

# Section III Surveillance

Updated: May 2023

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## Tuolumne County Health Emergency Preparedness and Response Plan

- I. **Purpose:** Monitoring the community for clusters of infectious disease is a primary duty of the Public Health system. This surveillance plan describes how the Tuolumne County Health Department fulfills this duty.
- II. **Procedures:** The Tuolumne County Health Department engages in disease surveillance through the following:
  - A. Day to day:
    1. Monthly Death Certificate review
    2. Attendance at the Infectious Disease Committee of the local hospital
    3. The Tuolumne County Syndromic Surveillance Program
    4. The Tuolumne County School Nurse attendance variance reports
    5. Monthly review of bite reports from local animal control
    6. Identified trends in animal and wildlife illnesses reported by the Agriculture Commissioner, Fish and Wildlife and/or local animal control agencies
    7. Regional and National Disease Surveillance programs such as:
      - a. Epi-X: A national infectious disease report system operated by the Centers for Disease Control (CDC) in Atlanta, Georgia
      - b. CAHAN: A CDPH-operated system for the dissemination of statewide communicable disease notices
  - B. Monthly Death Certificate Review: An awareness of mortality trends in the Tuolumne County population is provided through annual statewide county reports. Variances from these trends are monitored through monthly review of death certificates.
  - C. Infectious Disease Committees: By attending the Infectious Disease Committee meetings at Adventist Health Sonora, the Health Department is able to assist with the dissemination of epidemiologic information as well as monitor for illness trends in the local inpatient population. Surveillance for hospital-acquired infections by the communicable disease coordinators of the local facilities is also reviewed.
  - D. The Tuolumne County Syndromic Surveillance Program (TCSSP): This is a program designed to use established indicators as guidelines for syndromic surveillance. A further description of the program is provided below. It intends to identify early any cluster of illnesses in Tuolumne County that meets criteria for the following syndromes:
    1. Neurologic: including infectious meningitis, myelitis, encephalitis, or paralysis
    2. Gastroenteric: requiring hospitalization for rehydration
    3. Dermatologic: for vesicular eruptions, petechial and purpuric conditions, and ulcerative conditions unresponsive to traditional therapy
    4. Respiratory: for Acute Respiratory Distress Syndromes and Influenza-Like Illness (ILI)
    5. Sepsis: mortality and/or morbidity due to sepsis without an identified organism
  - E. Tuolumne County School Nurse Attendance Variance Reports: The Tuolumne County Superintendent of Schools Office reports to the Tuolumne County Health Department when school absenteeism exceeds 10% for a given district. Such a notice launches an investigation of such an incident by the Health Department Communicable Disease

Coordinator to determine if a significant cluster of illness accounts for the variance. Depending upon the syndromic presentation, a determination is made whether epidemic thresholds are met for any given illness or infectious agent.

- F. Animal Control Bite Reports: A monthly compilation of Animal Control bite reports and follow-up are reviewed by the Tuolumne County Health Department as a rabies surveillance instrument.
- G. Animal and Wildlife Disease Surveillance: In accordance with the Agriculture Commissioner's Animal Disease Emergency Response Plan and the current protocols followed by the California Department of Fish and Wildlife, information about outbreaks of illness among domestic animals, livestock, or local wildlife which might pose a risk to public health is conveyed to the Tuolumne County Health Department for assessment of potential human risk. Lead surveillance for animal and wildlife disease is managed by the Tuolumne County Agriculture Commissioner and the local field office for the California Department of Fish and Wildlife.
- H. State and National Epidemiologic Notification Systems: Several systems for monitoring state and national disease trends are available and implemented by the Tuolumne County Health Department for regional disease surveillance. CDC and CDPH publications provide long term strategic planning, but cannot be relied upon for early notification in the event of an incident posing an immediate risk to public health. Therefore, electronic modalities are utilized to alert local health department authorities to urgent public health threats. Tools include the following:
  - 1. Epi-X: This is an epidemiologic information exchange available to public health officials across the country for monitoring national disease trends.
  - 2. CAHAN: The California Health Alert Network is a web-based alerting and posting site which transmits information to California public health jurisdictions regarding statewide public health threats and grant-based program operations.
- I. Sentinel Providers Syndromic Surveillance Program: Local providers are eligible to enroll in this program at any time. Data collected from local providers will contribute to statewide targeted disease monitoring, such as for ILI during the influenza season. This data is processed by the CDPH and is utilized locally for regional disease surveillance.

