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ANTI-PLAGUE MEASURES IN TACOMA, WASHINGTON

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Bubonic plague, that rat-borne scourge of mankind, is not unknown in the Puget Sound area. A human case of plague was found on a vessel in Port Townsend in 1900, and three human cases occurred in Seattle in 1907. Plague-infected rats were discovered intermittently in that city until 1917. After that, for a quarter of a century, there were no indications of plague in any city on the Sound.

DISCOVERY OF PLAGUE IN TACOMA

Until the autumn of 1942, this panic disease had never appeared in Tacoma. In that year a United States Public Health Service mobile unit visited Tacoma in the course of a routine check for the presence of plague infection. It was engaged in securing samples from various parts of western Washington. From September 22 to 26, and October 9 to 10, this unit trapped 257 rats near two large flour mills on the western water front of Tacoma harbor.

Fleas and other ectoparasites were removed from these rats and shipped to the United States Public Health Service Laboratory for Plague Investigations in San Francisco, Calif. By means of animal inoculation and bacteriologic analysis, seven specimens yielded organisms which were positively identified on October 23, 1942, as *Pasteurella pestis*.

ENVIRONMENT

The presence of plague foci anywhere is a serious threat to the health of the community. This is particularly true of Tacoma. The city is especially vulnerable to the spread of infection because of its situation, size, and the presence of many old frame buildings. It is built around a projection of Puget Sound called Commencement Bay

¹ From the Office of Plague Suppressive Measures, San Francisco, Calif.

which provides a spacious protected harbor with accommodations for many ocean-going ships.

Almost all of the industrial section is concentrated along the water front and near the tideflats at the southern end of the harbor. The business section is near the harbor's western water front. Residential sections are located principally to the west and south of the bay.

Except in the business section, a large majority of Tacoma's buildings are of wood, especially those used for industrial purposes. Most of them have been in operation for many years. The consequent deterioration, plus the frame construction, affords abundant rat harborage in almost all sections of the city. Because of the influx of population and resultant overcrowding, there was danger of the infection spreading to humans.

During the war, Tacoma has become the center of a critical war-production area. There is a large concentration of military forces in nearby cantonments. The city is the second largest of the Puget Sound ports, with an estimated population of 138,000. Rail and water shipping are active.

In early days, the economic life of the community centered in the lumbering industry. In later years, industrial activity became more diversified. Fishing and canning assumed importance. Today there are flour and feed mills as well as sawmills. Not only plywood and lumber fabrication factories, but factories for aircraft subassembly, and salt, chemical, and aluminum ingot production plants contribute to the wartime activities of Tacoma. Shipyards are especially important.

ORIGIN OF THE INFECTION

In so large and busy an area the source of the outbreak was difficult to determine. It will probably remain a controversial question because there are not enough facts to establish any one of the various theories. It might be assumed that the plague had been present in Tacoma for many years. This possibility cannot be dismissed entirely.

From 1915 to 1918, during the time plague was present in Seattle, several surveys were made in Tacoma without finding evidence of the disease. So far as is known no adequate surveys were made after 1918. It seems likely that human cases would have developed if the infection had been prevalent for any length of time.

According to the records, no human case of plague has ever occurred in Tacoma. In the autumn of 1942, when there was a heavy infection of rats and their fleas in areas where considerable numbers of people were present, it seems strange at first glance that cases of human infection did not occur. A close study of the situation, however, reveals several reasons why the plague was confined to rats.

The fact that a vigorous control campaign was instituted promptly after the infection was discovered probably contributed in no small measure to the prevention of human plague. Although in a few instances other rats were carrying the infected fleas, the infection was confined to the Norway rat which lives in ground burrows or other places with which man does not have intimate contact. The principal infected areas were the industrial sections where few people were present during the night when rats are most active. Another factor was the occurrence of the acute outbreak at the beginning of the rainy season which is considered to be unfavorable to the propagation of fleas.

Nosopsyllus fasciatus, the predominant flea involved, is known to be an efficient vector of plague because it was the major species responsible for the San Francisco epidemic in 1907. It also has been proved to be an efficient vector in animal experimentation. But in the Tacoma outbreak the average number of fleas per rat was only 1.2. This figure is somewhat lower than that recorded for other outbreaks. In this connection it is interesting to note that it is rare for a resident of Tacoma to be bitten by a flea. Even the trappers who worked constantly in areas where many infected fleas were present were almost never bitten. Several who worked throughout the campaign were never bitten.

Although the exact origin of the plague cannot be determined, a possible local source is indicated by the fact that the first plague specimens were taken from a heavily rat-infested area where railway cars filled with grain were unloaded. Many of these grain shipments originated in sections of eastern Washington which are known to have rural foci of plague. Evidence of rats and mice was found in several of these grain cars.

Only a few hundred yards from this section were piers at which ships from Hawaiian, Russian, and South American ports docked to load flour and other grain products. A considerable percentage of the vessels engaging in this trade were rat infested, and it is possible that plague could have been introduced in this way.

PROGRAM FOR ERADICATION

As soon as the presence of plague was definitely established, the Public Health Service Office of Plague Suppressive Measures immediately assumed the initiative. Under the Pan-American Sanitary Treaty, the United States Public Health Service has certain obligations when plague is present in a seaport city. Conferences were held and the situation discussed with the Governor of the State of Washington, the Public Health Service quarantine officer for the Northwest District, the State Health Officer, the Fish and Wildlife Service, the

Mayor of Tacoma, the City Commissioners, and the Director of Health for the city of Tacoma.

As the State Health Officer and the Mayor lacked personnel experienced in anti-plague measures, they requested the United States Public Health Service to take immediate charge of the situation. The joint responsibility of the Federal, State, and municipal governments was recognized, however, and each made arrangements to contribute financially to the project. Because of the urgency of the situation, funds were made available at once.

Local newspapers were fully informed but were requested to release no information until an official statement could be issued at an appropriate time after the program was under way.

PRELIMINARY SURVEY

The first objective of the program was a thorough survey of the city by trapping and sanitary inspection. A hasty reconnaissance was made in order to determine the approximate areas of infection. The city was divided into three large districts, lettered A, B, and C. Each of these districts was then subdivided into numbered sections according to type of buildings and activities (fig. 1), and for convenience in the assignment of trappers.

A commissioned officer and nine other employees of the United States Public Health Service experienced in rodent control were detailed to Tacoma to supervise field operations, to do the laboratory work, and to train trappers. The three cooperating agencies joined in providing office space and transportation. Traps and other supplies were procured and on November 4, 1942, trapping operations were started.

It was feared that if trapping began abruptly in the heavy concentration of rats in the focus, the rats might be dispersed and might spread infection before they could be killed. Consequently, trapping was started in the sections which surrounded the area where plague had been found. Gradually the trappers moved concentrically from the outlying territory into the focus itself. This plan of operations provided a zone of traps surrounding the focus which may have served as a barrier against a spread of the infection by destroying rats which tried to migrate.

Additional sections were trapped as more trappers were employed and trained. After an adequate section sample was secured, activities moved to another section unless plague or a heavy rat population was present. If either of these situations prevailed, trapping was continued until no more specimens of plague were found, or until the infestation had been reduced to a point where it was no longer economical to continue. All parts of the city were covered as rapidly as the supply of trappers permitted.

Laboratory activities.—As there was no laboratory adaptable to plague work in Tacoma, it was necessary to build one. Bids were submitted, contracts awarded, and within 1 week the laboratory was in operation.

All of the rodents caught were tagged with identifying data which stated their location and the date on which they were trapped. They were then removed from the traps, placed in fleaproof cloth bags, and delivered to the laboratory at the end of the day's work. At the laboratory the bags containing the rats were placed in a garbage can

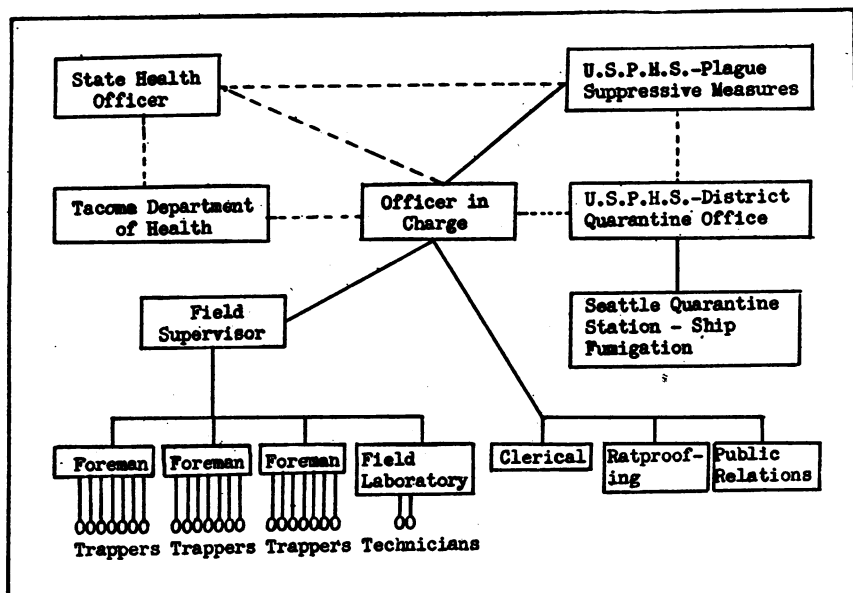


FIGURE 2.—An outline of the administrative plan during the early phases of Tacoma antiplague operations.

covered with a tight-fitting lid and treated with hydrocyanic gas to kill the ectoparasites.

