Guidelines for Local Plague Surveillance and Control Programs in California
June 2011

The primary goal of a public health plague surveillance program is the early detection of plague activity and conditions that may present increased risk for disease transmission to humans. The California Department of Public Health, Vector-Borne Disease Section (CDPH/VBDS) recommends that local agencies conducting plague surveillance and/or control operations consult with and work collaboratively with VBDS. The following recommendations are provided to help ensure appropriate evaluations and risk reduction measures are implemented.

Routine surveillance

- Surveillance activities should focus on plague endemic areas—see the California Compendium of Plague Control[1] and consult with VBDS staff for specific regional information.
- Testing should be limited to species typically involved with plague transmission in California—see Submission Criteria for Rodents and Wild Carnivores[2].
- To properly evaluate the presence or level of plague activity in an area, attempts should be made to sample all rodent species involved with local plague ecology. This typically requires overnight trapping and use of various sizes and types of live traps to successfully sample relevant rodent species (e.g. ground squirrels, chipmunks, woodrats, deermice).
- Serological titers (particularly <1:256, from a single or few animals) are not necessarily indicative of current plague activity or risk. Serological evidence must be assessed within the context of a comprehensive evaluation of the level of plague activity and current risk—see Epizootic Investigation below and the California Compendium of Plague Control[1].
- Fleas taken from rodents or collected from burrows should be identified to species to assess abundance of known or suspected vectors.
- Fleas submitted for testing should be pooled by host and species. Consult with VBDS for assistance in flea identification prior to submission.
- Detection of plague bacteria in rodents or their fleas confirms current plague activity and should prompt an immediate follow-up investigation and risk evaluation.

Evaluating Plague Activity: Epizootic Investigation and Risk Evaluation

When direct or indirect surveillance detects plague or suggests increased plague activity, additional surveillance and a risk evaluation should be completed to help guide an appropriate public health response.

- An evaluation of current plague activity involves direct surveillance of rodent and flea populations to acquire additional evidence of increased activity or epizootic plague. In addition to the detection of plague bacteria in rodents or vector fleas, multiple high titers from rodent blood samples suggest recent plague exposure

and increased local transmission. Surveillance efforts also provide an opportunity to evaluate densities of plague reservoirs, susceptible (amplifying) rodent species, and vector flea loads.

- Direct surveillance can be augmented by other (indirect) indicators of plague activity such as documentation of rapid decreases in rodent populations (requires prior knowledge of local "baseline" populations), evidence of burrow abandonment, fleas on the ground or in burrow entrances, or carrion flies emerging from or near burrows.
- Direct and indirect surveillance results should be integrated into a comprehensive risk evaluation which also considers: 1) plague history and current ecological conditions of the area, and 2) potential human exposure to infected animals and their fleas (type and degree of human activities and their proximity to plague activity or other identified risk factors)—see CDPH/VBDS plague surveillance evaluation form[3] for a template.

Plague Control Activities

Plague control should be a collaborative effort between state and local public health authorities, county agricultural officials, and the appropriate land-use jurisdictional authority (e.g., USFS, state parks, BLM, DOD, other public agencies).

- The presence of active plague transmission closely associated with human activities may necessitate the suppression of potentially infective vector flea populations to rapidly lower the current disease risk. In these instances, temporary closure of recreational or other public-use areas prior to and during insecticide applications (or in lieu of applications) may be warranted.
- Limit flea suppression to areas of actual or potential human exposure. Routine and/or repetitive insecticide treatments can lead to the development of resistance and should be avoided.
- Exposure of the public to insecticides should be minimized during flea control operations. Insecticides used for burrow treatments or in bait stations must follow product label instructions and all other applicable laws and regulations. Insecticide treatments should continue a minimum of 7 days before assessing control efficacy.
- Post-treatment flea counts are necessary to determine the efficacy of the pesticide application. Reduction of flea density to less than one flea per rodent host is considered sufficient to interrupt transmission to humans. Public use areas closed due to plague activity should remain closed until surveillance and control activities suggest the potential for human disease has been sufficiently mitigated.
- Managers of public use areas with potential for plague should be strongly advised to adopt an on-going integrated disease management program that includes habitat manipulation and sanitation methods to reduce rodent abundance. In some cases, additional rodent control measures (e.g., trapping, poisoning) may be warranted as long-term control measures, but these activities should be directed by qualified and experienced professionals and should not precede flea control. Rodent control using toxic baits or fumigants is not a viable option to rapidly reduce plague risk—see California Compendium of Plague Control[1].

Supporting documentation and recommended reading

[1] California Compendium of Plague Control: (https://www.cdph.ca.gov/Programs/CID/DCDC/CDPH%20Document%20Library/CAPlagueCompendium.pdf)

[2] Submission Criteria for Rodents and Wild Carnivores: Contact VBDS staff

[3] CDPH/VBDS plague surveillance evaluation form: Contact VBDS staff

Contact information

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https://www.cdph.ca.gov/Programs/CID/DCDC/Pages/VBDS.aspx
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