and respiratory secretions, for duration of illness

2. Search for persons and other animals bitten or exposed to saliva.

CONTACTS: Anyone in contact with saliva.

The same guidelines are used for treatment of persons significantly exposed by animal bite as those exposed to human case's saliva.

CARRIERS: Not applicable.

PREVENTION/EDUCATION

1. Vaccinate dogs and cats; recommend pre-exposure prophylactic vaccination for animal control officers, veterinarians, zoo keepers, etc.
2. Report all animal bites to local animal control agency.

3. Animals manifesting strange behavior should be reported to animal control authorities.

4. Do not pick up or handle sick or strangely acting animals, especially bats.

5. Avoid exposure to carnivorous wildlife. Do not keep wild animals as pets.

6. Warn medical personnel of hazards of saliva and importance of universal infection control precautions.

7. Be sure owner of biting dog understands quarantine instructions.

DIAGNOSTIC PROCEDURES

Consult with ACDC and Virology Section of Public Health Laboratory.

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PREVENTION OF RABIES AFTER ANIMAL BITES

RABIES PROPHYLAXIS FOR HIGH RISK ANIMAL EXPOSURES

INITIAL RISK ASSESSMENT

A. Assessment of exposure

a. Bite exposure

A bite exposure to rabies virus occurs when saliva or other potentially infectious material (e.g., neural tissues) is introduced into intact skin through a cut into the skin. Bite exposure is considered

a significantly higher risk exposure than a non-bite exposure.

b. Non-bite exposure

1) Non-bite exposure occurs when saliva or other potentially infectious material comes in contact with mucous membrane without bite. These are in general much lower risk than bite exposure and rarely cause rabies.
2) High risk non-bite exposures have been documented among surgical recipients of corneas, solid organs and vascular tissue transplanted from a patient who died of rabies.

3) Aerosolization of rabies virus has also been documented to lead to human rabies in the laboratory setting and in caves containing in the Southwestern US and persons exposed to large amount of aerosolized rabies virus.

4) Exposure to blood, urine, or feces does not constitute exposure.

5) Contact of saliva to intact skin does not constitute exposure.

c. Bat exposures: The most common rabies virus variant responsible for human rabies in the US is bat-related.

1) Bats involved in a human exposure should be tested for rabies if available.

2) Assess exposure—determine if bite, scratch or mucous membrane exposure occurred.

d. Human to human exposures: Infection via organ and tissue transplantation has been documented for corneas, solid organs, and vascular tissue.

1) Although no human to human transmission within the US has been documented, medical staff should wear gowns, goggles, masks, gloves, particularly during intubation and suctioning for suspected human rabies cases.

2. Review rabies surveillance data from area where bite exposure from potential rabid animal occurred.

a. Bats – Rabid bats have been documented in 49 states; only Hawaii is free of bat rabies.

1) All bat exposures are considered high risk exposure.

2) Exposure to bat saliva can occur through minor bites.

b. Western terrestrial carnivores – Raccoons, skunks, and foxes have been documented to be infected with rabies. Clinical signs of rabies in the wildlife are not reliable. All such exposures should be considered as potentially rabid.

c. Other wild animals – Small rodents such as squirrels, chipmunks, rats, mice, hamsters, guinea pigs, gerbils, rabbits and hares are considered to be very low risk for rabies.

d. Domestic dogs, cats, and ferrets – With near universal registration, licensing, and vaccination for rabies, the risk of acquiring rabies from indigenous US dogs is nearly non-existent. A healthy domestic dog, cat or ferret that bites a person should be confined and observed for 10 days.

1) In developing countries, dog bites continue to place humans at risk for exposure to rabies from both domesticated and feral dogs.

3. Circumstances of biting Incident and vaccination status of exposing animal

a. Unprovoked vs. provoked – An unprovoked attack by an animal is more likely to be associated with rabies than a provoked attack.

b. Vaccination status – Up-to-date rabies vaccinated animal is unlikely to be infected with rabies.

B. TREATMENT OF WOUNDS AFTER POTENTIALLY RABID EXPOSURE

Wound cleansing – Thorough cleaning of all wounds with soap and water should be done immediately after bite exposure from any animal regardless of vaccination status. If available, use a virucidal agent such as povidine-iodine to irrigate the wounds. Assessment of the need for a tetanus vaccine booster should also be considered.

POST-EXPOSURE PROPHYLAXIS AFTER POTENTIALLY RABID EXPOSURE

Human rabies immune globulin (HRIG)

- Should be administered only once as the initial treatment to previously unvaccinated persons. For the patient who has previously been vaccinated against rabies, see below.
- HRIG provides immediate rabies virus neutralizing antibody coverage until the patient responds to vaccination.
- Can be administered up to and including day 7 after initiation of the vaccine series.
- Recommended dosage of HRIG is 20 IU/kg body weight.
- Ideally the entire dose should be infiltrated around the area of the wound. The remaining amounts are administered at an anatomical site distant from vaccine administration

RABIES VACCINE FOR PREVIOUSLY UNVACCINATED PERSONS

Human Rabies Vaccine – two vaccines are available in the US (see Table 1):

Imovax® Human Diploid Cell Vaccine (HDCV), manufactured by Sanofi Pasteur
and
RabAvert® Purified Chick Embryo Cell Vaccine (PCECV), manufactured by Novartis Vaccine and Diagnostics

Either brand of vaccine can be administered in conjunction with HRIG at the beginning of post-exposure prophylaxis. For completion of the vaccine series, the two brands are considered interchangeable.

The Advisory Committee on Immunization Practices finalized recommendations on March 19, 2010 , supporting a 4 dose rabies vaccine regimen in immunocompetent and previously unvaccinated individuals; see details at http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5902a1.htm.

POST-EXPOSURE PROPHYLAXIS FOR PREVIOUSLY VACCINATED PERSONS

1. Wound care and assessment for tetanus booster should proceed as previously noted for all bites exposures.
2. For persons who previously received a complete vaccination series (pre- or post-exposure prophylaxis) with a cell-culture vaccine or who previously had a documented adequate rabies virus-neutralizing antibody titer following vaccination with noncell-culture vaccine, the recommendation for a 2-dose PEP vaccination (2 IM doses, 1.0 mL each in the deltoid, one immediately and one 3 days later) series has not changed.
3. Administration of HRIG is unnecessary and should not be administered due to possible interference with an expected anamnestic immune response in previously vaccinated individuals.

ROLE OF ACUTE COMMUNICABLE DISEASE CONTROL PROGRAM IN ASSESSMENT OF RISK

1. ACDC provides evaluation and assessment of the need for rabies post-exposure prophylaxis for medical providers in Los Angeles County during normal working hours and after hours through the Administrative Officer of the Day.
2. ACDC coordinates with Community Health Services for rabies post-exposure prophylaxis administration to uninsured individuals who are deemed by Public Health to require post-exposure prophylaxis.

REFERENCES

1. **Centers for Disease Control and Prevention. Use of a Reduced (4-dose) Vaccine Schedule for Postexposure Prophylaxis to Prevent Human Rabies.** Recommendations of the Advisory Committee on Immunization Practices. March 19, 2010. Vol.59/RR-2. http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5902a1.htm.

2. Centers for Disease Control and Prevention, Human Rabies Prevention- United States,

2008. Recommendations of the Advisory Committee on Immunization Practices. May 23, 2008, Vol. 57, No. RR-3. http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5703a1.htm

3. Heymann, DL, Editor. Control of Communicable Diseases Manual, 19th Edition, 2008. Rabies chapter. American Public Health Association.

TABLE 1. Currently available rabies biologics — United States, 2008

Human rabies vaccine	Product name	Manufacturer	Dose	Route	Indications
Human diploid cell vaccine	Imovax® Rabies*	sanofi Pasteur Phone: 800-822-2463 Website: http://www.vaccineplace.com/products/	1 mL	Intramuscular	Pre-exposure or postexposure†
Purified chick embryo cell vaccine	RabAvert®	Novartis Vaccines and Diagnostics Phone: 800-244-7668 Website: http://www.rabavert.com	1 mL	Intramuscular	Pre-exposure or postexposure†
Rabies immune globulin	Imogam® Rabies-HT	sanofi pasteur Phone: 800-822-2463 Website: http://www.vaccineplace.com/products/	20 IU/kg	Local§	Postexposure only
	HyperRab™ S/D	Talecris Biotherapeutics Bayer Biological Products Phone: 800-243-4153 Website: http://www.talecris-pi.info	20 IU/kg	Local§	Posteexposure only

* Imovax rabies I.D., administered intradermally, is no longer available in the United States.
† For postexposure prophylaxis, the vaccine is administered on days 0, 3, 7, 14 and 28 in patients who have not been previously vaccinated and on days 0 and 3 in patients who have been previously vaccinated. For pre-exposure prophylaxis, the vaccine is administered on days 0, 7 and 21 or 28.
§ As much of the product as is anatomically feasible should be infiltrated into and around the wound. Any remaining product should be administered intramuscularly in the deltoid or quadriceps (at a location other than that used for vaccine inoculation to minimize potential interference).

Table 2. The Advisory Committee on Immunization Practices Recommendations for the Prevention of Human Rabies (March 19, 2010) (modified Feb. 2, 2012 by ACDC)

1. A regimen of 4 one-mL doses of rabies vaccine (HDCV) or PCECV) should be administered intramuscularly to previous unvaccinated persons with no immunosuppression.
2. The first dose should be administered as soon as possible after exposure and this is considered day 0 of the post-exposure prophylaxis.
3. Additional doses should be administered on days 3, 7, and 14 after the first vaccination.
4. Deviation from recommended post-exposure vaccination schedules once vaccination is initiated by a few days for each individual dose is unimportant. The effect of longer lapses of weeks or more is unknown. Most interruptions in the vaccine schedule do not require re-initiation of the entire series.
5. Post-vaccination serologic testing is not necessary in immunocompetent persons. Immunosuppressed individuals should have serologic testing documenting seroconversion; specimens should be collected from 1 to 2 weeks after completion of rabies vaccination series. See for http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5902a1.htm further details and contact the Public Health Laboratory to arrange for testing. Low-cost service is available to the private sector from Atlanta Health Associates, Inc., http://www.atlantahealth.net/ and Kansas State University laboratory, http://www.vet.k-state.edu/depts/dmp/service/rabies/.
6. Precautions in Individuals with Immunosuppression: Primary or secondary immunodeficiencies can significantly reduce immune responses to vaccines. All rabies licensed vaccines are inactivated cell culture vaccines and can safely be administered to persons with altered immunocompetence. All persons with immunosuppression should be administered 5 (five) doses of vaccine.
7. See details on rabies vaccine storage and use in the Recommendations for Use and Storage of Immunobiologics and Other Prophylactic Agents (B-71).
8. For additional instructions regarding management of adverse reactions to rabies biologics and other precautions and contraindications to rabies post-exposure prophylaxis, please see http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5703a1.htm for additional details.
9. Patients who did not receive RIG at the appropriate time and who are not immuno-compromised generally will receive only 4 doses of rabies vaccine, regardless of the lack of RIG. If there is concern about the quality of the vaccine administered in another country, with or without RIG, an antibody titer can be obtained as described above in step 5, and an additional dose of vaccine administered if adequate antibodies are not detected.

RELAPSING FEVER (Louse-borne, Tick-borne)

1. **Agent:**

   Louseborne - *Borrelia recurrentis*, a spirochete.

   Tickborne - many *Borrelia* species, distinguished by area of first isolation and/or vector.

2. **Identification:**

   a. **Symptoms**: Periodic fever lasting 2 to 9 days alternating with 2 to 4 day afebrile periods; the number of relapses varies from 1 to 10 or more. The duration of louse-borne illness averages 13 to 16 days; tick-borne disease is longer. Transitory petechial rash is common during initial febrile episode.

   b. **Differential Diagnosis**: Febrile illnesses associated with transitory rash.

   c. **Diagnosis:** Darkfield preparation of fresh blood or stained thick films demonstrating the borreliae.

3. **Incubation**: 5-15 days, usually 8.

4. **Reservoir:** Louseborne: humans (Asia, Africa, and South America). Tick-borne: wild rodents.

5. **Source:** Louse-borne: *Pediculus humanus* (body louse). Tick-borne: in California, *Ornithodoros hermsi*; present only at higher altitudes.

6. **Transmission**: Louse-borne: by crushing an infected louse over the bite wound or skin abrasion. Tick-borne: from the bite or coxal fluid of an infected tick.

7. **Communicability:** Not person-to-person. A louse becomes infective 4 to 5 days after ingesting the borreliae, and remains so for the rest of its life (20-40 days). Ticks may remain infective for years.

8. **Specific Treatment:** Tetracyclines.

9. **Immunity:** Transient.

REPORTING PROCEDURES

1. **Reportable.** *California Code of Regulations*, Title 17, Section 2500. Immediately telephone report of case or suspect case is required if louseborne disease is suspected.

   a. Call Morbidity Unit during working hours.

   b. Call Acute Communicable Disease Control; after working hours, contact Administrative Officer of the Day (AOD) through County Operator.

2. **Report Form**: **RELAPSING FEVER CASE REPORT, (CDPH 8561)**

3. **Epidemiologic Data:**

   a. A history of travel to, or visitors from endemic areas within incubation period. In southern California, tick-borne illness has been acquired in the San Bernardino and San Gabriel mountains above 5,000-ft. elevation.

   b. Description of area where infection was probably acquired.

   c. History and dates of insect and tick bites.

   d. Exposure to rodents.

   e. Louse-borne disease has not occurred in the United States for many years; it is associated with malnutrition, crowding and poor hygiene.

CONTROL OF CASE, CONTACTS & CARRIERS

Immediate investigation required. ACDC will supervise investigation and control measures.

CASE:

Isolation: None if no lice or ticks are present.

If patient dies, refer to **Part III, MORTICIANS & CEMETERIES**.

CONTACTS:

Asymptomatic, louse-infested persons with similar history of exposure. Immediate quarantine for 9 days or until residual insecticide is applied to premises.

PREVENTION-EDUCATION

1. Control rodents at higher elevations and rodent proof the structures.

2. Avoid contact with ticks and wild rodents.

3. Use residual insecticides for tick and louse control.

DIAGNOSTIC PROCEDURES

Consult with the Public Health Laboratory.

Serology: Collect blood in 7 ml. EDTA (purple top) tube. Submit to lab within 24 hours or prepare one thick and one thin smear.

Diagnosis is made by demonstration of borreliae in darkfield preparations of fresh blood or stained thick blood films, or by intraperitoneal inoculation of laboratory rats or mice with blood taken during a febrile episode.

RESPIRATORY DISEASE OUTBREAKS

(See Influenza, Pertussis, or Legionellosis if suspected)

Note: Respiratory outbreaks should be initially reported as respiratory outbreaks (unknown) until laboratory testing confirms the etiology. Forms are the same as those used for reporting influenza outbreaks, however until one case of a lab confirmed pathogen is identified, outbreaks should be reported as general respiratory outbreak unknown.

1. **Agents**: Influenza viruses, *Mycoplasma pneumoniae*, adenovirus, respiratory syncytial virus, rhinovirus, parainfluenza viruses, *Legionella* spp., group A streptococcus, human metapneumovirus, and coronavirus. For more information on influenza, pertussis, or legionellosis see the appropriate chapter.

2. **Identification:**

   a. **Acute febrile respiratory infection (AFRI)** is defined as influenza-like illness (ILI) symptoms of fever (≥100°F) plus cough and/or sore throat.

   b. **Symptoms**: Fever, upper or lower respiratory congestion, non-productive cough, sore throat, chills, headache, myalgia, malaise, and sometimes gastrointestinal (GI) symptoms. Duration and recovery vary with agent. Infection with non-human strains of influenza such as avian influenza viruses theoretically may cause other illness, such as gastroenteritis or hepatitis.

   c. **Differential Diagnosis**: Agents that cause febrile respiratory illnesses or community acquired pneumonia including but are not limited to influenza, *Mycoplasma pneumoniae*, adenovirus, respiratory syncytial virus, rhinoviruses, parainfluenza viruses, *Legionella* spp., group A streptococcus, human metapneumovirus, and coronavirus. For more information on influenza, pertussis, or legionellosis see the appropriate chapter.

   d. **Diagnosis**: Clinical syndrome associated with community outbreaks, confirmed by viral culture, PCR, rapid antigen test, DFA/IFA test, or other test.

3. **Incubation**: Varies with agent. Bacterial infections generally have longer incubation times than viral infections.

4. **Reservoir**: Varies with agent; mostly human.

5. **Source**: Mostly droplet spread by nasal or pharyngeal secretions and sometimes fomites.

6. **Transmission**: Droplet spread or contaminated fomites from infective persons.

7. **Communicability**: Varies with agent. On average, up to 2 days prior to and through 1 day after resolution of fever; may be longer in children or in patients with compromised immune systems.

8. **Specific Treatment**: Supportive care (e.g., rest, antipyretics, fluids, etc.). Bacterial infections require antibiotic treatment. With influenza, antiviral medications may reduce the severity and duration of influenza illness if administered within 48 hours of onset. Serious infections with RSV may be prevented with the antiviral Synagis® (palivizumab).

9. **Immunity**: Varies by agent.

REPORTING PROCEDURES

1. **Respiratory Outbreak Definitions:**

   Note: Respiratory outbreaks should be initially reported as respiratory outbreaks (unknown) until laboratory testing confirms the etiology.

   Outbreaks of respiratory illness may occur in healthcare and non-healthcare settings. By definition:

   Health care institutions associated with long term health care (i.e., skilled nursing facilities, intermediate care facility, and

intermediate care for developmentally disabled)**:** At least one case of laboratory-confirmed influenza or other respiratory pathogen in the setting of a cluster of ILI within a 72-hour period.

Non healthcare-associated institutions defined as prison, jail, university dormitory and overnight camps: At least two cases of ILI within 48-72 hour period; OR at least one case of ILI with laboratory confirmation for influenza or other respiratory pathogen in the setting of a cluster of ILI.

Congregate Settings defined as schools and day camps (excluding pertussis): At least 10% of average daily attendance absent with ILI sustained over a 3-day period; OR 5 or more cases of AFRI in an epidemiologically-linked group (i.e., single classroom, sports team or after-school group) sustained over a 3-day period.

2. **Report Forms: SEE TABLE 1**

   a. Use the following forms for outbreaks at various settings:

      i. **Non healthcare institution**
      For initial report of respiratory outbreaks:

      INITIAL ASSESSMENT OF RESPIRATORY OUTBREAK REPORT

      For final report of a respiratory outbreak (if outbreak continues after initial report has been filed):

      Line List-Non-Healthcare Facility for Students, Staff, or Residents

      FINAL ACUTE FEBRILE RESPIRATORY ILLNESS OUTBREAK REPORT FORM (CDPH 9003 08/14)

      ii. **Healthcare institutions**
      For initial and final reports of respiratory outbreaks:

      CD OUTBREAK INVESTIGATION — SUB-ACUTE HEALTH CARE FACILITY (H-1164-SubAcute, fillable)

      For final report of a respiratory outbreak (if outbreak continues after initial report has been filed):

      Line List - Respiratory Outbreak for Residents and Staff

      FINAL ACUTE FEBRILE RESPIRATORY ILLNESS OUTBREAK REPORT FORM (CDPH 9003 08/14)

***Special Note**:* When an AFRI outbreak is reported and the first assessment is made, a PHN should fill out the **INITIAL ASSESSMENT OF RESPIRATORY OUTBREAK REPORT**. At that point, if the AMD determines that the outbreak is over or that the situation does not meet the definition of an outbreak, then inform the facility to wash hands, teach respiratory etiquette, and keep sick people out of facility for 24 hours after fever resolves. Providing educational materials may be sufficient and no active investigation need be taken. The initial form then should be submitted to ACDC checking boxes for "No further investigation needed" and "Outbreak, Not Ongoing."

If the situation does look like an AFRI outbreak (ex: 5 cases in a classroom over a 3 day period, any case(s) in a nursing home or facility for the developmentally disabled) then a more significant follow-up would be needed including considering site visit, possibly offering post exposure prophylaxis, and collecting swabs or following up on reports of diagnostic tests by private medical docs. In that case an **Acute Febrile Respiratory Illness Outbreak Report Form (CDPH 9003 08/14)** should be submitted. The same form should be used when the outbreak is closed.

3. **Epidemiologic Data for Outbreaks:**

   a. Establish a case definition (i.e., fever [measured or reported] and either cough, sore throat, or stuffy nose): include pertinent clinical symptoms and laboratory data (if appropriate).

   b. Confirm etiology of outbreak using laboratory data (rapid test, culture, or PCR).

   c. Create line list that could include:
      i. names of cases

ii. dates of onset
iii. symptoms
iv. age
v. hospitalization status
vi. results of laboratory tests
vii. prior immunization history
viii. travel history, if relevant
ix. epi links to other cases (room #s, grades in school, etc)
x. avian or swine exposure, if relevant

d. Create an epi-curve, by date of onset. Only put those that meet the case definition on the epi-curve.

e. Maintain surveillance for new cases until rate of AFRI is down to "normal" or no new cases for 1 week.

CONTROL OF CASE, CONTACTS & CARRIERS

CASE: Varies by agent.

Precautions: None. Advise symptomatic individuals to stay away from work or school for at least 24 hours after resolution of fever. Limit exposure to others, especially those at high risk for complications.

CONTACTS: No restrictions.

CARRIERS: Not applicable.

GENERAL CONTROL RECOMMENDATIONS FOR OUTBREAKS

1. Reinforce good hand hygiene among all (including visitors, staff, and residents/students).
2. Emphasize respiratory etiquette (cover cough and sneezes, dispose of tissues properly).
3. Reinforce staying home when sick.
4. Provide posters and health education about hand hygiene and respiratory etiquette.
5. Discourage sharing water bottles. Emphasize importance of early detection of cases and removing them from contact with others.
6. Encourage regular environmental cleaning with EPA registered disinfectant appropriate for respiratory pathogens.
7. Consider isolation and/or cohorting and/or quarantine for congregate-living facilities.
8. Consider canceling group activities.
9. Provide educational materials to facility-including posters, handouts, etc. Go to this website to order influenza and respiratory virus health education: http://publichealth.lacounty.gov/acd/HealthEdFlu.htm

Consider the additional recommendations for congregate-living facilities, especially with high risk patients:

1. Close facility or affected areas to new admissions until 1 week after last case.
2. Suspend group activities until 1 week after last case.
3. If possible, separate staff that cares for sick from staff that cares for well patients.
4. Institute droplet precautions for symptomatic individuals.
5. Refer to California Department of Public Health, *Recommendations for the Prevention and Control of Influenza in California Long-Term Care Facilities*

DIAGNOSTIC PROCEDURES

Clinical and epidemiologic histories are required to aid in laboratory test selection.