Fleas, lice, and other ectoparasites were removed by striking and combing the animals. The ectoparasites were then placed in vials containing 2 percent salt solution. A separate vial was used for each type of parasite and each trapping section. All rodents were identified, and it was found that *Rattus norvegicus* was the predominant species.

The number of fleas found on the rats varied greatly but averaged only 1.2 per rat. Many rats, especially those living outdoors in such places as the riprap waterfront and the garbage dumps, had very few fleas, but occasionally one was found with as many as 250 fleas.

Representative samples of the fleas were examined morphologically to determine the prevailing species. More than 95 percent were *Nosopsyllus fasciatus*. A few of the common cat and dog fleas and

small rural rodent fleas were identified. Of the many hundreds examined, only nine specimens of *Xenopsylla cheopis* were found, and these originated in an area in which plague was not present.

TABLE 1.—*Distribution of rodents by species, Nov. 4, 1942, to Oct. 31, 1943*

Species	Number of rodents collected	Percentage of total
<i>Rattus norvegicus</i>	19,693	72.0
<i>Rattus rattus rattus</i>	2,969	10.9
<i>Rattus rattus alexandrinus</i>	1,245	4.6
<i>Mus musculus</i>	3,396	12.5
Miscellaneous.....	16	-----
Total.....	27,321	100.00

After the ectoparasites had been removed, all rodents, except those so badly decomposed that the pathology was obscured, were dissected and examined for the pathologic lesions of plague. Small pieces of spleen, liver, and lymph nodes for those animals with suggestive findings were placed in stoppered bottles and packed in ice and sawdust in thermos jugs. Pools of tissue were taken periodically from rats which appeared to be normal and treated in the same manner.

All flea and tissue specimens were shipped to the laboratory of the United States Public Health Service Office of Plague Suppressive Measures in San Francisco, Calif. At this laboratory the specimens were triturated and inoculated into guinea pigs or mice. Animals inoculated with plague-infected materials usually died in 4 to 7 days. If they were not dead after 10 days these test animals were killed. An autopsy was performed on each animal. The tissues from those showing pathology suggestive of plague were subjected to bacteriologic tests until the organisms were identified.

Pathologic findings.—More than 95 percent of the rats examined in the laboratory were obtained by trapping. As an acutely ill rat is likely to remain in his protected nest, it was not often that specimens were found which showed the advanced pathology of rat plague. Usually the condition was that of a very early infection. Occasionally lesions were seen which suggested resolving or chronic disease.

Usually the subcutaneous tissue was a reddish color faintly tinged with purple which was due to a diffuse engorgement of the vascular bed. The lymphatic glands, usually the axillary or cervical, were slightly enlarged, firm, injected, and sometimes showed slight surrounding edema. The spleen was almost always enlarged, firm, and dark red in color. Occasionally it showed irregularly scattered, grayish-white pinpoint lesions. The liver usually showed grayish-white pinpoint lesions scattered sparsely throughout its substance. Only rarely did the lungs show lesions. Sticky, clear, or sero-sanguinous pleural fluid was often present in abnormal amounts.

Of the various pathologic lesions observed, an injected subcutaneous tissue and an enlarged, dark, firm spleen were the most consistent indicators of plague infection. In the resolving or chronic cases, however, the only clear-cut pathology in many specimens was a scarred or adherent spleen.

Infected specimens.—From the 26,048 rodents examined by dissection, 592 pools of tissue were sent to the San Francisco laboratory. Of these, 262 were from apparently normal animals, and plague was identified in 4 of them. The other 330 pools were from animals which showed lesions simulating plague, and 30 were proved to be plague-infected. Of the 1,765 pools of fleas examined, averaging 17 per pool, 54 were positive.

Undoubtedly, many infected rats were not detected with the method used. The active epizootic persisted from the beginning of the campaign to May 4, 1943, and accurate records were kept during this time so that it was possible to estimate the approximate percentage of infected rats and fleas. It was determined that at least 2.2 of each 1,000 rats were infected, and at least 2.7 of each 1,000 fleas contained plague organisms. The rates were considerably higher when only those animals from plague foci were considered.

Species infected.—So far as could be determined, the infection was confined to the Norway rats. Occasionally infected fleas were taken from the "black" and "Alexander" rats, but in not a single instance was tissue from these rats found to be infected.

Distribution of infection.—The distribution of the infection followed a definite pattern (fig. 1). There were two principal foci of infection, as shown in table 2. One was at the flour mills (A6) and the other at the slaughterhouse and its stock sheds (C11). The infection had spread and was found in all sections between the two foci, but the distance that the infection spread was limited by geographic features. The Puyallup River limited its extension eastward. The high escarpment along the west side of the bay limited its westward extension. Each of these geographic barriers prevented a large-scale migration of rats and consequent spread of the infection.

TABLE 2.—Number of times plague was found in the various sections of the city

District	Type of activity	Plague isolations	
		Tissue	Fleas
A6.....	Flour mills; water front.....	10	22
A7.....	Upper class residential.....	1	1
A8.....	Water front; docks, warehouses.....	0	3
A9.....	Water front; docks, warehouses.....	6	4
A10.....	Commercial; residential.....	2	1
B1.....	Industrial; water front.....	1	1
B9.....	Old residential.....	0	1
B17, 19.....	Old residential; light industrial.....	0	1
C1.....	Water front.....	0	1
C10.....	Industrial.....	2	1
C11.....	Industrial; meat packing.....	12	18

In two areas, however, the effectiveness of the escarpment as a barrier was nullified. The business section is located on the edge of the escarpment, and a few roads lead through it into the central business district. This accounts for the three positive specimens taken in A10. The two positive specimens found in A7 were taken from the group of houses at the top of the escarpment above the flour mills, where the rat burrowing and colonization were fostered by spillage of grain along a spur unloading track. In addition, the slope of the escarpment at this point is gradual enough to permit rat burrowing and foraging.

At the southern end of the business section the escarpment is cut by two wide, deep gulches which could serve as a natural channel of rat migration from the heavily infested and infected section C11. That they did so serve is indicated by the presence of one positive specimen along each of these gulches (B9 and B17-19).

In the tideflat section, the disease was not found south of the slaughterhouse in C11. No distinct geographic barrier interfered with migration, but the sloughs and railroad yards south of this plant are not favorable to rat harborage and contained no appreciable supply of food.

It was fortunate that the infection was so definitely confined because this made possible a concentration of measures that quickly controlled the infection.

Surveys in adjacent areas.—Because of the proximity and close connection, by rail and ship, of other cities to Tacoma, it seemed advisable to make limited surveys in these areas to determine whether plague had spread to them. Surveys were made in all the major Puget Sound ports by units of the United States Public Health Service operating independently of the Tacoma project. No plague infection was found. Through the cooperation of the Post Surgeon a survey was made at Fort Lewis by Army personnel trained by the Tacoma plague-control group. No plague was detected in the 830 rodents examined.

CONTROL MEASURES

By March 1943 the extent and distribution of the rat infestation was determined and the area infected was known. Control work already had begun in many of the areas, but after April 1 the emphasis swung entirely from survey to control. Trapping was continued in and around all positive areas for four purposes: To eradicate infected rats; to prevent migration to uninfected areas; to provide a steady flow of rats for laboratory examination in order to determine the course of the epizootic; and to gage the progress being made in reducing the total rat population. The administrative plan for control work was closely coordinated between the agencies (fig. 3).

The method of control was adapted to the individual situation. The usual methods were trapping, poisoning, and gassing, and these were supplemented as occasion demanded by shooting, clubbing, and destruction of nests. Food sanitation and destruction of harborage were carried out on all infested premises. The graphs in figure 4 illustrate the trend of the trapping catch in proportion to the number of trapping days and the application of the accessory control measures.

