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A STRAIN OF TYPHUS RICKETTSIAE ISOLATED FROM THE BRAIN OF A WILD RAT IN CALIFORNIA[1]

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INTRODUCTION

Typhus fever was not recognized clinically in California prior to 1916 according to a publication by Cumming and Senftner (*1*). Since that time an increasing number of cases have been reported to the California State Department of Public Health, the total to October 1, 1943, being 278. Of these, 129 have occurred in the last 5 years. Endemic foci of infection have been confined almost exclusively within the geographical limits of southern California, mainly in Los Angeles and San Diego Counties. However, there is recorded a group of 26 cases with 1 death in 1916 among Mexican railroad section gangs. The infection was believed to have been louse borne and imported from Mexico. Blood from three of these patients when inoculated into guinea pigs produced a mild disease with temperatures only after 10 to 12 days' incubation (*1*). Four passages were made but no further laboratory work was done to identify the etiological agent. From the description given it is probable that these were nonorchitic strains. The history of the infection in California has never recorded a repetition of the 1916 outbreak and epidemiologically since that year the disease has been considered to be flea borne. The following report presents preliminary field and laboratory studies in connection with a survey of typhus fever in California.

LABORATORY STUDIES

Field work.—Field studies were initiated in March 1943 in San Bernardino County following the report of a laboratory diagnosed case (Weil-Felix positive 1–5120) of typhus fever with onset in February. The patient, M. B. H., was employed as an egg packer in a poultry plant located in a semirural district where she had worked

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from September 1942 until February 24, 1943. Rats and mice were reported as being numerous around the building. Ample opportunity was afforded for the rodents to gain access to the 6- to 7-inch space beneath the floor of the "feather" room located on the second floor of the main building. Furthermore, a large section of plaster was missing from the ceiling of the women's rest room directly below making it possible for fleas to drop onto a cot which had been used by the patient on several occasions. M. B. H. remarked that she had been bitten but was not sure that the bites were caused by fleas. The epidemiological history in this case indicated that the poultry plant was a probable source of infection and an investigation followed.

A mobile laboratory unit was used which was equipped for trapping, autopsying of animals, and the inoculation of guinea pigs. Cage traps were placed in and around the main building where M. B. H. had worked and in the smaller adjacent units. A total of 21 mice (*Mus musculus musculus*), 3 rats (*R. rattus alexandrinus*), and 3 pools of fleas was collected.

Method of examination.—Only specimens from live animals were used for inoculation. The animals were chloroformed, combed for fleas, and the brains removed aseptically. One-half of each rodent's brain was thoroughly ground in a mortar and made up to approximately a 10 percent suspension with infusion broth (pH 7.2). The suspension was allowed to settle to remove the coarse particles and 3 to 4 cc. of each were inoculated intraperitoneally into one or two male guinea pigs. The other half of each brain was stored in a portable dry-ice box for subsequent examination. Pools were made of the mouse brains and also of the fleas, but the rat brains were injected separately. The guinea pigs inoculated with field specimens were shipped immediately by express to the central laboratory in Berkeley for observation.

Isolation of a strain.—The inoculated guinea pigs were observed daily for 21 days for rise of temperature and appearance of scrotal involvement. Field specimen No. 10 from a rat trapped in the "feather" room on the second floor of the main poultry plant was inoculated into two male guinea pigs, Nos. 817 and 825. Guinea pig No. 817 showed a rise of temperature (104°) on the eleventh and twelfth days with slight scrotal swelling on the latter day. Temperature and swelling of the scrotum subsided on the thirteenth day. This animal was tested for immunity and will be referred to later. Guinea pig No. 825 had a temperature of 104.5° on the eighth day, 103.8° on the ninth day, 105° on the tenth day with scrotal swelling. On the eleventh day the temperature was 104.5° with swollen and adherent testes; the animal was sacrificed.

Blood and testicular washings were passed separately to two guinea pigs; all animals received 4 cc. intraperitoneally. This strain, which

will be designated as "825," has been maintained through 25 serial passages over a period of 5 months. Fleas from the rat found positive for typhus when injected into guinea pigs failed to produce the infection as judged by lack of clinical symptoms and immunity to a known endemic strain of typhus. The remaining field specimens were negative for typhus rickettsiae. The newly isolated strain was compared with endemic and epidemic typhus fever strains supplied by Dr. R. R. Parker, United States Public Health Service.

PATHOGENICITY TESTS IN ANIMALS

Guinea pigs.—After the initial passage of rat brain into guinea pigs, strain 825 has been transmitted with ease in this host, a total of 69 animals being used for routine passage. Two of these died with intercurrent infections 2 and 4 days after inoculation. The remaining 67 showed a typical rise in temperature and 64, or approximately 95 percent, developed scrotal involvement. The larger animals showed more pronounced scrotal reactions, an observation which has also been noted by Raynal (cited by Liu and Zia (*2*)). The animals exhibited no other clinical signs of illness and only two deaths occurred.

Autopsy findings were similar to those recorded in the literature (*3*, *4*) for endemic typhus strains in guinea pigs. Irregular findings were enlarged inguinal lymph glands and a deposit of fibrin on the surface of the spleen. Similar observations have also been noted by Lewthwaite and Savoor (*4*). Intracellular rickettsiae were quite easily demonstrated in the scrapings of the tunica vaginalis when stained by Machiavello's method or by Bengtson's (*5*) or Gracian's (*6*) modifications of Giemsa.

Animals selected for transfer were etherized and bled from the heart. The heart blood was routinely cultured in broth at the time of transfer and all cultures have proved sterile.

Blood, brain, and testicular washings have been used for passage material. Blood was passed on the fifth or sixth day, 4 cc. being injected intraperitoneally into normal male guinea pigs weighing at least 300 gm. When brain was used as inoculum the animal was sacrificed on the fourteenth or fifteenth day following inoculation. The tissue was ground in a sterile mortar and made up to approximately 10 percent suspension in saline; 3 to 4 cc. were given intraperitoneally to each of two normal guinea pigs. Testicular washings have been employed for routine passage applying Maxcy's (*7*) technique. The infected guinea pigs were killed on the fifth or sixth day after inoculation or 48 to 72 hours from the development of the temperature.

The incubation time for the original animal (825) was 8 days. This, however, was reduced to 3 days on the second passage and has remained almost constant when testicular washings were used as inoculum. On the third day following inoculation the animals showed

a sharp rise in temperature which frequently declined on the fourth day and rose again on the fifth day. The incubation period for blood averaged 7 days and for brain material the incubation period was 8 days with 11 days as maximum for the latter. Maxcy (7) noted longer incubation periods with his strains of endemic typhus when blood was employed for passage. The scrotal involvement closely followed the temperature rise and appeared either on the same day or a day later. Testicular washings produced a more persistent reaction lasting approximately 4 days.

Rabbits.—Two rabbits were inoculated intraperitoneally with 3 cc. of testicular washings from a guinea pig showing typical symptoms of temperature and scrotal involvement. Temperatures were taken on one animal for 14 days but no rise was observed over this period nor were any clinical symptoms noted in either of the rabbits. The animals were bled before and 14 days after inoculation. Agglutination tests with four strains of proteus were done and table 1 gives the results. The agglutinins were of the OX19 type.

TABLE 1.—*Agglutination tests with strains of* B. proteus

Rabbit No.	Day of bleeding	Proteus strains			
		OX19	OX2	OXK	XLL[1]
12	0	0	0	0	0
	14	+1-40	0	0	±1-20
17	0	0	0	0	0
	14	+++1-320 ++1-640	0	0	+++1-640 ++1-1280

[1] Strain XLL came originally from Dr. R. R. Parker, United States Public Health Service.

A number of workers (*8*, *9*) have observed that the response of rabbits, as demonstrated by the production of agglutinins, varied considerably; this variation was evinced from the difference in titer developed by the two rabbits receiving strain 825.

White rats.—Strain 825 passed to white rats by the intraperitoneal route produced inapparent infections. Serial transfers were made using brain as the source of rickettsiae. After two passages, rats Nos. 9 and 10 were sacrificed at 16 days and the brains inoculated intraperitoneally into guinea pigs. Typical temperature and scrotal reactions developed. These rats were bled and their blood tested for agglutinins. The results are shown in table 2.

