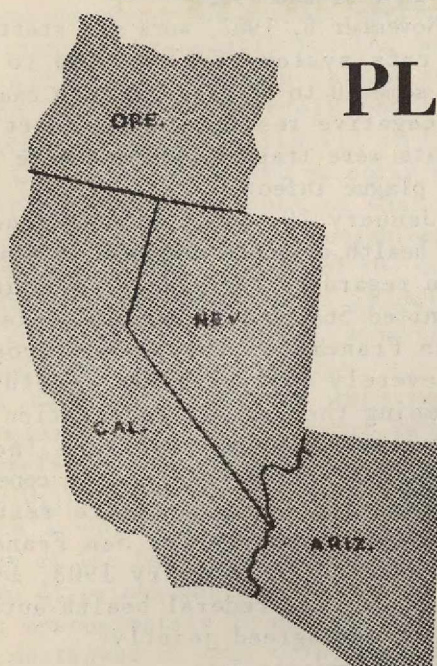


DEVELOPMENT OF PLAGUE CONTROL IN THE WESTERN STATES



by
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On March 6, 1900, a Chinese man died in the basement of the Globe Hotel in San Francisco and a police surgeon reported to the city health officer that he suspected bubonic plague as the cause of death. Arrangements were made to have the diagnosis confirmed at the Angel Island Quarantine Station. On March 11, animal inoculation and bacteriologic study of autopsy specimens verified this as a case of plague. There followed a period of lack of cooperation which led to inability to properly cope with the situation when responsible officials first tried to act.

An attempt was made by city officials to isolate Chinatown but the lack of funds tended to minimize municipal efforts. On May 15, after the occurrence of the fourth proven case of plague, the Surgeon General of the U. S. Marine Hospital Service recommended the following:

1. Concerted anti-plague efforts under direction of one person
2. Isolation of suspected area
3. Inspection of transportation facilities leaving San Francisco in an effort to stop exodus of Chinese
4. House-to-house inspection of Chinatown with administration of Haffkine vaccine
5. Establishment of a pest hospital
6. Isolation of suspected cases
7. Disinfecting corps
8. Destruction of rats
9. Investigation of suspicious illnesses in adjacent cities.

On May 19, the local board of health officially announced the existence of plague. Efforts were made to forestall an exodus of Chinese. Haffkine vaccination was supposed to have been required for an exit permit but there was considerable unwillingness on the part of the Chinese to be vaccinated.

¹ Federal Security Agency, Public Health Service.

Federal inspectors were placed on trains leaving San Francisco and at points of exit on the state border at Ashland, Oregon; Reno, Nevada; Needles, California; and Yuma, Arizona, to prevent San Francisco Chinese from leaving the state. Launches were used in a 24-hour patrol of the San Francisco waterfront for the purpose of preventing Chinese from leaving the city.

On May 29, the board of supervisors gave legal backing to the board of health authorizing such measures to be taken as may be necessary for the prevention and spread of disease and ordered an immediate cordon around Chinatown. Because of the magnitude of the job and the lack of funds, the effort was not effective. On June 4, the governor of California refused a request for aid from the state board of health. On June 6, the quarantine of Chinatown was ordered lifted on the basis of severe and oppressive racial discrimination. This was the result of a suit brought in the United States court to test the validity of the 1890 Federal law governing movement of Asiatics. The service officer in charge of Federal participation was ordered to appear in court to show why he should not be punished for contempt. Although not held in contempt, all active anti-plague efforts had been suspended and were not resumed. However, cases of plague continued to be diagnosed and confirmed by laboratory examinations.

Early in 1901, the Secretary of Treasury appointed a commission of three members, Simon Flexner, F. G. Novy, and Llewelyn F. Parker, to investigate the plague problem in San Francisco. In a report dated February 26, 1901, they presented unquestionable evidence of the existence of plague. As a direct result, representatives from California discussed the report in Washington on March 9, and on March 22, agreed in San Francisco to raise funds for immediate work as follows:

1. To disinfect all infected houses
2. To provide a hospital for all suspects
3. To provide a detention house
4. To provide a morgue.

By June 21, 1901, when the work was discontinued, 1,180 houses had been disin-

fecting using sulphur dioxide, steam, and bichloride of mercury. Plague continued to occur in 1901 and 1902.