Nasopharyngeal (NP) or nasal swab, and nasal wash or aspirate. Public Health Laboratory (PHL) recommends Dacron or Nylon flocked swabs, do NOT use wooden swabs. NP swabs are preferred because the specimens can be tested for influenza and a variety of other respiratory pathogens using PCR based technology. All other specimens can only be tested for influenza. Samples should be collected within the first 4 days of illness. Collect specimens from **at least 2 separate symptomatic individuals** and up to 5 symptomatic individuals for any community-based outbreak and select those individuals with the most recent onset for specimen collection.

1. NOTE: Culture should not be attempted when avian influenza is suspected. Contact PHL or ACDC for instructions.

Container: Viral Culturette with M4 viral transport medium.

Laboratory Form: **Reference Examination for Influenza A, B and/or Other Respiratory Viruses** or online request if electronically linked to the PHL.

Examination: Testing algorithm is determined by the PHL.

Material: Nasopharyngeal swab preferred; nasal swab can be used if necessary. See: Los Angeles County Department of Public Health Standardized Nursing Procedures: NP Competency Checklist (5/6/2009).

Storage: Keep refrigerated and upright. Deliver to Public Health Laboratory as soon as possible.

PREVENTION/EDUCATION

1. All persons >6 months are recommended to receive an annual influenza vaccine.

2. Practice good personal hygiene, avoid symptomatic persons during outbreaks, and do not go to work or school when ill with a respiratory disease.

3. Do not give aspirin to children with influenza and other viral illnesses.

4. Postpone elective hospital admissions during epidemic periods, as beds may be needed for the ill.

5. Sick visitors and staff should not be allowed in the facility.

6. Refer to CDC. Infection Control Guidance for the Prevention and Control of Influenza in Healthcare Settings.

Additional information on the control of influenza during outbreaks can be found in the B-73 Influenza chapter: Influenza Cases and Outbreaks

TABLE 1. RESPIRATORY DISEASE OUTBREAK FORMS

NON-HEALTHCARE INSTITUTIONS	INITIAL REPORT	FINAL REPORT
○ Congregate settings-Schools and day camps ○ Non healthcare-associated institutions(i.e. jail, juvenile hall, camps, university dormitory, and overnight camps)	INITIAL ASSESSMENT OF RESPIRATORY OUTBREAK REPORT	FINAL Acute Febrile Respiratory Illness Outbreak Report Form (CDPH 9003 08/14) Line List - Respiratory Outbreak for Students, Staff, or Residents
LONG TERM HEALTHCARE INSTITUTIONS	**INITIAL REPORT**	**FINAL REPORT**
○ Skilled nursing facility ○ Intermediate care facility ○ Intermediate care for developmentally disabled ○ Psychiatric facility	CD OUTBREAK INVESTIGATION — SUB-ACUTE HEALTH CARE FACILITY (H-1164-SubAcute, fillable) (instructions)	FINAL Acute Febrile Respiratory Illness Outbreak Report Form (CDPH 9003 08/14) Line List - Respiratory Outbreak for Residents and Staff CD OUTBREAK INVESTIGATION — SUB-ACUTE HEALTH CARE FACILITY (H-1164-SubAcute, fillable)

Respiratory Outbreak Flow Chart

Respiratory Outbreak Suspected

If influenza or pertussis is suspected see appropriate B-73 chapter

By default all respiratory outbreaks should be opened as "**OUTBREAK-UNK. RESP**" until lab tests confirm a pathogen

Non-Healthcare Institutions

Congregate settings (e.g., schools, daycare)
5 or more cases in a similar setting (e.g., same classroom)*

Non healthcare-associated institutions (e.g., jail, juvenile hall, camps, assisted living) 2 or more cases

Sub-Acute Healthcare Institutions

Skilled nursing facility, intermediate care facility, intermediate care for developmentally disabled, psychiatric facility

Note: One confirmed case of influenza in this setting should prompt infection control measures

Initial Assessment of Respiratory Outbreak Report

Fill out initial form; PHNS or AMD review within 24 hours

CD OUTBREAK INVESTIGATION — SUB-ACUTE HEALTH CARE FACILITY (H-1164-SubAcute, fillable)

Collect NP or nasal swabs within 4 days of onset of illness from at least 2 symptomatic cases (up to 5)

Fill out line list and final forms; PHNS or AMD review

Line List for Students, Staff, or Residents

FINAL Acute Febrile Respiratory Illness Outbreak Report Form (CDPH 9003 08/14)

Line List for Residents or Staff

FINAL Acute Febrile Respiratory Illness Outbreak Report Form (CDPH 9003 08/14)

CD OUTBREAK INVESTIGATION — SUB-ACUTE HEALTH CARE FACILITY (H-1164-SubAcute, fillable)

*If school is LAUSD ensure school district is notified by phone

RINGWORM OF SCALP (Outbreaks only)

(Tinea capitis)

1. **Agent**: Various species of *Trichophyton* and *Microsporum;* e.g., *Trichophyton tonsurans*, *Microsporum audouinii, M. canis. Trichophyton tonsurans* is responsible for 90% of the cases in the USA.

2. **Identification**:

   a. **Symptoms**: May begin as small papules that spread peripherally, leaving scaly patches of baldness; or as numerous discrete pustules; or as excoriations with little hair loss. Occasionally boggy, raised and suppurative lesions (kerions) develop. Favus (infection by *T. schoenleinii*) is characterized by mousy odor and yellowish, cup-like crusts.

   b. **Differential Diagnosis**: Other dermatoses.

   c. **Diagnosis**: Microscopic examination of hairs and skin scales in 10% potassium hydroxide, Wood's (ultraviolet) light, or culture. Lesions caused by *M. canis and M. audouinii* fluoresce yellow-green under Wood's light. *Trichophyton* species do not fluoresce. Culture is necessary for organism identification.

3. **Incubation**: Varies.

4. **Reservoir**: Humans (principally) for *T. tonsurans, M. audouinii*, *and T. schoenleinii*; animals, primarily dogs, cats, and cattle, harbor other species.

5. **Source**: Fomites contaminated with infected hair and skin scales.

6. **Transmission**: Direct skin-to-skin or indirect contact from fomites.

7. **Communicability**: As long as active lesions or viable spores on contaminated fomites are present.

8. **Specific Treatment**: Griseofulvin by mouth, usually **for 4 to 6** weeks. Selenium sulfide shampoos (1% or 2.5%) decrease fungal shedding and may help reduce transmission. In resistant cases with kerion formation, the combination of oral prednisone and griseofulvin may be helpful.

9. **Immunity**: Reinfections are rare.

REPORTING PROCEDURES

1. Reportable (outbreaks only). *(California Code of Regulations*, Section 2500.)

2. **Report Form: OUTBREAK/UNUSUAL DISEASE REPORT FORM (CDPH 8554)**

3. **Epidemiologic Data**:

   a. Site of infection.

   b. Exposure to known infected humans or animals, such as a dog, cat, or farm animal.

   c. Shared hair-care items or fomite, e.g., hair clippers, combs, brushes, hats, pillowcases, etc.

CONTROL OF CASE & CONTACTS

Investigate outbreaks only. Initiate evaluation within 24 hours.

CASE:

Isolation: None.

CONTACTS:

No restrictions.

Encourage examination of household, other close contacts, and pets for evidence of infection. Treat if infected.

PREVENTION-EDUCATION

1. Stress personal cleanliness; encourage individual combs, brushes and other personal items. Include proper sterilization of barbering equipment.

2. Advise households with pets that transmission can occur between animals and humans.

3. Advise child-care providers that children's cots and mats should be arranged such that the children are placed head to toe.

DIAGNOSTIC PROCEDURES

Container: Mycology.

Laboratory Form: **Test Requisition and Report Form H-3021**

Examination Requested: Dermatophyte.

Material: Hair and/or scalp scrapings.

Amount: Several hairs from involved area.

Storage: Room temperature.

Remarks: Place material into provided 50 ml plastic tube.

ROCKY MOUNTAIN SPOTTED FEVER

1. **Agent**: *Rickettsia rickettsii*, a pleomorphic, obligate intracellular coccobacillus.

2. **Identification**:

   a. **Symptoms**: Acute onset of fever, which may persist for 2-3 weeks, headache, chills, and conjunctival injection. A maculopapular rash appears on the extremities about the third day, which includes the palms and soles and involves most of the body; petechiae and hemorrhages are common.

   Case fatality rate in untreated cases is 20%. Deaths are rare once prompt treatment begins, and in recent years, have declined to below 1% of cases in the United States.

   b. **Differential Diagnosis**: Measles, meningococcemia, coxsackie and echovirus infections, typhoid fever, murine typhus, and Colorado tick fever. Complement fixation test of sera may cross-react with other diseases.

   c. **Diagnosis**: Serologic tests of paired sera, detection of rickettsia by immunofluorescence in skin biopsies.

3. **Incubation period**: 3-14 days.

4. **Reservoir**: Maintained in nature by transovarial and transstadial passage among ticks. Transmission to dogs, various rodents, and other animals possible; infection in animals is usually subclinical, although disease has been observed in dogs.

5. **Source**: *Dermacentor* species of ticks (American dog tick); possibly *Amblyomma* species. The brown dog tick (*Rhicephalus sanguineus*) has been described in Arizona.

6. **Transmission**: Bite of tick (several hours of attachment required); contamination of skin with crushed tissue or feces of tick.

7. **Communicability**: Not person-to-person. Tick remains infective for life.

8. **Specific Treatment**: Tetracyclines, specifically doxycycline is the preferred treatment in children and adults.

9. **Immunity**: Probably permanent.

REPORTING PROCEDURES

1. **Reportable**. *California Code of Regulations,* Title 17, Section 2500.

2. **Report Form**: **SPOTTED FEVER RICKETTSIOSES CASE REPORT (CDPH 8575).**

3. **Epidemiologic Data**:

   a. Recent travel to endemic areas: eastern, central, southwest US.

   b. History of tick bite or exposure to pets with ticks.

   c. Occupational exposure.

CONTROL OF CASE, CONTACTS & CARRIERS

Investigate within 7 days unless circumstances indicate a higher priority.

CASE:

Isolation: None.

CONTACTS: No restrictions.

CARRIERS: Not applicable.

PREVENTION-EDUCATION

1. Use tick repellents in endemic areas.

2. Wear protective clothing in areas where ticks are present. Check for and immediately remove any attached ticks.

3. Prevent exposure of domestic animals to ticks.

DIAGNOSTIC PROCEDURES

Clinical and epidemiologic histories are required to aid the laboratory in test selection.

1. **Serology**: Paired sera recommended.

   Container: Serum separator tube (SST).

   Laboratory Form: **Test Requisition and Report Form H-3021.**

   Test requested: Rocky Mountain Spotted Fever serology.

   Material: Whole clotted blood.

   Amount: 8-10 ml.

   Storage: Refrigerate.

   Remarks: Collect first (acute) blood specimen as soon as possible. Collect second (convalescent) blood approximately 2 weeks after the first. Send each specimen to Public Health Laboratories as soon as it is collected. A third specimen (30-40 days after onset) may be necessary if early antibiotic therapy has been instituted.

2. **PCR**: Can be performed on whole blood and tissue specimens.

3. **Immunohistochemical**: Staining of skin biopsy and autopsy specimen.

RUBELLA, ACUTE or POSTNATAL

(German Measles, 3-day Measles)

(See also **RUBELLA, CONGENITAL SYNDROME**)

1. **Agent**: Rubella virus

2. **Identification**:

   a. **Symptoms**: Commonly a mild acute febrile disease frequently demonstrating an erythematous maculopapular rash and few constitutional symptoms, which may include low-grade fever, headache, malaise, mild coryza, and conjunctivitis. Symptoms are often minimal; 25-50% of cases may be sub-clinical or in-apparent. Post-auricular, sub-occipital, or post-cervical lymphadenopathy is common. Transient polyarthralgia and polyarthritis occasionally occur in children and are common in adolescents and adults, especially females. Prodrome may or may not be present. Encephalitis and thrombocytopenia are rare. Principal concern is congenital rubella syndrome if disease occurs during pregnancy.

   b. **Differential Diagnosis**: Refer to **DIFFERENTIAL DIAGNOSIS OF EXANTHEMS** in Appendix A.

   c. **Diagnosis**: Presence of rubella-specific IgM antibodies or a $\geq$ 4-fold rise in HI or CF antibody titer in paired sera is diagnostic of recent infection. Virus isolation from throat, urine, or body fluids is also acceptable. IgM antibody is present only in primary infection and has a half-life of about 7 days. It is usually undetectable after 4 weeks. Since decay is rapid, a negative IgM test must be interpreted cautiously. A clinical diagnosis alone is unreliable and unacceptable except in the control of an outbreak. False positive IgM test results have been seen in persons with parvovirus infection, mononucleosis, or rheumatologic disease. Parvovirus IgM, heterophile antibody, and rheumatoid factor tests should be done to rule out false positive rubella IgM results.

3. **Incubation**: 16-18 days; range 14-23 days.

4. **Reservoir**: Human

5. **Source**: Nasopharyngeal secretions, blood, and urine of infected person.

6. **Transmission**: Person to person via direct or droplet contact from nasopharyngeal secretions. The peak incidence of infections is late winter to early spring. The virus may be transmitted through urine. Transplacental transmission occurs from mother to fetus.

7. **Communicability**: From approximately 1 week before to 5-7 days after onset of rash.

8. **Specific Treatment**: Supportive.

9. **Immunity**: Disease confers lifelong immunity. Available data suggest that one dose of rubella virus vaccine confers long term, probably life-long, immunity.

REPORTING PROCEDURES

1. **Reportable**. (Section 2500, *California Code of Regulations*.) Report case or suspect case within 7 calendar days from the time of identification by mail, telephone, fax, or electronic report.

2. **Report Form**: **RUBELLA (GERMAN MEASLES) CASE REPORT (PM 358).**

3. **Epidemiologic Data**:

   a. Immunization history.

   b. Possible source of infection.

   c. Laboratory reports of antibody test and virus isolation.

   d. Contacts who are in the first five months of pregnancy.

   e. Group contacts.

CONTROL OF CASE, CONTACTS & CARRIERS

Investigate each case within 7 days. Report institutional cases to the Immunization Program.

CASE:

Precautions: Exclude from school or work and isolate from susceptible pregnant women for 7 days after onset of rash. For hospitalized patient, contact isolation is required for 7 days after onset of rash.

CONTACTS:

The goal of rubella case investigation is to prevent exposure of susceptible pregnant women to rubella, and thereby prevent cases of CRS. It is essential that potentially susceptible, exposed pregnant women be identified, evaluated, and counseled. Identify settings where transmission may have occurred (e.g., day care, work, church, school, college, health care facility).

Ensure that susceptible persons are rapidly vaccinated and maintain active surveillance for 2 incubation periods after the last case's infectious period. All persons at risk who cannot readily provide laboratory evidence of immunity or a documented history of vaccination, on or after their first birthday, should be considered susceptible and should be vaccinated if there are no contraindications.

Immunization of contacts will not necessarily prevent illness or infection from current exposure, but is recommended to provide protection against subsequent exposures should current exposure not result in infection. Immune globulin (IG) is not indicated except possibly in susceptible pregnant women who will not consider abortion under any circumstances. IG's value though has not been established.

1. **Pregnant Contacts**: Draw a blood sample immediately for antibody test to establish immunity if not previously known. Request the laboratory to save an aliquot of frozen blood for future test. If susceptible, re-draw blood 3 weeks later for paired serological testing with first blood specimen. If antibody not detectable in second specimen, repeat test again 3 weeks later. Conduct paired serological test of the first and third blood specimens. If antibody is present in the second or third specimen, but not the first specimen, recent infection is assumed to have occurred. Counsel and/or refer patient to personal physician for possible abortion.

2. **School Exclusion of Un-immunized Contacts**: In schools where a case of rubella has been reported, exclude all persons exempted from rubella vaccination because of medical or personal-beliefs waiver from 7 days after first exposure to 23 days after onset of rash in the last reported case, unless the individual can demonstrate proof of rubella immunity. Immunization after exposure has not been shown to be effective in preventing disease.

PREVENTION-EDUCATION

1. Immunization should be administered unless documented evidence of rubella immunization or serologic evidence of naturally acquired immunity is provided. Immunization or other legal status required for school entry. California law requires exclusion from school if conditions for admission are not fulfilled or pupil is un-immunized and is subsequently exposed to a rubella case (*California Code of Regulations*, Title 17).

2. Rubella vaccine, as MMR, may be given postpartum concurrently or after the administration of anti-RhO or other blood products; serologic testing should be done 8 weeks later to confirm seroconversion if patient received anti-RhO. Routine testing of post-pubertal women before immunization is not necessary. Breastfeeding is not contraindicated to postnatal immunization.

3. Advise women of childbearing age to avoid becoming pregnant for one month after receiving the vaccine. Inadvertent immunization is not an indication for abortion.

4. Studies have shown no evidence that congenital rubella syndrome (CRS) occurs in offspring of women vaccinated during pregnancy. Thus the observed risk of vaccine induced malformations is 0%; however, there is a theoretical risk. Since the risk to the fetus caused by vaccination during pregnancy is so low, termination of pregnancy is not recommended for women vaccinated before pregnancy status was known.

5. Arthralgia and transient arthritis occur in about 25% of susceptible post-pubertal females 7-21 days after vaccination.

6. All allied hospital personnel should be immune. Ideally proof of immunity or receipt of vaccine should be required for employment.

7. Educate caretakers on how to disinfect fomites soiled with body secretions.

DIAGNOSTIC PROCEDURES

Clinical and epidemiological histories are required to aid the laboratory in test selections.

1. **Serology**:

   a. **Diagnosis of acute case**: paired sera required for IgG and a single specimen for IgM. IgG test preferred since false-positive IgM tests may occur. For IgG test, collect first blood specimen as early as possible. Collect the second approximately 2 weeks after the first (3 weeks apart for an exposed person who does not develop a rash illness). For IgM test, collect serum 2-28 days after rash onset. If possible, both tests should be done on acute sample.

      Send each specimen as it is collected. Do not store. The Virology Laboratory will send a request for a second specimen if it is required.

   b. **Immunity status testing**: Only one specimen required. Request an IgG test only. Available to DHS prenatal clinic patients and employees in hospital or clinic settings who have contact with patients.

   Container: Serum separator tube (SST, a red-gray top vacutainer tube).

   Laboratory Form: **Test Requisition and Report Form H-3021**

   Examination Requested: Rubella serology. Specify IgM or IgG paired or screening. Indicate on lab slip if screening is for a prenatal patient or an employee.

   Material: Whole clotted blood.

   Amount: 7-ml.

   Storage: Refrigerate until transport.

2. **Culture**: Viral isolation. Virus can be isolated from throat swabs, urine, CSF, blood, or body fluids. Consult with the Immunization Program.

   Specimen Container: Viral culturette.

   Laboratory Form: **Test Requisition and Report Form H-3021**

   Submission Requirements: Call Virology Laboratory for requirements.

   Turn-around Time: 1-2 weeks.

   Examination Requested: Rubella isolation.

RUBELLA, CONGENITAL

(See also **RUBELLA, ACUTE**)

1. **Agent**: Rubella virus.

2. **Identification**:

   a. **Symptoms**: Congenital rubella syndrome (CRS) is manifested by cataracts, congenital glaucoma, congenital heart disease, microphthalmia, microcephaly, deafness, mental retardation. Thrombocytopenic purpura, hepatosplenomegaly with jaundice, and bone defects may be noted at birth. Occurs in up to 85% of infants born to women experiencing rubella during first trimester of pregnancy. Defects are rare with infection after the 20th week of gestation.

   b. **Differential Diagnosis**: Other causes of "ATORCH" congenital infection, including AIDS, toxoplasmosis, cytomegalovirus, herpes, and syphilis.

   c. **Diagnosis**: Clinical syndrome and the presence of IgM-specific antibodies to detect antenatal infection, also virus isolation from the nasopharynx, throat, urine, CSF and the buffy coat of the blood. A persistent high IgG antibody titer after 6-9 months of age is also diagnostic.

3. **Incubation period**: Not applicable.

4. **Reservoir**: Human.

5. **Source**: Maternal viremia.

6. **Transmission**: Transplacental passage of rubella virus from maternal blood.

7. **Communicability**: Birth to 9-12 months of age, rarely longer.

8. **Specific Treatment**: None.

REPORTING PROCEDURES

1. **Reportable**. *California Code of Regulations*, Section 2500. Report case or suspect case within 7 calendar days from the time of identification by mail, telephone, fax, or electronic report.

2. **Report Form**: CONGENITAL RUBELLA SYNDROME CASE REPORT (CDC 71.17)

3. **Epidemiologic Data**:

   a. Mother's medical history: age at delivery, date of exposure to rubella, date of rubella-like illness, immune globulin prophylaxis, vaccination history, premarital or prenatal screening result.

   b. Infant's history: anomalies and other clinical findings, age diagnosed.

   c. Laboratory findings, tests performed, and dates.

CONTROL OF CASE, CONTACTS & CARRIERS

Investigate cases and pregnant female contacts within 7 days.

CASE: Isolate from non-immune pregnant women, non-immune infants and children, and settings where they may be encountered.

Infants with congenital rubella should be considered infectious until they are one year of age unless urine and nasopharyngeal cultures for rubella virus taken after 3 months of age are repeatedly negative. Contact Immunization Program for testing intervals.

Infants with congenital rubella often require multiple visits to medical specialists. Medical appointments should be booked for the last appointment of the day and the child should not be made to wait in the waiting room.

CONTACTS: The goal of rubella case investigation is to prevent exposure of susceptible pregnant women to rubella, and thereby prevent cases of CRS. It is essential that potentially susceptible, exposed pregnant women be identified, evaluated, and counseled. Identify settings where transmission may have occurred (e.g., day care, work, church, school, college, health care facility).

Ensure that susceptible persons are rapidly vaccinated and maintain active surveillance for 2

incubation periods after the last case's infectious period. All persons at risk who cannot readily provide laboratory evidence of immunity or a documented history of vaccination, on or after their first birthday, should be considered susceptible and should be vaccinated if there are no contraindications.