TABLE 2.—*Agglutination tests with strains of* B. proteus

Rat No.	Day of bleeding	Proteus strains			
		OX19	OX2	OXK	XLL[1]
9	16	±1-20	0	±1-10	±1-80
10	16	±1-160	±1-10	±1-10	++++1-160

[1] Strain XLL came originally from Dr. R. R. Parker, United States Public Health Service.

Cotton rats.—Snyder and Anderson (*10*) reported that epidemic strains of typhus may be passed in very young cotton rats (*Sigmodon hispidus hispidus*) by the intracardial route resulting in a fatal infection. According to Varela (*11*) and Brigham (*12*) endemic strains have no effect on these rodents. Applying the technique of Snyder and Anderson eight young cotton rats, 4 to 6 weeks old, were given 0.2 cc. of testicular washings from a guinea pig infected with strain 825. Inapparent infections were the rule in this series; however, the brains from two of these animals were removed 24 days after inoculation and they produced typical symptoms in two normal guinea pigs in 7 and 9 days. Like the rat this species evidently carries the infection over a period of time without clinical symptoms and may be of epidemiological importance as a reservoir of typhus fever.

Mice.—Another difference between endemic and epidemic strains is emphasized by the use of white mice as experimental animals. Epidemic strains as reported in the literature (*13*, *14*, *15*, *16*, *17*) are lost after three transfers, whereas endemic strains may be passed repeatedly in mice by intraperitoneal inoculation of mouse brains at 10-day intervals.

Strain 825 was passed serially in mice and at the third, fifth, and ninth transfers guinea pigs were also injected. Characteristic reactions developed. These animals subsequently were found to be immune to the known strain of endemic typhus.

Liu and Zia (*2*) in their studies on typhus fever in China reported fatalities among the inoculated mice. Deaths were observed also among mice infected with strain 825 and at autopsy exhibited only a sticky peritoneal exudate.

Developing eggs.—Cox (*18*, *19*) has successfully established the rickettsiae of typhus fever in the yolk sacs of developing eggs. Strain 825 was readily adapted by the inoculation of testicular washings into the yolk sacs of 5-day-old fertile eggs. After 6 days' incubation some of the embryos from the initial inoculation died. Yolk sacs from the remaining live embryos were harvested and passed. Subsequent transfers proved fatal to the embryos in most instances in 5 to 6 days.

Yolk sac material from the fourth egg passage was ground in a mortar, diluted with saline, and injected intraperitoneally into male guinea pigs as well as eggs. The animals gave characteristic reactions and were immune to reinoculation with the known endemic strain. Numerous free rickettsiae were demonstrable in smears of the infected yolk sac as described by Bengtson (*5*).

Pathology.—Sections were made of the brains of five guinea pigs, showing typical temperature and scrotal reactions, autopsied on the fifteenth day after inoculation. According to Dr. J. F. Rinehart, University of California Medical School, only two showed the characteristic brain lesions of typhus fever. A third had one lesion of uncer-

tain character. Various workers (*9, 20, 21*) have stated that the lesions are difficult to find in the brains of guinea pigs inoculated with endemic strains and that the time of obtaining the specimen and the sections of tissue examined are important factors.

Preservation of the rickettsiae.—From the standpoint of field surveys it was important to know if specimens would retain their infectivity after being stored at −70° C. One-half of all field specimens were frozen with dry ice, the plan being to reinoculate any material from which rickettsiae had been isolated in the original. The frozen half of field specimen No. 10 from which strain 825 was obtained was kept for 2 weeks at −70° C. and then ground up and two normal guinea pigs inoculated.

After 7 and 12 days' incubation, temperature and scrotal swelling developed. This strain was carried for three passages and then discontinued. The results indicate that field specimens may be successfully preserved at −70° C. for at least 2 weeks. Experiments were done to determine if this time limit could be extended. It has been found that infected guinea pig brain sealed in pyrex tubes will remain viable for at least 2 months at −70° C., which is the longest period tested thus far.

Topping (*22*) suggests sterile skim milk as a diluent when typhus material is to be frozen and dried. This method has been used for testicular washings, brain and yolk sac passage material for strain 825 with good results.

Cross immunity tests.—As a final check on the identity of strain 825, cross immunity tests were done. Guinea pigs were given one intraperitoneal inoculation of the various strains; e. g., strain 825, endemic and epidemic, and were usually tested for immunity at the end of 14 days with the homologous and heterologous strains. Appropriate controls receiving the same test dose were included for each. Temperatures of all animals were taken daily for 21 days.

Figure 1 demonstrates the results of cross immunity tests using the United States Public Health Service endemic strain as the challenging agent. Guinea pig No. 817, as stated above, was inoculated in the field laboratory with the same material as No. 825, and tested 46 days later. Guinea pig No. 73 represents the second passage of the frozen brain from field specimen No. 10, and guinea pig No. 87 is the sixth passage of strain 825. These three animals were found to be solidly immune to known endemic typhus fever.

Figure 2 represents the cross immunity tests against the United States Public Health Service epidemic strain. Guinea pigs Nos. 112 and 164 inoculated with strain 825 were found to be completely protected against epidemic typhus fever. Figures 3 and 4 illustrate the cross immunity tests in guinea pigs inoculated with strain 825 and with known endemic and epidemic strains and tested with strain 825.

One of the original guinea pigs (No. B38528) inoculated with endemic typhus sent to us by the United States Public Health Service Laboratory at Hamilton, Mont., was included in this group. Homologous and heterologous immunity with strain 825 was demonstrated.

DISCUSSION

The experimental laboratory work on a strain of typhus rickettsiae isolated from a wild rat for the first time in California has been completed, fulfilling all the criteria set up by Dyer, Workmann, Badger, and Rumreich (*23*) for the identification of unknown endemic strains:

1. Typical febrile reactions and typical scrotal involvement in guinea pigs.
2. Negative blood cultures from guinea pigs at the height of their reactions.

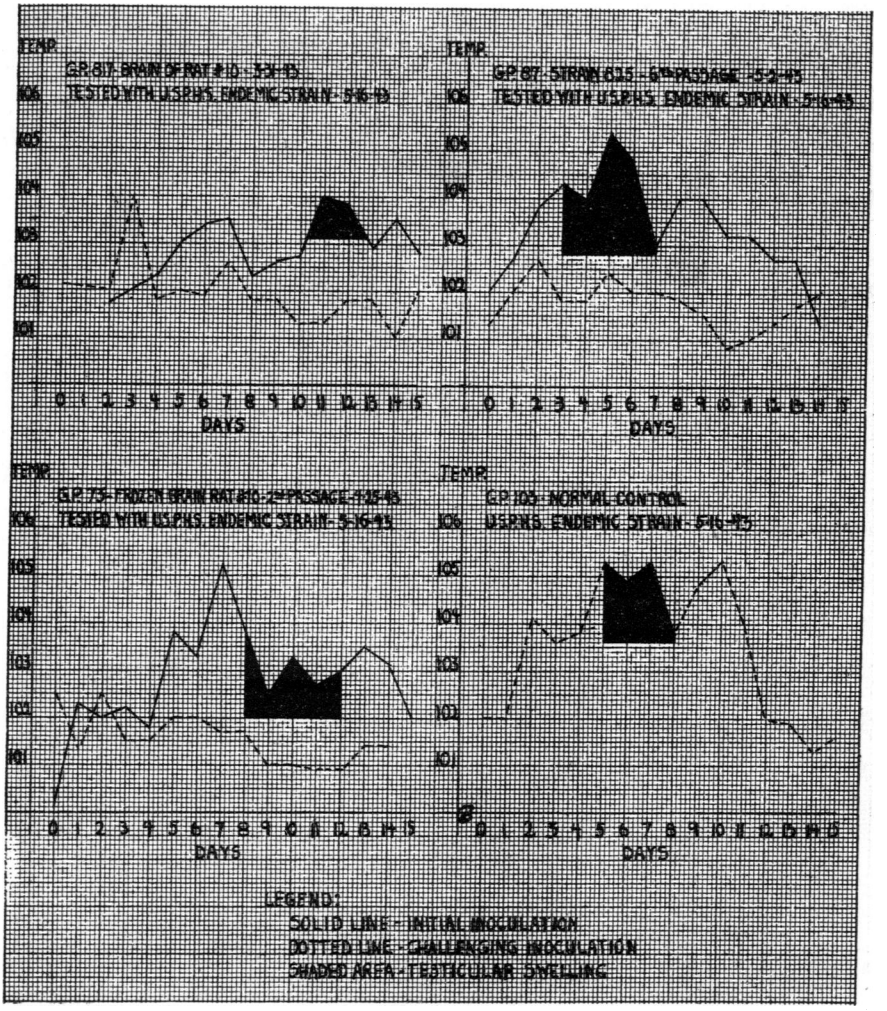

FIGURE 1.—Cross immunity tests with endemic typhus as the test strain.