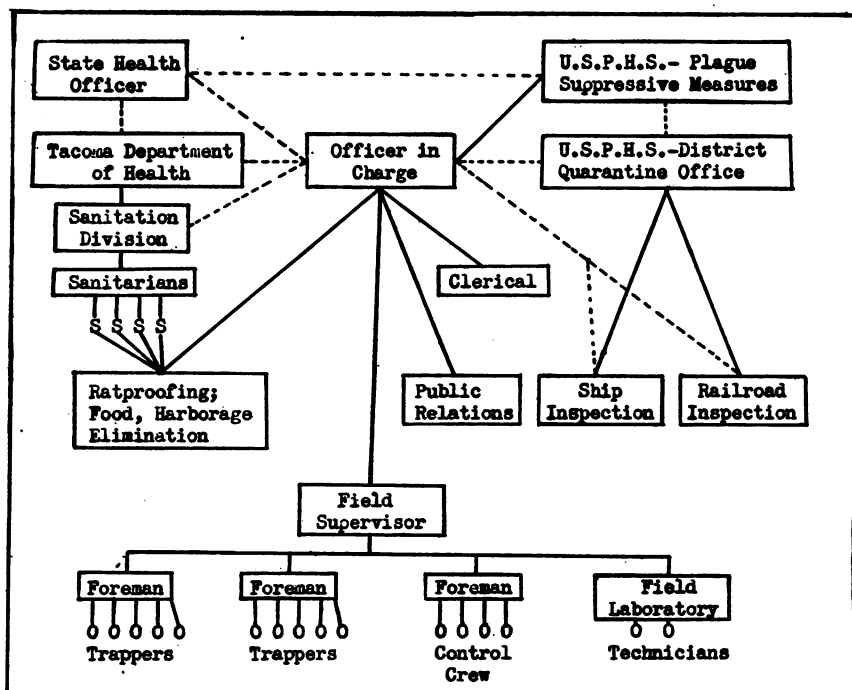


FIGURE 3.—Administrative plan for control work, Tacoma antiplague operations.

Trapping.—The majority of the men employed devoted most of their time to trapping activities. Each trapper tended daily from 200 to 500 traps, depending on the size of the area and the density of the rat population. Ordinary wooden snap traps of conventional design were used exclusively, baited with one-half inch cubes of bacon.

A total of 948,102 trap days, most of them in the industrial water front and business sections, resulted in a catch of 25,618, rodents of which 22,238 were rats, an index of 2.3 rats per 100 trap days.

Poisoning.—Zinc phosphide, thallium sulfate, and phosphorus paste on bread, meat, fish, apple, and vegetables were the poisons used for bait. Those giving the best results were phosphorus on bread or canned salmon and thallium sulfate on oat groats, fresh meat, or fish (table 3).

TABLE 3.—*Poisoning operations*

Poison	Number of baits	Man hours	Rats recovered
Zinc phosphide.....	63,000	92	3
Thallium sulfate.....	30,149	216	424
Phosphorus.....	162,680	292	188
Total.....	255,829	600	615

TACOMA PLAGUE CONTROL

TRAPPING CATCH, TRAP-DAYS BY WEEKS
SECTIONS A-6, C-II AND C-12

NOV. 22, 1942 TO OCT. 30, 1943

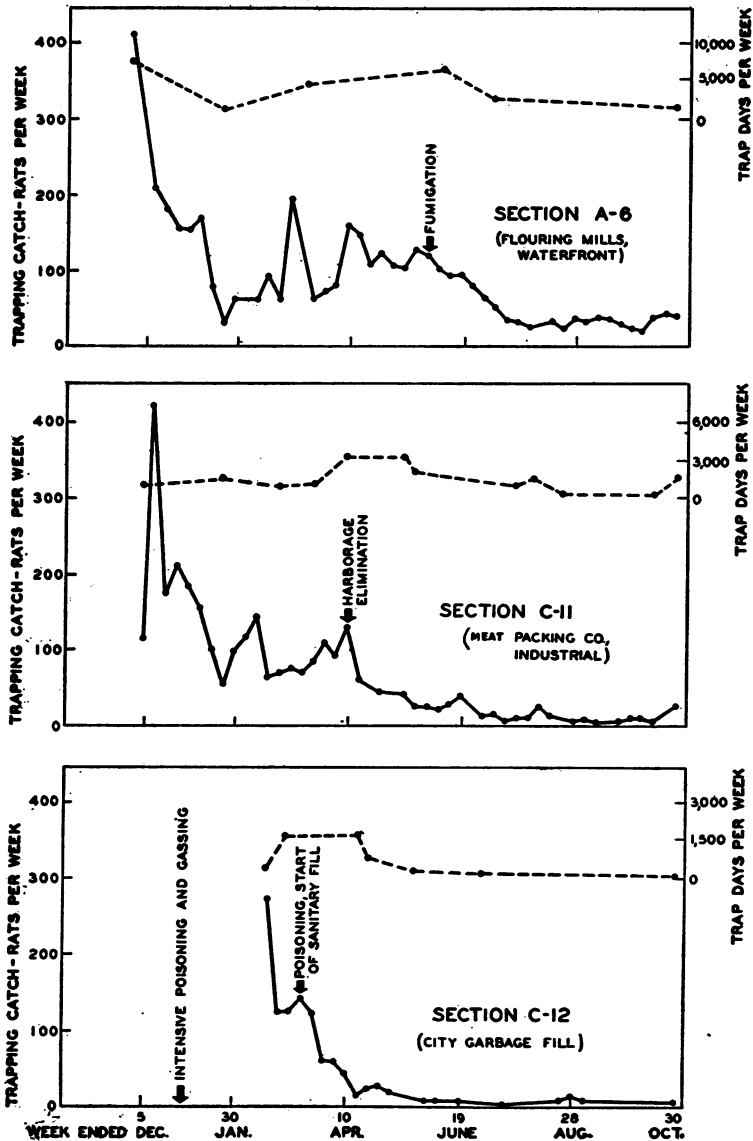


FIGURE 4.—Graphs showing reduction in total rat population (as indicated by trapping catch) and the relationship to various control measures.

Altogether, 255,829 poisoned baits were distributed, from which 615 rats were recovered. No accurate estimate of the total number of rats killed by poison can be given because rats usually die in their holes where it is impossible to recover them. Undoubtedly many times the number recovered were killed by the poison.

Trapping and poisoning were sufficient to control the infestation in several sections, but in the more heavily infested areas other methods were necessary.

Gassing.—In places where rats were living in ground burrows or in narrow enclosed spaces, gassing with calcium cyanide dust was effective. Its value was limited, however, in areas where the rats were harboring in long deep burrows or in complicated spaces such as the riprap water front.

Fumigation.—Fumigation was effective in eliminating rats in the interior of the large flour mills after the buildings had been made more resistant to rat traffic to and from the outside. All buildings were fumigated by commercial fumigators under government supervision from one to three times during the period of operations. The areas fumigated had a capacity of about 7,000,000 cubic feet. More than 70,000 ounces of hydrocyanic acid gas, principally in liquid form, were used. Fiber discs, impregnated with hydrocyanic acid gas, and generated gas were employed in a few places. The minimum exposure was 4 ounces per 1,000 cubic feet for 24 hours, and 440 rats were recovered.

Several parts of the flour mills were piped for liquid gas, and fumigation had been regularly conducted twice a year. As the fumigations were done primarily for the control of insects, the piping did not extend into many of the areas most heavily rat infested. The piping has now been extended and new systems installed so that all areas with actual or potential rat infestation will be fumigated two or three times a year.

Food sanitation.—Efforts were made to remove all available food supplies from all areas. Around the flour mills, grain elevators, and stockyards the control of food supply was especially difficult, but in most areas the supply of food accessible to rats was greatly reduced.

The proper handling of garbage was handicapped by a lack of suitable garbage cans. This was due to wartime restrictions on metal products. After considerable effort, priority to purchase several thousand metal cans was obtained. These cans were distributed in places where they were most needed, and alleviated the situation considerably. The many small "unofficial" garbage dumps in various sections were cleaned up, and warnings against further dumping were posted.

At the beginning of the program, all garbage and refuse collected under supervision of the municipal government were deposited on an open dump located on the tideflats near the industrial area (C12). This fill, which occupied about 10 acres, was utilized for open dumping of garbage and the burning of combustible refuse without any orderly system of procedure. It had a heavy and extensive infestation of rats.

Before any change in the disposal procedures was made, intensive suppressive measures were started at this dump. Sustained trapping, large-scale poisoning, gassing of burrows, and removal of rat harborage caused a satisfactory reduction in the rodent population within a few weeks. After this had been done, all exposed garbage and refuse were covered with earth and a modified sanitary fill was started to effect a proper disposal of garbage. By this method the active face was limited to a 100-foot width and a 12-foot depth. All exposed surfaces, except the active face, were covered with earth every day. A tractor with bulldozer attachment provided placement and compaction of garbage and cover material. Within 2 months the trapping catch at the garbage fill was reduced from 300 rats per week to fewer than 10. No plague-positive rats were found among the 2,000 examined from this source.

Proper disposal of lunch scraps was a problem in many sections, especially at the shipyards and lumber mills. Receptacles placed in strategic places and posted warnings controlled this situation.

Harborage elimination and ratproofing.—As soon as the emphasis changed from survey to control work, two sanitarians were employed and trained in rodent-control methods which emphasized rat harborage elimination and exterior or "vent stoppage" ratproofing. Two general sanitarians on the regular staff of the health department also were given this special training. In cooperation with the sanitation section of the health department, these men were assigned to districts in which they carried on rodent control in addition to their general sanitation programs. Premises in need of attention were referred to them, and assistance in formulating recommendations was available to them when requested. Attention was concentrated on areas in or near plague foci.