Immunization of contacts will not necessarily prevent illness or infection from current exposure, but is recommended to provide protection against subsequent exposures should current exposure not result in infection. Immune globulin (IG) is not indicated except possibly in susceptible pregnant women who will not consider abortion under any circumstances. IG's value though has not been established.

1. **Pregnant Contacts**: Draw a blood sample immediately for antibody test to establish immunity if not previously known. Request the laboratory to save an aliquot of frozen blood for future test. If susceptible, re-draw blood 3 weeks later for paired serological testing with first blood specimen. If antibody not detectable in second specimen, repeat test again 3 weeks later. Conduct paired serological test of the first and third blood specimens. If antibody is present in the second or third specimen, but not the first specimen, recent infection is assumed to have occurred. Counsel and/or refer patient to personal physician for possible abortion.

2. **School Exclusion of Un-immunized Contacts**: In schools where a case of rubella has been reported, exclude all persons exempted from rubella vaccination because of medical or personal-beliefs waiver from 7 days after first exposure to 23 days after onset of rash in the last reported case, unless the individual can demonstrate proof of rubella immunity. Immunization after exposure has not been shown to be effective in preventing disease.

CARRIERS: There are rare reports of children with CRS continuing to shed virus for years in nasal secretions.

PREVENTION-EDUCATION

1. Avoid exposure of CRS infants to non-immune pregnant women.
2. Immunize all child and adult susceptibles.
3. Advise women of childbearing age to avoid becoming pregnant for one month after receiving the vaccine. Inadvertent immunization is not an indication for abortion.
4. Educate caretakers on how to disinfect fomites soiled with body secretions.

DIAGNOSTIC PROCEDURES

Clinical and epidemiologic histories are required to aid the laboratory in test selection.

1. **Serology**: Demonstration of rubella-specific IgM antibodies in the infant's cord blood or sera is lab confirmation of rubella. IgM antibody persists for at least 6-12 months in infants with CRS. Documentation of persistence of serum rubella IgG beyond the time expected with passive transfer of maternal antibody is also indicative of CRS.

   Container: Serum separator tube (SST, a red-gray top vacutainer tube).

   Laboratory Form: **Test Requisition and Report Form H-3021**

   Test requested: Congenital rubella.

   Material: Whole clotted blood.

   Amount: 1-2 ml for infant.

   Storage: Refrigerate.

2. **Culture**: Virus can be isolated from nasopharyngeal swabs, urine, throat swabs, CSF, blood, and body fluids. Consult with Immunization Program.

   Specimen Container: Viral culturette.

   Laboratory Form: Test Requisition and Report Form H-3021

   Submission Requirements: Call Virology Laboratory for requirements.

   Examination Requested: Rubella isolation.

SALMONELLOSIS

(See also **TYPHOID FEVER**, **TYPHOID CARRIER**, and **PARATYPHOID FEVER**)

1. **Agent:** *Salmonella*, a Gram-negative bacillus with more than 2,000 serotypes.

2. **Identification**:

   a. **Symptoms:** Acute gastroenteritis with sudden onset of fever, headache, abdominal pain, diarrhea, nausea, and sometimes vomiting. Occasionally the clinical course is that of enteric fever or septicemia. The organism may localize anywhere in the body, causing abscesses, arthritis, meningitis, endocarditis, pericarditis, pneumonia, or pyelonephritis. Asymptomatic infections occur.

   b. **Differential Diagnosis**: Other enteric pathogens or toxins, typhoid. Recurrent salmonellosis is an AIDS-defining condition.

   c. **Diagnosis**: Isolation of organism from stool, blood, urine or other body fluids or tissues.

3. **Incubation**: 6-72 hours, usually about 12-36 hours for gastroenteritis. Longer and variable for other manifestations of salmonellosis.

4. **Reservoir**: Humans and animals, both domestic and wild.

5. **Source**: Feces of infected persons and animals; raw or undercooked eggs and unpasteurized egg products; undercooked meat and poultry; meat products; unpasteurized milk or milk products; pet reptiles and chicks; unsterilized pharmaceuticals of animal origin; water or food contaminated with fecal matter, including fresh produce.

6. **Transmission:** Fecal-oral route, from animal or human, with or without intermediary contamination of foodstuffs.

7. **Communicability**: Variable; as long as organisms are excreted. Usually ranges from 2-5 weeks, but can last for several months to years.

8. **Specific Treatment:** Acute cases of gastroenteritis should not routinely be treated with antimicrobials, as certain antibiotics may prolong shedding of the organism. Ampicillin, ciprofloxacin, chloramphenicol, trimethoprim-sulfamethoxazole or third generation cephalosporins may be indicated for treatment of bacteremia, enteric fever, or disseminated infections. Treatment of chronic carriers or of cases in a sensitive occupation or situation (SOS) who remain positive for more than 2 months may be considered. Consult with ACDC for current regimens for treating carriers.

9. **Immunity**: None. Carrier state occasionally continues for months, especially in infants or cancer patients. Chronic carrier state (> 6 months) is rare. Patients with HIV infection are at risk of recurrent septicemia.

REPORTING PROCEDURES

1. **Reportable**. *California Code of Regulations,* Section 2500.

2. **Report Form:**

   SALMONELLOSIS CASE REPORT AND CONTACT ROSTER

   All pages including the contact roster MUST be submitted. The original form should not be held in the district pending SOS clearance; for reporting purposes, the form should be submitted as soon as possible after completion of interview. Follow-up of SOS can be continued in the district without the original form.

   If a prepared commercial food item is the LIKELY source of this infection, a **FOODBORNE INCIDENT REPORT** (FBIR) should be filed. For likelihood determination and filing procedures, see Part 1, Section 7 – Reporting of a Case or Cluster of Cases Associated with a Commercial Food: Filing of Foodborne Incident Reports.

3. **Epidemiologic Data**:

   a. Exposure to others with diarrhea in or outside of household.

   b. Attendance at gatherings where food was served; consumption of food from restaurants or other commercial establishments within the incubation period. Obtain detailed information on date, time, types of foods or beverages ingested; ascertain whether dining companions had similar symptoms.

   c. Specific food history for at-risk products (e.g., unpasteurized milk, raw or poorly cooked beef, liver, eggs or poultry products) and place of purchase. Handling of raw meats or eggs while cooking should also be assessed.

   d. If associated with child care center, institution, or babysitting group, obtain detailed information on clientele, caretakers, and sources of food served at the facility or residence.

   e. Contact with pets, reptiles, or farm animals before onset.

   f. History of medication, medical-surgical or gastrointestinal procedures. Should include all over-the-counter, "organic" or "holistic" medicines or herbs.

   g. Travel, hiking, camping, or hunting prior to onset.

   h. Visitors during incubation.

   i. Type of water supply used and possible exposure to sewage.

   j. For infants 3 months of age and under at time of onset, if source is not identified, obtain detailed epidemiologic data and cultures on caretaker(s) including babysitter (even if asymptomatic). Carefully review food handling practices of caretaker(s) to determine whether cross-contamination of infant formula or food was involved.

   k. If an outbreak of salmonellosis is identified while investigating an individual case, discuss with supervisor and advise ACDC by telephone.

CONTROL OF CASE, CONTACTS & CARRIERS

Public Health Nursing Home Visit Protocol:
Home visit as necessary – a face to face interview is conducted as necessary.

Refer to "Public Health Nursing Home Visit AS NECESSARY (HVAN) Algorithm" (B-73 Part IV Public Health Nursing Home Visit Protocol).

Contact within 24 hours to determine if SOS involved; otherwise, investigate within 3 days. For definition of **SOS**, see B-73, **Part I**, Section 13. Individuals living in a group setting, including a skilled nursing or intermediate care facility, are considered to be in a sensitive situation.

Protection of the public health is a priority in the management of SOS. Reasonable efforts to contact the case must be made by the PHN. If unable to locate or the case is uncooperative, refer to PHI in a timely manner to assist in locating case and determining SOS.

Prior written approval from the Area Medical Director, after consultation with ACDC, is required before admission to a skilled nursing or intermediate care facility (B-73, **Part II**, Section 2A) is permitted.

For paratyphoid fever, clearance of cases and contacts is the same as for typhoid fever cases (see PARATYPHOID FEVER).

CASE:

1. **Precautions**: Enteric precautions until bacteriologically cleared as described below.

2. **Sensitive Occupation or Situation**: Remove from sensitive work until 2 successive negative feces specimens are obtained at least 24 hours apart, taken at least 48 hours after the completion of antibiotic treatment, if antibiotics were taken. If specimens remain positive at the end of 2 months, confer with Area Medical Director, or if necessary with ACDC.

3. **Non-sensitive Occupation or Situation**: No restrictions unless household contact is in a SOS. If household contact is in a SOS, then release after obtaining 2 negative feces specimens as above.

CONTACTS:

Household members or persons who share a common source.

1. **Sensitive Occupation or Situation**:

   a. **Symptomatic**: Remove from work until 2 negative specimens as for case. Then, weekly specimens until case released or contact with case is broken.

   b. **Asymptomatic**: Do not remove from work unless hand-washing practices are questionable. May be assigned to non-sensitive work duties, if available. Collect weekly specimens until case released or contact with case broken. If positive, remove from work until cleared as for case.

2. **Non-sensitive occupation or situation**: Obtain a specimen if symptomatic.

3. **Presumptive Cases**:

   a. Definition: any person who is epidemiologically linked to a confirmed case, who has diarrhea (more than 2 loose stools in 24 hours) and fever, or diarrhea and at least 2 other symptoms.

   b. Follow up is the same as for a confirmed case (i.e., - clearance as needed and submission of a case history form for reporting).

PREVENTION-EDUCATION

1. Thoroughly cook all food derived from animal sources.

2. Properly refrigerate perishable food.

3. Avoid the use of unpasteurized milk or the ingestion of raw or undercooked eggs or meat.

4. Avoid cross-contamination of other foods. All utensils, including chopping boards that have been in contact with raw meat or poultry products, should be washed before using for preparation of other food. After working with raw meat or poultry products, the hands should be washed before preparing other foods.

5. Wash fresh produce before cutting or consuming.

6. Recommend removal of known or suspected animal sources (e.g., pet turtles and iguanas).

7. Emphasize hand washing, cleaning fingernails and personal hygiene.

8. Dispose of feces, urine, and fomites properly.

DIAGNOSTIC PROCEDURES

1. **Culture**:

   Container: Enterics.

   Laboratory Form: **Test Requisition Form H-3021**

   Examination Requested: Salmonella.

   Material: Feces. Urine only if original positive culture was the urine. Follow instructions provided with container.

   Storage: Protect from overheating. Maintain at room temperature. Specimen should be delivered to the Public Health Laboratory no later than 4 days after collection.

   Remarks: Mark "SOS" (sensitive occupation or situation) in red on specimen, if appropriate.

2. **Culture for Identification (CI)**:

   Container: Enteric

   Laboratory Form:
   Test Requisition Form H-3021

   Material: Pure culture on appropriate medium.

   Storage: Same as above.

3. Comparative Medical and Veterinary Services may investigate and test suspected animal sources at the request of ACDC.

PROCEDURE FOR COLLECTING SPECIMENS FOR CULTURE FROM REPTILES IN SALMONELLOSIS CASES

If the reptiles are still in the home, specimens may be collected on each animal. If not, specimens may be collected from the empty aquarium or cage. The PHN may instruct the owner to collect the specimens.

Note: In instances with severe disease (e.g., meningitis or other invasive infection) or if there are many reptiles, call ACDC for help with specimen collection.

1. Collect solid stool specimens from each reptile. As most reptiles are small, several stools from one reptile may be placed in one enteric container. The owner may collect stools over two or three days.

2. If no stools are available, a swab of the animal may be taken. This is best performed with another person holding the reptile. Using a moistened swab, wipe the underside of the animal near the cloaca.

3. Swabs of the reptile environment should be taken. Wet surfaces are best to culture. Thoroughly wet the swab by rolling it along the surface you are culturing. Use two or three sterile swabs and break them off into an enteric container; or use a culturette kit (normally used for throat swabs). If the surface is dry, first wet the swab with the transport media or sterile water. Swab areas with stool or residue on them, the bottom and sides of the container, and any objects that the animals use, such a log, rocks used for sunning, or food or water dishes.

4. Water may be collected from tanks or water dishes with a syringe. Scoop up water and bottom residue. Place 5 ml (one teaspoon) of liquid in a routine enteric container; fill to the line.

5. Carefully label all specimens with the name of the human case and the name and type of animal or specimen taken (e.g., iguana log, turtle terrarium wall, snake stool, etc.). Specimens should be received in the Public Health Laboratory by the fourth day after collection.

6. Notify the Public Health Laboratory, General Bacteriology, that you are sending in animal specimens, especially if there will be more than five.

SCABIES (crusted or atypical and outbreaks)

1. **Agent**: *Sarcoptes scabiei*, a mite.

2. **Identification**:

   a. **Symptoms**: An infestation of the skin caused by a mite whose penetration of the skin is visible as papules or vesicles, or as tiny linear burrows containing the mites and their eggs. Lesions are prominent around finger webs, flexor surfaces of wrists, extensor surfaces of elbows, axillary folds, belt line, thighs, abdomen and lower portion of the buttocks. Lesions also may be found on external genitalia in men and on breasts and nipples in women. Itching may be intense, especially at night. For recurrent cases, rash and itching may occur over the entire body, not limited to sites of entry.

   Norwegian, atypical or crusted scabies are the terms used to designate a severe infection with the same mite that causes typical scabies. It is usually found in institutionalized patients, particularly those with developmental disabilities, and in individuals who are debilitated or immunosuppressed. Crusted scabies is characterized by unusual skin manifestations such as scaling or thickening suggestive of psoriasis. Thickened nails, alopecia, generalized hyperpigmentation, and pyoderma with lymphadenopathy also may occur. Itching may be reduced or absent, making diagnosis more difficult. It is highly communicable because of the large number of mites. The incubation period may be as short as several days.

   b. **Differential Diagnosis**: Contact dermatitis, allergic dermatitis, drug reaction, psoriasis, and pyoderma.

   c. **Diagnosis**: Microscopic demonstration of the mite, ova, or fecal matter obtained from a skin scraping and/or based on clinical signs and symptoms. A negative skin scraping does not conclusively rule out scabies infestation. Mites are easily recovered, however, in skin scrapings from persons with atypical or crusted scabies.

3. **Incubation**: Generally 4 to 6 weeks in primary infestation; but may be less than 1 week for subsequent infestations or following exposure to crusted scabies. The pruritic response to scabies is actually an allergic (IgE) phenomenon. Therefore, primary infestation is slow to become pruritic, while repeated infestation re-activates the immune memory in just a few days.

4. **Reservoir**: Humans. Other species of mites from animals may infest man but do not reproduce on humans.

5. **Source**: Infested human or fomite.

6. **Transmission**: Direct or indirect contact.

7. **Communicability**: Until mites and eggs are destroyed; potentially from date of contact through date of adequate treatment.

8. **Specific Treatment**: Topical scabicides: permethrin 5% (Elimite®) is considered the drug of choice. The usual adult dose is 30 grams. Treatment details vary with regular scabies versus crusted scabies; refer to package insert or Scabies Prevention and Control Guidelines Acute and Sub-Acute Care Facilities (7/09)

   Itching may persist for 1-2 weeks following successful treatment. One treatment with permethrin, properly applied, is usually curative. Ivermectin (Stromectol®) (administered in a single oral dose of 200 mg per kilogram) appears to be effective but is not as yet FDA-approved for this purpose.

REPORTING PROCEDURES

1. A single case of atypical/crusted scabies is reportable in Los Angeles County. If the atypical case is not in a health facility or under home health care, use:

   Report Form: **Outbreak/ Other Reportable Disease or Disease of Unusual Occurrence Form (CDPH 8554)**

2. Outbreaks (not in a health facility or under home health care) are reportable, *California Code of Regulations*, Section 2500.

   Report Forms: **Outbreak/ Other Reportable Disease or Disease of Unusual Occurrence Form (CDPH 8554)**.

3. A single case of atypical/crusted scabies in a healthcare facility (non-acute care) is defined as an outbreak.

   For outbreaks of scabies in healthcare facilities (non-acute care) use:

   Report Forms: CD Outbreak Investigation—Sub-Acute Health Care Facility (H-1164, Sub-Acute).

4. A single case of atypical/crusted scabies in an acute care hospital will be assessed by ACDC. Outbreaks of scabies in these facilities will be investigated by ACDC as all hospital outbreaks.

5. **Epidemiologic Data**:

   a. Date of onset.

   b. List of potential contacts.

   c. Immunocompromising condition(s).

   d. Hospitalization(s) within incubation period.

   e. Skilled nursing or home health care within incubation period.

   f. Outpatient care within incubation period.

   g. Other institutionalized care within incubation period.

   h. Previous treatment(s) for scabies, date(s), medication(s) prescribed.

CONTROL OF CASE, CONTACTS & CARRIERS

Investigate single cases of atypical (crusted Norwegian) scabies and known or suspected outbreaks of regular and crusted scabies. Initiate evaluation within 24 hours.

CASE:

1. **Isolation**:

   a. **Community**: Exclude from school, work, and public gatherings until adequately treated.

   b. **Healthcare facility or congregate living**: Maintain contact precautions/isolation until treatment is completed and/or case is determined by dermatology consultant or other experienced designee to be non-infectious.

2. Concurrently launder linen and clothing used or worn within 72 hours prior to treatment.

CONTACTS:

For individual cases of regular scabies, household members, roommates, care givers, and other direct contacts should be treated prophylactically.

For individual cases of atypical or crusted scabies, currently hospitalized and admitted from a skilled nursing facility or other group setting, and reported directly to Acute Communicable Disease Control, a written referral will be faxed or emailed to the appropriate District Public Health Nurse Supervisor with Area Medical Director notification, requesting an assessment of the facility residents and staff for prophylaxis and follow-up care.

If during the course of investigation of scabies in a skilled nursing facility or other group setting, a scabies case was transferred to an acute care hospital or other facility, ensure notification of the receiving facility.

For outbreaks of scabies, assess extent of potential spread and extend prophylactic treatment for scabies as appropriate.

INSTITUTIONAL OUTBREAKS:

Refer to Scabies Prevention and Control Guidelines Acute and Sub-Acute Care Facilities (7/09). A fillable sample line-listing form is available in this guideline and also attached at the end of this chapter.

PREVENTION/EDUCATION

1. Emphasize recognition of early signs and symptoms of infestation and the importance of appropriate treatment, and increase awareness of atypical presentations of scabies.

2. Stress proper laundering of linen in hot water for at least 10 minutes and clothing worn 72 hours prior to treatment. Dry clean or place non-washable items in tightly closed plastic bag for at least 7 days.

3. For community settings, issue Prevention and Control Guidelines Acute and Sub-Acute Care Facilities (7/09)-Appendices D and E.

4. Issue Scabies Prevention and Control Guidelines Acute and Sub-Acute Care Facilities (7/09) if appropriate.

DIAGNOSTIC PROCEDURES

Skin scraping. The procedure is described in Scabies Prevention and Control Guidelines Acute and Sub-Acute Care Facilities (7/09)- Diagnosis of Scabies by Skin Scraping (Appendix A).

SHIGELLOSIS

(DYSENTERY, BACILLARY DYSENTERY)

1. **Agent**: A gram-negative bacillus, divided into four groups: Group A, *S. dysenteriae*; Group B, *S. flexneri*; Group C, *S. boydii*; Group D, *S. sonnei*. Group A, B and C are further divided into serotypes. Group A is comprised of 12 serotypes, Group B of 10, Group C of 18 serotypes, Group D has only one serotype and there are two provisional serotypes.

2. **Identification:**

   a. **Symptoms**: Acute gastroenteritis characterized by diarrhea, fever, nausea and sometimes vomiting, cramps, and tenesmus. In severe cases the stools contain blood, mucus, and pus. The disease is usually self-limited; complications are rare; mild and asymptomatic infections occur.

   b. **Differential Diagnosis**: Other enteric pathogens or toxins.

   c. **Diagnosis**: Isolation and serotyping of organism from feces or rectal swab.

3. **Incubation**: 1 to 7 days; usually 1 to 3 days.

4. **Reservoir**: The only significant reservoir is human.

5. **Source**: Feces of infected persons.

6. **Transmission**: Fecal-oral route with or without contamination of foodstuffs. This may include fecally contaminated water and certain sexual behaviors. Up to 80% of transmission is person-to-person with association with contaminated food or water.

7. **Communicability**: Highly communicable with low infective dose. Variable as long as organisms are excreted, usually for no more than 4 weeks after onset. Asymptomatic carriers may transmit infection; rarely the carrier-state may persist for months.

8. **Specific Treatment**: Antibiotics such as trimethoprim/sulfamethoxazole (TMP/SMX), ampicillin and quinolones have been shown to shorten the duration of illness and bacterial shedding. Usage of antibiotics should be based on the clinical status of patient and sensitivity of organism. Currently circulating strains are resistant to ampicillin or TMP/SMX, or multiply resistant to ampicillin, TMP/SMX, and tetracycline. Cases considered being a public health risk due to sensitive occupation or situation (SOS) should routinely receive antimicrobial therapy.

9. **Immunity**: There is some evidence of serotype-specific immunity of short duration.

REPORTING PROCEDURES

1. **Reportable**. *California Code of Regulations*, Section 2500.

2. **Report Form**:

   SHIGELLOSIS CASE REPORT (acd-shig) and CONTACT ROSTER (acd)

   All 3 pages of form MUST be submitted. The original form should be submitted as soon as the investigation is complete. Original forms should not be held in the district pending completion of "Sensitive Occupation or Situation" (SOS) clearance. District follow-up for SOS can be continued without the original form.

   If a prepared commercial food item is the LIKELY source of this infection, a **FOODBORNE INCIDENT REPORT** (FBIR) should be filed. For likelihood determination and filing procedures, see Part 1, Section 7 – Reporting of a Case or Cluster of Cases Associated with a Commercial Food: Filing of Foodborne Incident Reports.