3. Intracellular rickettsia in smears made from the tunica vaginalis of guinea pigs reacting typically.
4. The development in rabbits of agglutinins for *B. proteus* X19 type 0.
5. Typical histologic lesions in the brains of guinea pigs.
6. Clear-cut cross immunity between the unknown and known strains of typhus.

Epidemiologically the case history of M. B. H. corresponds to the observation of Dyer et al. (*24*) that endemic typhus is more closely associated with the place of employment than with the domicile, as the infected rat in this instance was trapped alive at the poultry plant where the patient worked.

It is apparent from the experimental and epidemiological evidence presented herein that the murine variety of typhus fever is present in at least one locality of the State. In view of the fact that the 1916

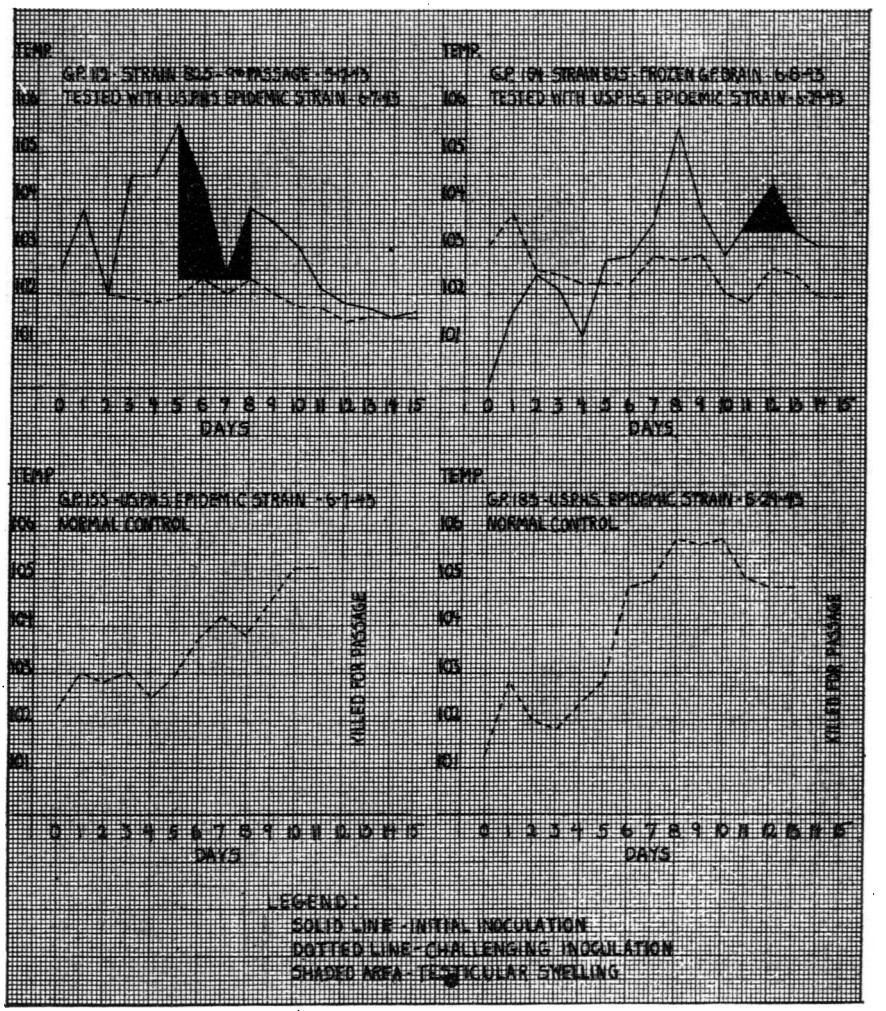

FIGURE 2.—Cross immunity tests with epidemic typhus as the test strain.

cases were considered to be louse borne, while subsequent infections have apparently been transmitted by fleas, a more extensive field survey will be necessary to completely establish the type or types of this disease in California.

SUMMARY

For the first time in California a strain of typhus rickettsiae has been isolated from the brain of a wild rat (*R. rattus alexandrinus*) associated with the place of employment of a laboratory diagnosed case of typhus fever.

Strain 825 fulfills the six criteria for the identification of endemic strains of typhus fever.

Typhus fever of the murine type was found to be present in the county surveyed.

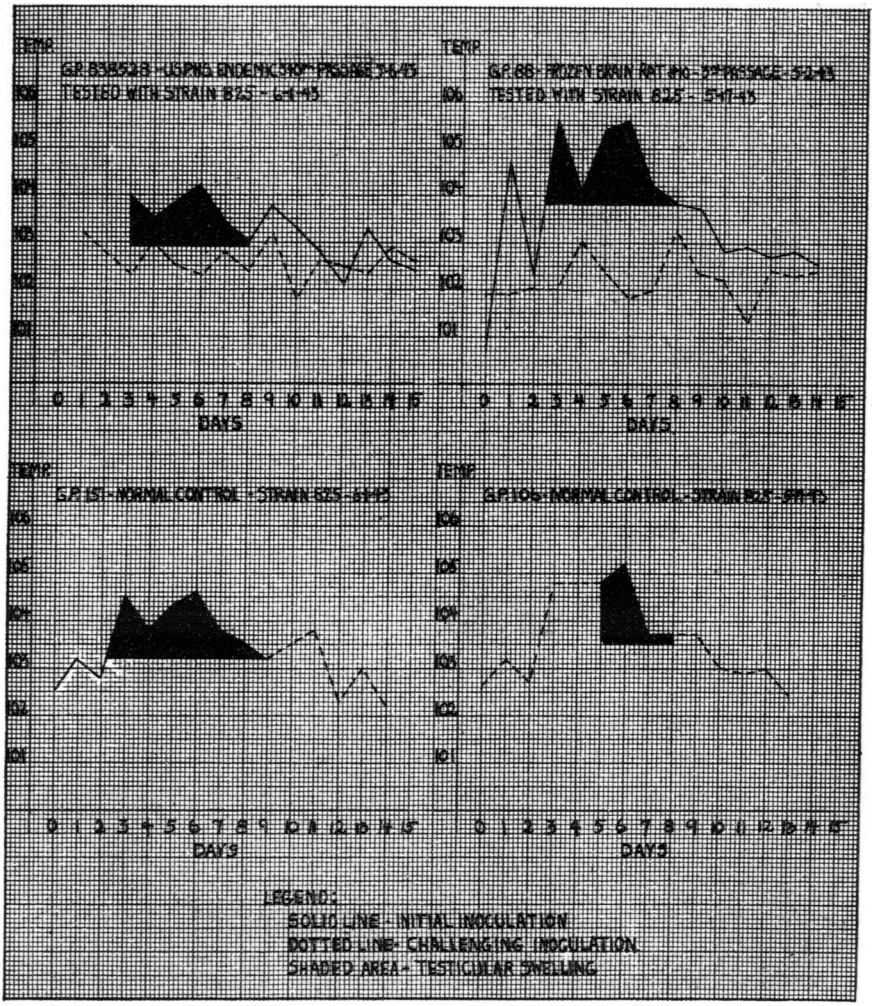

FIGURE 3.—Cross immunity tests with strain 825 as the test strain.