### **III. Communicable Disease Surveillance Procedures**

- A. Reports: Day-to-day individual communicable disease reports from the public are received by the Public Health Department according to the urgency of the event.
- B. Staff availability: Health Department personnel are available 24 hours per day, seven days per week for urgent or emergency public health reports.

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- C. Specific Surveillance: Targeted disease surveillance will be established when necessary as indicated by data which suggests an ongoing outbreak of a communicable disease.
- D. Statistics: Community statistics will then be compiled by the Communicable Disease Coordinator on a more intensive schedule to monitor such an outbreak in accordance with the urgency of the incident.
- E. School-based Surveillance: Local public and private schools monitor the health status of students through attendance and school nurse activities. Agreements are in effect to notify the Health Department when absentees exceed 10% of the student population, or when unusual trends in illness present to the attendance office staff.
- F. EMS Monitoring: The EMS system monitors ambulance transports through monthly meetings, alternating between base station or QA meetings. In the event of an unusual number of transports occurring, the outlying nature of the frequency is reviewed. In such a situation, these reports would be shared with the health officer and an investigation undertaken by the Health Department if indicated.
- G. Death Certificate Monitoring: Death certificates are provided to the CD Program by the Tuolumne County Assessor/Recorder's office to review for trends in causes of death each month. As historical records are compiled, exceptional outlying trends will be recognized and reviewed with the health officer in monthly CD meetings.
- H. Environmental Health Surveillance: The response by the Tuolumne County Environmental Health Department to a hazardous materials call may identify factors indicative of a Bioterrorism event. In such a case, the Director of Environmental Health will be notified and an epidemiological assessment undertaken in consultation with the Health Officer and Law Enforcement and in accordance with the Hazardous Materials Response Plan component of the Operational Area Emergency Response Plan of the Office of Emergency Services.
- I. Epidemiologist availability: The Tuolumne County Health Department utilizes the resources of the California state epidemiologist (see Section 6, Resource Management) in consultation for statistical and epidemiological analysis of communicable disease events.
- J. Media and Communication:
  - 1. The CDC publishes weekly Mortality and Morbidity Weekly Reports (MMWR) which are reviewed by the CD Coordinator and by the Health Officer. The reports are compared against established frequencies for the reportable conditions in order to identify unexplained increases in disease incidence.
  - 2. Local health care providers and hospital facilities will be notified of this situation through CAHAN or via direct California Department of Public Health (CDPH) communication.

- K. **CAHAN Alerts**  
The PHEP Coordinator and the HPP Coordinator maintain California Health Alert Network (CAHAN) connections in order to receive up-to-date emergency information from CDPH regarding regional CD trends. This would provide a conduit for emergency communication of vital information in the event of a regional, national or worldwide EP incident. CAHAN also allows for a means of posting important information and sharing information with local resources in the event of any Public Health unusual event, whether on a local or wider scale.

#### IV. Tuolumne County Syndromic Surveillance Program

- A. **Overview:** In accordance with the California Code of Regulations, Title 17, Division 1, Chapter 4, Subchapter 1, laboratories and health care providers must notify the local Health Department of reportable diseases and conditions. As an additional layer of surveillance, health departments may implement local syndromic surveillance programs to identify clinical syndromes even before a distinct diagnosis is made. Literature suggests that such programs may alert health authorities to a disease outbreak earlier than might be accomplished by laboratory reporting alone. The Tuolumne County Health Department supervises the TCSSP as the local mechanism to provide for syndromic surveillance for both natural infectious diseases and potential bioterrorist incidents.
- B. **Selected Syndromes for Surveillance:** The following clinical syndromes are defined, their correlating potential agents described, and inpatient and outpatient thresholds for investigation identified.
1. **Neurologic:**  
Definition: Infectious and toxin-induced diseases involving the central nervous system may present in three fashions:
    - a. **Meningitis**
      - i. Symptoms of inflammation of the tissues surrounding the brain and spinal cord include neck stiffness, fever, headache, and may include certain dermatologic findings or symptoms of Encephalitis, Myelitis or Paralysis (see below)
      - ii. Organisms might include *Neisseria meningitides*, and enteroviruses, among many other viruses. *Streptococcus pneumonia* is a frequent cause in adults, but not in the form of outbreaks of infections. Newborn nurseries may rarely experience clusters of meningitis caused by Group B or D *Streptococcus* and *Listeria monocytogenes*, among other bacterial or viral agents
    - b. **Encephalitis (brain inflammation) or Myelitis (spinal cord inflammation)**
      - i. Brain or spinal cord tissue infections usually present with changes in Level of Consciousness, cognitive impairment, or with specific neurological deficits, such as visual loss, speech deficits or specific patterns of regional weakness, often with symptoms described above for meningitis.