3. **Epidemiologic Data:**

   a. Source of water, food, and milk within incubation period.

   b. Exposure to others with diarrhea in or outside of household.

   c. Attendance at group gatherings where food was served, restaurants, or

commercial food establishments within incubation period. Obtain detailed information on date, time, and types of foods or beverages ingested and ascertain whether dining companions had similar symptoms.

d. Travel history within incubation period. Visitors within incubation period.

e. If a contact to a child care center, developmentally disabled facility, institution, or babysitting group, obtain detailed information on clientele, caretakers, and conditions at the facility or residence.

f. For infants 3 months of age and under, if source is not identified, culture care giver (even if asymptomatic) to identify possible source.

g. Recreational water contact.

h. Colonic irrigation.

I. Sexual contacts within incubation period.

j. Sanitary conditions in the residence or other location(s) of possible exposure.

k. If an outbreak of shigellosis is identified while investigating an individual case, discuss with supervisor and advise ACDC by telephone.

CONTROL OF CASE, CONTACTS & CARRIERS

Contact within 24 hours to determine if sensitive occupation or situation (SOS) involved. Certain group settings (e.g., day care, long term care and facilities for the developmentally disabled) should be considered a sensitive situation; otherwise, investigate within 3 days.

CASE:

Precautions: Enteric precautions until bacteriologically cleared as described below.

1. **Sensitive Occupation or Situation:** Remove from work until 2 successive negative feces specimens or rectal swabs are obtained, at least 24 hours apart and taken at least 48 hours after cessation of antimicrobial therapy.

2. **Non-sensitive Occupation or Situation**: Release after clinical recovery unless household contact in SOS. Then release after obtaining 2 negative feces specimens or rectal swabs as for case.

CONTACTS:

Public Health Nursing Home Visit Protocol:
Home visit as necessary – a face to face interview is conducted as necessary.

Refer to "Public Health Nursing Home Visit AS NECESSARY (HVAN) Algorithm" (B-73 Part IV Public Health Nursing Home Visit Protocol).

1. **Sensitive Occupation or Situation:**

   a. **Symptomatic:** Remove from work until negative specimens as for case. Then, weekly negative specimens until case released or contact with case broken.

   b. **Asymptomatic**: Remove from work until 1 negative feces specimen. Then, weekly negative specimens until case released. Release after 2 successive negative specimens if contact with case is broken.

2. **Non-sensitive Occupation or Situation**: Obtain specimens if symptomatic.

3. **Presumptive Cases**:

   a. **Definition**: any person who is epidemiologically linked to a confirmed case, who has diarrhea (more than 2 loose stools in 24 hours) and fever, **or** diarrhea and at least 2 other symptoms.

   b. Follow up is the same as for a confirmed cases (i.e., clearance as needed and submission of a case history form for reporting).

PREVENTION-EDUCATION

1. Emphasize hand washing after defecation and before handling food.

2. Wash raw fruits and vegetables thoroughly.

3. Protect from contamination by proper food handling techniques and sanitary storage.

4. Properly prepare infant formula.

5. Protect drinking water or boil drinking water for 20 minutes if it is suspected to be a source of infection.
6. Control flies by screening of doorways and windows, by eliminating fly breeding areas, and by the proper use of insecticides.

7. Dispose of feces properly.

8. Limit occupancy to meet housing codes and ensure adequate toilet facilities are available in group housing situations.

9. Emphasize safe sexual practices, avoiding direct contact with fecal material.

DIAGNOSTIC PROCEDURES

1. **Culture**:

   Container: Enterics.

   Laboratory Form: **Test Requisition Form H-3021**

   Examination Requested: Shigella

   Material: Feces. Follow instruction provided with container.

   Storage: Protect from overheating. Maintain at room temperature.

   Remarks: Mark "SOS" (sensitive occupation or situation) in red on specimen container, if appropriate.

2. **Culture for Identification (CI):**

   Container: Enteric CI.

   Laboratory Form:
   Test Requisition Form H-3021

   Material: Pure culture on appropriate medium.

Storage: Same as above.

SMALLPOX

1. **Agent**: Variola virus, a member of the poxviridae family. (This is the agent for both variola major—classic smallpox—and variola minor, a less serious form of the disease.)

2. **Identification**:

   a. **Symptoms**: Most significantly, the rash of smallpox is preceded by a prodrome consisting of 1 to 4 days of high fever, malaise, headache, muscle pain, prostration; sometimes nausea, vomiting, abdominal pain, and backache. In 90% of cases, smallpox (variola major) presents as an acute infectious disease characterized by a maculopapular rash, which becomes vesicular on day 3 or 4, then slowly evolves into pustular lesions, deeply embedded into the dermis, by day 6. Fourteen days after the initial appearance of the rash, most of the lesions have developed scabs. The rash in smallpox usually appears as a single crop with all lesions progressing from the macular to the pustular stage at about the same time.

   The mortality rate for smallpox may be as high as 30% in unvaccinated persons and 3% in those with a history of vaccination sometime in the past. (Patients with variola minor have similar signs and symptoms but the disease is less severe and the mortality rate is only about 1%.)

   In a minority of instances, smallpox can present as “flat type” smallpox where lesions remain flush with the skin, never becoming elevated even during the pustular stage. This type of presentation is seen in 5% to 10% of cases and results in very severe disease. Another severe form of smallpox is “hemorrhagic smallpox” which involves extensive bleeding into the skin and almost always results in death. This form of disease, which can be seen in less than 3% of cases, can easily be mistaken for meningococcal sepsis.

   Milder disease with a less severe prodrome and a more rapid evolution of lesions can be seen in previously vaccinated individuals.

   b. **Differential diagnosis**: Although there are other causes of generalized rash illness which present as vesicles and pustules, the severe prodrome along with the nature of the rash and its evolution distinguishes smallpox from other diseases. The diseases, which can look similar to smallpox, include: varicella, disseminated herpes simplex, enterovirus, molluscum contagiosum, secondary syphilis, drug rash, meningococcal sepsis, and monkeypox.

   c. **Diagnosis**: The clinical case definition for smallpox is: an illness with an acute onset of fever of 101˚F or higher followed by a rash characterized by firm, deep seated vesicles or pustules in the same stage of development on any body part, without other apparent cause. Laboratory diagnosis is aided by a negative result on one of the rapid diagnostic tests for **varicella** (i.e., DFA, electron microscopy, and PCR). Laboratory diagnosis of smallpox can be made by PCR, culture of vesicular or pustular fluid, or culture of the scab; it should only be performed by the LAC Public Health Laboratory, California Viral & Rickettsial Diseases Laboratory, and Centers for Disease Control and Prevention (CDC). (After appropriate consultation to ensure safe packaging and handling, specimens can be sent to the local public health laboratory for forwarding to the state laboratory and then to CDC.)

   Electron microscopy of vesicular or pustular fluid, or of the scab, as well as acute and convalescent serologic testing through CDC, can also be performed for diagnosis.

3. **Incubation**: Usually 12-14 days (range 7-17 days).

4. **Reservoir**: Officially, only in designated laboratory repositories in USA and Russia. Humans are the only natural host.

5. **Source**: Macules, papules, vesicles, pustules, and scabs of the skin and lesions in mouth and pharynx.

6. **Transmission**: Inhalation of virus-containing droplet nuclei or aerosols expelled from the oropharynx of an infected person, or less commonly, contact with material from smallpox lesions. Transmission may more easily occur in a hospital setting if isolation of the case is not implemented immediately. The virus is most likely to be disseminated in an aerosol cloud if used in biological warfare.

7. **Communicability**: A smallpox case becomes infectious to others when rash lesions first appear in the mouth and pharynx, which usually occurs 24 hours before the rash is noted on the skin. Patients can transmit the virus throughout the course of the rash illness until all scabs have separated.

8. **Specific treatment**: None of proven benefit; treatment is supportive.

9. **Immunity**: Infection is felt to confer lifelong immunity. Immunity from vaccination with the smallpox vaccine (vaccinia virus) gradually wanes over time beginning 5 years after vaccination. Usually no protection against disease is observed for persons 30 or more years post-vaccination, although they can have less severe illness if infected.

REPORTING PROCEDURES

1. **Report any case or suspect cases by telephone immediately** (Title 17, Section 2500. *California Code of Regulations*).

   a. Call Morbidity Unit during working hours.

   b. Call ACDC; after working hours, contact Administrative Officer of the Day (AOD) through County Operator.

   c. Any laboratory that receives a specimen for anthrax testing is required to report to the State Microbial Diseases Laboratory immediately (Title 17, Section 2505, *California Code of Regulations).*

   d. ACDC must notify the State Division of Communicable Disease Control (DCDC) immediately upon receiving notice of a case of suspected anthrax. ACDC will supervise investigation and control measures.

CONTROL OF CASE, CONTACTS & CARRIERS

ACDC will coordinate all contact investigations for smallpox. Personnel designated for case interviews and contact investigation must be effectively vaccinated prior to initiating face-to-face interviews with the case and contacts.. Initial investigation will be conducted immediately upon notification by vaccinated members of the Public Health Smallpox Response Team.

CASE:

1. Place case immediately into airborne, contact and standard isolation precautions; maintain isolation for the duration of disease until all scabs have separated from skin lesions. Refer to LAC Smallpox Response Plan for details.

2. Interview case to obtain: Detailed name and contact information for all persons with whom the case had face-to-face contact (within 6 feet) since onset of fever until time of interview; places visited by the case since onset of fever including health care provider offices, clinics, and emergency departments; work, school, and regular, as well as occasional activities. (If case is unable to answer questions because of age or illness, obtain information from case's close family members and friends.) Refer to LAC Smallpox Response Plan for details.

CONTACTS:

1. List and prioritize all contacts for urgency of vaccination based on duration and intimacy of exposure, and prior immunization history for smallpox.

2. Locate and interview each contact to confirm exposure to the case and to determine the presence or absence of symptoms in the contact.

3. Make arrangements for the immediate vaccination of asymptomatic contacts and contact's household. (If household members cannot be vaccinated due to

contraindications, insure that they avoid exposure to the contact until the end of the contact's surveillance period.)

4. If contact is symptomatic with fever or rash, make immediate arrangements (with appropriate safety precautions to prevent transmission of possible disease to others) for transportation of contact to the County's designated facility for evaluation of smallpox cases.

5. If contact does not have fever or rash, place contact under surveillance so that if he/she develops fever or rash, he/she can be immediately isolated. Asymptomatic contacts must be kept under surveillance for 18 days after their last exposure to the case, or until 14 days after successful vaccination. Refer to LAC Smallpox Response Plan for details.

CARRIERS: Not applicable.

PREVENTION-EDUCATION

Stress the importance of immunizing all contacts to the case as soon as possible. In a smallpox emergency, all contraindications to vaccination would be reconsidered in light of the risk of smallpox exposure.

Educate all cases and contacts regarding the transmission and communicability of smallpox and the actions required to prevent further transmission including precautions for the handling of case's clothing, bedding, linens, and eating utensils.

Provide information on decontamination of household surfaces. Refer to LAC Smallpox Response Plan for details.

OUTBREAK DEFINITION

A single case of smallpox is a public health emergency and warrants an immediate investigation, in consultation with ACDC.

DIAGNOSTIC PROCEDURES

1. **Culture**: Culture of vesicular or pustular fluid or scabs is available through the CDC. Contact the LAC Public Health Laboratory for specific procedures prior to any attempt to obtain specimens from patients with suspected smallpox.

2. **Serologic Testing**: Acute and convalescent serologic testing is available through the CDC. 10 cc of blood should be drawn into a plastic or glass marble-topped serum separator tube. Contact the LAC Public Health Laboratory prior to collection of serologic specimens from patients with suspected smallpox.

3. **Electron Microscopy**: Because of the distinct appearance of poxviruses, electron microscopy can be helpful in the rapid diagnosis of smallpox. This test is available through the CDC. Contact the Public Health Laboratory for information regarding this test.

Note: Ideally, only successfully vaccinated individuals wearing barrier protection should be involved in collecting specimens from suspected smallpox cases. If unvaccinated individuals must be used for this purpose, they must wear fit-tested N95 masks and not have contraindications for vaccination, as they would require immediate vaccination if the diagnosis of smallpox is confirmed.

SMALLPOX VACCINE (VACCINIA VIRUS) ADVERSE EVENTS MONITORING

Timely recognition of and response to smallpox vaccine adverse events are important in protecting the public from unnecessary risk and to maintain confidence during an immunization effort.

Adverse events that are serious or unexpected may require expert consultation or IND (investigational new drug) therapeutics.

Healthcare workers should report any unexpected or serious event occurring after smallpox vaccination as well as adverse events occurring in persons following close contact with a vaccine recipient to the Vaccine Adverse Event Reporting System (VAERS). An adverse event is any clinically significant medical event that occurs following administration of a vaccine. Refer to LAC Smallpox Response Plan for details.

STAPHYLOCOCCUS AUREUS INFECTIONS (community acquired)

(See also **FOODBORNE ILLNESS** and **STAPHYLOCOCCAL TOXIC SHOCK SYNDROME** for primarily toxin-mediated staphylococcal diseases)

1. **Agent**: *Staphylococcus aureus* a Gram positive bacterium. Most *S. aureus* is divided into 2 groups: methicillin-resistant (MRSA) and methicillin-sensitive (MSSA).

2. **Identification**:
   a. The most common staphylococcal infections include impetigo, boils, carbuncles, abscesses, and infected wounds. Methicillin-resistant *Staphylococcus aureus* (MRSA) is the most common cause of community acquired bacterial skin infections in the United States.

      In rare cases, community acquired *S. aureus* may result in bacteremia, meningitis, pneumonia, or necrotizing fasciitis.

      Outbreaks of *S. aureus* skin infections are often found in close crowded living conditions such as correctional facilities, homeless shelters or in the military.

   b. **Differential Diagnosis**: Miliaria (heat rash), diaper dermatitis, chemical conjunctivitis, and cellulitis or abscesses due to other pyogenic organisms (primarily group A streptococcus).

   c. **Diagnosis**: Culture of organism from involved site. PCR may be used in some circumstances to identify MRSA (not MSSA)

3. **Incubation**: Variable and indefinite; commonly 2 to 10 days. However, people may be colonized for months-years before an infection occurs.

4. **Reservoir**: Human; some farm and domestic animals.

5. **Source**: Nares, perineum, and any purulent lesion. Thirty to forty percent of the general population carries MSSA in their anterior nares and moist body areas; 1-3% carries MRSA in these same areas.

6. **Transmission**: Usually by contaminated hands, contact with infected or colonized site, or fomites; airborne droplet spread is rare. *S. aureus* is not commonly found in water, especially water that is adequately chlorinated.

7. **Communicability**: As long as viable organisms exist in lesion or the carrier state persists, the person may continue to autoinfect themselves or others. *S. aureus* may survive in dry environments for weeks.

8. **Specific Treatment:**

   Case: Therapy should consider the drug sensitivity pattern of the organism. Resistance to methicillin is a marker for resistance to all ß-lactam antibiotics such as penicillin or the cephalosporins. Many skin infections due to *S. aureus* will clear-up with good skin care and drainage of pus (if necessary) and may not need antibiotics for treatment.

   Carriers: There is no reason to treat carriers in community settings unless there are repeated autoinfections. Consider decolonization of patients who will undergo cardiac, orthopedic or neurosurgery procedures with implants. Decolonization treatment consists of topical antibiotics to the nares and anti-staphylococcal soap to the body for at least 5 days. Consult with ACDC if considering recommending decolonization.

9. **Immunity**: None.

REPORTING PROCEDURES

1. Outbreaks: all outbreaks of *Staphylococcus aureus* (MRSA or MSSA) in the community are reportable within one working day of identification. *California Code of Regulations*, Section 2500

   Severe community acquired *Staphylococcus aureus* infections are also reportable. A case is defined as a patient who dies or is

admitted to an intensive care unit due to infection with *S. aureus* and who has not had surgery or dialysis or been hospitalized, or resided in a long-term care facility in the past year, and did not have an indwelling catheter or percutaneous medical device at the time of culture. Cases are reportable within seven working days of identification. *California Code of Regulations*, Section 2500. ACDC investigates severe cases of community acquired *S. aureus*.

2. **Report Form**

For single cases of severe community acquired *S. aureus:* **SEVERE *STAPHYLOCOCCUS AUREUS* INFECTION IN A PREVIOUSLY HEALTHY PERSON CASE REPORT (acd-sevsaureus)** (ACDC use only)

For outbreaks in non-healthcare facilities: **OUTBREAK/UNUSUAL DISEASE CASE REPORT (CDPH 8554)**

For outbreaks in acute care facilities: **CD OUTBREAK INVESTIGATION-HEALTH CARE FACILITY (H-1165AHCF)** (ACDC use only)

For sub-acute health care facility outbreaks: **CD OUTBREAK INVESTIGATION-SUB-ACUTE HEALTH CARE FACILITY (H-1164-SubAcute)**

3. **Epidemiologic Data:**

a. Demographics of patient(s) including age, race/ethnicity, gender

b. Onset date

c. Location and description of lesions or symptoms

d. Culture and antibiotic sensitivity reports

e. Occupation, school, recreational activities (sports), and drug use.

f. Close contacts (household, sexual, teammates) with active skin infections

g. Treatment received, outcome (hospitalized, surgery needed, etc)

h. History in past 12 months of surgery, dialysis, hospitalization or stay in licensed healthcare facility.

i. History in past 3 months of antibiotic use

CONTROL OF CASE, CONTACTS & CARRIERS

Investigate outbreaks; evaluate within 24 hours. Investigate individual cases within 3 days.

CASE:

Precautions:

1. **Person**: Appropriate hand hygiene should be emphasized. Skin lesions should be covered with a clean dry bandage and patients should be taught how to dispose of soiled bandages appropriately. Patients may return to work, school, or usual activities if they can maintain a clean, dry bandage over any open skin lesion. Hand hygiene should be performed before and after changing bandages. Soap and water or an alcohol based hand rub (at least 62% alcohol) will effectively disinfect hands.

   According to the California Food Code, if the patient is a food handler and has a rash, skin lesion or open/draining wound on their hand(s) or the exposed part(s) of their arm(s), they are required to wear an impermeable cover over the condition. If the lesion is on another part of their body, they must wear a dry, durable, tight-fitting bandage. Otherwise they must report their condition to their employer. All employees with any cuts, sores, or rashes must wear gloves when contacting food and food contact surfaces.

   Patients do not need to be on antibiotics or complete an antibiotic course before returning to their usual activities.

Environment: Use an EPA registered disinfectant to clean the environment. Ensure that the label specifies that the product is active against *S. aureus* and ensure adequate contact time (usually 30 seconds-1 minute) for disinfection. Note that while the environment may be a reservoir for *S. aureus*, most transmission is thought to be from direct person to person contact. For

water reservoirs, such as pools or hot-tubs, assure that the chlorine concentration meets the State standards. Consult with Environmental Health as needed.

CONTACTS:

Contacts are persons in close contact with patient with any staphylococcal disease

1. Emphasize hand hygiene, especially before and after handling any soiled bandages.

2. Encourage contacts to check skin for any new lesions or infections. Contacts with new infections should be encouraged to see their healthcare provider for diagnosis and treatment.

CARRIERS:

It is rarely worthwhile to search for nasal carriers or perform environmental sampling.

PREVENTION-EDUCATION

1. Stress importance of personal hygiene. Emphasize hand hygiene, regular bathing or showers, and changing clothes.

2. Stress importance that cases/carriers or contacts do not share personal skin care articles such as soap, razors, towels, etc.

3. Emphasize proper disposal of bandages and disinfection of fomites.

4. For more information, please see http://lapublichealth.org/acd/MRSA.htm

DIAGNOSTIC PROCEDURES

1. **Culture**

   Container: Culturette; follow package instructions.

   Laboratory Form:
   PUBLIC HEALTH LABORATORY TEST REQUISITION FORM

   Examination Requested:
   Other: Staphylococcus.

   Material: Exudate or discharge from infected site, nares, pharynx.

   Storage: Room temperature.

2. Molecular typing of outbreak strains by pulsed-field gel electrophoresis is available in consultation with Acute Communicable Disease Control. However, most community strains of *S. aureus* have the same pulsed-field type and PFGE is not very helpful in identifying the source of infection(s).

STREPTOCOCCAL INFECTIONS, GROUP A

(See also **STREPTOCOCCAL TOXIC SHOCK SYNDROME** and **EXANTHEMS—DIFFERENTIAL DIAGNOSIS**)

1. **Agent**: Group A beta-hemolytic streptococci (*Streptococcus pyogenes*, GAS) with over 80 M-protein types, cause localized or generalized infection and nonsuppurative sequelae, including rheumatic fever and glomerulonephritis.

   Group B streptococci (GBS, *Streptococcus agalactiae*) are important causes of neonatal sepsis and meningitis acquired in utero or during delivery from a vaginally colonized mother. Groups C and G streptococci have been implicated in outbreaks of streptococcal tonsillitis, usually foodborne.

   Group D streptococci have been reclassified as *Enterococcus* species.

2. **Identification:**

   a. **Symptoms**: The most common conditions caused by group A *streptococci* are pharyngitis or tonsillitis and skin infections (pyoderma and impetigo). GAS also cause scarlet fever, cellulitis, wound infections, erysipelas, otitis media, pneumonia, septicemia, puerperal fever, and rarely, necrotizing fasciitis and streptococcal toxic shock syndrome. Typical symptoms of streptococcal pharyngitis include sudden onset of fever and sore throat with enlarged, tender anterior cervical lymph nodes.

      Scarlet fever usually occurs in association with streptococcal pharyngitis and is characterized by an erythematous, sandpaper-like skin rash and circumoral pallor, in addition to the symptoms of the streptococcal infection (e.g., sore throat, skin or wound infection. The rash is caused by an erythrogenic exotoxin produced by some strains of streptococci. During convalescence, desquamation of skin on fingertips and toes may occur. Streptococcal necrotizing fasciitis and streptococcal toxic shock syndrome are rare, life-threatening conditions which involve localized tissue destruction, multiorgan system failure and shock and are associated with infection with invasive, toxin-producing strains of GAS.

      Nonsuppurative complications of GAS infection include acute rheumatic fever and acute glomerulonephritis, with onset 1-5 weeks after streptococcal infection.

   b. **Differential Diagnosis**: Infectious mononucleosis, drug eruptions, allergy, roseola, herpangina, cellulitis, sepsis, meningitis from other organisms. See **ACUTE EXANTHEMS -- DIFFERENTIAL DIAGNOSIS**.

   c. **Diagnosis**: Rapid streptococcal tests based on identification of GAS antigen in pharyngeal secretions may be used as an adjunct to culture. If results are positive, assume the patient has group A streptococcal infection. If results are negative or equivocal, a throat culture should be done and plated on blood agar. Latex agglutination, immunofluorescence and co-agglutination tests performed on colonies growing on the agar are accurate in distinguishing group A from other beta-hemolytic streptococci. Bacitracin sensitivity discs presumptively differentiate group A.