ACKNOWLEDGMENTS

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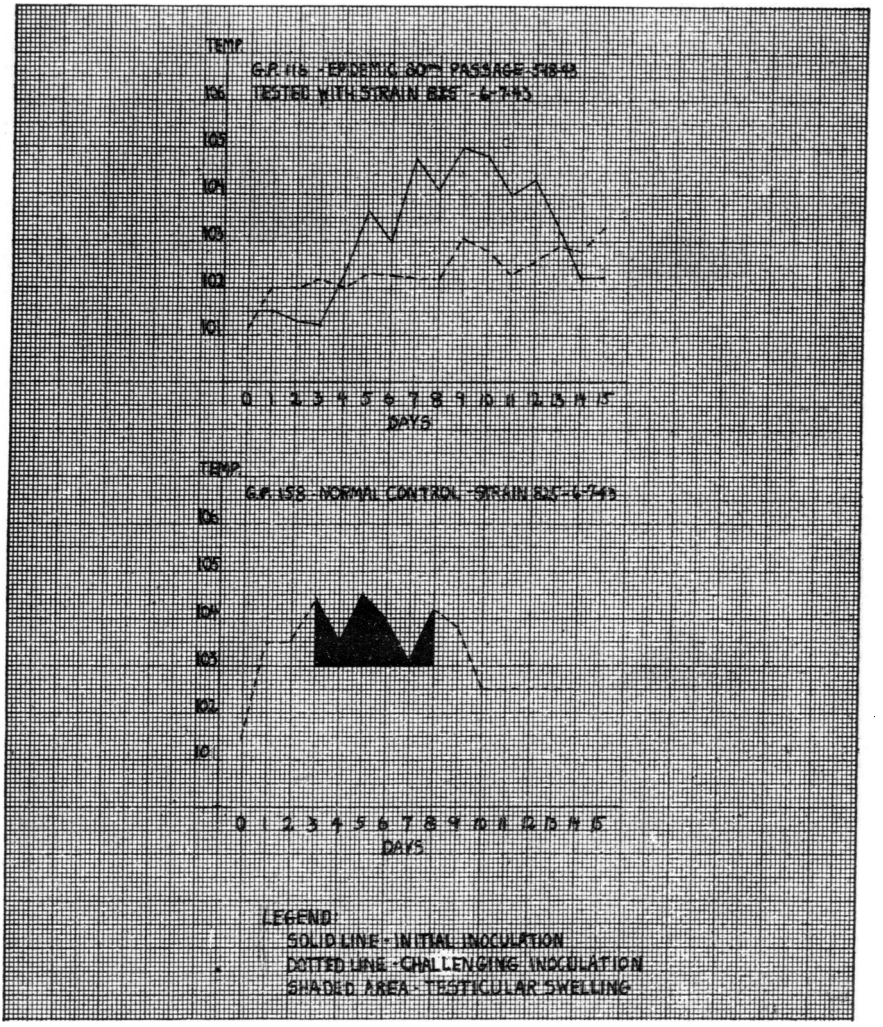

FIGURE 4.—Cross immunity tests with strain 825 as the test strain.

NOTE: Since this report was submitted for publication, field studies have been extended, and from the material collected nine specimens have been found positive for typhus rickettsiae: seven rat brains, one pool of fleas, and blood from a human case. Details of this survey will be published at a later date.

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PREVALENCE OF POLIOMYELITIS IN THE UNITED STATES IN 1943

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The reported incidence of poliomyelitis in the United States during 1943 was higher than in any previous year for which data are available with the exception of two years, 1916 and 1931. In 1916, 27 States reported 27,363 cases, 43 States reported 15,790 cases in 1931, and 48 States reported 12,429 cases in 1943.[1] Other years in which more than 10,000 cases were recorded were 1927 with 10,533 and 1935 with 10,839 cases. A very low incidence, 4,033 cases, was recorded in 1942.

As pointed out in a previous report [2] certain counties in Texas and California had a relatively high incidence of poliomyelitis late in 1942. As in other years this occurrence of the disease late in the fall and early winter of 1942 was a forerunner of a more widespread epidemic in these States in 1943. A number of counties involved in this late appearance of the disease in 1942 contained large cities which also experienced high rates of incidence. From January to April 1943, inclusive, these cities and counties reported small numbers of cases and a sharp increase became apparent late in May in California, principally in Los Angeles, and early in June in the Texas counties. The disease subsequently occurred in epidemic form throughout various parts of these two States as shown in the accompaning map (fig. 1). A total of 2,685 cases of poliomyelitis was reported in California during 1943 and 1,271 in Texas, or about 32 percent of the total for the entire United States. The morbidity rates per 100,000 population were 38.8 in California and 19.8 in Texas.

As shown in figure 1 and table 1, poliomyelitis was widespread throughout the entire southwestern part of the country and along the Pacific coast region. In the eastern half of the United States there was a comparatively low rate of incidence except in certain localized areas.

Two States, Utah and Kansas, experienced even higher rates of incidence than California. In Utah where 399 cases were reported, or a rate of 72.7 per 100,000 population, the disease first appeared in the latter part of July and the peak in incidence was reached in September.

[1] All data for 1943 in this report are provisional.

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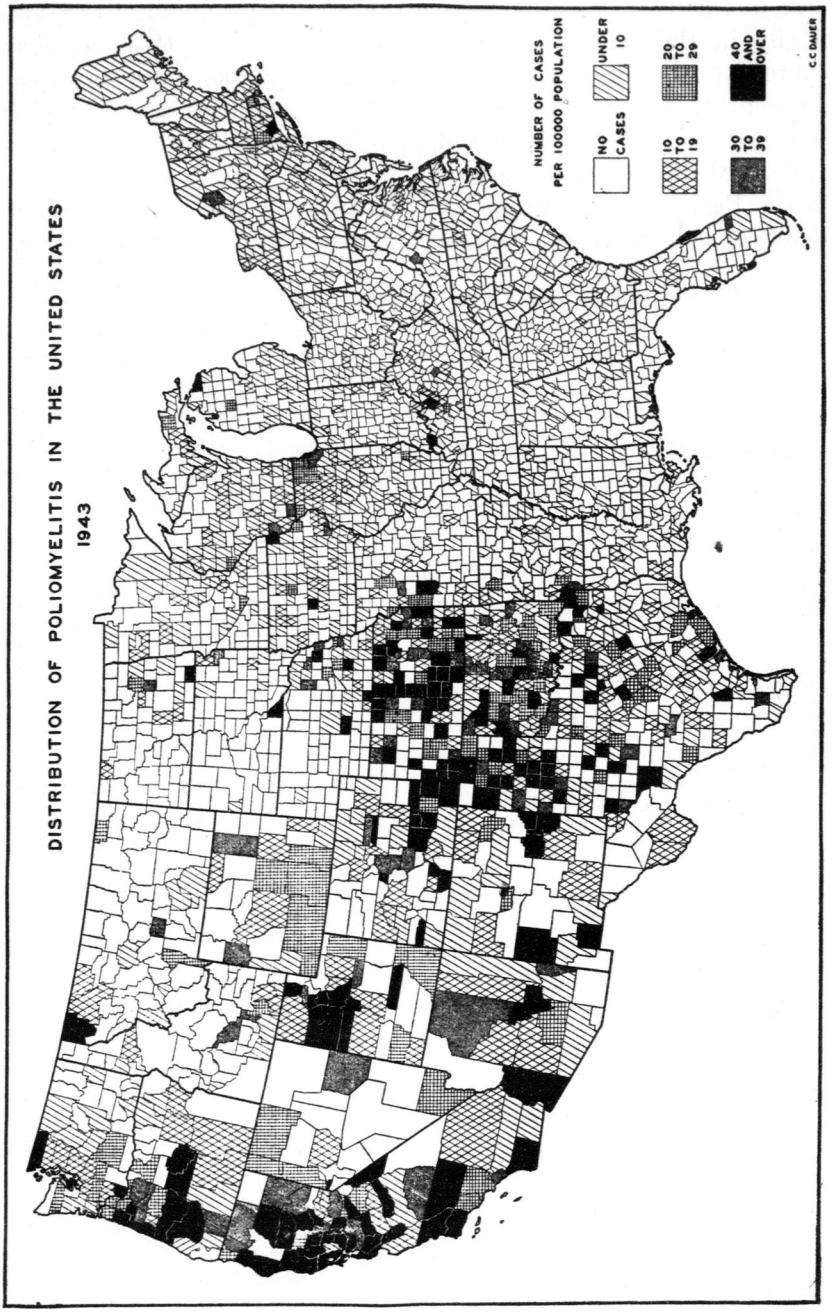
DISTRIBUTION OF POLIOMYELITIS IN THE UNITED STATES
1943
NUMBER OF CASES
PER 100000 POPULATION
NO CASES
UNDER 10
10 TO 19
20 TO 29
30 TO 39
40 AND OVER
C.C.DAUER

FIGURE 1.