- ii. Organisms might include enteroviruses, West Nile Virus, or rabies among others. Nearly all encephalitides are caused by viral organisms, although certain bacteria may also be involved, such as with *Treponema pallidum* (Neurosyphilis) or metastatic infection from sepsis with nearly any bacterial organism. Metastatic infection does not usually occur in outbreaks, unless bacteria with antibacterial resistance are involved.
    - c. Paralysis (loss of control of muscle movement)
      - i. Presentations of diffuse paralysis typically first involve weakness of cranial nerves, with diplopia and/or dysphagia, followed by loss of coordination, gait disturbances and eventually respiratory compromise. Fever and signs of infection are typically absent.
      - ii. Diffuse patterns of weakness or paralysis usually suggest a toxic or metabolic condition, such as Botulism or botulinum toxin exposure
    - d. Monitoring: The Health Department is to be notified by hospital communicable disease coordinators for all hospitalized or emergency room cases of meningitis, encephalitis, myelitis or paralysis. Based upon the circumstances, a Health Department epidemiologic investigation may be launched.
- 2. Gastroenterologic
  - Definition: Infectious and toxin-induced diseases involving the gastroenterologic system, with resultant dehydration due to diarrhea and vomiting. Infectious conditions are often associated with fever and abdominal cramping.
  - a. Monitoring: For the purposes of Syndromic Surveillance, bi-weekly monitoring is restricted to cases of gastroenteritis requiring hospitalization in Tuolumne County for rehydration.
    - i. A Health Department investigation is launched for weeks exceeding 125% of the usual hospitalization rate for any given two weeks during the year.
    - ii. Additional information collected during an investigation includes the presence or absence of patterns of fever, hemorrhagic stools, dysentery, dermatologic conditions, and epidemiologic links between cases.
- 3. Dermatologic
  - Definition: Dermatologic syndromes under surveillance include the following:
    - a. Vesicular eruptions
      - i. Definition: Symptoms include clusters of vesicles, fever, and evidence of infectious involvement of other organ systems, such as encephalitis or pneumonia.
      - ii. Monitoring: Surveillance is limited to hospitalized patients and consists of bi-weekly diagnosis code review from Sonora Regional Medical Center.

- iii. Vesicular eruptions are of importance primarily as a tool for smallpox awareness and monitoring for severe herpetic or varicella illness.
  4. Petechial and Purpuric Conditions  
Definition: Findings include more than one case of a dermatologic condition suggestive of infectious vasculitis, identified by such findings as petechiae, purpura, and hemorrhage, with lab work suggestive of DIC and/or coagulopathy.
    - a. Monitoring: Surveillance is limited to hospitalized patients and consists of bi-weekly diagnosis code review from Sonora Regional Medical Center.
      - i. Potential agents of concern in such circumstances include the agents of Viral Hemorrhagic Fever, *Neisseria spp.* sepsis, *E. coli* O157:H7 among other rare infectious causes
    - b. Ulcerative Lesions unresponsive to usual antibiotic therapy
      - i. Definition: Skin ulcers unrelated to pressure necrosis, diabetes or underlying vascular compromise that fail to respond to antibiotic therapy after an appropriate course of inpatient therapy
      - ii. Monitoring: Surveillance is limited to hospitalized patients and consists of bi-weekly diagnosis code review from AHSR.
      - iii. Such lesions may result from arthropod envenomations, unusual organisms such as *Bacillus anthracis*, or from common organisms demonstrating antibiotic resistance.
5. Respiratory
  - a. Acute Respiratory Distress Syndrome (ARDS)  
Definition: A Health Department investigation would be triggered by more than one case at the local inpatient facility meeting the following case description: fever, rapidly progressive pulmonary infiltrates, and respiratory failure, often leading to intubation and mechanical ventilation, without evidence of a common pulmonary pathogen.
    - i. Agents to be considered public health threats in such a cluster of infection include coronavirus-induced Severe Acute Respiratory Syndrome (SARS), pneumonic plague, or hanta virus among a variety of other unusual bacterial and viral agents
    - ii. Monitoring: Surveillance is limited to hospitalized patients and consists of bi-weekly diagnosis code review from AHSR.
6. Influenza-Like Illness (ILI)  
Definition: The CDC criteria for ILI includes fever >100°F AND cough and/or sore throat (in the absence of a known cause other than influenza).
  - a. Monitoring: Local surveillance for ILI is described under the Tuolumne County Pandemic Influenza Plan, and consists of bi-weekly diagnosis code review from Adventist Health Sonora during the influenza season, as defined for any given year by the California Department of Communicable Disease Control (CDC).