On November 8, 1902, work was started to trap rats systematically. (Up to that time, some 50 to 60 rats had been examined with negative results.) In a short time 481 rats were trapped. Fifteen were found to be plague infected.

On January 19, 1903, a conference of state health officers was held in Washington in regard to the plague situation in the United States with special reference to San Francisco. The plague progress was severely criticized in resolutions condemning the lack of cooperation with the Service and the resultant lack of progressive action possible to cope with the situation. This pressure resulted in sanitary measures for San Francisco being adopted in February 1903, by the city, State, and Federal health authorities. It was agreed jointly:

1. To exterminate rats
2. To clean streets
3. To remove garbage
4. To report cases.

This time the work was carried on in an amicable manner. A year later the last case of plague had been reported and two years later, on April 13, 1905, the Federal Plague Laboratory was closed. One hundred and twenty-one cases and 113 deaths had occurred during the period.

In August 1907, three cases and deaths occurred in San Francisco and on September 4, the mayor requested the service to assume charge of measures to eradicate and prevent spread of bubonic plague in that city. There was no lack of action this time and cooperation was immediately given on all sides. The city had not completely recovered from the earthquake and fire of 1906 and conditions were favorable for an epidemic outbreak. On October 3, 1907, Oakland, Alameda, and Berkeley made similar requests to the Service. During the first year, efforts were limited to measures taken to diagnose plague and to prevent its spread by action taken against the domestic rat. Then, on August 5, 1908 a plague infected ground-squirrel was

found in the northern part of Contra Costa County on a ranch where a plague death had occurred on July 15. This finding changed the concept about the animal reservoir of infection and eventually led the Service into all of the western states in its search for other reservoir hosts. The existence of plague epizootic in Contra Costa County was suspected as early as the summer of 1903. In August of that year, two fatal cases of human infection occurred in widely separated sections of the county. Investigations indicated an association with ground-squirrels which, however, was not confirmed at that time.

For two years, efforts were made to determine how far the reservoir in ground-squirrels extended. Then in the early part of 1910, a concerted effort was begun to create a squirrel-free zone around the cities of the bay area. Extensive distribution of poison was undertaken. In 1913-1914, approximately 20 million squirrels were destroyed by this work. By November 1914, the opinion was ventured that ground-squirrels could be so reduced in number so as to cause the disappearance of plague and that all discoverable plague had been eradicated from the State of California. In spite of this early optimism, this squirrel-free zone was never actually attained but work toward this objective was continued for over 26 years. Needless to say, infected ground-squirrels continued to be reported from time to time, and at no time was it ever claimed that the squirrel population had been eradicated.

The first attempt to see whether plague had extended into neighboring states was made in 1910-1911 when counties in Oregon (Jackson); Nevada (Douglas, Ormsby, Washoe); and Arizona were scouted. These results were negative. This work was inspired by the fact that plague had been found to be prevalent in ground-squirrels in some of the mountain passes which would be natural pathways for the infection to follow if it were to spread from California to neighboring states.

In 1935, a renewed search was made for plague foci in other states. A mobile unit was created which began investigations in

Lake County, Oregon, and the adjoining part of the State of Nevada because of a case of plague in that area. Thus began a new era in the search for plague foci which eventually were discovered in the 15 westernmost states in this country. In 1936, fleas were used for the first time in addition to tissue specimens as inoculated material. Using this technique, survey work really began to show results and large-scale surveys have been conducted during the past 12 years to locate new foci and discover other reservoir hosts and vectors.

A review of the history of plague in the United States leaves the reader with the following impressions:

1. Eradication of the vast wild rodent population is impossible. Even if it were, it would be economically inadvisable. Therefore, human cases attributed to contact with wild rodents may continue to occur sporadically.
2. The extension of plague infection to domestic rodent populations is the apparent danger and one which could be prevented by the application of measures against rats. Methods are available for the control of acute epizootics (insecticides and rodenticides) and epidemics (sulfa and streptomycin) in domestic rodent and human populations but reliance upon them should not be too great. Instead, communities infested with domestic rodents should be encouraged to institute ratproofing and rat eradication methods.
3. Studies should be continued in an effort to learn more about plague ecology, the factors concerned in its transmission and their applicability to control measures.
4. Surveys should be continued as in the past—
 - a. to locate new foci
 - b. to stimulate state and local interest in rodent control activities
 - c. to remind physicians to consider plague as a diagnosis whenever indicated.