Projects which had already been started, and those which involved a considerable expenditure of money, were handled directly by members of the plague-control staff.

Altogether, 993 premises were inspected for possible ratproofing. Ratproofing has been completed on 135, and work is still in progress on 250 premises. The work done on these premises varied from removal of board floors, piles of lumber, trash, and other harborages which required only a few hours' labor, to extensive projects costing as much as \$50,000 (estimated).

As considerable difficulty was experienced in obtaining metal products because of priority restrictions, the work was confined to exterior ratproofing which consumed the least amount of strategic materials. Sufficient quantities of sheet metal and wire cloth were obtained, however, so that lack of materials did not prevent the completion of any project.

The most extensive projects were undertaken at the flouring mills and the slaughterhouse and stock sheds. At the slaughterhouse, 7,600 cubic yards of gravel were used to fill a rat-infested slough at a cost of \$4,934.70. The large stock sheds serving this company were heavily infested. Rat harborages were found under concrete platforms, mangers, and feed bins. Extensive destruction of these harborages was carried out, and reconstructive work designed to eliminate them permanently is now nearing completion. The estimated cost of this work was \$10,000. A large ratproof room also was constructed for the storage of grain feed at a cost of several hundred dollars.

Reconstructive work at the flour mills was confined to ratproofing the buildings exteriorly and eliminating inside harborages by removing double walls, opening sheathing on beams, etc. The open ground areas under the buildings were ratproofed by the use of concrete and wire cloth. Doors were adjusted and flashed. Defects in the walls were repaired. All rat holes and runways were stopped. Stored lumber was removed. Driftwood under the mills' docks was cleaned up and catch aprons were installed to minimize grain spillage. Several sections of railroad track, where grain was transferred to and from railroad cars, were paved with concrete to facilitate cleaning. The cost of this work is estimated at \$10,000.

Along the water front, the railroad spurs and property adjacent to the flour mills are owned by a large railroad company. The dense vegetation of the embankment along the grain-unloading tracks on the "highline" was removed because it afforded excellent rat harborage. In this section, the water front was formed by a large rock-rubble type of riprap which was heavily infested. Instead of constructing a permanent ratproof bulkhead, the railroad company filled the large rubble with finer crushed rock. Although this has eliminated the harborage temporarily, continued maintenance will be necessary. It is estimated that 10,500 or more cubic yards of rock were used to cover the 3,500-foot length of water front at an estimated cost of \$50,000.

Two other large docks, one used as a grain storehouse (A9), the other containing an egg and poultry house and a feed mill (C4), have been ratproofed, but much less extensive work was necessary because of the nature of their construction.

Quarantine.—From February to May 1, 1943, two experienced quarantine inspectors were detailed to Tacoma from the United States

Public Health Service Quarantine Station in New York City. One of these was assigned to full-time ship inspection.

Each ship was inspected thoroughly. The number of rats aboard was estimated. A few vessels were required to have fumigations because of excessive rat population. The majority of vessels, however, were satisfactorily controlled by trapping. A total of 90 ships was inspected, of which 33 were found to be infested. On these, 121 rats were trapped while the vessels were in port. All of these rats were examined in the laboratory, but no infection was found.

In addition, each ship was required to have a sufficient number of metal garbage cans with tight-fitting covers which were to be used exclusively for food waste. Burlap bags were used for old papers, cans, bottles, and other non-rat-attracting trash. When permitted by the regulations of the Bureau of Animal Industry, United States Department of Agriculture, garbage was removed from the ship and transported to the city garbage dump. Dumping of garbage overboard while in port was prohibited. Approved rat guards were required to be properly placed on all lines at all times. General cleaning of rat-infested compartments and ratproofing of some were requested.

The other inspector was assigned to inspection of railroad cars and their loading and unloading areas in order to prevent the transportation of rats from Tacoma by rail. A survey of 300 cars used in grain shipment revealed that 2 percent showed signs of recent rodent infestation. This inspector also directed rodent-eradication measures in the vicinity of the loading and unloading areas as a further precaution against the possible spread of plague-infected rats.

All rail and maritime inspections were discontinued on May 31, 1943, because the infection was well under control. After June 1, 1943, a cooperative arrangement was made so that the dock operators and the health department jointly enforced rat guarding and other requirements.

Educational activities.—An educational pamphlet giving simple directions for rodent-eradication measures was prepared by the Tacoma Health Department and distributed as opportunity permitted. Newspapers cooperated by releasing appropriate publicity. A few talks on the rat were given upon request. In addition, 279 rat complaints were answered and advice was given on control measures. The rat film "Keep 'Em Out" was shown to several interested groups and several radio broadcasts were made.

Many members of health departments in areas near Tacoma became interested in anti-plague measures as a result of the outbreak and visited the project to study rat-control methods. Each was instructed as thoroughly as his time allowed. One bacteriologist from the Canadian Ministry of Health also visited the project and was given some training.

OPERATING COSTS

In comparison with the costs of plague eradication programs in other outbreaks, the cost of the Tacoma project has not been great. For example, the San Francisco outbreak required \$561,143.65 for a period of 11 months in 1907-08, when trappers could be hired for only \$2 to \$2.50 per day. During the same period, the city of Oakland spent about \$65,000 on plague eradication measures.

During the fiscal year 1914-15, the campaign in New Orleans required \$526,704.27. It cost the city of Seattle \$65,000 to eradicate plague. In view of these facts, the city of Tacoma was fortunate in having plague controlled at such a nominal cost. In addition, approximately \$5,000 of this investment remains in capital equipment over and above that expended in training personnel, and can be used to carry on a permanent program.

Approximate summary of amounts contributed by the agencies concerned, Nov. 1, 1942, to Oct. 31, 1943¹

U. S. Public Health Service.....	\$24, 122. 80
State of Washington.....	12, 682. 66
City of Tacoma.....	19, 936. 89
Total.....	56, 742. 35

¹ This figure includes no allowance for depreciation of vehicles or capital equipment.

Of the \$56,742.35, \$5,268.47 was expended for capital equipment, supplies, and operating expenses. The remainder was spent for salaries.

The labor turn-over during the early part of the program was too rapid to permit an estimate of the average number of employees. As a rule, however, the number of employees engaged directly in the campaign averaged 25 to 27 during November 1942 to April 1943. After that time the number was gradually reduced. During September and October, the average number of employees was 15. Trappers were paid \$200 a month and the supervisory and special personnel somewhat more. The high wage scale was necessary because of the prevailing wages in nearby war industries. All employees worked six 8-hour days per week.

RESULTS OF THE PROGRAM

Early in the campaign the concentrated application of control measures began to be reflected in the trapping catch. In some areas that had been producing 100 or more rats per week, the catch became so small that trapping was discontinued. On May 4, 1943, the last positive specimen was found. Since then, more than 8,000 rodents and their ectoparasites have been examined without detecting the

presence of plague. It therefore seems reasonable to conclude that the infection has been brought under complete control and that plague has been eradicated in Tacoma.

No claim is made that all rats in the city have been destroyed. The work necessarily was confined to the areas in which plague infection was found. But the total rat population has been reduced and all major concentrations of rats have been eliminated.

It is believed that officials and citizens of Tacoma are now more aware of the seriousness of rat infestation. The program may have stimulated them to devote more attention to it in the future. A group of men have been trained in rodent control methods and are available to the city. They should provide a sound foundation upon which to build a permanent rodent control program adequate to prevent further outbreaks of plague.

DEATHS DURING WEEK ENDED SEPTEMBER 9, 1944

From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce

	Week ended Sept. 9, 1944	Correspond- ing week, 1943
Data for 93 large cities of the United States:		
Total deaths.....	7, 673	7, 623
Average for 3 prior year.....	7, 511	-----
Total deaths, first 36 weeks of year.....	327, 682	334, 120
Deaths under 1 year of age.....	628	613
Average for 3 prior years.....	572	-----
Deaths under 1 year of age, first 36 weeks of year.....	22, 316	24, 098
Data from industrial insurance companies.		
Policies in force.....	66, 723, 057	65, 808, 740
Number of death claims.....	9, 601	7, 980
Death claims per 1,000 policies in force, annual rate.....	7.5	6.3
Death claims per 1,000 policies, first 36 weeks of year, annual rate.....	10.1	9.8

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED SEPTEMBER 16, 1944

Summary

The incidence of poliomyelitis for the country as a whole declined for the second consecutive week, but decreases in the New England, Middle Atlantic, West North Central, and South Atlantic areas were partly offset by increases, chiefly in Ohio, Michigan, Wisconsin, Maryland, Kentucky, and California. A total of 1,440 cases was reported, as compared with 1,498 for the preceding week, 1,020 for the corresponding week last year, and a 5-year (1939-43) median of 593. The largest weekly total so far reported was 1,682 for the week ended September 2, which is also the largest total for any week since weekly records became available (1927). The current figure is above that recorded for any week in prior years, the next largest being 1,370, reported for the week ended September 5, 1931.