In Kansas there were 764 cases, or a rate of 42.4. A number of counties in the western part of the State had reported localized outbreaks in 1942 but in 1943 the disease was prevalent throughout the State, especially in the central part. No longer ago than 1940, a fairly widespread outbreak occurred when the disease was more prevalent in the central and eastern sections. A few counties reported high rates of incidence both in 1940 and 1943 but the two outbreaks generally involved different counties.

On the Pacific coast, Oregon and Washington also reported a high incidence of poliomyelitis. Oregon had a rate of 37.1 (405 cases) but

TABLE 1.—*Poliomyelitis morbidity rates per 100,000 population by States, 1940–43*

	1940	1941	1942	1943
United States	7.4	6.8	3.2	9.5
New England:				
Maine	1.3	4.8	5.1	2.0
New Hampshire	.4	6.3	2.3	2.6
Vermont	1.7	3.9	9.1	7.2
Massachusetts	1.0	4.2	.9	5.9
Rhode Island	1.2	5.2	.7	26.1
Connecticut	1.1	6.7	2.8	22.1
Middle Atlantic:				
New York	1.6	8.2	2.1	5.1
New Jersey	1.5	8.4	6.1	2.0
Pennsylvania	1.7	7.4	1.2	1.4
East North Central:				
Ohio	9.5	7.0	2.3	2.7
Indiana	19.9	3.4	2.9	3.1
Illinois	7.6	4.8	6.2	19.9
Michigan	23.0	5.1	3.1	2.6
Wisconsin	15.7	3.1	1.4	6.6
West North Central:				
Minnesota	8.4	10.1	2.9	6.1
Iowa	36.9	1.7	2.9	8.0
Missouri	8.3	1.1	2.3	5.8
North Dakota	3.9	2.6	2.8	3.4
South Dakota	12.7	4.3	2.2	2.6
Nebraska	14.0	1.0	10.7	10.6
Kansas	30.1	2.7	6.1	42.4
South Atlantic:				
Delaware	.8	1.0	6.3	2.6
Maryland	.9	13.1	.8	1.2
District of Columbia	1.2	10.1	.6	1.4
Virginia	9.3	5.9	1.8	2.3
West Virginia	34.8	2.5	2.6	1.6
North Carolina	2.1	4.7	2.2	1.0
South Carolina	1.0	8.7	3.5	1.0
Georgia	.9	23.5	1.8	.9
Florida	1.7	14.4	2.2	1.5
East South Central:				
Kentucky	7.8	7.7	4.8	5.5
Tennessee	1.9	18.4	5.3	.6
Alabama	1.9	30.5	2.6	1.4
Mississippi	2.0	6.9	2.7	1.5
West South Central:				
Arkansas	1.5	3.0	7.8	4.0
Louisiana	5.5	2.9	2.4	2.9
Oklahoma	4.9	2.1	.7	24.2
Texas	2.7	2.0	3.8	19.8
Mountain:				
Indiana	19.1	5.3	2.7	4.8
Idaho	13.0	1.9	1.1	2.8
Wyoming	16.3	4.7	6.0	13.1
Colorado	3.5	2.5	3.3	25.7
New Mexico	4.3	1.9	5.1	14.4
Arizona	1.4	3.0	6.8	18.0
Utah	11.3	7.4	5.0	72.7
Nevada	1.0	0	2.7	19.1
Pacific:				
Washington	24.6	4.1	1.8	20.0
Oregon	5.8	7.5	2.5	37.1
California	16.6	6.7	5.1	38.8

over half of the cases occurred in two counties, Lane County with 126 cases (182.3 per 100,000) and Multnomah with 96 cases (27.2 per 100,000). The disease appeared rather abruptly late in July and the peak was reached in October. In Washington State where there were 348 cases, or a rate of 20.0, the disease began to appear at the same time as in Oregon and reached its height at approximately the same time.

In Oklahoma poliomyelitis cases began to be reported late in June and increased rapidly in number until the first week of August. About the same time cases began to be reported in fairly large numbers in Kansas and Colorado. In Arizona small numbers of cases were noted throughout the spring and summer of 1943 but never in excessively large numbers. Likewise in New Mexico and Nevada the disease was reported regularly in small numbers during the late summer months.

A severe outbreak of poliomyelitis occurred in Chicago and Cook County as well as the nearby counties of northeastern Illinois which represented nine-tenths of all the cases reported in the State during 1943. Of the 1,575 cases reported for the State as a whole, 1,053, or 65 percent, occurred in Chicago. In Connecticut 228, or 60 percent of the 379 cases occurring in the State, were reported from New Haven County. In Rhode Island poliomyelitis was concentrated in and near Providence, and moderate increases in prevalence were reported in Bristol and Essex Counties in Massachusetts. Only a few small localized outbreaks occurred in other parts of the country in which one or more counties were involved. These occurred mainly in Kentucky, Wisconsin, Minnesota, Nebraska, and Wyoming. The South Atlantic and East South Central States, with the exception of Kentucky, reported a very low prevalence in 1943.

The information on the occurrence of poliomyelitis in California, Oregon, and Washington suggests that the infection spread northward from southern California where it first appeared in 1943, eventually involving the northern part of the State and finally Oregon and Washington. Examination of the weekly returns of cases reported by certain cities in these three States shows that the disease was first reported in fairly large numbers in Los Angeles in April. The disease made its appearance in San Francisco in May. It began abruptly in Sacramento in June, and finally in Seattle in August. The situation with reference to Texas and the States north of it is not so clear. Cases were reported in comparatively large numbers in several Texas cities in May and June and subsequently in Oklahoma City in July and in Tulsa, Okla., in August. However, in Wichita, Kans., and Kansas City, Mo., the epidemic was already in progress early in July. In these two cities the infection may have spread from foci already established within the

State, namely, the localized areas where epidemics had occurred in 1942, rather than spread from Oklahoma or Texas. In Colorado the disease first appeared in the southern part of the State and later in counties and cities farther north. In the New England area poliomyelitis appeared simultaneously in New Haven and Providence about the middle of July and seems to have spread concentrically to contiguous areas.