3. **Incubation**: 1 to 3 days.

4. **Reservoir**: Human.

5. **Source**: Discharge from nose, throat, purulent lesions, scabs.

6. **Transmission**: Direct contact with patients or carriers; rarely by indirect contact through objects or hands. Anal, vaginal, skin and pharyngeal carriers have been responsible for nosocomial outbreaks of surgical wound infections.

7. **Communicability**: Highest during acute infection and in untreated cases of pharyngitis. It gradually decreases over several weeks. If treated with appropriate

antibiotics, patients are considered noninfectious within 24 hours of beginning treatment.

8. **Specific Treatment**: Orally administered penicillin V or penicillin G for at least 10 days or a single dose of intramuscularly administered benzathine penicillin G are acceptable agents for treatment of uncomplicated streptococcal pharyngitis or tonsillitis (erythromycin is indicated for patients allergic to penicillin). Clindamycin and cephalosporins are acceptable alternatives. Although resistance of GAS to penicillin has not been documented, treatment failures have occurred, presumably due to beta-lactamase-producing upper respiratory tract flora interfering with penicillin. Sulfonamide and tetracyclines should not be used for treating GAS pharyngitis.

9. **Immunity**: Immunity develops only against specific M-type strains or exotoxins.

REPORTING PROCEDURES

1. **Reportable**. Outbreaks and cases in food handlers and dairy workers are reportable under *California Code of Regulations*, Section 2500. Individual cases of invasive streptococcal disease (GAS isolated from normally sterile site), including streptococcal necrotizing fasciitis and streptococcal toxic shock syndrome, are reportable under *California Code of Regulations,* Section 2500, Occurrence of Unusual Diseases.

2. **Report Forms**: (outbreaks only)

   OUTBREAK / UNUSUAL DISEASE REPORT (DHS 8554)

   CD OUTBREAK NOTICE -- HEALTH CARE FACILITY (H-1163)

   CD OUTBREAK INVESTIGATION -- HEALTH CARE FACILITY (H-1164)

3. **Epidemiologic Data:**

   a. Occupation of case, contacts.

   b. Evidence of virulent strains such as symptoms of necrotizing fasciitis, toxic shock syndrome, acute rheumatic fever, glomerulonephritis, etc.

CONTROL OF CASE, CONTACTS & CARRIERS

Investigate within 24 hours of notification of cases in food handlers and dairy workers and of outbreaks in other groups.

CASE:

1. **Sensitive Situation or Occupation**: Remove from sensitive situation or occupation or from school until at least 24 hours after beginning antibiotic therapy and until afebrile.

2. **Isolation**: Drainage and secretion precautions; may be terminated 24 hours after beginning antibiotic therapy.

CONTACTS:

1. **Sensitive Situation or Occupation**: If symptomatic, remove and follow as for case. If asymptomatic, daily surveillance until case is released, or 3 days after contact is broken.

2. **Symptomatic Contacts**: Appropriate cultures should be obtained and the person should receive treatment if the culture is positive.

3. **Asymptomatic contacts**: Treatment of asymptomatic contacts is generally not indicated except in special outbreak situations in which individuals have unusually close contact or when the contacts are at increased risk for developing sequelae. While household contacts of patients with severe invasive GAS disease may be at increased risk for developing invasive GAS infections, the role of chemoprophylaxis in this setting has not as yet been defined and should be determined on a case by case basis. Consult ACDC.

CARRIERS:

Asymptomatic pharyngeal carriage of GAS is usually not an indication for antibiotic treatment, except in special situations.

PREVENTION-EDUCATION

1. Stress hand washing and personal hygiene.

2. Investigate promptly any unusual clusters of cases to identify possible common sources, such as contaminated milk or foods.

3. Detect early infection in other family members. Household contacts who have recent or current evidence of streptococcal infection should be cultured and treated if the culture is positive.

4. For outbreaks in special groups in which individuals have especially close contact, such as military populations and newborn nurseries, or when recurrent outbreaks occur in institutional settings, it may be necessary to administer prophylactic antibiotics to the entire group to terminate spread. Consult with District Health Officer or ACDC if mass prophylaxis is being considered as a control measure.

5. For outbreaks in schools and daycare centers, encourage vaccination for children who are susceptible to varicella.

6. Encourage completion of full 10 day or antibiotic course to minimize complications and carrier state.

7. Prepare, store, and refrigerate food properly.

8. Disinfect articles soiled with purulent discharges and dispose of appropriately.

DIAGNOSTIC PROCEDURES

Culture:

Container: Culturette; follow package instructions.

Laboratory Form: **BACTERIOLOGY CULTURE & SENSITIVITY (H-2553)**.

Examination Requested: Streptococcus.

Material: Throat (or wound) swab.

Storage: Room temperature.

Molecular typing by pulsed-field gel electrophoresis is available in consultation with Acute Communicable Disease Control.

STREPTOCOCCAL TOXIC SHOCK SYNDROME (STSS)

1. **Agent**: *Streptococcus pyogenes* (group A beta-hemolytic streptococci [GAS]). Believed to be toxin-mediated; more commonly associated with infection due to GAS of M-protein types 1 and 3.

2. **Identification**:

   a. **Symptoms**: STSS is a severe illness characterized by signs of toxicity and a rapidly progressive clinical course; case fatality rate can be as high as 30%. Clinical manifestations include hypotension (systolic BP≤90 mm Hg in adults) and evidence of multiorgan system dysfunction (renal impairment, coagulopathy, liver involvement, adult respiratory distress syndrome) usually occurring within 48 hours of onset of illness. STSS may occur with either systemic or with focal GAS infections, often in conjunction with rash and local tissue destruction (necrotizing fasciitis).

   b. **Diagnosis**: The CDC case definition includes the following:

      Isolation of GAS from either a normally sterile site or a non-sterile site.

      Clinical signs of severity:

      Hypotension: systolic ≤ 90 mm Hg in adults, and

      Two or more of following signs:

      - Renal impairment; creatinine ≥ 2 mg/dL
      - Coagulopathy: platelets < 100,000/mm^3 or disseminated intravascular coagulation defined by elevated PT/PTT and either low fibrinogen level or the presence of fibrin split products
      - Liver involvement: SGOT, SGPT, or serum bilirubin twice normal levels
      - Adult respiratory distress syndrome
      - Generalized erythematous macular rash
      - Soft tissue necrosis including necrotizing fasciitis or gangrene.

REPORTING PROCEDURES

1. **Reportable**: *California Code of Regulations,* Section 2500, **INVASIVE GROUP A STREPTOCOCCAL DISEASE (IGAS) REPORT FORM (acd-igas).**

2. Telephone report of case to Acute Communicable Disease Control at (213) 240-7941.

CONTROL OF CASE, CONTACTS & CARRIERS

CARRIERS:

Same as for other group A streptococcal infections.

PREVENTION-EDUCATION:

Same as for other group A streptococcal infections.

TETANUS

1. **Agent**: Exotoxin of *Clostridium tetani*, a Gram-positive bacillus.

2. **Identification**:

   a. **Symptoms**: Acute paralytic disease due to tetanus toxin produced by tetanus bacilli growing at site of injury; characterized by painful muscle contractions, principally involving masseter and neck muscles, secondarily muscles of trunk. Muscle contraction sometimes confined to region of injury.

   b. **Differential Diagnosis**: Hypocalcemic tetany, reaction to antipsychotic and anti-depressive medications, central nervous system (CNS) disturbances, various types of poisonings.

   c. **Diagnosis**: Clinical history, immunization history and anaerobic culture of suspicious wound or debrided tissue. Diagnosis is usually made clinically by excluding other possibilities.

3. **Incubation**: 3 days to 3 weeks, dependent on character, extent, and location of wound; average 8 days. The further the injury site is from the central nervous system, the longer the incubation period. In neonatal tetanus, symptoms appear 4-14 days after birth, averaging 7 days.

4. **Reservoir**: Organism is normal member of intestinal flora of animals and man; frequently found in soil.

5. **Source**: Soil, dust, animal or human feces, plaster, sutures, injection drug use.

6. **Transmission**: Tetanus spores enter the body usually through wound; occasionally from parenteral injection. Neonatal tetanus occurs through infection of umbilical stump.

7. **Communicability**: Not contagious from human to human.

8. **Specific Treatment**:

   a. Supportive care including appropriate medications to control tetanus spasms.

   b. Tetanus Immune Globulin (TIG) in a single total dose of 3000 to 6000 units is recommended for children and adults.

   c. Oral (or IV) metronidazole (30 mg/kg/day) given in 4 divided doses (maximum 4 g/day) for 10 to 14 days. Parenteral penicillin G, 100,000 U/kg/day, every 4 to 6 hours can be given as an alternative.

9. **Immunity**: The disease does not confer immunity. The primary series of immunizations is needed. Following a properly administered primary series, most people retain antitoxin levels that exceed the minimal protective level for 10 years after the last dose.

REPORTING PROCEDURES

1. **Reportable**. (California Code of Regulations, Section 2500.) Report case or suspect case within 7 calendar days from the time of identification by mail, telephone, fax, or electronic report.

2. **Report Forms: TETANUS SURVEILLANCE WORKSHEET.**

   SUPPLEMENTAL INJECTING DRUG USE QUESTIONNAIRE FOR TETANUS CASE (CA DHS).

3. **Epidemiologic Data**:

   a. Description of wound: date and place, anatomic site, type, contamination, depth, and signs of infection.

   b. Immunization history.

   c. History of military or National Guard service, as evidence of past immunization.

   d. Medical care for the presumptive wound or lesion that led to tetanus before tetanus symptoms began, including information

about non-acute wounds and associated medical history.

e. Clinical course: type of tetanus disease, TIG therapy given.

CONTROL OF CASE, CONTACTS & CARRIERS

Investigate within 7 days.

CASE:

Isolation: None.

CONTACTS: Not applicable.

CARRIERS: Not applicable.

PREVENTION-EDUCATION

1. Recommend immunization with pediatric diphtheria-tetanus-pertussis or diphtheria-tetanus (DTaP or DT) vaccine for children under 7; tetanus-diphtheria (Td) vaccine for those 7 years and older and tetanus-diphtheria-pertussis (Tdap) (one time only) for persons 11 – 64 years of age. All Adults should receive Td boosters every 10 years. Adolescents 11-18 can receive their first tetanus booster in the form of Tdap. (Please consult current Advisory Committee on Immunization Practices recommendations on the use of Tdap vaccine since usage will be expanded over the next few years.)

2. Recovery from disease does not result in immunity. Primary immunization is indicated after recovery for adults and neonates.

3. Remove foreign matter from wounds by through cleansing. Give TIG in a preventive dose, as indicated for contaminated wounds. For persons with less than 3 previous doses of a tetanus toxoid containing vaccine or when vaccine history is unknown a Td should be given as part of routine wound management. For contaminated “dirty” wounds, a Td should be given even if the person has received 3 or more doses of a tetanus toxoid containing vaccine, if 5 or more years have elapsed since the last dose of vaccine. See section on wound management in *Recommendations for Use and Storage of Immunobiologics and Other Prophylactic Agents (B-71).*

4. Immunization is not contraindicated during pregnancy. Prevention of neonatal tetanus can be accomplished by prenatally immunizing the mother. Un-immunized mothers should receive 2 doses of tetanus toxoid or Td at least 4 weeks apart; the 3rd dose should be given 6-12 months after the 2nd dose and preferably at least 2 weeks before the expected delivery date.

5. California law requires exclusion from school if immunization status is not in compliance with *California Code of Regulations*, Title 17.

6. Education of mothers, relatives, and attendants in the practice of strict asepsis of the umbilical stump of newborn infants.

DIAGNOSTIC PROCEDURES

Consult the Public Health Laboratory.

TOXIC SHOCK SYNDROME

(Previously listed as staphylococcal toxic shock syndrome. See also **STAPHYLOCOCCAL INFECTIONS, STREPTOCOCCAL INFECTIONS, TOXIC SHOCK SYNDROME**, and **EXANTHEMS – DIFFERENTIAL DIAGNOSIS** in Appendix A)

1. **Agent**: Toxic shock syndrome toxin-1 (TSST-1), which is produced by same strains of *Staphylococcus aureus*.

2. **Identification**:

   a. **Symptoms**: Toxic shock syndrome is a severe illness characterized by sudden onset of high fever, myalgia, weakness, vomiting, diarrhea, hypotension, diffuse macular erythroderma, and multiorgan system dysfunction. Staphylococcal TSS is often associated with menstruation and tampon use in females and production of TSS-related toxins. Non-menstrual TSS cases have been associated with surgical wound infections, use of diaphragms or contraceptive sponges, and focal staphylococcal infections.

   b. **Differential Diagnosis**: Kawasaki disease, scarlet fever, Rocky Mountain spotted fever, measles, leptospirosis, and other febrile mucocutaneous diseases.

   c. **Diagnosis**: The CDC case definition includes the following 5 criteria:

      - Fever of 38.9° C (102° F) or higher.
      - Presence of a diffuse macular erythroderma (a sunburn-like rash).
      - Desquamation of skin 1 to 2 weeks after onset of illness.
      - Hypotension (systolic blood pressure < 90 mm Hg for adults).
      - Involvement of 3 or more of the following organ systems: gastrointestinal, muscular, mucous membrane, renal, hepatic, hematologic, and central nervous system.

REPORTING PROCEDURES

1. **Reportable**. (Section 2500, California Code of Regulations.)

2. **Report Forms**: **TOXIC SHOCK SYNDROME CASE REPORT (CDC 52.3)** will be mailed to the diagnosing physician by ACDC staff.

CONTROL OF CASE, CONTACTS & CARRIERS

Standard isolation precautions of hospitalized patient is recommended; no additional control measures are required.

PREVENTION-EDUCATION

Warn against continuous use of tampons during menstruation. Women who have had a previous episode of TSS should not use tampons.

DIAGNOSTIC PROCEDURES

The diagnosis of toxic shock syndrome is based on clinical findings supported by abnormal hematologic, renal, and hepatic function tests.

TOXOPLASMOSIS

1. **Agent**: *Toxoplasma gondii*, a protozoan.

2. **Identification**:

   a. **Symptoms**:

   - **Congenital**: May cause stillbirth or neonatal disease. Neonatal symptoms may be slight or generalized: hemorrhagic rash, jaundice, hemolysis, and hepatosplenomegaly. When acute phase occurs *in utero*, damage is concentrated in brain and eyes. Sequelae include convulsions, hydrocephaly, microcephaly, intracerebral calcifications, chorioretinitis, and ocular palsies.

   - **Acquired**:

     Immunocompetent Persons: Frequently asymptomatic. May present as an acute febrile illness with rash, pneumonia, headache, lymphadenopathy, and meningoencephalitis. In chronic infections, retinitis with hazy vision may occur, usually in one eye. In pregnant women, clinical evidence of infection may manifest only in fetus or infant.

     Immunosuppressed Persons (including HIV disease): May include cerebral signs, pneumonia, generalized skeletal muscle involvement, myocarditis, and maculopapular rash. May cause death.

   b. **Differential Diagnosis**:

   - **Congenital**: Cytomegalovirus (CMV), syphilis, rubella, herpes simplex, herpes zoster.

   - **Acquired**: Other parasitic diseases with dissemination (e.g., trichinosis); viral, fungal, or tuberculous meningoencephalitis; space-occupying brain lesions (e.g., lymphoma, meningioma); infectious mononucleosis (EBV or CMV).

   c. **Diagnosis**: Serological studies, CT or MRI scan, brain biopsy, clinical response to therapy in presence of positive serology.

3. **Incubation**: Uncertain—several weeks to several months but possibly shorter.

4. **Reservoir**: Cats, rodents, dogs, swine, cattle, sheep, goats, poultry, birds, and reptiles.

5. **Source**: Infected raw meat, cat feces, soil contaminated with animal feces, dust or vegetation.

6. **Transmission**: Transplacental infection; consumption of raw or undercooked meat; ingestion or inhalation of sporulated (infective) oocysts.

7. **Communicability**: Unknown. No evidence of person-to-person spread except transplacentally and only during primary infection of mother.

8. **Specific Treatment**: Most cases of acquired infection do not require therapy. When indicated combined therapy with sulfadiazine or clindamycin and pyrimethamine (Daraprim®). In pregnant women, spiramycin is commonly used; the addition of pyrimethamine and sulfadiazine should be considered when fetal infection is documented.

9. **Immunity**: Probably permanent.

REPORTING PROCEDURES

1. **Reportable**. (Section 2500, *California Code of Regulations*.)

2. **Report Form: OUTBREAK / UNUSUAL DISEASE REPORT FORM (CDPH 8554)**.

3. **Epidemiologic Data**:

   a. Contact with animals, especially cats.

   b. Ingestion of raw or undercooked meats.

c. Type of cat food (raw or cooked meat, or prepared dry food).

CONTROL OF CASE, CONTACTS & CARRIERS

Note: Investigate only IgM positive and congenital cases. If the case is a newborn baby, confirm that it was actually diagnosed by a physician and is IgM positive. Investigate within 7 days.

CASE: Isolation: None.

CONTACTS: No restrictions.

CARRIER: Persons chronically infected with *T. gondii* are at risk of active disease if the cellular immune system becomes suppressed (e.g., cancer, cancer chemotherapy or radiation therapy, HIV disease, high dose corticosteroids). Persons with cancer or HIV should be screened for toxoplasma IgG; if reactive, prophylaxis is indicated. With HIV, use of a sulfa-containing prophylaxis such as trimethoprim-sulfamethoxazole for *Pneumocystis* prevention appears to protect against reactivation of *Toxoplasma* as well.

PREVENTION-EDUCATION

1. Avoid eating raw or undercooked meat or consuming unpasteurized dairy products.

2. If pregnant, avoid cats and their litter boxes.

3. Avoid feeding pets with raw meat products.

4. Dispose of cat feces and litter daily (cysts require 1-5 days to become infective).

5. Use good hand washing technique after handling raw meat, cat litter boxes, and cats.

DIAGNOSTIC PROCEDURES

Clinical and epidemiological histories are required to aid the laboratory in test selections.

Serology: Paired sera required on suspected acute cases. For suspected congenital cases, blood from the mother and infant are required as they are tested in parallel.

Container: Serum separator tube (SST, red/gray top vacutainer tube).

Laboratory Form: Test Requisition and Report Form H-3021

Examination Requested: Toxoplasmosis Serology.

Material: Whole clotted blood.

Amount: 8-10 ml.

Storage: Refrigerate.

Remarks: Collect first blood specimen as early as possible. Collect the second specimen approximately 2 weeks after the first. Send each specimen as it is collected. Do not store.

TRICHINOSIS (Trichiniasis, trichinellosis)

1. **Agent**: *Trichinella spiralis*, a nematode (round worm).

2. **Identification**:

   a. **Symptoms**: A disease caused by larval migration through the body of larvae and their encystment in muscles. Clinical disease in man is markedly irregular and can range from inapparent infection to a fulminant, fatal disease. Symptoms include edema of upper eyelids, gastrointestinal symptoms (diarrhea), muscle soreness and weakness, fever, respiratory and neurological abnormalities, and myocardial failure.

   b. **Differential Diagnosis**: Other conditions such as collagen disorders and systemic illnesses with diverse manifestations.

   c. **Diagnosis**: Muscle biopsy often conclusive. EIA for IgG and IgM is very sensitive and specific. Eosinophilia, skin tests, and serologic tests may aid in diagnosis.

3. **Incubation**: 1-45 days; usually about 10-14 days after ingestion of infected meat.

4. **Reservoir**: Swine and wild animals, including wild boar, fox, wolf, bear, and rats.

5. **Source**: Meat of infected animals.

6. **Transmission**: Ingestion of flesh of animals containing viable encysted trichinae, chiefly, insufficiently cooked pork.

7. **Communicability**: Not person to person.

8. **Specific Treatment**: Mebendazole; corticosteroids in severe cases of cardiac or central nervous system disease.

9. **Immunity**: None

REPORTING PROCEDURES

1. **Reportable**. *California Code of Regulations*, Sections 2500 and 2622.

2. **Report Form**: **TRICHINOSIS CASE REPORT (CDPH 8606)**

3. **Epidemiologic Data**:

   a. Kinds of meat eaten during month prior to onset: pork or pork products, wild game; include dates, places and preparation of home or commercial food.

   b. Names and addresses of others eating suspected food.

   c. Investigate the possibility of an unlicensed meat source, slaughterhouse. Notify ACDC; and Environmental Health Food and Milk Unit.

   d. Investigate any ethnic foods purchased or consumed. Notify ACDC; and Environmental Health Food and Milk Unit.

CONTROL OF CASE, CONTACTS & CARRIERS

Investigate within 24 hours to determine if commercial food is implicated or if suspected noncommercial source is still available for consumption. Hold any suspected food products for possible laboratory analysis. Prohibit further use of contaminated product.

CASE: No restrictions.

CONTACTS: No restrictions.

CARRIERS: Not applicable.

PREVENTION-EDUCATION

1. Cook pork and wild game thoroughly.

2. Advise that home freezing does not necessarily kill trichinae.

3. Clean potentially contaminated utensils including meat grinder, chopping board, knives.

4. Avoid feeding uncooked garbage to swine.

DIAGNOSTIC PROCEDURES

1. Food samples to be collected by the Food and Milk inspector. Embargo suspected meat in original container and refrigerate. Obtain signed **SPECIMEN RELEASE FORM (H-137)**.

   Container: Clean, covered container.

   Laboratory Form: **PARASITOLOGY (H-383)**.

   Examination Requested: Trichinosis.

   Material: Suspected food (meat).

   Storage: Refrigerate.

   Remarks: Collect lean portions of suspected food (meat).

2. **Serology**: To California State Department of Health.

   Container: State Special Serology.

   Laboratory Form: **State Special Serology (Lab 413)**.

   Examination Requested: Trichinosis.

   Material: Clotted blood.

   Amount: 10 ml.

   Storage: Refrigerate.

   Remarks: The State performs a qualitative latex agglutination test. If positive, it is sent to CDC for a quantitative bentonite flocculation (BF) test; diagnostic titer is >1:5. A rise in titer is significant. Collect second blood specimen 1 month later as necessary. Allow 2 weeks to 2 months for results.