Fifteen States reporting currently more than 16 cases each (last week's figures in parentheses) are as follows: *Increases*—New Jersey 54 (50), Ohio 118 (92), Indiana 24 (23), Michigan 112 (75), Wisconsin 31 (20), Maryland 54 (32), North Carolina 28 (26), Kentucky 40 (33), California 25 (12); *decreases*—Massachusetts 28 (42), New York 497 (581), Pennsylvania 123 (130), Illinois 44 (45), Minnesota 40 (48), Virginia 46 (67).

The cumulative total to date this year is 12,413 (as compared with 7,812 for the same period last year and 5-year median of 4,856), probably exceeded only twice by the total for any entire year since 1916 (12,439 in 1943, and 15,745 in 1931).

The cumulative total of meningococcus meningitis to date is 13,607, as compared with 14,153 for the same period last year and a 5-year median of 1,544. The total for the entire year 1943 was 17,922.

The current total for scarlet fever is above that for last week, but below both the 5-year median and the total for the corresponding week last year. The cumulative total is 150,581, as compared with 101,240 for the same period last year, which figure is also the 5-year median.

An aggregate of 7,793 deaths was recorded for the week in 92 large cities of the United States, as compared with 7,655 last week and 3-year (1941-43) average of 7,729. The cumulative total is 334,568, as compared with 341,169 for the same period last year.

Telegraphic morbidity reports from State health officers for the week ended Sept. 16, 1944, and comparison with corresponding week of 1943 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none was reported, cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended—		Median 1939-43	Week ended—		Median 1939-43	Week ended—		Median 1939-43	Week ended—		Median 1939-43
	Sept. 16, 1944	Sept. 18, 1943		Sept. 16, 1944	Sept. 18, 1943		Sept. 16, 1944	Sept. 18, 1943		Sept. 16, 1944	Sept. 18, 1944	
NEW ENGLAND												
Maine.....	0	0	0				0	5	7	0	3	1
New Hampshire.....	0	0	0				2	0	0	0	0	0
Vermont.....	0	1	0				0	1	2	1	0	0
Massachusetts.....	6	2	2				18	31	31	3	10	1
Rhode Island.....	0	0	0				0	17	9	2	3	0
Connecticut.....	0	1	0		5	1	5	9	5	3	8	0
MIDDLE ATLANTIC												
New York.....	15	7	7	(1)	(1)	13	21	70	70	13	12	8
New Jersey.....	2	1	1		4	4	8	86	21	3	5	1
Pennsylvania.....	8	4	7				26	12	26	11	10	3
EAST NORTH CENTRAL												
Ohio.....	11	5	5	2	1	7	5	40	17	6	5	1
Indiana.....	5	3	3	7	4	4	4	10	3	3	1	0
Illinois.....	3	8	14	1	6	4	14	15	20	9	8	1
Michigan 1.....	9	4	3	1	2	2	9	151	44	9	9	1
Wisconsin.....	0	0	0	10	17	17	30	75	61	4	0	0
WEST NORTH CENTRAL												
Minnesota.....	5	8	1				4	17	5	1	0	0
Iowa.....	0	7	3		1	1	2	0	7	0	5	0
Missouri.....	3	1	3	2			3	1	2	4	2	0
North Dakota.....	1	2	1	3			0	14	0	0	0	0
South Dakota.....	6	2	2				2	0	1	0	0	0
Nebraska.....	2	6	1	2			1	1	2	0	0	0
Kansas.....	2	3	4			1	7	4	5	1	1	1
SOUTH ATLANTIC												
Delaware.....	0	0	0				0	1	1	0	0	0
Maryland 1.....	1	0	1			1	3	6	5	0	1	1
District of Columbia.....	0	0	1				0	1	1	0	1	0
Virginia.....	4	7	8	55	74	66	4	19	10	4	4	1
West Virginia.....	8	6	6		1	3	2	5	5	1	4	2
North Carolina.....	13	47	40				5	9	7	1	2	1
South Carolina.....	9	19	19	129	122	123	6	6	6	3	1	0
Georgia.....	13	32	24	3	36	13	4	1	1	1	0	0
Florida.....	4	3	3	1	5	2	5	3	3	1	2	0
EAST SOUTH CENTRAL												
Kentucky.....	8	8	8	1			0	3	10	0	2	0
Tennessee.....	6	17	14	5	6	9	2	13	10	2	6	1
Alabama.....	34	16	19	8	17	8	1	2	2	1	6	1
Mississippi 1.....	14	12	12							0	1	0
WEST SOUTH CENTRAL												
Arkansas.....	4	5	12	24	5	5	3	11	10	1	1	0
Louisiana.....	6	7	7	2	7	2	0	1	1	0	2	0
Oklahoma.....	9	3	8		1	10	1	3	2	0	1	1
Texas.....	43	26	26	259	284	156	18	28	28	2	2	1
MOUNTAIN												
Montana.....	8	4	0	2			2	12	3	1	0	0
Idaho.....	0	0	0	5	1		0	0	1	0	0	0
Wyoming.....	0	0	0				1	1	1	0	0	0
Colorado.....	4	3	3	6	4	5	1	4	4	2	0	0
New Mexico.....	2	1	1	3	1	1	1	0	1	0	0	0
Arizona.....	1	1	0	24	34	34	0	3	3	2	2	1
Utah 1.....	0	0	0				8	6	6	0	0	0
Nevada.....	1	0	0				23	13	0	0	1	0
PACIFIC												
Washington.....	8	3	3				15	13	13	4	2	1
Oregon.....	2	1	1	1	4	6	11	15	15	3	3	0
California.....	21	16	15	8	14	14	38	42	42	24	9	1
Total.....	301	302	310	564	657	601	365	780	561	126	135	30
37 weeks.....	7,729	8,312	8,744	340,887	84,051	153,176	593,079	540,807	468,877	13,607	14,153	1,544

¹New York City only.

²Period ended earlier than Saturday.

Telegraphic morbidity reports from State health officers for the week ended Sept. 16, 1944, and comparison with corresponding week of 1943 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever ¹		
	Week ended—		Median 1939-43	Week ended—		Median 1939-43	Week ended—		Median 1939-43	Week ended—		Median 1939-43
	Sept. 16, 1944	Sept. 18, 1943		Sept. 16, 1944	Sept. 18, 1943		Sept. 16, 1944	Sept. 18, 1943		Sept. 16, 1944	Sept. 18, 1943	
NEW ENGLAND												
Maine.....	1	2	1	13	8	6	0	0	0	0	0	3
New Hampshire.....	6	0	0	1	1	1	0	0	0	0	1	0
Vermont.....	2	2	2	4	2	3	0	0	0	0	0	1
Massachusetts.....	28	35	6	57	79	59	0	0	0	6	8	5
Rhode Island.....	0	20	1	0	6	2	0	0	0	1	1	0
Connecticut.....	12	32	6	5	16	11	0	0	0	3	0	1
MIDDLE ATLANTIC												
New York.....	497	65	65	81	79	72	0	0	0	7	9	16
New Jersey.....	54	8	20	16	21	21	0	0	0	3	4	5
Pennsylvania.....	123	18	18	57	57	57	0	0	0	9	6	20
EAST NORTH CENTRAL												
Ohio.....	118	20	20	50	64	64	1	0	0	7	7	8
Indiana.....	24	13	7	23	21	21	0	0	1	3	0	2
Illinois.....	44	208	52	49	55	52	0	0	0	0	9	10
Michigan ²	112	29	29	38	39	47	0	0	0	3	4	4
Wisconsin.....	31	18	6	29	36	43	0	0	1	1	1	1
WEST NORTH CENTRAL												
Minnesota.....	40	10	10	22	25	16	0	0	0	0	0	1
Iowa.....	13	29	12	10	16	16	0	0	0	0	1	1
Missouri.....	4	13	3	19	27	18	0	0	0	5	4	6
North Dakota.....	5	2	1	5	15	4	0	0	0	0	0	0
South Dakota.....	1	4	2	0	7	7	0	0	0	1	0	0
Nebraska.....	4	13	11	6	9	8	0	0	0	0	0	0
Kansas.....	9	77	10	18	34	32	0	0	0	6	4	3
SOUTH ATLANTIC												
Delaware.....	6	0	0	0	0	4	0	0	0	0	0	0
Maryland ²	54	2	1	16	15	15	0	0	0	5	4	4
District of Columbia.....	16	2	1	3	4	4	0	0	0	0	1	1
Virginia.....	46	6	6	24	27	20	1	0	0	3	8	14
West Virginia.....	10	1	1	48	74	28	0	0	0	6	1	8
North Carolina.....	28	1	3	34	69	46	0	0	0	3	7	7
South Carolina.....	0	1	3	4	8	9	0	0	0	6	3	11
Georgia.....	5	4	4	15	24	21	0	0	0	6	8	8
Florida.....	4	6	4	4	7	4	0	0	0	1	1	4
EAST SOUTH CENTRAL												
Kentucky.....	40	5	9	18	24	25	0	0	0	6	9	14
Tennessee.....	11	0	3	34	28	28	1	0	0	9	10	12
Alabama.....	5	0	1	23	25	19	0	0	0	4	2	7
Mississippi ²	3	2	3	11	8	8	0	0	0	8	5	5
WEST SOUTH CENTRAL												
Arkansas.....	1	2	2	6	4	4	0	0	1	11	6	14
Louisiana.....	2	4	1	5	5	2	0	0	0	6	12	13
Oklahoma.....	2	26	2	3	0	9	0	0	0	2	2	11
Texas.....	10	57	8	10	18	18	0	1	0	13	8	36
MOUNTAIN												
Montana.....	3	4	2	9	9	9	0	0	0	0	0	1
Idaho.....	1	1	1	1	11	3	0	0	0	0	0	0
Wyoming.....	0	1	0	2	3	1	0	0	0	0	0	0
Colorado.....	7	35	6	12	18	14	0	0	0	1	1	4
New Mexico.....	2	8	2	3	2	2	0	0	0	2	3	3
Arizona.....	2	2	0	3	1	1	0	0	0	0	3	3
Utah ²	2	41	4	6	10	8	0	0	0	0	0	0
Nevada.....	1	0	0	0	2	0	0	0	0	0	0	0
PACIFIC												
Washington.....	14	27	8	13	21	12	0	0	0	2	1	1
Oregon.....	12	14	4	15	11	8	0	0	0	0	0	2
California.....	25	150	14	68	77	55	0	0	0	13	5	8
Total.....	1,440	1,020	593	893	1,119	949	3	1	10	162	159	342
37 weeks.....	12,413	7,812	4,856	150,581	101,240	101,240	314	619	1,204	3,924	4,006	5,878