One rather unusual feature about the prevalence of poliomyelitis in 1943 was the number of cities in which the disease was epidemic. Records of cases reported for a limited number of cities are available, those having high rates of incidence being shown in table 2. Provisional data indicate that Pueblo, Colo., had the highest morbidity rate per 100,000 population (99.6), and Chicago reported the largest number of cases (1,053). This group of 21 cities, 3 of which were in California and 3 in Texas, reported 22 percent of all the cases reported in the United States in 1943, although having only about 7 percent of the total population. Sacramento and New Haven had case rates appreciably higher than the remainder of the counties in which they are located, and in two others, Salt Lake City and Wichita, the reverse was true. There was no significant difference in rates in the remaining 17 cities as compared with the counties in which they are located. In addition to the 21 cities listed in table 2 there were others in which the evidence indicates high rates of incidence. For instance, Tarrant County, Tex., in which the city of Fort Worth is located, had a rate of 64.1; Multnomah County, Oreg. (Portland), reported 27.1 cases per 100,000; and Alameda (Oakland City), San Diego (San Diego City), and Santa Clara (San Jose City) counties in California reported rates of 32.7, 41.7, and 73.7, respectively. Data for these counties sug-

TABLE 2.—*Poliomyelitis morbidity rates per 100,000 population in certain cities and counties in which cities are located, 1943*

City	Morbidity rate	County	Morbidity rate
Pueblo, Colo.	99.6	Pueblo	104.3
Sacramento, Calif.	99.0	Sacramento	55.5
New Haven, Conn.	62.7	New Haven	47.0
Salt Lake City, Utah	60.6	Salt Lake	86.8
Wichita, Kans.	55.6	Sedgwick	116.6
Galveston, Tex.	37.7	Galveston	35.7
Dallas, Tex.	35.9	Dallas	34.0
Omaha, Nebr.	32.6	Douglas	26.8
Chicago, Ill.	31.0	Cook	31.3
San Francisco, Calif.	23.6	San Francisco	23.6
Los Angeles, Calif.	21.6	Los Angeles	28.4
Houston, Tex.	20.2	Harris	26.6
Providence, R. I.	19.2	Providence	27.4
Seattle, Wash.	18.7	King	18.6
Denver, Colo.	18.5	Denver	18.5
Shreveport, La.	18.4	Caddo	12.0
Bridgeport, Conn.	18.3	Fairfield	11.7
Topeka, Kans.	17.6	Shawnee	21.9
Kansas City, Mo.	16.2	Jackson	18.1
Minneapolis, Minn.	14.7	Hennepin	14.4
Fall River, Mass.	14.0	Bristol	11.2

gest a high incidence of poliomyelitis in the cities as well as in the counties as a whole.

The fact that many urban areas have had large increases in population in the past few years, might help to explain the relatively large number of cities with high rates of incidence in 1943. Much of this increase presumably has been from rural areas where exposure to the poliomyelitis virus may have been less likely or less frequent.

In the 10-year period from 1933 to 1942 there were 232, or nearly 8 percent of all counties in the United States, which reported no cases. Forty of the 232 counties reported the occurrence of one or more cases in 1943. In only 4 of these can the disease be said to have occurred in sufficient numbers to be called epidemic; one of these, located in Colorado, reported 10 cases (population 6,207). The remaining three, having populations of 4,461, 6,494, and 19,228 were located in Texas. In the order listed they reported 5, 4, and 8 cases. In the case of all 4 counties, they were located in areas where the disease was epidemic as were many of the remaining 36 counties which had not reported any cases during the 10-year period immediately preceding. This might seem to indicate that introduction of clinically recognized cases of poliomyelitis in a community where no cases had been reported for 10 years does not always result in a severe epidemic. However, it is quite probable that the infection was not absent from all of them during the 10-year period but could have existed in an unrecognized form or had occurred in sporadic form and was not reported.

Some of the States in which epidemics of poliomyelitis occurred in 1943 are among those in which outbreaks have occurred fairly frequently in the past two and one-half decades. Morbidity records are not complete for all States continuously since 1915 but a sufficient number exist to indicate that epidemics have occurred more frequently in some States than in others. Even adjoining States have shown wide variations in the number of outbreaks since 1915. The annual morbidity rates from 1915 to 1943, inclusive, for a number of States are shown in figure 2. Selection of States for inclusion in this illustration was made arbitrarily to show differences not only in adjoining States but also in different sections of the country. However, most of the States which have had more than an average number of outbreaks have been included.

Massachusetts, Connecticut, Minnesota, and California have experienced severe epidemics since 1915 more frequently than other States shown in figure 2 and also those not included in this graph, each having 4 outbreaks with rates in excess of 20 per 100,000 population. A rate of 20 or more for a State has indicated either a comparatively high rate of incidence in a limited proportion of the population or a widespread occurrence of the disease in epidemic pro-

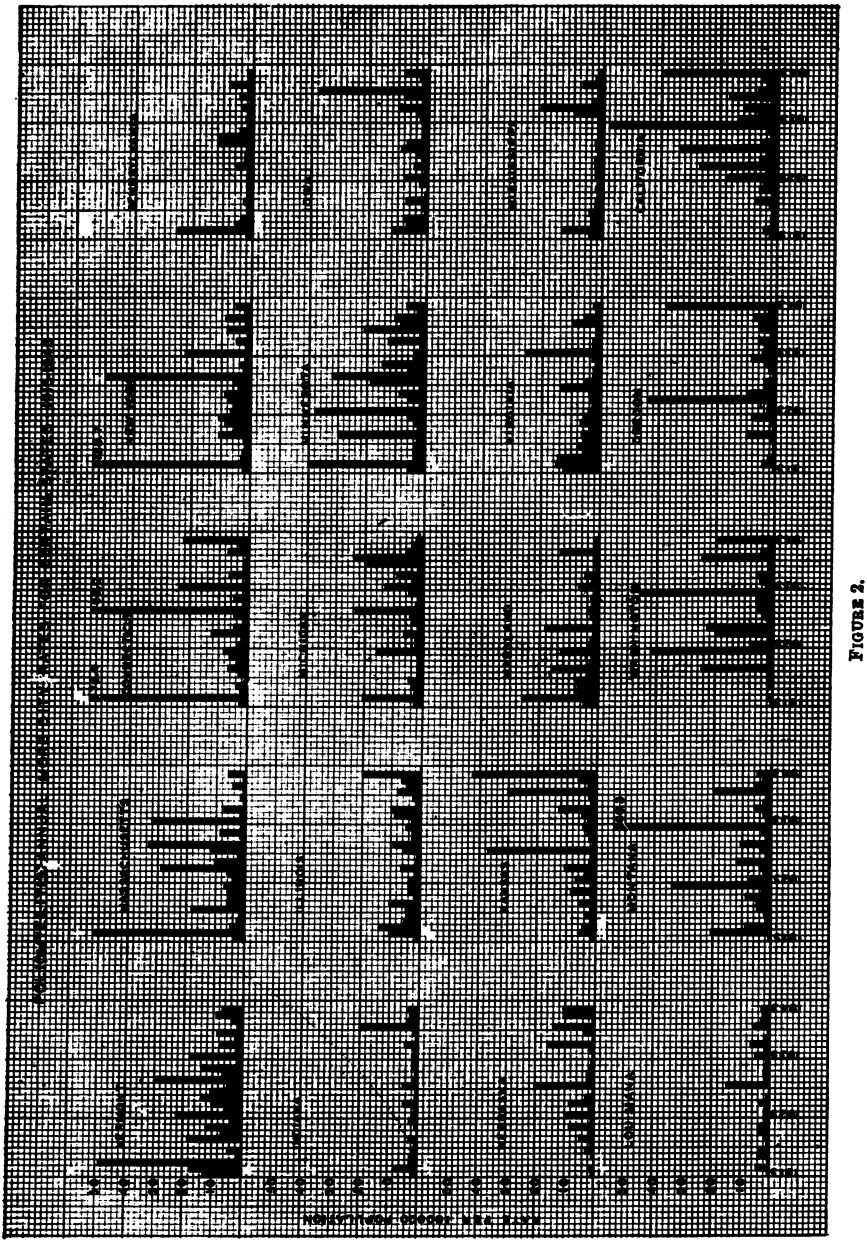

FIGURE 2.

portions. Vermont and Montana, as shown in figure 2, have also experienced a more than average number of outbreaks during the same period. It is readily apparent that in many instances adjoining States have shown striking differences in the number of epidemics, such as New York and Pennsylvania, Minnesota and Iowa, Nebraska and Kansas, and Washington or California and Oregon. Differences in frequency and severity of epidemics also are to be found in groups of States. Even though the data are not complete for all States since 1915 it appears that epidemics of poliomyelitis have been less frequent and usually less severe in the East North Central and Southern States than in the New England, Middle Atlantic, West North Central, Mountain, or Pacific groups of States. The rates for the East North Central and Southern States shown in figure 2 are typical for their respective groups.

It does not appear that differences in geography, climate, size of State, or distribution, density, or racial characteristics of the population are factors of importance in accounting for variations in numbers of poliomyelitis outbreaks. Differences in completeness of reporting, differences in proportion of nonparalytic cases of the disease, or both, probably would account for the fact that some States may report higher rates of incidence than others in the same or even in different years but could not account for the wide variations in numbers of outbreaks.