7. Sepsis
  - a. Definition: Intensive care hospitalizations for sepsis in patients without underlying medical or surgical illness or identified immune deficiency are reviewed when the organism is unidentified.
  - b. The public health implications of such septic presentations include a number of unusual and aggressive organisms such as malaria, ebola and tularemia, among others.
  - c. Monitoring: Surveillance is limited to hospitalized patients and consists of bi-weekly diagnosis code review from Sonora Regional Medical Center.
8. Hemorrhagic Conditions

Definition: Conditions marked by diffuse hemorrhage, such as DIC and platelet abnormalities with findings that may include diffuse ecchymoses, petechiae, purpura and/or obvious active bleeding.

  - a. Viral hemorrhagic fevers and various Rickettsial diseases
  - b. Surveillance is limited to hospitalized patients and consists of bi-weekly diagnosis code review from Sonora Regional Medical Center.
9. Severe Illness and Death
  - a. Definition: Any aggressive severe illness and/or death that is suspected to occur as a result of an infectious disease is included in surveillance statistics
  - b. A number of BT agents and rare endemic conditions may first present with such a clinical course.
  - c. Surveillance is limited to hospitalized patients at the discretion of the Communicable Disease Coordinator at Sonora Regional Medical Center.

V. **International Emerging Infectious Disease Surveillance:** Emerging infectious agents will almost certainly be identified by components of the global surveillance network, such as the World Health Organization or by the Centers for Disease Control prior to arrival in Tuolumne County. Monitoring transmission patterns of wild-type infectious agents will allow Tuolumne County to institute preparations specific to emerging epidemics. It is the responsibility of the international and federal public health agencies to share data that can help to maximize efficient preparations and focus local surveillance activities. Information from such international sources which is vital to Tuolumne County preparedness includes:

- A. Transmissibility: Identifying whether an organism is transmitted by contact, droplet or aerosol routes will determine the appropriate Personal Protective Equipment used by responding personnel and health care providers. Timing and duration of viral shedding will influence transmissibility. Infectivity is largely determined by the minimal infectious inoculum of an agent. This information is often not available during the early epidemic phase of a newly emergent infectious agent, but will need to be sought to assist with appropriate decision making.
- B. Incubation period: Understanding the transmission cycle of an unfamiliar infectious organism is critical to predicting its movement through a community. Microbes like the classic influenza virus that are potentially transmissible from a host prior to inciting symptoms are much more difficult to control by isolation and quarantine interventions than organisms like *Neisseria meningitidis* which are primarily transmissible only after a host is symptomatic.



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- C. Reservoir: Agents with an available local reservoir are much more difficult to eradicate, as demonstrated by the relentless spread of West Nile Virus across the United State between 1999 and 2006.
- D. Availability of Vaccine or Prophylaxis: The early initiation of the development of vaccines or the identification of appropriate prophylaxis for emerging infectious agents is the goal of worldwide health organizations. However, such interventions may necessarily await the full emergence of an agent as a clear pandemic threat before treatments can be effectively pursued, because further modification of the organism may render such treatments ineffective.
- E. Pathogenicity: Epidemiologic data will be used to calculate case-fatality rates for newly emergent illnesses to allow predictions to be made about impact upon the health care system and mortuary resources. Potential need for expanded mortuary services must be anticipated. Pathogenicity also relates to the propensity for a particular infection to be symptomatic in the host, and therefore more easily recognized by clinicians.
- F. Tuolumne County Commerce: The degree of commerce between Tuolumne County and an endemic source for a newly identified infectious disease will influence the likelihood of a local outbreak of disease. In addition, during tourism season the Tuolumne County population may increase by 200%. The expanded transient population renders epidemiologic investigations much more complex.

Related content in the HEPRoP

Section 1: Public Health Response

Section 3: Communicable Disease Response

Annex 1: Bioterrorism