¹ Period ended earlier than Saturday.

² Including paratyphoid fever cases reported separately as follows: Massachusetts, 5; New York, 2; Maryland, 1; South Carolina, 5; Georgia, 2; Florida, 1; Louisiana 1; Washington, 1; California, 3.

Telegraphic morbidity reports from State health officers for the week ended Sept. 16, 1944, and comparison with corresponding week of 1943 and 5-year median—Con.

Division and State	Whooping cough			Week ended September 16, 1944									
	Week ended—		Median 1939-43	Anthrax	Dysentery			Encephalitis, infectious	Leprosy	Rocky Mt. spotted fever	Tularemia	Typhus fever	
	Sept. 16, 1944	Sept. 18, 1943			Amebic	Bacillary	Unspecified						
NEW ENGLAND													
Maine.....	16	24	27	0	0	0	0	0	0	0	0	1	
New Hampshire.....	3	2	0	0	0	0	0	0	0	0	0	0	
Vermont.....	23	15	15	0	0	0	0	0	0	0	0	0	
Massachusetts.....	86	95	134	0	0	12	0	0	0	0	0	0	
Rhode Island.....	8	153	31	0	0	0	0	0	0	0	0	0	
Connecticut.....	36	21	41	0	0	0	0	0	0	0	0	0	
MIDDLE ATLANTIC													
New York.....	168	204	319	0	3	53	0	0	0	0	0	0	
New Jersey.....	70	150	150	0	1	1	0	1	0	0	0	0	
Pennsylvania.....	99	196	241	0	1	1	0	1	0	0	0	1	
EAST NORTH CENTRAL													
Ohio.....	122	147	162	0	1	0	0	0	0	0	1	0	
Indiana.....	10	25	31	0	1	0	0	0	0	0	0	0	
Illinois.....	104	139	237	0	0	2	0	0	0	2	0	0	
Michigan ¹	114	188	256	0	2	9	0	0	0	0	0	0	
Wisconsin.....	126	249	204	0	0	0	0	0	0	0	0	0	
WEST NORTH CENTRAL													
Minnesota.....	37	60	57	0	6	0	0	2	0	0	0	0	
Iowa.....	7	11	11	0	0	0	0	0	0	0	0	0	
Missouri.....	10	18	19	0	0	0	0	0	0	0	0	0	
North Dakota.....	10	7	5	0	1	0	0	1	0	0	0	0	
South Dakota.....	13	11	9	0	0	0	0	0	0	0	0	0	
Nebraska.....	1	6	6	0	0	0	0	0	0	0	0	0	
Kansas.....	23	21	35	0	0	0	0	0	0	0	0	0	
SOUTH ATLANTIC													
Delaware.....	3	0	2	0	0	0	0	0	0	0	0	0	
Maryland ¹	66	81	46	0	0	0	10	0	0	2	0	0	
District of Columbia.....	2	14	23	0	0	0	0	0	0	0	0	0	
Virginia.....	22	63	47	0	0	0	244	0	0	0	1	0	
West Virginia.....	18	50	31	1	0	0	0	0	0	0	0	0	
North Carolina.....	73	77	79	0	0	0	0	0	0	3	0	1	
South Carolina.....	65	95	26	0	0	26	0	0	0	0	0	19	
Georgia.....	17	10	9	0	1	4	0	0	0	0	2	30	
Florida.....	2	12	8	0	4	0	0	0	0	0	0	10	
EAST SOUTH CENTRAL													
Kentucky.....	40	63	63	0	0	0	0	0	0	0	0	0	
Tennessee.....	36	47	33	0	0	0	12	0	0	1	0	3	
Alabama.....	22	2	15	0	1	0	0	0	0	0	0	46	
Mississippi ¹				0	0	0	0	0	0	0	0	6	
WEST SOUTH CENTRAL													
Arkansas.....	28	13	13	0	0	16	0	0	0	0	6	0	
Louisiana.....	2	2	2	0	1	5	0	0	0	0	1	18	
Oklahoma.....	1	6	8	0	0	0	7	1	0	0	0	0	
Texas.....	86	107	96	0	10	323	4	1	0	0	0	40	
MOUNTAIN													
Montana.....	38	22	22	0	0	0	0	1	0	0	0	0	
Idaho.....	1	5	4	0	0	0	0	0	0	0	0	0	
Wyoming.....	5	13	13	0	1	0	0	0	0	1	0	0	
Colorado.....	62	9	15	0	0	1	0	3	0	0	0	0	
New Mexico.....	4	2	14	0	0	7	7	0	0	0	0	0	
Arizona.....	10	19	14	0	2	0	9	0	0	0	0	0	
Utah ¹	4	54	33	0	0	0	0	0	0	0	0	0	
Nevada.....	1	0	0	0	0	0	0	0	0	0	0	0	
PACIFIC													
Washington.....	36	66	53	0	0	0	2	1	0	0	0	0	
Oregon.....	13	19	16	0	0	0	0	0	0	0	0	0	
California.....	106	179	187	0	0	14	0	2	1	0	0	4	
Total.....	1,849	2,772	2,799	1	36	474	295	13	1	9	11	179	
Same week 1943.....	2,772			0	41	401	214	22	0	15	11	168	
Same week 1942.....	3,003			2	31	259	179	25	0	15	9	133	
37 weeks 1944.....	70,150			32	1,245	16,095	6,315	472	21	416	419	3,441	
37 weeks 1943.....	142,692			47	1,536	11,979	5,834	525	19	404	640	2,796	
37 weeks 1942.....	133,994		137,038	63	818	6,572	5,087	402	35	421	700	1,928	

¹ Period ended earlier than Saturday.

⁴ 5-year median 1939-43.