There has been no consistent interval of time between severe outbreaks. The interval may be as short as 2 to 4 years as in California, Washington, Minnesota, and Montana, or in excess of 15 years as in Oregon and New York. Epidemics of moderate severity show equally wide variations. Some States such as Kansas, Nebraska, Louisiana, and California seem to show some indication of increased prevalence of the disease in the past 10 to 15 years (see fig. 2). Too much reliance cannot be placed on this apparent increase since there probably has been more complete reporting of cases or perhaps the inclusion of many nonparalytic cases not previously recorded in recent years. On the other hand there are some States, such as Vermont, New York, Pennsylvania, and Minnesota, where the trend in morbidity rates has apparently been downward. Data for a few large cities indicate similar differences in frequency of outbreaks as noted for States. A period of about three decades does not seem to be sufficiently long to permit any definite conclusions regarding trends in incidence.

INCIDENCE OF HOSPITALIZATION, APRIL 1944

Through the cooperation of the Hospital Service Plan Commission of the American Hospital Association, data on hospital admissions among about 10,000,000 members of Blue Cross Hospital Service Plans are presented monthly. These plans provide prepaid hospital service. The data cover about 60 hospital service plans scattered throughout the country, mostly in large cities.

Item	April	
	1943	1944
1. Number of plans supplying data	65	69
2. Number of persons eligible for hospital care	10,003,704	12,002,748
3. Number of persons admitted for hospital care	85,482	96,306
4. Incidence per 1,000 persons, annual rate, during current month (daily rate×365)	103.9	97.8
5. Incidence per 1,000 persons, annual rate for the 12 months ended April 30	106.7	104.1

DEATHS DURING WEEK ENDED MAY 20, 1944

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

	Week ended May 20, 1944	Corresponding week, 1943
Data for 92 large cities of the United States:		
Total deaths	8,841	9,119
Average for 3 prior years	8,560	
Total deaths, first 20 weeks of year	195,659	198,620
Deaths under 1 year of age	617	625
Average for 3 prior years	566	
Deaths under 1 year of age, first 20 weeks of year	12,510	13,773
Data from industrial insurance companies:		
Policies in force	66,545,578	65,524,713
Number of death claims	12,919	12,886
Death claims per 1,000 policies in force, annual rate	10.2	10.3
Death claims per 1,000 policies, first 20 weeks of year, annual rate	10.9	10.6

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 MAY 27, 1944

Summary

The incidence of meningitis decreased for the country as a whole, and in all of the 9 geographic areas except the New England. A current total of 332 cases was reported, as compared with 385 for the preceding week, 423 for the corresponding week last year, and a 5-year (1939–43) median of 56. Nine States reported 16 or more cases currently. The total number of cases reported for the year to date is 10,609, as compared with 10,253 for the same period last year. For the 12 weeks ended May 27, the cumulative figure is 5,536, and the comparable figure last year was 6,733.

Of a total of 39 cases of poliomyelitis, as compared with 36 last week and 28 for the 5-year median, 9 were reported in Louisiana, 5 in Florida, and 4 each in New York, Texas, and California. The total for the year to date is 501, as compared with 547 for the corresponding period last year and a 5-year median of 481.

A total of 114 cases of typhoid fever was reported, as compared with 115 last week, 68 for the corresponding week last year, and a 5-year median of 120. States reporting the largest numbers are as follows: California 18, Kentucky 11, Pennsylvania 8, Massachusetts and Texas 7 each, and Louisiana 6. The cumulative total to date is 1,605, as compared with 1,236 last year and a 5-year median of 1,702.

For the first time this year the incidence of measles fell below the corresponding weekly 5-year median. Totals of 17,935 cases of measles and 4,365 of scarlet fever were reported, as compared with 5-year medians of 19,116 and 3,218 respectively. Cumulative totals are 521,499 for measles and 128,239 for scarlet fever, as compared with 5-year respective medians of 391,848 and 82,498.

A new low for smallpox has been established. For the first 5 months a total of 244 cases has been reported, as compared with 536 for the same period last year, which was the lowest figure previously recorded.

A total of 8,061 deaths was recorded for the week for 92 large cities of the United States, as compared with 8,224 last week and a 3-year (1941–43) median of 7,653. The total to date is 189,557, as compared with 192,589 for the same period last year.

Telegraphic morbidity reports from State health officers for the week ended May 27, 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
	May 27, 1944	May 29, 1943		May 27, 1944	May 29, 1943		May 27, 1944	May 29, 1943		May 27, 1944	May 29, 1943	
NEW ENGLAND												
Maine	0	1	0	0	------	------	[1] 207	81	97	1	3	0
New Hampshire	0	0	0	0	------	------	4	27	28	0	0	0
Vermont	0	0	0	0	------	------	39	224	168	0	0	0
Massachusetts	3	0	2	0	------	------	982	1,715	958	16	13	1
Rhode Island	0	0	0	9	------	------	9	60	133	1	9	0
Connecticut	0	0	0	0	4	2	437	473	400	8	12	3
MIDDLE ATLANTIC												
New York	22	13	19	[2] 1	10	7	614	4,081	2,181	52	92	7
New Jersey	2	3	7	2	10	4	925	2,543	990	18	35	2
Pennsylvania	11	8	9	1	1	------	600	1,658	1,143	20	30	7
EAST NORTH CENTRAL												
Ohio	7	17	11	12	17	9	412	792	309	17	8	1
Indiana	1	7	5	2	11	4	46	162	162	3	1	1
Illinois	13	27	23	9	4	15	419	1,706	287	23	16	0
Michigan [3]	4	4	4	3	2	2	886	4,315	667	35	27	1
Wisconsin	2	0	0	4	37	37	2,122	2,374	1,274	7	1	1
WEST NORTH CENTRAL												
Minnesota	0	3	2	0	------	1	476	647	254	5	4	1
Iowa	1	5	3	0	------	------	226	397	268	7	1	0
Missouri	2	1	5	1	------	1	159	208	189	12	13	0
North Dakota	0	0	0	0	40	2	15	11	18	0	1	0
South Dakota	0	0	1	0	------	------	9	64	53	2	0	0
Nebraska	0	0	1	1	6	1	16	63	63	2	0	0
Kansas	5	4	3	1	1	1	220	377	377	4	0	0
SOUTH ATLANTIC												
Delaware	0	0	0	0	------	------	8	59	20	0	2	0
Maryland [3]	8	6	4	3	5	3	290	221	221	5	14	3
District of Columbia	0	0	0	0	1	------	147	92	92	0	7	0
Virginia	5	2	3	38	81	59	440	186	286	[1] 9	11	2
West Virginia	0	2	3	3	9	9	98	51	32	0	4	1
North Carolina	3	8	6	9	4	3	615	310	557	4	18	1
South Carolina	12	2	3	180	221	221	243	94	94	2	4	1
Georgia	2	7	7	6	8	14	62	294	142	5	1	0
Florida	1	1	1	0	6	6	168	48	152	7	5	0
EAST SOUTH CENTRAL												
Kentucky	2	2	3	25	4	4	74	143	113	3	7	0
Tennessee	3	0	2	8	4	12	44	234	133	3	5	0
Alabama	5	3	3	46	13	21	135	67	149	10	7	2
Mississippi [3]	6	2	2	------	------	------	------	------	0	7	5	1
WEST SOUTH CENTRAL												
Arkansas	3	3	3	10	7	23	45	75	75	1	3	1
Louisiana	0	2	1	2	1	7	34	19	27	4	0	1
Oklahoma	8	1	3	16	10	19	240	35	98	1	0	0
Texas	36	12	16	421	398	182	2,281	293	641	17	10	5
MOUNTAIN												
Montana	0	0	1	0	------	4	74	258	145	0	1	0
Idaho	0	0	0	0	------	------	19	50	50	0	10	0
Wyoming	0	0	0	0	18	3	82	110	71	0	0	0
Colorado	5	7	8	9	58	20	114	430	231	1	2	1
New Mexico	7	0	1	4	1	1	106	22	23	0	0	0
Arizona	4	2	2	40	33	55	80	67	67	1	2	0
Utah	0	0	0	4	7	5	52	134	134	0	2	0
Nevada	1	0	0	0	------	------	9	0	0	0	0	0
PACIFIC												
Washington	8	4	2	0	3	1	274	532	532	1	11	1
Oregon	1	3	2	3	14	10	0	137	137	2	4	0
California	18	15	11	11	33	55	3,378	679	734	16	22	1
Total	211	177	199	884	1,082	914	[1] 17,935	26,618	19,116	332	423	56
21 weeks	4,763	5,297	5,649	332,541	73,723	146,309	521,499	422,983	391,848	10,609	10,276	1,029