TULAREMIA

1. **Agent**: *Francisella tularensis*, a pleomorphic, gram-negative coccobacillus.

2. **Identification:**

   a. **Symptoms**: Focal ulcer at the site of entry of the bacteria, regional lymphadenopathy, fever, prostration, myalgia, and headache. Pneumonia accompanied by pleurisy, or a typhoid fever-like illness possible.

   b. **Differential Diagnosis**: Bubonic plague, typhoid fever, sporotrichosis, influenza, tuberculosis pulmonary, brucellosis, cat scratch fever, infectious mononucleosis.

   c. **Diagnosis**: Serology, culture of *F. tularensis* from lesion or blood, identification of organism by fluorescent antibody, or ≥ 4-fold rise in antibody titers between acute and convalescent sera.

3. **Incubation period**: 2-10 days, usually 3 days.

4. **Reservoir**: Numerous wild animals, e.g., beavers, lagomorphs (rabbits and hares), muskrats, and some domestic animals; various hard ticks.

5. **Source**: Infected blood and tissue of animals and arthropods, contaminated water, dust containing the bacteria.

6. **Transmission**: Inoculation of mucous membranes, skin, or eye after handling infected tissue; bite of infective vector, i.e., ticks, deerflies, and mosquitoes; bite of carnivore with mouth contaminated by eating infected carcass (rare); ingestion of contaminated water or inadequately cooked meat; inhalation of contaminated dust.

7. **Communicability**: Not person-to-person. Agent may be found in blood during the first 2 weeks of the disease and in lesions more than a month after onset. Deer flies are infective for up to 14 days; ticks are infective for life.

8. **Specific Treatment**: Streptomycin or gentamicin are drugs of choice; tetracyclines, chloramphenicol.

9. **Immunity**: Long term.

REPORTING PROCEDURES

1. **Reportable**. *California Code of Regulations*, Section 2500.

2. **Report Form**: **TULAREMIA CASE REPORT (CDPH 8559)**

3. **Epidemiologic Data:**

   a. Contact with animals, especially muskrats and rabbits.

   b. History of bite from ticks, deerflies, or mosquitoes.

   c. Source of food and water.

   d. Location of lesions.

   e. Occupation and exact address.

   f. Travel to endemic areas during incubation period.

   g. Names and addresses of contacts with same exposure as case.

CONTROL OF CASE, CONTACTS & CARRIERS

Investigate within 7 days.

CASE:

Isolation: Wound and body fluid precautions.

CONTACTS: No restrictions.

CARRIERS: Not applicable.

PREVENTION-EDUCATION

1. Cook game thoroughly; do not rely on freezing or smoking to kill the agent.

2. Do not drink untreated water.

3. Avoid handling or being bitten by ticks, deerflies, and mosquitoes in endemic areas.

4. Use insect repellants.

5. Use impermeable gloves when dressing game.

6. Wear a mask, impermeable gloves, gown, and eye protection when working with cultures of *F. tularensis* in the laboratory.

7. Live attenuated vaccine is available for occupational risk groups, (e.g., laboratory personnel who work with the organism), from U.S. Army Medical Material Activity, Attn: SGRD-UMB, Fort Detrick, Frederick, MD 21701-5009, USA.

DIAGNOSTIC PROCEDURES

1. **Serology** Paired sera required

   Container: Serum Separator Tube (SST)

   Laboratory Form: **Miscellaneous (H-378)**.

   Examination Requested: Tularemia.

   Material: Whole, clotted blood.

   Amount: 8-10 ml.

   Storage: Refrigerate.

   Remarks: Obtain acute specimen as soon as possible and convalescent serum at 3 and 5 weeks after onset. Send each specimen to Public Health Laboratory as soon as it is collected.

2. For material other than blood, consult Public Health Laboratory, Bacteriology.

TYPHOID FEVER, ACUTE

(See also TYPHOID CARRIER, PARATYPHOID, and SALMONELLOSIS)

1. **Agent**: *Salmonella typhi*, a gram-negative bacillus.

2. **Identification**:

   a. **Symptoms**: Systemic infectious disease with fever, headache, malaise, anorexia, diminished frequency of stool more common than diarrhea, bradycardia, enlargement of spleen and rose spots on trunk. Ulceration of Peyer's patches of ileum in late untreated disease may cause bloody diarrhea.

   b. **Differential Diagnosis**: Appendicitis, cholecystitis, other diseases with fever or rash, typhoid carrier.

   c. **Diagnosis**:

      Culture: Positive blood, feces or urine confirms diagnosis. Blood may be positive as early as first week; feces and urine after first week.

      Serum agglutination: Serologic test for "O" and "H" titers. No single titer or combination is diagnostic and should **not** be substituted for blood culture. Consult ACDC.

3. **Incubation period**: 2 weeks average; range 1 to 3 weeks.

4. **Reservoir**: Human.

5. **Source**: Feces and urine of infected person. Possibly infected draining wounds.

6. **Transmission**: Fecal-oral route by direct or indirect contact with feces or urine of case or carrier; ingestion of contaminated food or milk; raw shellfish from contaminated water; flies may be vectors.

7. **Communicability**: As long as bacilli are shed in excreta, usually after first week of illness into convalescence; 2-5% of acute cases become chronic carriers.

8. **Specific Treatment**: Ciprofloxacin, ceftriaxone or ofloxacin. Antibiotic sensitivity tests should be obtained on all typhoid isolates. Consult with ACDC as needed.

9. **Immunity**: Generally lifelong.

REPORTING PROCEDURES

1. Reportable. (*California Code of Regulations*, Sections 2500 and 2628). Report within 1 working day of identification.

2. **Report Form**:

   TYPHOID AND PARATYPHOID FEVER CASE REPORT (CDPH 8567)

   RELEASE OF ACUTE OR CONVALESCENT TYPHOID FEVER CASE (acd-typhoidcase release), formerly H-1961

   The original CDC 52.5 E form should be submitted as soon as the investigation is complete. Do not hold in the district pending completion of mandated clearance. District follow-up for mandated clearance or sensitive occupations or situations (SOS) can be continued without the original form.

3. **Epidemiologic Data:**

   a. Date and source of first positive culture.

   b. Onset, symptoms, birthplace, travel history, and treatment of case.

   c. Household contact roster. Include visitors within incubation period. Name, address, relationship, occupation, dates of contact. History of typhoid or exposure or similar illness; if so, where and when. Identify those persons in SOS.

   d. Travel itinerary during incubation period. Include places and dates. If homes visited, obtain information as in "b" above. If travel out of country, include mode of travel. If possible, identify suspect food or beverage ingested, where it was obtained and how contaminated.

e. If case occurred in commercial travel group, investigate all members of group.

CONTROL OF CASE, CONTACTS & CARRIERS

Contact on day of report to determine if sensitive occupation or situation (SOS) involved; otherwise, investigate within 3 days. For definition of SOS, see B-73, **Part I**, Section 12. Individuals living in a group setting, including a skilled nursing or intermediate care facility, are considered to be in a sensitive situation.

Protection of the public health is a priority in management of SOS. Reasonable efforts to contact the case must be made by the PHN. If unable to locate or if case is uncooperative, refer to PHI in a timely manner to assist in locating case and determining SOS.

Public Health Nursing Protocol:
Home visit is required – a face to face interview is required.

Refer to "Public Health Nursing Home Visit REQUIRED Algorithm" (B-73 Part IV Public Health Nursing Home Visit Protocol).

Case cannot be released from supervision until cleared according to public health law.

Prior written approval from the Area District Medical Director, after consultation with ACDC is required before any admission to a skilled nursing or intermediate care facility (B-73, **Part II**, Section 2A).

CASE:

1. **Precautions**: Blood/body fluids and enteric until clinical recovery.

2. **Sensitive Occupation or Situation**: Remove from work until **3** consecutive feces and urine cultures taken at least 24 hours apart, **beginning at least 1 week after discontinuation of specific therapy and not earlier than 1 month from onset**, are negative for *S. typhi* **at Public Health Laboratories.**

3. If **any** one of the clearance specimens is positive for typhi/paratyphi, the case must begin surveillance to assess for convalescent carrier status. A set of stool and urine should be collected at **one month** intervals until **three consecutive negative** sets are obtained. If the case continues to shed in either stool or urine for **more than three months** after acute onset of illness, the case meets criteria as a **convalescent carrier** (see section Typhoid Fever, Carrier). The case should be managed as such and continue to have monthly cultures until convalescent carrier clearance is completed or the case has been shedding for over 12 months at which time the case must be reported and followed as a chronic carrier.

4. **Non-sensitive Occupation or Situation**: **As above** except do not remove from work.

CONTACTS:

Household members or persons who share a common source.

1. **Sensitive Occupation or Situations:**

   a. **Symptomatic**: Confirm diagnosis. Remove from work. If positive, follow as a case. If negative, remain removed from work until **2** consecutive feces and urine cultures, taken at least 24 hours apart, are negative. Then, weekly negative specimens of both feces and urine until case released or contact with case broken. If contact to carrier, consult ACDC.

   b. **Asymptomatic**: Remove from work until **2** consecutive feces and urine cultures, taken at least 24 hours apart, are negative. Then, may return to work with weekly negative specimens of both feces and urine until case released or contact with case broken. If contact to carrier, consult ACDC.

2. **Non-sensitive Occupations**: May continue to work. Obtain **2** consecutive feces and urine cultures at least 24 hours apart for

additional case finding or identification of carriers.

PREVENTION-EDUCATION

1. Stress hand washing, personal hygiene and the need to keep fingernails short and clean.

2. Dispose of urine, feces, and fomites in a safe manner.

3. Prepare, store, and refrigerate foods properly.

4. Identify, supervise, and educate typhoid carriers (See TYPHOID CARRIER).

5. Typhoid Vaccination: Vaccination is not 100% effective and is not a substitute for careful selection of food /drink especially in areas not on the usual tourist itineraries. Tourists may wish to consider vaccination. There are currently three typhoid vaccines available in the United States: an oral live-attenuated, a parenteral heat-phenol-inactivated vaccine, and a capsular polysaccharide vaccine. All vaccines have approximately 50-80% protection depending on the degree of exposure.

DIAGNOSTIC PROCEDURES

Container: Enterics.

Laboratory Form: **Test Requisition Form H-3021 (Rev. 9/07)**

Examination Requested: *Salmonella typhi* (indicate if acute case or suspected carrier).

Material: Feces and urine; follow instructions provided with the container.

Storage: Protect from excessive heat. Maintain at room temperature.

Remarks: Check with the Public Health Laboratory regarding sensitivity testing.

TYPHOID FEVER, CARRIER

(See also **TYPHOID FEVER**, **ACUTE** and **SALMONELLOSIS**.)

1. **Agent**: *Salmonella typhi*, a Gram-negative bacillus.

2. **Identification**:

   a. **Symptoms**: None.

   b. **Differential Diagnosis**: Not applicable.

   c. **Diagnosis**: A carrier is an asymptomatic person who sheds typhoid bacteria from stool or urine, occasionally from wound, tissues, and organs. There is a higher incidence in older women.

   d. **Definitions**:

   - **Convalescent Carrier**: Sheds typhoid bacilli for 3 or more months after onset of acute illness.

   - **Chronic Carrier**:

     - Sheds typhoid bacilli for more than 12 months after onset of acute illness; or

     - Has no history of typhoid fever or had the disease more than 1 year previously, but has two feces or urine cultures positive for *S. typhi* separated by 48 hours.

   - **Other Carrier**: Typhoid bacilli have been isolated from surgically removed tissues, organs, or from draining lesions.

3. **Incubation period**: Not applicable.

4. **Reservoir**: Human (intestine, possibly gallbladder, kidney or wound).

5. **Source**: Feces and urine of infected person.

6. **Transmission**: Direct or indirect contact with contaminated feces or urine.

7. **Communicability**: As long as patient sheds typhoid bacilli.

8. **Specific Treatment**: Current therapy for chronic carrier is not 100% effective. Contact ACDC for suggested treatment protocol of chronic carrier.

9. **Immunity**: Not applicable to carrier. Immunization of contacts may be offered selectively. Consult with ACDC.

REPORTING PROCEDURES

1. **Reportable**. *California Code of Regulations*, Sections 2500 and 2628. Report within 1 working day of identification.

2. **Report Form**:

   When case is first identified:
   - **TYPHOID CARRIER CASE REPORT (CDPH 8566)**.

   - **TYPHOID CARRIER AGREEMENT, English (CDPH 8563)** or **TYPHOID CARRIER AGREEMENT, Spanish (DHS 8563)** when case is first identified.

   To remove case:
   - **RELEASE OF CHRONIC TYPHOID CARRIER (acd-typhoid carrier release)** (*formerly H-538*).

   To monitor cases:
   - **TYPHOID CARRIER SEMI-ANNUAL REPORT (acd-typhoid semi-rep)** (*formerly H-481*).

Note: Based on information from above forms, ACDC will complete and submit **TYPHOID CARRIER REGISTER—SEMI-ANNUAL UPDATE (CDPH 8466).** This form should not be completed by staff outside ACDC.

3. **Epidemiologic Data**:

   a. Occupation and volunteer activities related to health care, childcare, and food preparation.

   b. History of typhoid fever, with date and place of residence at time diagnosed.

c. History of typhoid fever in family, relatives, friends and neighbors, with place of residence and time of illness.

d. Name and address of case(s) traced to carrier. Identify probable method and time of transmission.

e. Place of birth of carrier, reason for obtaining first positive culture.

CONTROL OF CASE, CONTACTS & CARRIERS

Public Health Nursing Protocol:
Home visit is required – a face to face interview is required.

Refer to "Public Health Nursing Home Visit REQUIRED Algorithm" (B-73 Part IV Public Health Nursing Home Visit Protocol).

For definition of sensitive occupation or situation (SOS), see B-73, **Part I**, Section 12. Individuals living in a group setting, including a skilled nursing or intermediate care facility, are considered to be in a sensitive situation.

Carriers cannot be released from supervision until cleared according to public health law.

Prior written approval from the Area Medical Director after consultation with ACDC is required before any admission to a skilled nursing or intermediate care facility (B-73, **Part II**, Section 2A).

1. **RESTRICTIONS FOR ALL CARRIERS**:

   a. Enteric precautions, as long as feces and/or urine remain positive for bacilli.

   b. Exclude from SOS.

   c. Must sign "**Carrier Agreement**" and adhere to it. If in violation, consult ACDC.

   d. May not be admitted to skilled nursing facility without prior approval of ACDC.

2. **CONVALESCENT CARRIERS**:

   a. Release when 3 consecutive feces and urine cultures, taken at intervals of 1 month, and beginning 1 week after completion of specific therapy, are negative. Releases may be given 3-12 months after onset.

   b. If unable to obtain release 1 year after onset, report and follow as chronic carrier.

   c. Specimens must be submitted to the Public Health Laboratory.

3. **CHRONIC CARRIERS**:

   a. Visit at least twice yearly and offer to repeat cultures every 6 months. Repeating cultures is voluntary. If surveillance specimen is negative, proceed with attempt to clear. Verify address and adherence to "**Carrier Agreement**."

   b. **Release**: Request release from State Department of Health Services through ACDC when:

      - **Fecal or gallbladder carrier**: 6 consecutive negative feces and urine specimens submitted at 1-month or greater intervals beginning at least 7 days after completion of therapy.

      - **Urinary or kidney carrier**: 6 consecutive negative urine specimens submitted at 1-month or greater intervals beginning at least 7 days after completion of therapy.

NOTE: All specimens must be submitted to the Public Health Laboratory.

4. **OTHER CARRIERS**:

   a. Visit at least twice yearly and offer to repeat cultures every 6 months. If the surveillance specimen is negative, proceed with attempt to clear. Verify address and adherence to "**Carrier Agreement**".

   b. Official release is not effective until the local Health District receives a notice in writing from ACDC and/or the State Health Department.

CONTACTS: Household members or frequent contacts to the carriers.

1. **Sensitive Occupation or Situations**:

   a. **Symptomatic**: Confirm diagnosis. Remove from work. If positive, follow as a case. If negative, remain removed from work until 2 consecutive feces and urine cultures, taken at least 24 hours apart, are negative. Then, negative specimens of both feces and urine each week until case released or contact with case broken. If contact to carrier, consult ACDC.

   b. **Asymptomatic**: Remove from work until 2 consecutive feces and urine cultures, taken at least 24 hours apart, are negative. Then, may return to work with weekly negative specimens of both feces and urine until case released or contact with case broken. If contact to carrier, consult ACDC.

2. **Non-sensitive Occupations**: May continue to work. Obtain 2 consecutive feces and urine cultures at least 24 hours apart for additional case finding or identification of carriers.

PREVENTION-EDUCATION

1. Supervise and educate the typhoid carrier. During semi-annual visits, review contents of "**Carrier Agreement**" with patient. Document responses.

2. Stress hand washing, personal hygiene and the need to keep fingernails short and clean.

3. Dispose of urine, feces, and fomites in a safe manner.

4. Offer to immunize contacts (as defined in this section) where hygiene is questionable and/or contacts are in SOS.

5. Prepare, store and refrigerate foods properly.

6. Inform private physician of carrier status, if patient does not do so, to assure that enteric precautions will be taken during care of patient. If applicable, inform private physician that patient may not be admitted to a skilled nursing facility without prior health department approval.

7. If patient is mentally or physically disabled, identify and educate a responsible person about disease prevention. Obtain signed agreement from a responsible person.

DIAGNOSTIC PROCEDURES

Culture:

Container: Enterics.

Laboratory Form: **Test Requisition and Report Form H-3021**

Examination Requested: *Salmonella typhi* (indicate if acute case or suspected carrier).

Material: Feces and urine; follow instructions provided with the container.

Storage: Protect from excessive heat. Maintain at room temperature.

Remarks: Other body fluid cultures available. Consult the Public Health Laboratory, Bacteriology Section.

TYPHUS, FLEA-BORNE (Murine Typhus, Endemic Typhus)

1. **Agent**: *Rickettsia typhi*, a pleomorphic, obligate intracellular coccobacillus.

2. **Identification:**

   a. **Symptoms**: Variable onset with severe headache, chills, fever, myalgias. A macular rash may appear 3-5 days after onset. Untreated disease terminates by rapid lysis after 2 weeks of fever. The disease is mild in young children. A milder course, seasonality, sporadic distribution, and the absence of lice help differentiate this disease from louse-borne typhus.

   b. **Differential Diagnosis**: Influenza-like illness, viral exanthems, other rickettsial diseases.

   c. **Diagnosis**: Typhus fever group antibodies (IgG, IgM) by IFA; must be confirmed by species-specific IFA. Complement fixation (CF) positive by second week. Cases are confirmed by a single high IgM titer or a fourfold rise in antibodies to *R. typhi.* A Weil-Felix Proteus OX-19 titer is not diagnostic.

3. **Incubation**: 1-2 weeks, commonly 12 days.

4. **Reservoir**: Rats, opossums, outdoor cats.

5. **Source**: Infected fleas.

6. **Transmission**: Infected fleas defecate during feeding and contaminate the bite site and other breaks in the skin.

7. **Communicability**: Not person-to-person. Fleas are infective for life.

8. **Specific Treatment**: Tetracyclines or chloramphenicol.

9. **Immunity**: Generally lifelong, but reinfection can occur.

REPORTING PROCEDURE

1. **Reportable**. *California Code of Regulations*, Title 17, Section 2500.

2. **Report Form**: **TYPHUS AND OTHER NON-SPOTTED FEVER RICKETTSIOSES CASE REPORT (CDPH 8580)**

3. **Epidemiologic Data:**

   a. Occupation and outdoor hobbies.

   b. History of flea bites, presence of animals, i.e., rats, cats, opossums, and fleas at work or home.

   c. Travel to or residence in endemic areas. In California, the north central and some eastern sections of Los Angeles County, as well as Orange, Santa Barbara, San Bernardino and San Diego Counties are endemic areas.

CONTROL OF CASE, CONTACTS & CARRIERS

Investigate case within 3 days.

CASE:

Isolation: None.

CONTACTS: No restrictions.

CARRIERS: Not applicable.

PREVENTION-EDUCATION

Control fleas, pets, and wild animals around work or home. Homes should be rodent-proof, yards clear of heavy undergrowth and debris, pet food should not be left outside to discourage harborage by wild animals.

DIAGNOSTIC PROCEDURES

Clinical and epidemiologic history required to aid in the selection of laboratory tests.

1. **Serology**: Paired sera required.

   Container: Serum separator tube (SST) and a **VIRAL, RICKETTSIAL & CHLAMYDIAL DISEASE EXAMINATION FORM (H-789)**.

   Test requested: Typhus Serology.

Material: Whole clotted blood

Amount: 8-10 ml.

Storage: Refrigerate.

Remarks: Collect first (acute) blood specimen as soon as possible. Collect second (convalescent) blood approximately 2 weeks after the first. Send each specimen to Public Health Laboratory as soon as it is collected.

VIBRIOSIS, NON-CHOLERA (See also CHOLERA)

1. **Agent**: *Vibrios* are actively motile, gram-negative, curved rod-shaped bacteria that live freely in marine or brackish waters. At least thirty *Vibrio* species have been identified as causing human illness. See table for most common species and their presentations.

Clinical Presentations of the Most Common Vibrio Species Associated with Human Illness	
Gastrointestinal Illness	Sepsis or Wound Infection
cholerae non-01 *parahaemolyticus* *fluvialis* *mimicus* *hollisae* *furnissii*	*vulnificus* *alginolyticus* *damsela* *parahaemolyticus* (rarely) *cholerae* non-01 (rarely)

2. **Identification:**

   a. **Symptoms**: Illness can be classified into three categories: gastroenteritis, septicemia, and wound infection. Mortality rate for *V. vulnificus* septicemia in persons with underlying liver disease is 50%.

   b. **Differential Diagnosis**: Other causes of foodborne illness or septicemia.

   c. **Diagnosis**: Culture identification of specimens such as stool, blood, or wound discharge.

3. **Incubation**: Varies by presentation; foodborne illness generally presents within 12-24 hours.

4. **Reservoir**: Marine coastal regions are the natural habitat.

5. **Source**: Contact with brackish or salt water, or consumption of foods derived from or contaminated with seawater, especially shellfish.

6. **Transmission**: Ingestion of any raw or inadequately cooked seafood, or any food cross-contaminated by handling raw seafood or rinsing with contaminated seawater.