WEEKLY REPORTS FROM CITIES

City reports for week ended September 2, 1944

This table lists the reports from 89 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Polio-myelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and para-typhoid fever cases	Whooping cough cases
			Cases	Deaths								
NEW ENGLAND												
Maine:												
Portland	0	0		0	0	0	1	1	1	0	0	1
New Hampshire:												
Concord	0	0		0	0	0	4	1	0	0	0	0
Vermont:												
Barre	0	0		0	0	0	0	0	0	0	0	0
Massachusetts:												
Boston	0	0		0	10	0	5	5	11	0	0	19
Fall River	0	0		0	0	0	0	1	0	0	0	1
Springfield	0	0		0	0	0	0	2	1	0	0	4
Worcester	0	0		0	0	0	5	0	0	0	0	1
Rhode Island:												
Providence	1	0		0	1	1	2	0	1	0	0	6
Connecticut:												
Bridgeport	0	0		0	0	0	2	4	0	0	0	0
Hartford	1	0		0	0	1	0	1	2	0	0	2
New Haven	0	0		0	0	1	1	0	0	0	0	14
MIDDLE ATLANTIC												
New York:												
Buffalo	0	0		0	0	0	1	78	1	0	2	0
New York	6	5	1	0	5	11	33	253	33	0	11	64
Rochester	0	0		0	4	1	0	25	0	0	0	10
Syracuse	0	0		0	0	0	3	6	2	0	0	7
New Jersey:												
Camden	0	0		0	0	0	0	5	1	0	0	0
Newark	0	0		0	1	0	4	16	2	0	0	6
Trenton	0	0	1	0	0	0	0	0	0	0	0	4
Pennsylvania:												
Philadelphia	1	0		0	5	4	5	47	12	0	1	12
Pittsburgh	1	0	1	1	0	0	5	13	6	0	0	4
Reading	0	0		0	1	0	0	0	0	0	0	0
EAST NORTH CENTRAL												
Ohio:												
Cincinnati	0	0		0	0	2	2	11	5	0	0	7
Cleveland	0	0	3	0	0	1	4	27	9	0	2	20
Columbus	0	0	1	1	0	0	1	1	2	0	0	2
Indiana:												
Fort Wayne	0	0		0	0	0	2	1	1	0	0	0
Indianapolis	6	0		0	0	0	0	1	3	0	0	10
South Bend	0	0		0	0	0	0	0	1	0	0	0
Terre Haute	0	0		0	0	0	1	2	0	0	0	0
Illinois:												
Chicago	0	0	1	1	6	4	11	6	3	0	2	37
Springfield	0	0		0	0	0	0	0	0	0	0	2
Michigan:												
Detroit	5	0		0	2	5	3	60	9	0	2	45
Flint	0	0		0	0	0	1	1	0	0	0	0
Grand Rapids	0	0		0	0	0	1	1	2	0	0	1
Wisconsin:												
Kenosha	0	0		0	0	0	0	0	0	0	0	23
Milwaukee	0	0		0	4	0	0	19	6	0	0	41
Racine	0	0		0	1	0	1	1	1	0	0	2
Superior	0	0		0	2	0	0	1	0	0	0	2
WEST NORTH CENTRAL												
Minnesota:												
Duluth	0	0		0	0	0	0	7	4	0	0	0
Minneapolis	0	0		0	0	0	1	9	0	0	0	3
St. Paul	0	0		0	0	0	5	13	4	0	0	26
Missouri:												
Kansas City	0	0		0	0	2	6	0	1	0	3	0
St. Joseph	0	0		0	0	0	0	0	1	0	0	0
St. Louis	0	0		1	1	1	5	8	3	0	2	14

City reports for week ended September 2, 1944—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
WEST NORTH CENTRAL—continued												
North Dakota:												
Fargo.....	0	0	-----	0	0	0	0	3	0	0	0	0
Nebraska:												
Omaha.....	0	0	-----	0	0	0	2	0	2	0	0	0
Kansas:												
Topeka.....	0	0	-----	0	0	0	2	0	2	0	0	10
Wichita.....	0	0	-----	0	0	0	3	1	0	0	0	0
SOUTH ATLANTIC												
Delaware:												
Wilmington.....	0	0	-----	0	0	1	0	3	0	0	0	0
Maryland:												
Baltimore.....	4	0	-----	0	0	2	5	23	10	0	0	41
Cumberland.....	0	0	-----	0	4	0	0	0	0	0	0	0
District of Columbia:												
Washington.....	0	0	-----	0	1	0	5	22	2	0	0	0
Virginia:												
Lynchburg.....	0	0	-----	0	0	0	1	23	0	0	0	0
Richmond.....	0	0	-----	0	1	0	1	4	3	0	0	0
Roanoke.....	0	0	-----	0	0	0	0	3	2	0	1	3
West Virginia:												
Charleston.....	0	0	-----	0	0	0	0	0	0	0	0	0
Wheeling.....	0	0	-----	0	0	0	1	1	0	0	0	0
North Carolina:												
Raleigh.....	0	0	-----	0	1	0	0	0	1	0	0	0
Wilmington.....	0	0	-----	0	0	0	0	1	0	0	0	4
Winston-Salem.....	0	0	-----	0	0	0	2	3	1	0	0	0
South Carolina:												
Charleston.....	0	0	-----	0	0	0	1	0	2	0	1	0
Georgia:												
Atlanta.....	1	0	3	1	1	1	1	1	0	0	0	5
Brunswick.....	0	0	-----	0	0	0	0	0	0	0	0	0
Savannah.....	0	0	-----	0	0	0	1	0	1	0	1	2
Florida:												
Tampa.....	2	0	-----	0	0	0	0	0	0	0	1	0
EAST SOUTH CENTRAL												
Tennessee:												
Memphis.....	1	0	-----	0	1	0	5	1	1	0	0	9
Nashville.....	0	0	-----	0	0	0	1	0	0	0	0	0
Alabama:												
Birmingham.....	1	0	-----	0	0	0	3	0	2	0	0	3
Mobile.....	0	0	1	0	0	0	1	0	0	0	0	0
WEST SOUTH CENTRAL												
Arkansas:												
Little Rock.....	0	0	-----	0	0	0	1	1	0	0	0	0
Louisiana:												
New Orleans.....	0	0	1	0	0	1	8	1	0	0	1	1
Shreveport.....	3	0	-----	0	0	0	0	0	0	0	4	0
Texas:												
Dallas.....	5	0	-----	0	0	0	2	0	1	0	0	6
Galveston.....	0	0	-----	0	0	0	3	0	0	0	0	0
Houston.....	0	0	-----	0	0	0	2	1	1	0	1	0
San Antonio.....	0	1	-----	0	0	0	1	1	0	0	0	0
MOUNTAIN												
Montana:												
Billings.....	0	0	-----	0	0	0	0	0	0	0	0	2
Great Falls.....	0	0	-----	0	0	0	0	0	0	0	0	0
Helena.....	0	0	-----	0	0	0	0	0	0	0	0	1
Missoula.....	0	0	-----	0	0	0	2	0	0	0	0	0
Idaho:												
Boise.....	0	1	-----	0	0	0	0	0	0	0	0	0
Colorado:												
Denver.....	1	0	-----	0	0	0	3	2	2	0	0	9
Pueblo.....	0	0	-----	0	0	0	0	0	0	0	1	0
Utah:												
Salt Lake City.....	0	0	-----	0	3	0	0	0	2	0	0	9

City reports for week ended September 2, 1944—Continued

	Diphtheria cases	Etiology, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Pollomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
PACIFIC												
Washington:												
Seattle.....	0	0	-----	0	4	0	2	3	9	0	0	1
Spokane.....	0	0	1	1	8	0	2	1	0	0	0	0
Tacoma.....	0	0	-----	0	4	0	3	0	0	0	0	0
California:												
Los Angeles.....	2	0	3	1	11	1	1	5	9	0	0	7
Sacramento.....	0	0	-----	0	0	0	6	1	3	0	0	1
San Francisco.....	2	0	2	0	17	2	3	2	11	0	0	0
Total.....	43	7	19	7	99	42	189	734	195	0	36	504
Corresponding week, 1943.....	46	-----	20	13	211	-----	234	-----	216	0	35	836
Average, 1939-43.....	48	-----	31	10	174	-----	209	-----	208	1	42	1,045

1 3-year average, 1941-43.

2 5-year median.

Anthrax.—Cases: Camden, 1.

Dysentery, amebic.—Cases: New York, 1; Detroit, 1; Little Rock, 1; San Francisco, 2.

Dysentery, bacillary.—Cases: Providence, 1; New Haven, 1; Buffalo, 61; New York, 3; Chicago, 5; Detroit 2; St. Louis, 1; Los Angeles, 4.

Dysentery, unspecified.—Cases: Baltimore, 7; Richmond, 2.

Rocky Mountain spotted fever.—Cases: St. Louis, 1; Richmond, 1.

Typhus fever, endemic.—Cases: New York, 1; Wilmington, N. C., 4; Atlanta, 1; Savannah, 5; Tampa, 1; Nashville, 1; Birmingham, 2; Mobile, 5; New Orleans, 3; Dallas, 3; Houston, 14; San Antonio, 4; Los Angeles, 1.

Rates (annual basis) per 100,000 population, by geographic groups, for the 89 cities in the preceding table (estimated population, 1943, 34,380,700)

	Diphtheria case rates	Etiology, infectious, case rates	Influenza		Measles case rates	Meningitis, meningococcus, case rates	Pneumonia death rates	Pollomyelitis case rates	Scarlet fever case rates	Smallpox case rates	Typhoid and paratyphoid fever case rates	Whooping cough case rates
			Case rates	Death rates								
New England.....	5.2	0.0	-----	0.0	29	7.8	52.3	39.2	42	0.0	0.0	125
Middle Atlantic.....	3.7	2.3	1.4	0.5	7	7.4	23.6	205.0	26	0.0	6.5	50
East North Central.....	6.7	0.0	3.0	1.2	9	7.3	16.4	80.3	26	0.0	3.6	117
West North Central.....	0.0	0.0	-----	2.0	2	6.0	47.7	81.6	34	0.0	9.9	105
South Atlantic.....	11.5	0.0	4.9	1.6	13	6.6	29.6	137.9	36	0.0	6.6	90
East South Central.....	11.8	0.0	5.9	0.0	6	0.0	59.0	5.9	18	0.0	0.0	71
West South Central.....	23.0	2.9	2.9	0.0	0	2.9	48.8	11.5	6	0.0	17.2	20
Mountain.....	7.9	7.9	-----	0.0	24	0.0	39.7	15.9	32	0.0	7.9	167
Pacific.....	6.3	0.0	9.5	3.2	70	4.7	26.9	19.0	51	0.0	0.0	14
Total.....	6.5	1.1	2.9	1.1	15	6.4	23.7	111.6	30	0.0	5.5	77

PLAGUE INFECTION IN LASSEN AND SAN LUIS OBISPO COUNTIES, CALIFORNIA

Plague infection has been reported proved in tissue from 4 ground squirrels, *C. beecheyi*, taken on August 8, 1944, from a ranch 4½ miles north and 4 miles west of Milford, Lassen County, and in a pool of 200 fleas from 40 ground squirrels, *C. beecheyi*, proved positive September 6, and in tissue from 10 ground squirrels, same species, taken August 23 from a ranch 2 miles east of San Luis Obispo, San Luis Obispo County, Calif.