7. **Communicability**: Generally not communicable from person to person, but potentially communicable by fecal-oral means.

8. **Specific Treatment**: For gastrointestinal illness, fluid replacement and supportive care; antibiotics in severe disease may shorten duration. For septicemia and wound infection, antibiotics are required. Tetracylines are the drug of choice, while chloramphenicol and trimethoprim-sulfamethoxazole may be effective.

9. **Immunity**: None.

REPORTING PROCEDURES

1. **Reportable**, *California Code of Regulations*, Section 2500.

2. **Report Form**: **CHOLERA AND OTHER *VIBRIO* ILLNESS CASE REPORT (CDPH 8587)**

   CDC CHOLERA AND OTHER *VIBRIO* ILLNESS SEAFOOD INVESTIGATION REPORT FORM [CDC 52.79 (E)]

3. **Epidemiologic Data**:

   a. Ingestion of raw or partially cooked seafood, especially oysters and crabs. Water or food contaminated with seawater.

   b. Recent travel to areas with inadequate sewer service.

   c. Exposure to water, such as swimming, surfing, fishing, and aquarium maintenance.

   d. Pre-existing medical conditions or medical treatments (antibiotics, antacids or H-2 blocker, peptic ulcer or gastric surgery, alcoholism or other liver disease, diabetes, HIV infection, corticosteroids, etc.) which might increase susceptibility.

   e. Pre-existing wound or receipt of a wound exposed to water or marine animals.

f. Specific seafood consumption history for 7 days prior to illness, indicating if eaten raw or cooked; source of seafood if known and place of purchase.

g. When seafood is suspected as the source of infection, additional questions must be answered concerning the method of preparation, specific location where seafood was obtained, shipping lot numbers, harvest site, environmental conditions of the harvest area, and conditions of storage and holding. The people conducting the Food and Milk investigation complete this information.

CONTROL OF CASE, CONTACTS & CARRIERS

Initiate investigation within one day of report.

Public Health Nursing Home Visit Protocol:
Home visit as necessary – a face to face interview is conducted as necessary.

Refer to "Public Health Nursing Home Visit AS NECESSARY (HVAN) Algorithm" (B-73 Part IV Public Health Nursing Home Visit Protocol).

CASE:

Precautions: Enteric Precautions or Wound and Body Fluid Precautions, as appropriate.

1. Gastroenteritis: remove from sensitive occupation or situation until one negative stool.

2. If patient dies, refer to **Part III, MORTICIANS & CEMETERIES**.

CONTACTS: Household members or persons who share a common source.

1. **Sensitive Occupation or Situation**:

   a. **Symptomatic**: Treat as a case. Remove from work until asymptomatic and on therapy. Release specimens not mandatory.

   b. **Asymptomatic**: Do not remove from work.

2. **Non-Sensitive Occupation or Situation**: May obtain specimens on all household contacts and other suspect contacts to identify source of infection.

CARRIERS: Not applicable.

PREVENTION-EDUCATION

1. Stress hand washing and personal hygiene.

2. Dispose of feces in a safe, sanitary fashion.
3. Take precautions with food and water during recreation. Avoid ingestion of seawater.

4. Protect water supply from seawater or fecal contamination.

DIAGNOSTIC PROCEDURES

Consult with the Bacteriology Section of the Public Health Laboratory.

Container: Feces-Parasite.

Laboratory Form: **Test Requisition Form H-3021 (Rev. 9/07)**

Examination Requested: Culture.

Material: Feces. Follow instructions provided with container.

Amount: Walnut size.

Storage: Do not refrigerate; protect from overheating.

WATERBORNE DISEASE OUTBREAKS

1. **Agent**: A variety of agents can cause symptomatic waterborne infection, including bacteria, viruses and parasites.

   A waterborne outbreak is a cluster of two or more infections caused by the same agent(s) and linked in time and a common water exposure or consumption.

   A waterborne outbreak may involve:
   a) Recreational water
      -treated water includes swimming pools, spa/whirlpools, hot tubs
      -untreated water which includes freshwater lakes, rivers, beaches and hot springs

   b) Water intended for drinking.

   c) Water not intended for drinking or water of unknown intent which includes cooling towers, air conditioning systems, misters, decorative water fountains and reclaimed water.

2. **Identification:**

   a. **Symptoms**: Vary by etiologic agent. May involve an acute onset of gastrointestinal, pulmonary, respiratory or febrile illness depending on underlying infectious etiology.

   b. **Differential Diagnosis**: Agents that cause waterborne illnesses outbreaks include but are not limited to Cryptosporidium, Giardia, *Legionella spp*., Norovirus, *Shigella,* swimmer's itch, vibrios, and viral hepatitis agents (A, E).

   c. **Diagnosis**: Based on the clinical history of patients and laboratory results from patients and/or suspected waterborne sources.

   d. Many etiologic agents of disease can potentially be transmitted by water. For disease-specific information, refer to the individual disease sections.

REPORTING PROCEDURES

1. Outbreaks are reportable under *California Code of Regulations,* Section 2502

2. Immediate telephone report of outbreak or suspected outbreak is required to:

   a. Morbidity Unit during working hours; or

   b. ACDC, Director of Community Health Services or Director of Environmental Health.

   c. After working hours contact via the County Operator

3. Morbidity Unit assigns an outbreak number.

4. **Report Forms**: Depends on route of transmission as determined by investigation

Use the following forms to report waterborne outbreaks:

General or non-health care facilities:
OUTBREAK/UNUSUAL DISEASE REPORT (CDPH 8554)

For acute health care facilities:
CD OUTBREAK INVESTIGATION ACUTE HEALTH CARE FACILITY (HOSPITAL)

For sub-acute care facilities:
CD OUTBREAK INVESTIGATION SUB-ACUTE HEALTH CARE FACILITY (H-1164-SubAcute)

Use the following forms to report waterborne outbreaks to the State based on the type of water associated with the outbreak being reported (See form instructions):

-Treated Recreational Water (CDC 52.12)

-Untreated Recreational Water (CDC 52.12)

-Water Intended for Drinking (CDC 52.12)

-Water Not Intended for Drinking or Water of Unknown Intent (CDC 52.12)

If the etiologic agent of infection is reportable as an individual case, confirmed case should be entered into vCMR and **separate epidemiologic forms must be filled for each case**, in addition to the outbreak summary report.

5. **Epidemiologic Data for Outbreaks:**

   a. Establish a case definition based on the case's symptoms, include laboratory data if appropriate.

   b. Confirm etiology of outbreak using laboratory data from clinically ill individuals.

   c. Create line list of ill individuals to include:
      i. Name of case
      ii. Date of onset
      iii. Symptoms
      iv. Age
      v. Hospitalization status/Name of Hospital/Date of admission/Admission diagnosis
      vi. Results of laboratory tests
      vii. Travel history, if relevant
      viii. Medical treatment
      ix.Source/location of water exposure
      x. Epi links to other cases

   d. Create an epi-curve, by date of onset for all cases during the outbreak. Include cases meeting case definition and probable cases.

   e. Maintain surveillance for new cases until the baseline rate is down to "normal" or no new cases for one week.

   f. Look for suspected source of contaminated water and all possible water exposures to include: inhalation, aspiration, contaminated produce and oral intake during incubation period.

   g. Conduct an epidemiologic study to detect the course of the outbreak and to determine if the illness originated from a single source or is ongoing.

   h. In collaboration with the Public Health Laboratory, obtain appropriate environmental testing of water and other items exposed in the environment to contaminated water (i.e., shower head, facets filters, exhaust hoods, HVAC systems) from various sources as directed by Environmental Health Program and ACDC.

   i. Follow-up on all water testing investigation results.

   j. For suspected source, note date of specimen consumption and potential for cross contamination.

   k. **Secondary Transmission**: obtain information regarding illness in the non-water consuming contacts to ill individuals.

CONTROL OF CASE, CONTACTS & CARRIERS

When no specific agent is known or suspected to be involved, investigate within one day of report or within three days if episode is reported late.

Follow-up as required by specific waterborne infectious agent with appropriate isolation, restriction from work and other activities, vaccination or use of post exposure prophylaxis if warranted.

1. **Chief, Environmental Health (EH)**

   a. Investigates and clarifies the original account of episode in collaboration with ACDC.

   b. Collaborates with ACDC in determining the course of field investigation to be made, including source of water, methods of water handling, preparation, and storage.

   c. Collects relevant water specimens. Determines the relevance of water specimens under the direction of Chief, ACDC.

   d. Maintains written reports of Environmental Health Specialists investigations.

   e. Chief of EH, in consultation with ACDC, will have authority to close recreation facility and/or other source facilities for waterborne disease outbreak if appropriate.

2. **Chief, Acute Communicable Disease Control**

   a. Is the lead authority and responsible to investigate and control a waterborne illness or known hazardous condition caused by biological agent

   b. Provides the lead in the investigation and control

of large outbreaks, multi-area episodes and episodes occurring outside working hours.

c. Notifies involved district and Environmental

Health program, Community Health Services Director, Area Health Officer, and Medical Director of pertinent epidemiologic findings.

d. Chief of ACDC will have authority to close recreation or health facility if appropriate.

3. **Department Water and Power** or **Private Water Company:**

Providing source of water should be notified of outbreak or case cluster investigation. This entity will also advise in water treatment and remediation of water source.

PREVENTION-EDUCATION

Implement hygienic measures applicable to diseases transmitted via fecal-oral mouth, or respiratory transmission of infected water.

1. Obtain water from safe sources.

2. Proper hand hygiene before meals and after using the restroom.

3. Individuals who come in contact with diapered/incontinent children and adults shouldensure they are properly washing their hands.

4. Persons with diarrhea should not go swimming in order to prevent transmission to others.

5. Persons should avoid drinking untreated water that may be contaminated.

6. Avoid fecal exposure during sexual activity.

7. Proper water treatment of source water.

8. Proper Maintenance of recreational water facilities.

9. Proper maintenance of water exposures in medical facilities and treatment and testing.

10. Proper use of recycled and reclaimed water.

For other diseases, refer to the individual disease section.

DIAGNOSTIC PROCEDURES

For disease-specific information, refer to the individual disease sections.

Submit clinical specimens as requested by Chief, ACDC. ACDC will consult with PHL regarding proper collection and handling, storage shipping/transportation of any additional clinical or environmental specimens.

WEST NILE VIRUS

1. **Agent:** WNV is a mosquito-borne flavivirus.

2. **Identification:**

   a. **Symptoms**: Most infections may include fever, 80% are asymptomatic. Mild to severe headache, nausea, vomiting, muscle weakness, stiff neck, altered consciousness, rash, limb paralysis, coma and death.

   b. **Clinical Syndromes**: Asymptomatic (detected most commonly in a blood donor), WNV Fever (WNF) and neuroinvasive disease which includes: meningitis, encephalitis, and acute flaccid paralysis (AFP)

   c. **Diagnosis**:

   - WNV specific IgM antibodies in CSF or acute-phase serum suggest recent infection. A four-fold rise in titer in paired acute and convalescent sera by enzyme immunoassay and or immunofluorescence assay (IFA) confirms recent infection.

   - Other diagnostics: reverse transcriptase – polymerase chain reaction (for CSF only) rarely used in human diagnostics and plaque reduction neutralization (confirmatory test completed at the State or CDC level).

3. **Incubation**: Usually 3-14 days

4. **Reservoir**: Birds are the primary reservoirs for WNV.

5. **Source**: Infective mosquito. WNV is also transmitted through WNV-infected blood products and organ tissue, and also potentially transplacentally and through blood screening. All blood products and organ donations are screened for the presence of WNV.

6. **Transmission**: Bite of an infective mosquito.

7. **Communicability**: Not transmitted person-to- person

8. **Specific treatment**: Supportive

9. **Immunity**: Thought to be lifelong

REPORTING PROCEDURES

1. Reportable (Title 17, Section 2500 and 2505, California Code of Regulations). Cases of persons with any positive WNV test must be reported within one working day using a standard Confidential Morbidity Report; the CMR may be faxed to the DPH Morbidity Unit or called in during normal business hours.

2. **Report Form:**

   WEST NILE VIRUS (WNV) INFECTION CASE REPORT (CDPH 8687)

   WEST NILE VIRUS INFECTION SUPPLEMENTAL FORM (acd-wnvsupp)

   WEST NILE VIRUS ACTIVE SURVEILLANCE LABORATORY SUBMITTAL FORM (acd-wnvlabsubmit)

   REPORT OF WEST NILE VIRUS-POSITVE BLOOD DONOR TO THE CALIFORNIA DEPARTMENT OF PUBLIC HEALTH AND GUIDELINES

3. **Epidemiologic and Clinical Data**:

   a. If case was bitten by mosquitoes or was in a mosquito infested area during incubation period, identify as precisely as possible, (address, city, zip) the area where the exposure occurred. Note outdoor activities during dusk.

   b. Increased mortality of dead crows or other corvid species may indicate the presence of WNV activity.

   c. Presence of other human cases or equine cases in the same region.

d. Presence of other human cases or equine cases in the same region.

e. Presence of other human cases or equine cases in the same region.

f. Travel up to 3 weeks prior to onset.

g. Occupation and hobbies.

h. History of organ transplantation or recent receipt of blood products.

i. Results of WNV serum serology and CSF tests, if available.

CONTROL OF CASE, CONTACTS & CARRIERS

Investigate within 1 day. ACDC reviews case investigation and informs the appropriate local mosquito abatement district and State of CA.

CASE: No restrictions.

CONTACTS: No restrictions

CARRIERS: Not applicable

PREVENTION-EDUCATION

1. Prevent mosquito bites by using screens on windows, and wear protective clothing and repellents if outdoor activity occurs in areas with mosquito infestation.

2. Eliminate mosquito breeding sites by emptying containers with stagnant water (i.e., bird baths, old tires, potted plants, swimming pools, pet bowls and other containers).

3. Control adult mosquito population by applying appropriately labeled pesticides. Control of larva and eliminating large breeding areas should be referred to mosquito abatement agencies.

4. Use insect repellent products with no more than 35% DEET for adults and less than 10% to 30% for children. Picaridin and oil of lemon eucalyptus have also shown to offer long-lasting protection against mosquito bites.

DIAGNOSTIC PROCEDURES

Clinical and epidemiologic history required to aid the laboratory in test selection.

See **WEST NILE VIRUS ACTIVE SURVEILLANCE LABORATORY SUBMITTAL FORM (acd-wnvlabsubmit)**

1. **Serology**: Paired acute and convalescent sera required.

   Container: Serum separator tube (SST).
   Test Requisition and Report Form H-3021

   Test requested: Arbovirus antibodies, IgG and IgM.

   Material: Serum.

   Amount: >2 ml of blood.

   Storage: Refrigerate immediately.
   Remarks: Collect first (acute) blood specimen as soon as possible. Collect second (convalescent) blood approximately 2 weeks after the first. Send each specimen to Public Health Laboratory as soon as it is collected.

2. **CSF:** Antibodies, IgG and IgM

   Amount: 1-2ml CSF

   Storage: Refrigerate

YELLOW FEVER

1. **Agent**: Yellow fever virus.

2. **Identification:**

   a. **Symptoms**: Acute onset with fever, backache, bradycardia, nausea, vomiting, jaundice, and hemorrhaging. Leukopenia, albuminuria, and anuria can also occur. Duration is short; severity varies.

   b. **Differential Diagnosis**: Any viral hepatitis, leptospirosis, typhoid fever, dengue, any hemorrhagic fever virus.

   c. **Diagnosis**: Serologic tests. EIA or FA for viral antigen in blood or liver tissue; isolation of virus from blood; complement fixation (CF). Characteristic changes in the liver are also seen.

3. **Incubation**: 3-6 days.

4. **Reservoir**: In urban areas, humans and mosquitoes; in sylvan areas, primates and forest mosquitoes.

5. **Source**: Infected mosquitoes.

6. **Transmission**: Bite of infective mosquitoes.

7. **Communicability**: Not person-to-person. Human blood can infect feeding mosquitoes during first 3-5 days of illness. Mosquito is infected for life, and can transmit virus 9-12 days after feeding.

8. **Specific Treatment**: Supportive measures only.

9. **Immunity**: Permanent.

REPORTING PROCEDURES

1. **Reportable**. *California Code of Regulations* Section 2500 and 2640. **Immediate telephone report of case or suspect case is required.**

   a. Call Morbidity Unit during working hours.

   b. Call the Acute Communicable Disease Control Unit. After hours call County Operator and ask for the Administrative Officer of the Day.

2. **Report Form: YELLOW FEVER CASE REPORT (CDPH 8584)**.

3. **Epidemiologic Data:**

   a. Recent travel to endemic areas. The fatality rate in indigenous populations of endemic areas is <5%, but may reach 50% among non-indigenous groups and in epidemics.

   b. Exposure to mosquitoes.

   c. Reports of febrile illness or unexplained deaths in the area.

CONTROL OF CASE, CONTACTS & CARRIERS

Immediate investigation required.

CASE:

Isolation: Blood and body fluid precautions.

Precautions: Patient should be kept in a screened room for at least five days after onset.

CONTACTS:

Recommend yellow fever vaccine if indicated.

PREVENTION-EDUCATION

1. Vaccine is available for travelers to endemic areas.

2. Minimize contact with mosquitoes in endemic areas by using nets and repellents.

DIAGNOSTIC PROCEDURES

Consult with Public Health Laboratory.

Serology: Paired sera required.

Container: serum separator tube (SST) and a **VIRAL, RICKETTSIAL & CHLAMYDIAL DISEASE EXAMINATION FORM (H-789)**.

Test requested: Yellow fever Serology.

Material: Whole clotted blood.

Amount: 8-10 ml.

Storage: Refrigerate.

Remarks: Collect first (acute) blood specimen as soon as possible. Collect second (convalescent) blood approximately 2 weeks after the first. Send each specimen to Public Health Laboratory as soon as it is collected.

YERSINIOSIS

1. **Agent**: *Yersinia enterocolitica* and *Yersinia pseudotuberculosis* are gram-negative bacilli

2. **Identification**:

   a. **Symptoms**: Acute febrile diarrhea (especially in young children), enterocolitis, acute mesenteric lymphadenitis mimicking appendicitis (especially in older children and adults), complicated in some cases by erythema nodosum (in about 10% of adults, particularly women), post-infectious arthritis and systemic infection.

      Y. enterocolitica infections present more commonly with a gastroenterocolitis syndrome: bloody diarrhea is seen in 10%-30% of *Y. enterocolitica*-infected children; joint pain is reported in half of infected adults.

      Y. pseudotuberculosis presents with fever, rash and abdominal pain.

   b. **Differential Diagnosis**: Other bacterial causes of gastroenteritis or sepsis. Post-infectious arthritis is seen with bacterial chlamydial infection. Since 20% of infections in older children and adolescents can mimic acute appendicitis, outbreaks can be recognized by local increases in appendectomies.

   c. **Diagnosis**: Isolation of organism from stool or blood culture. Serologic tests.

3. **Incubation period**: Usually 3-7 days, range 1-14.

4. **Reservoir**: Animals are the principal reservoir for *Yersinia*. The pig is the principal reservoir for pathogenic *Y. enterocolitica*; asymptomatic pharyngeal carriage is common in swine, especially in the winter. *Y. pseudotuberculosis* is widespread among many species, and particularly among rodents.

5. **Source**: Worldwide. *Y. pseudotuberculosis* is primarily a zoonotic disease of wild and domesticated birds and mammals, with humans as incidental host. *Y. enterocolitica* has been recovered from a wide variety of animals without signs of disease. The most important source of infection may be pork, as the pharynx of pigs may he heavily colonized by *Y. enterocolitica*. Human cases have been reported in association with disease in household pets, particularly sick puppies and kittens.

   Vehicles implicated in outbreaks attributed to *Y. enterocolitica* have included chocolate milk, soybean cake (tofu) and pork chitterlings. Studies in Europe suggest that many cases are related to ingestion of raw or undercooked pork.

6. **Transmission**: Fecal-oral transmission takes place by eating and drinking contaminated food and water or by contact with infected people or animals.

   Transmission by transfusion of stored blood from donors who were asymptomatic or had mild GI illness may occur.

7. **Communicability**: Secondary transmission appears to be rare. There is fecal shedding at least as long as symptoms exist, usually for 2-3 weeks. Untreated cases may excrete the organism for 2-3 months. Prolonged asymptomatic carriage has been reported in both children and adults.

8. **Specific Treatment**: Therapy may be helpful for GI symptoms; definitely indicated for septicemia and other invasive disease.

   Agents of choice against *Y. enterocolitica* are the aminoglycosides (for septicemia only) and trimethoprim/sulfamethoxazole. Quinolones such as ciprofloxacin are also effective. Both *Y. enterocolitica and Y. pseudotuberculosis* are usually sensitive to the tetracyclines, but not to penicillins.

9. **Immunity**: Unknown

REPORTING PROCEDURES:

1. Report cases within 1 day. *California Code of Regulations*, Title 17, Section 2500. Any group of cases of acute febrile gastroenteritis or cases suggestive of appendicitis should be reported at once to the local health authority,

even in the absence of specific identification of the etiology.

2. **Report Form: LAC DHS YERSINIOSIS and CONTACT ROSTER (acd-yersin)**

3. **Epidemiologic Data:**

   a. Source of food (especially meats), milk and water during incubation period

   b. Exposure to others with febrile illness in or outside the household

   c. Attendance at group gatherings where food was served and restaurants or commercial food establishments during incubation period

   d. Travel history

   e. Sensitive occupation or situation

   f. Possible exposure to sewage contaminated water

   g. History of blood transfusion

CONTROL OF CASE, CONTACTS & CARRIERS:

Public Health Nursing Home Visit Protocol:
Home visit as necessary – a face to face interview is conducted as necessary.

Refer to "Public Health Nursing Home Visit AS NECESSARY (HVAN) Algorithm" (B-73 Part IV Public Health Nursing Home Visit Protocol).

Contact within 24 hours to determine if SOS involved, otherwise no routine investigation.

CASE:

1. **Isolation**: Blood and enteric precautions until clinical recovery.

2. Remove those with diarrhea from food handling, patient care and occupations involving care of young children. May return to work after treatment, without clearance specimens.

3. **Quarantine**: None.

4. Investigate general sanitation and search for common-source vehicle; attention to close contacts with animals, especially pet dogs, cats and other domestic animals.

CONTACTS:

1. **Symptomatic**: Remove from work as for case. Confirm diagnosis.