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended August 19, 1944.—During the week ended August 19, 1944, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Chickenpox		6	1	27	27	6	3	17	13	100
Diphtheria		1	3	31	4	2	1			42
Dysentery (bacillary)				2						2
Encephalitis, infectious									2	2
Influenza					12	1			1	14
Measles		3	2	102	74	11	15	17		224
Meningitis, meningococcus		1		3	1		1		1	7
Mumps				16	5		8	14	13	59
Pollomyelitis		2	13	3	118	9			1	146
Scarlet fever		2	4	40	38	10	6	5	4	109
Tuberculosis (all forms)		1	21	133	51		21		46	282
Typhoid and paratyphoid fever		1		29	1				3	34
Undulant fever				2	1					3
Whooping cough		36		63	52	3	16	11	37	218
German measles				1	6		2		8	17

¹ Includes 2 cases in delayed reports.

CUBA

Habana—Communicable diseases—4 weeks ended August 19, 1944.—During the 4 weeks ended August 19, 1944, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Cerebrospinal meningitis	1		Malaria	3	
Diphtheria	19		Measles	7	
Dysentery	4		Tuberculosis	3	2
Leprosy	1		Typhoid fever	40	

Provinces—Notifiable diseases—4 weeks ended August 12, 1944.—During the 4 weeks ended August 12, 1944, cases of certain notifiable diseases were reported in the Provinces of Cuba, as follows:

Disease	Pinar del Rio	Habana ¹	Matanzas	Santa Clara ²	Camaguey	Oriente	Total
Cancer		3	4	8	2	7	24
Cerebrospinal meningitis				1			1
Chickenpox						2	2
Diphtheria	1	28	2				31
Dysentery		2					2
Hookworm disease		29					29
Leprosy		1		1			2
Malaria	10	7	7	10	2	294	330
Measles	1	6		8		1	16
Pollomyelitis	1	1					2
Tetanus, infantile			1				1
Tuberculosis	14	34	9	31	13	38	139
Typhoid fever	13	66	13	119	26	59	296
Whooping cough		1					1

¹ Includes the city of Habana.

² For the week ended July 8, 1944, 1 case of human rabies was reported in Santa Clara Province.

JAMAICA

Notifiable diseases—4 weeks ended August 26, 1944.—During the 4 weeks ended August 26, 1944, cases of certain notifiable diseases were reported in Kingston, Jamaica, and in the island outside of Kingston, as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Cerebrospinal meningitis.....	-----	1	Poliomyelitis.....	-----	1
Chickenpox.....	6	11	Scarlet fever.....	-----	1
Diphtheria.....	2	5	Tuberculosis.....	31	45
Dysentery.....	3	3	Typhoid fever.....	13	58
Erysipelas.....	-----	1	Typhus fever.....	9	-----
Leprosy.....	-----	3			

NEW ZEALAND

Notifiable diseases—4 weeks ended August 12, 1944.—During the 4 weeks ended August 12, 1944, certain notifiable diseases were reported in New Zealand as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Actinomycosis.....	1	-----	Puerperal fever.....	7	-----
Cerebrospinal meningitis.....	19	2	Scarlet fever.....	932	2
Diphtheria.....	97	2	Tetanus.....	2	-----
Dysentery (bacillary).....	17	-----	Trachoma.....	6	-----
Erysipelas.....	28	-----	Tuberculosis (all forms).....	187	63
Leprosy.....	1	-----	Typhoid fever.....	7	-----
Lethargic encephalitis.....	1	-----	Undulant fever.....	3	-----
Malaria.....	72	-----			

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual incidence, only those places are included which had not previously reported any of the above-mentioned diseases; except yellow fever, during the current year. All reports of yellow fever are published currently.

A table showing the accumulated figures for these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday in each month.

(Few reports are available from the invaded countries of Europe and other nations in war zones.)

Plague

Bolivia—Chuquisaca Department—Muyupampa.—For the month of July 1944, 1 case of plague with 1 death was reported in Muyupampa, Chuquisaca Department, Bolivia.

French West Africa—Dakar.—For the week ended August 26, 1944, 36 cases of plague with 32 deaths were reported in Dakar, French West Africa.

Palestine—Haifa.—For the week ended August 19, 1944, 8 cases of plague were reported in Haifa, Palestine.

Smallpox

Bolivia.—For the month of July 1944, 103 cases of smallpox with 44 deaths were reported in Bolivia. Departments reporting the highest incidence of the disease are as follows: La Paz, 54 cases, 31 deaths, including 34 cases and 21 deaths in La Paz city; Potosi, 42 cases, 13 deaths, including 32 cases and 11 deaths in Potosi city; Cochabamba, 4 cases.

Typhus Fever

Bolivia.—For the month of July 1944, 58 cases of typhus fever with 11 deaths were reported in Bolivia, including 12 cases and 1 death in Cochabamba Department and 39 cases and 7 deaths in Potosi Department.

Egypt.—For the week ended August 5, 1944, 124 cases of typhus fever with 16 deaths were reported in Egypt.

Hungary.—For the week ended August 19, 1944, 25 cases of typhus fever (including 15 cases in Subcarpathia) were reported in Hungary.

Yellow Fever

Gold Coast—Tamale.—On August 20, 1944, 1 fatal case of suspected yellow fever was reported in Tamale, Gold Coast.

Ivory Coast—Abidjan.—For the period August 1–10, 1944, 1 fatal case of yellow fever was reported in Abidjan, Ivory Coast.

* * *

COURT DECISION ON PUBLIC HEALTH

Ordinance prohibiting sale of milk or cream in bottles of other than specified size upheld.—(United States Circuit Court of Appeals, 10th Circuit; *Independent Dairymen's Association, Inc., v. City and County of Denver et al.*, 142 F.2d 940; decided May 15, 1944; rehearing denied June 26, 1944.) A 1943 ordinance of the city and county of Denver provided that milk or cream, when sold in bottles, could be sold in 2-quart, quart, pint, half-pint, quarter-pint, or 10-ounce bottles but prohibited the sale of milk or cream in bottles of any other size or capacity. Three creameries were engaged in the bottling, sale, and distribution of milk and cream in standard gallon-size bottles in the city and county and these creameries and a dairymen's association brought an action in the United States District Court for a judgment declaring the ordinance to be null and void and enjoining its enforcement. The trial court entered a judgment dismissing the action but granted an injunction against the enforcement of the ordinance until the determination of an appeal to the United States Circuit Court of Appeals.

The latter court stated that it was common knowledge that milk was easily contaminated and that contaminated milk was a prolific source of disease. The regulation of the sale and distribution of milk, it said, was within the police power of the city and it then proceeded to quote from a prior case to show the extent to which the sale and distribution of milk could be regulated under the police power. The evidence adduced at the trial established the following facts: When milk was first sold in gallon bottles in Denver a small-mouthed bottle, which was difficult to thoroughly clean and sterilize, was used; shortly thereafter, dairymen, after a conference with municipal representatives, agreed to eliminate the use of small-necked bottles, to use large-necked bottles, and to install mechanical equipment for capping; experience demonstrated, however, that large-necked bottles were also difficult to clean and sterilize and that mechanical capping equipment would not work well on such bottles; the caps did not seat perfectly and the operator's thumb was frequently used to seat them, and, after sterilization, the dairy employees were disposed to insert their fingers in the top of the bottles when handling them; such practices subjected the milk to danger of contamination from the employees' hands; when smaller bottles were used this was not true; when heated to a high temperature gallon bottles often broke and there was a temptation to neglect complete sterilization in order to avoid breakage; large-mouthed gallon bottles had a tendency to chip and break around the mouth; half-gallon and smaller bottles were more readily sterilized, were less apt to chip and break, could be capped without the use of human hands, and were less apt to be contaminated in handling.

The circuit court of appeals concluded that the plaintiffs had failed to establish that a rational factual basis for the requirements of the ordinance was so wanting as to render it unreasonable and arbitrary or that the classification was without any rational basis or was essentially arbitrary. On the contrary, the court, in the light of the proven facts, was of the opinion that the ordinance had a legitimate relation to the protection of the public health and was a proper exercise of the police power of the city and county.

The injunction during the litigation, granted by the trial court, was ordered dissolved and the judgment of the trial court dismissing the action was affirmed.