2. **Asymptomatic**: Investigation of contacts and source of infection: Search for unrecognized cases and convalescent carriers among contact indicated only when a common-source exposure is suspected.

PREVENTION-EDUCATION:

1. Wash hands prior to food handling and eating, after handling raw pork and after animal contact.

2. Prepare meat and other foods in a sanitary manner.

3. Avoid eating raw pork; irradiation of meat is effective.

4. Avoid unpasteurized milk.

5. Protect water supplies from animal and human feces; purify appropriately.

6. Control rodents and birds (for *Y. pseudotuberculosis*).

7. Dispose of human, dog and cat feces in a sanitary manner.

8. During the slaughtering of pigs, the head and neck should be removed from the body to avoid contaminating meat from the heavily colonized pharynx.

DIAGNOSTIC PROCEDURES:

Consult Public Health Laboratory.

1. **Culture**

   Container: Enterics

   Laboratory Form: Test Requisition Form H-3021

   Examination Requested: Yersinia

Material: Feces. Follow instructions provided with container.

Storage: Maintain at room temperature. Protect from overheating.

2. **Culture for Identification (CI)**

   Container: Enteric CI

   Laboratory Form: **Test Requisition Form H-3021**

   Material: Pure culture on appropriate medium.

   Storage: Same as above.

APPENDICES

APPENDIX A
EXANTHEMS -- DIFFERENTIAL DIAGNOSIS

Disease	Incubation	Prodromal Signs and Symptoms	Nature of Eruption	Other Diagnostic Features
Chickenpox (Varicella)	2-3 weeks, usually 13-17 days	0-1 day of fever, anorexia, headache. Communicable 1-2 days before and as long as 5 days after rash onset.	Rapid evolution of macules to papules, vesicles, crusts; all stages simultaneously present; lesions superficial, distribution centripetal.	Lesions on scalp and mucous membranes, predominantly on trunk. Pruritic: heals with crusty, slightly adherent scab.
Exanthem subitum (Roseola infantum, HHV-6, Human herpes virus 6)	About 10 days	3-4 days of high fever.	As fever falls, pink maculopapules appear on chest and trunk; fade in 1-3 days.	Posterior occipital lymphadenopathy. Usually under 4 years of age, commonly at about 1 year of age.
Fifth disease (Erythema infectiosum, Parvovirus B-19)	4-14 days, estimated	None; occurs as outbreaks among children.	Red, flushed cheeks; circumoral pallor; maculopapules on extremities.	"Slapped cheek" appearance. Evanescent rash with lacy appearance for 1-5 weeks.
Infectious mononucleosis (Epstein-Barr Mononucleosis)	4-6 weeks or longer	Fever, adenopathy, sore throat; communicability prolonged.	Maculopapular, pink; begins on head and neck, spreads downward; fades in 3 days. No desquamation.	Lymphadenopathy, post-auricular or occipital. Transient arthralgias may occur 2-4 weeks following rash in adults.
Rubella (German Measles)	14-21 days, usually 18 days	Little or no prodrome. Communicable 1 week before rash and 4 days after.	Maculopapular rash resembling measles or scarlet fever, rarely papulovesicular.	Splenomegaly, adenopathy, and hepatomegaly.
Rubeola (Measles)	8-13 days, usually 10 days	3-4 days of fever, coryza, conjunctivitis, and cough. Communicable from about 4 days prior to rash to 4 days after.	Maculopapular, reddish-brown; begins on head and neck, spreads downward. In 5-6 days rash turns brownish, desquamating.	Koplik's spots on buccal mucosa. General lymphadenopathy, occasional splenomegaly; encephalitis.
Scarlet fever (Scarlatina)	1-3 days	1-2 days of malaise, sore throat, fever, vomiting. Usually non-communicable 24-48 hours after antibiotics started. If untreated, can be communicable for 2-3 weeks.	Generalized, punctuate, red; prominent on chest, neck, axilla, groin, skin folds; circumoral pallor; fine desquamation involves hands and feet. Rash is sandpaper-like to touch and blanches on pressure.	Strawberry tongue, exudative tonsillitis; general cervical adenopathy.
Smallpox (Variola)	7-19 days, usually 10-14 days	Occurring 1-4 days before rash onset, fever and at least 1 of the following: prostration, headache, backache, chills, vomiting, or severe abdominal pain.	Greatest concentration of lesions on face and distal extremities. Lesions are deep seated, firm/hard, round well-circumscribed vesicles or pustules at the same stage of development on same part of body.	First lesions on the oral mucosa/palate, face or forearms. Lesions occur on palms and soles. Patient appears toxic or moribund.

Appendix B

Guidelines for Confirmation of Foodborne-Disease Outbreaks

A foodborne-disease outbreak (FBDO) is defined as an incident in which two or more persons experience a similar illness resulting from the ingestion of a common food.* The following table provides information about incubation periods, clinical syndromes, and criteria for confirming the etiology once an FBDO has been identified. The information on incubation periods and clinical syndromes is provided as a guideline and should not be included in the confirmation criteria. These guidelines might not include all etiologic agents and diagnostic tests.

FBDOs should be reported to the Foodborne and Diarrheal Diseases Branch at CDC on Form 52.13, Investigation of a Foodborne Outbreak, which was updated in October 1999. Provision of other documents describing the outbreak investigation also is encouraged. For information regarding collection of laboratory specimens and for additional information on viral agents, refer to other CDC publications (i.e., "Recommendations for Collection of Laboratory Specimens Associated with Outbreaks of Gastroenteritis," *MMWR* 1990:39[No. RR-14] and "Viral Agents of Gastroenteritis: Public Health Importance and Outbreak Management," *MMWR* 1990;39[No. RR-5]).

*Before 1992, three exceptions existed to this definition; only one case of botulism, marine-toxin intoxication, or chemical intoxication was required to constitute an FBDO if the etiology was confirmed. The definition was changed in 1992 to require two or more cases to constitute an outbreak.

Table B. Guidelines for confirmation of foodborne-disease outbreaks

Etiologic agent	Incubation period	Clinical syndrome	Confirmation
Bacterial			
1. *Bacillus cereus*			
a. Vomiting toxin	1–6 hrs	Vomiting; some patients with diarrhea; fever uncommon	Isolation of organism from stool of two or more ill persons and not from stool of control patients OR Isolation of 10^5 organisms/g from epidemiologically implicated food, provided specimen is properly handled
b. Diarrheal toxin	6–24 hrs	Diarrhea, abdominal cramps, and vomiting in some patients; fever uncommon	Isolation of organism from stool of two or more ill persons and not from stool of control patients OR Isolation of 10^5 organisms/g from epidemiologically implicated food, provided specimen is properly handled
2. *Brucella*	Several days to several mos; usually >30 days	Weakness, fever, headache, sweats, chills, arthralgia, weight loss, splenomegaly	Two or more ill persons and isolation of organism in culture of blood or bone marrow; greater than fourfold increase in standard agglutination titer (SAT) over several wks, or single SAT 1:160 in person who has compatible clinical symptoms and history of exposure
3. *Campylobacter jejuni/coli*	2–10 days; usually 2–5 days	Diarrhea (often bloody), abdominal pain, fever	Isolation of organism from clinical specimens from two or more ill persons OR Isolation of organism from epidemiologically implicated food

Table B. (*Continued*) Guidelines for confirmation of foodborne-disease outbreaks

Etiologic agent	Incubation period	Clinical syndrome	Confirmation
4. *Clostridium botulinum*	2 hrs–8 days; usually 12–48 hrs	Illness of variable severity; common symptoms are diplopia, blurred vision, and bulbar weakness; paralysis, which is usually descending and bilateral, might progress rapidly	Detection of botulinal toxin in serum, stool, gastric contents, or implicated food OR Isolation or organism from stool or intestine
5. *Clostridium perfringens*	6–24 hrs	Diarrhea, abdominal cramps; vomiting and fever uncommon	Isolation of 10^5 organisms/g from stool of two or more ill persons, provided specimen is properly handled. OR Demonstration of enterotoxin in the stool of two or more ill persons OR Isolation of 10^5 organisms/g from epidemiologically implicated food, provided specimen is properly handled
6. *Escherichia coli*			
a. Enterohemorrhagic (*E. coli* O157:H7 and others)	1–10 days; usually 3–4 days	Diarrhea (often bloody), abdominal cramps (often severe), little or no fever	Isolation of *E. coli* O157:H7 or other Shiga-like toxin-producing *E. coli* from clinical specimen from two or more ill persons OR Isolation of *E. coli* O157:H7 or other Shiga-like toxin-producing *E. coli* from epidemiologically implicated food
b. Enterotoxigenic (ETEC)	6–48 hrs	Diarrhea, abdominal cramps, nausea; vomiting and fever less common	Isolation of organism of same serotype, demonstrated to produce heat-stable (ST) and/or heat-labile (LT) enterotoxin, from stool of two or more ill persons
c. Enteropathogenic (EPEC)	Variable	Diarrhea, fever, abdominal cramps	Isolation of organism of same enteropathogenic serotype from stool of two or more ill persons

Table B. (*Continued*) Guidelines for confirmation of foodborne-disease outbreaks

Etiologic agent	Incubation period	Clinical syndrome	Confirmation
d. Enteroinvasive (EIEC)	Variable	Diarrhea (might be bloody), fever, abdominal cramps	Isolation of same enteroinvasive serotype from stool of two or more ill persons
7. *Listeria monocytogenes*			
a. Invasive disease	2–6 wks	Meningitis, neonatal sepsis, fever	Isolation of organism from normally sterile site
b. Diarrheal disease	Unknown	Diarrhea, abdominal cramps, fever	Isolation of organism of same serotype from stool of two or more ill persons exposed to food that is epidemiologically implicated or from which organism of same serotype has been isolated
8. Nontyphoidal *Salmonella*	6 hrs–10 days; usually 6–48 hrs	Diarrhea, often with fever and abdominal cramps	Isolation of organism of same serotype from clinical specimens from two or more ill persons OR Isolation of organism from epidemiologically implicated food
9. *Salmonella* Typhi	3–60 days; usually 7–14 days	Fever, anorexia, malaise, headache, and myalgia; sometimes diarrhea or constipation	Isolation of organism from clinical specimens from two or more ill persons OR Isolation of organism from epidemiologically implicated food
10. *Shigella* spp.	12 hrs–6 days; usually 2–4 days	Diarrhea (often bloody), often accompanied by fever and abdominal cramps	Isolation of organism of same serotype from clinical specimens from two or more ill persons OR Isolation of organism from epidemiologically implicated food

Table B. (*Continued*) Guidelines for confirmation of foodborne-disease outbreaks

Etiologic agent	Incubation period	Clinical syndrome	Confirmation
11. *Staphylococcus aureus*	30 min–8 hrs; usually 2–4 hrs	Vomiting, diarrhea	Isolation of organism of same phage type from stool or vomitus of two or more ill persons OR Detection of enterotoxin in epidemiologically implicated food OR Isolation of 10^5 organisms/g from epidemiologically implicated food, provided specimen is properly handled
12. *Streptococcus,* group A	1–4 days	Fever, pharyngitis, scarlet fever, upper respiratory infection	Isolation of organism of same M- or T-type from throats of two or more ill persons OR Isolation of organism of same M- or T-type from epidemiologically implicated food
13. *Vibrio cholerae*			
a. O1 or O139	1–5 days	Watery diarrhea, often accompanied by vomiting	Isolation of toxigenic organism from stool or vomitus of two or more ill persons OR Significant rise in vibriocidal, bacterial-agglutinating, or antitoxin antibodies in acute- and early convalescent-phase sera among persons not recently immunized OR Isolation of toxigenic organism from epidemiologically implicated food
b. non-O1 and non-O139	1–5 days	Watery diarrhea	Isolation of organism of same serotype from stool of two or more ill persons

Table B. (*Continued*) Guidelines for confirmation of foodborne-disease outbreaks

Etiologic agent	Incubation period	Clinical syndrome	Confirmation
14. *Vibrio parahaemolyticus*	4–30 hrs	Diarrhea	Isolation of Kanagawa-positive organism from stool of two or more ill persons OR Isolation of 10^5 Kanagawa-positive organisms/g from epidemiologically implicated food, provided specimen is properly handled
15. *Yersinia enterocolitica*	1–10 days; usually 4–6 days	Diarrhea, abdominal pain (often severe)	Isolation of organism from clinical specimen from two or more ill persons OR Isolation of pathogenic strain of organism from epidemiologically implicated food
Chemical			
1. Marine toxins			
a. Ciguatoxin	1–48 hrs; usually 2–8 hrs	Usually gastrointestinal symptoms followed by neurologic symptoms (including paresthesia of lips, tongue, throat, or extremities) and reversal of hot and cold sensation	Demonstration of ciguatoxin in epidemiologically implicated fish OR Clinical syndrome among persons who have eaten a type of fish previously associated with ciguatera fish poisoning (e.g., snapper, grouper, or barracuda)
b. Scombroid toxin (histamine)	1 min–3 hrs; usually <1 hr	Flushing, dizziness, burning of mouth and throat, headache, gastrointestinal symptoms, urticaria, and generalized pruritis	Demonstration of histamine in epidemiologically implicated fish OR Clinical syndrome among persons who have eaten a type of fish previously associated with histamine fish poisoning (e.g., mahi-mahi or fish of order Scomboidei)

Table B. (*Continued*) Guidelines for confirmation of foodborne-disease outbreaks

Etiologic agent	Incubation period	Clinical syndrome	Confirmation
c. Paralytic or neurotoxic shellfish	30 min–3 hrs	Paresthesia of lips, mouth or face, and extremities; intestinal symptoms or weakness, including respiratory difficulty	Detection of toxin in epidemiologically implicated food OR Detection of large numbers of shellfish-poisoning–associated species of dinoflagellates in water from which epidemiologically implicated mollusks are gathered
d. Puffer fish, tetrodotoxin	10 min–3 hrs; usually 10–45 min	Paresthesia of lips, tongue, face, or extremities, often following numbness; loss of proprioception or floating sensations	Demonstration of tetrodotoxin in epidemiologically implicated fish OR Clinical syndrome among persons who have eaten puffer fish
2. Heavy metals • Antimony • Cadmium • Copper • Iron • Tin • Zinc	5 min–8 hrs; usually <1 hr	Vomiting, often metallic taste	Demonstration of high concentration of metal in epidemiologically implicated food
3. Monosodium glutamate (MSG)	3 min–2 hrs; usually <1 hr	Burning sensation in chest, neck, abdomen, or extremities; sensation of lightness and pressure over face or heavy feeling in chest	Clinical syndrome among persons who have eaten food containing MSG (e.g., usually 1.5 g MSG)
4. Mushroom toxins			
a. Shorter-acting toxins	2 hrs	Usually vomiting and diarrhea, other symptoms differ with toxin	Clinical syndrome among persons who have eaten mushroom identified as toxic type OR Demonstration of toxin in epidemiologically implicated mushroom or food containing mushroom
• Muscimol		• Confusion, visual disturbance	
• Muscarine		• Salivation, diaphoresis	
• Psilocybin		• Hallucinations	
• *Coprinus artrementaris*		• Disulfiram-like reaction	
• Ibotenic acid		• Confusion, visual disturbance	

Table B. (*Continued*) Guidelines for confirmation of foodborne-disease outbreaks

Etiologic agent	Incubation period	Clinical syndrome	Confirmation
b. Longer-acting toxins (e.g., *Amanita* spp.)	6–24 hrs	Diarrhea and abdominal cramps for 24 hrs followed by hepatic and renal failure	Clinical syndrome among persons who have eaten mushroom identified as toxic type OR Demonstration of toxin in epidemiologically implicated mushroom or food containing mushrooms
Parasitic			
1. *Cryptosporidium parvum*	2–28 days; median: 7 days	Diarrhea, nausea, vomiting; fever	Demonstration of organism or antigen in stool or in small-bowel biopsy of two or more ill persons OR Demonstration of toxin in epidemiologically implicated food
2. *Cyclospora cayetanensus*	1–11 days; median: 7 days	Fatigue, protracted diarrhea, often relapsing	Demonstration of organism in stool of two or more ill persons
3. *Giardia lamblia*	3–25 days; median: 7 days	Diarrhea, gas, cramps, nausea, fatigue	Two or more ill persons and detection of antigen in stool or demonstration of organism in stool, duodenal contents, or small-bowel biopsy specimen
4. *Trichinella* spp.	1–2 days for intestinal phase; 2–4 wks for systemic phase	Fever, myalgia, periorbital edema, high eosinophil count	Two or more ill persons and positive serologic test or demonstration of larvae in muscle biopsy OR Demonstration of larvae in epidemiologically implicated meat

Table B. (*Continued*) Guidelines for confirmation of foodborne-disease outbreaks

Etiologic agent	Incubation period	Clinical syndrome	Confirmation
Viral			
1. Hepatitis A	15–50 days; median: 28 days	Jaundice, dark urine, fatigue, anorexia, nausea	Detection of immunoglobulin M anti-hepatitis A virus in serum from two or more persons who consumed epidemiologically implicated food
2. Norwalk family of viruses, small round-structured viruses (SRSV)	15–77 hrs; usually 24–48 hrs	Vomiting, cramps, diarrhea, headache	More than fourfold rise in antibody titer to Norwalk virus or Norwalk-like virus in acute and convalescent sera in most serum pairs OR Visualization of small, round-structured viruses that react with patient's convalescent sera but not acute sera — by immune-electron microsopy (assays based on molecular diagnostics [e.g., polymerase-chain reaction, probes, or assays for antigen and antibodies from expressed antigen] are available in reference laboratories)
3. Astrovirus, calicivirus, others	15–77 hrs; usually 24–48 hrs	Vomiting, cramps, diarrhea, headache	Visualization of small, round-structured viruses that react with patient's convalescent sera but not acute sera — by immune-electron microsopy (assays based on molecular diagnostics [e.g., polymerase-chain reaction, probes, or assays for antigen and antibodies from expressed antigen] are available in reference laboratories)

MMWR

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APPENDIX C
VIRAL HEPATITIS - DIFFERENTIAL DIAGNOSIS

	HEPATITIS A	HEPATITIS B	HEPATITIS C
Agent	HAV (hepatitis A virus), an RNA virus related to enteroviruses	HBV (hepatitis B virus), a double-stranded DNA virus.	HCV (hepatitis C virus), a single-stranded RNA virus.
Transmission	Fecal-oral: Person to person, contaminated food.	By parenteral inoculation or mucosal membrane exposure to human blood or blood products. Sexual contact, contaminated IV needles, razors, tattoo/body piercing and other sharp instruments. Perinatal transmission.	Parenteral or permucosal exposure to contaminated blood or blood products. Transmission by sexual and perinatal exposure is possible but uncommon.
Incubation	15-50 days (average 28-30 days).	45-180 days (average 60-90 days).	15-180 days (average 40 days).
Source	Feces from infected human, rarely blood.	Blood or blood products; semen.	Blood or blood products.
Communicability	Two weeks prior to onset of jaundice. Not infectious 1 week after onset of jaundice.	Several weeks before onset of jaundice for as long as HBsAg present.	From one or more weeks prior to onset; may persist indefinitely. Carrier state is common. Viremia appears to be relatively low.
Diagnosis	An acute illness with 1) discrete onset of symptoms **and** 2) jaundice or elevated serum aminotransferase levels **AND** based on positive IgM specific hepatitis A virus antibody test (anti-HAV IgM). Total hepatitis A virus antibody (Total anti-HAV) is not a confirmatory test for acute HAV. A case meets the clinical definition and occurs in a person who has an epidemiologic link with a person who has laboratory-confirmed hepatitis A (i.e., household or sexual contact with an infected person during the 15-50 days before the onset of symptoms).	Acute case: 1) discrete onset of symptoms, and 2) jaundice or elevated aminotransferase levels, and 3) appropriate lab tests for confirmation: HbsAg positive and/or anti-HBc IgM positive (if done), and 4) anti-HAV IgM negative (if done).	Acute case: 1) discrete onset of symptoms and 2) jaundice or ALT>7 times the upper limit of normal; and 3) IgM anti-HAV negative (if done), and 4) IgM anti-HBc negative (if done) or HbsAg negative and 5) anti-HCV positive by EIA, verified by an additional more specific assay (e.g. RIBA for anti-HCV or RT-PCR for HCV RNA) or by an average EIA signal to cutoff ratio of $\geq$3.8.
Treatment	None specific; supportive. No carrier state.	Antiviral medications help about one-third; supportive Chronic HBV disease occurs in 5-10% of acute cases with one third of these showing active liver disease with poor prognosis.	Treatment with interferon alone or in combination with ribravirin may be effective in 10-20% of cases with chronic disease.
Prophylaxis/ Vaccine	Immune globulin (IG) - see B-71. Hepatitis A vaccine.	HBIG: acute exposure (see B-71). Hepatitis B vaccine; for long-term exposure (see B-71).	IG of no known benefit; no vaccine available.
Laboratory Test	Anti-HAV IgM.	Various serological tests available (see table in the hepatitis B chapter). Transaminase and bilirubin levels are used to monitor course of disease and liver function.	Liver function tests, anti-HAV IgM, HBsAg,anti-HBc IgM, second or third-generation EIA for HCV antibody(anti-HCV),RIBA, RT-PCR.
Signs/Symptoms	Abrupt onset with fever, malaise, anorexia, abdominal discomfort, jaundice, nausea & vomiting, and hepatomegaly. Chronic liver disease with cirrhosis not documented. Fulminating liver disease with coma rare. With acute hepatic failure, mortality rate is 65-75%. Severity increases with age. Often asymptomatic in infants and small children.	Insidious onset with anorexia, malaise, abdominal discomfort, jaundice and arthralgias. For carriers, can progress to chronic liver disease and cirrhosis. With acute hepatic failure, mortality rate is 65-75%. Severity increases with age. Asymptomatic in 70% of cases. 15-25% of those with chronic infection will develop liver cancer.	Often asymptomatic, mild disease. 10%-20% have vague symptoms such as anorexia, malaise or abdominal pain, 20-30% have jaundice, 85% become chronic carriers, 70% develop chronic liver disease, 15% develop cirrhosis after 20 to 30 years, 5% die from liver cancer or cirrhosis. Fulminant hepatic failure following infection is rare.
Synonyms	Infectious hepatitis (obsolete).	Serum hepatitis, Australian antigen (both obsolete).	Hepatitis non-A, non-B (obsolete).