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended May 27, 1944, and comparison with corresponding week of 1943 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			[4] Typhoid and paratyphoid fever		
	Week ended—		Median 1939–43	Week ended—		Median 1939–43	Week ended—		Median 1939–43	Week ended—		Median 1939–43
	May 27, 1944	May 29, 1943		May 27, 1944	May 29, 1943		May 27, 1944	May 29, 1943		May 27, 1944	May 29, 1943	
NEW ENGLAND												
Maine	0	0	0	34	17	13	0	0	0	0	0	0
New Hampshire	0	0	0	0	11	4	0	0	0	0	0	0
Vermont	0	0	0	6	14	5	0	0	0	0	0	0
Massachusetts	0	0	0	286	465	181	0	0	0	7	3	2
Rhode Island	0	0	0	7	23	6	0	0	0	1	0	0
Connecticut	0	0	0	58	107	58	0	0	0	1	1	1
MIDDLE ATLANTIC												
New York	4	0	1	448	429	486	0	0	0	4	1	5
New Jersey	0	0	0	237	101	221	0	0	0	3	1	1
Pennsylvania	1	1	0	464	239	307	0	0	0	8	5	8
EAST NORTH CENTRAL												
Ohio	1	0	0	371	201	213	0	2	1	0	8	7
Indiana	0	0	0	38	19	87	2	2	1	2	1	2
Illinois	0	0	1	275	160	269	0	0	3	3	2	4
Michigan [3]	0	0	0	327	130	267	0	0	0	1	0	3
Wisconsin	0	1	0	292	317	149	1	0	2	0	1	0
WEST NORTH CENTRAL												
Minnesota	1	0	0	125	45	52	0	0	0	0	0	0
Iowa	0	0	0	156	42	42	0	1	4	0	3	1
Missouri	0	0	0	61	58	55	0	0	2	5	0	1
North Dakota	0	0	0	32	5	5	0	1	1	0	0	0
South Dakota	0	0	0	11	3	6	0	0	4	0	0	0
Nebraska	0	0	0	11	8	9	0	0	0	0	0	0
Kansas	1	1	0	51	28	53	0	0	0	1	0	0
SOUTH ATLANTIC												
Delaware	0	0	0	8	4	4	0	0	0	0	0	0
Maryland [3]	0	0	0	122	49	39	0	0	0	2	3	3
District of Columbia	0	0	0	82	12	13	0	0	0	0	3	0
Virginia	1	1	0	55	25	15	0	0	0	0	1	4
West Virginia	0	0	0	67	13	24	0	0	0	3	1	1
North Carolina	1	0	0	20	15	14	0	1	0	5	1	2
South Carolina	0	0	1	5	5	5	0	0	0	4	0	1
Georgia	0	1	0	16	7	8	0	0	0	5	6	9
Florida	5	0	1	3	5	3	0	1	0	3	3	3
EAST SOUTH CENTRAL												
Kentucky	1	0	0	49	25	30	0	2	0	11	0	3
Tennessee	0	0	0	26	20	25	0	0	3	4	0	1
Alabama	2	0	1	8	9	6	0	0	0	3	1	1
Mississippi [3]	2	0	0	4	1	1	1	1	1	2	4	2
WEST SOUTH CENTRAL												
Arkansas	0	1	0	4	1	4	0	1	1	1	1	3
Louisiana	9	1	1	1	0	4	3	0	0	6	3	7
Oklahoma	0	0	0	[1] 14	4	12	0	0	1	3	1	4
Texas	4	6	0	57	43	24	0	6	4	7	6	8
MOUNTAIN												
Montana	0	0	0	25	14	14	0	0	0	0	0	0
Idaho	0	0	0	21	92	4	0	0	0	0	1	0
Wyoming	0	0	0	6	24	4	0	0	0	0	0	0
Colorado	1	0	0	29	56	20	0	0	2	0	1	1
New Mexico	0	1	0	11	7	7	0	0	0	0	0	0
Arizona	1	3	0	24	15	10	0	0	1	0	0	0
Utah	0	0	0	43	32	15	0	0	0	0	1	0
Nevada	0	0	0	1	------	0	0	1	0	0	0	0
PACIFIC												
Washington	0	1	0	124	43	36	0	0	0	0	0	0
Oregon	0	1	1	90	16	9	0	0	1	1	1	2
California	4	9	5	160	129	117	0	0	0	18	4	6
Total	39	28	28	4,365	3,088	3,218	7	19	34	114	68	120
21 weeks	501	547	481	128,239	82,498	82,498	244	536	953	1,605	1,236	1,702

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended May 27, 1944, and comparison with corresponding week of 1943 and a 5-year median—Con.

Division and State	Whooping cough			Week ended May 27, 1944								
	Week ended—		Median 1939–43	Anthrax	Dysentery			Encephalitis, infectious	Leprosy	Rocky Mt. spotted fever	Tularemia	Typhus fever
	May 27, 1944	May 29, 1943			Amebic	Bacillary	Unspecified					
NEW ENGLAND												
Maine	2	80	34	0	0	0	0	0	0	0	0	0
New Hampshire	0	5	4	0	0	0	0	0	0	0	0	0
Vermont	5	12	30	0	0	0	0	0	0	0	0	0
Massachusetts	57	118	161	0	0	0	0	0	0	0	0	0
Rhode Island	5	18	23	0	0	0	0	0	0	0	0	0
Connecticut	39	39	66	0	0	1	0	0	0	0	0	0
MIDDLE ATLANTIC												
New York	102	254	313	0	3	13	0	2	0	1	0	0
New Jersey	57	172	194	0	0	0	0	2	0	0	0	0
Pennsylvania	70	184	238	0	1	0	0	0	0	0	0	0
EAST NORTH CENTRAL												
Ohio	64	94	181	0	0	0	0	1	0	0	0	0
Indiana	4	44	44	0	0	0	0	0	0	0	0	0
Illinois	33	119	119	0	0	0	0	0	0	0	0	0
Michigan [3]	51	304	279	0	0	0	0	1	0	0	0	0
Wisconsin	60	212	125	0	0	0	0	0	0	0	0	0
WEST NORTH CENTRAL												
Minnesota	20	86	44	0	0	0	0	0	0	0	0	0
Iowa	11	65	28	0	0	0	0	0	0	0	0	0
Missouri	21	4	21	0	0	0	0	0	0	0	0	0
North Dakota	0	1	3	0	0	0	0	1	0	0	0	0
South Dakota	5	6	4	0	0	0	0	0	0	0	0	0
Nebraska	0	20	7	0	0	0	0	0	0	0	0	0
Kansas	43	101	63	0	0	0	0	0	0	0	0	0
SOUTH ATLANTIC												
Delaware	0	2	2	0	0	0	0	0	0	0	0	0
Maryland [3]	54	129	106	0	0	0	4	0	0	4	1	0
District of Columbia	4	39	17	0	0	0	0	0	0	1	0	0
Virginia	104	116	83	0	0	0	79	0	0	3	0	0
West Virginia	21	26	26	0	0	0	0	0	0	0	0	0
North Carolina	147	238	238	0	0	0	0	0	0	2	0	1
South Carolina	91	97	74	0	0	0	0	0	0	1	0	2
Georgia	13	63	35	0	1	3	0	0	0	0	1	12
Florida	22	34	24	0	3	61	0	0	0	0	1	9
EAST SOUTH CENTRAL												
Kentucky	80	41	41	0	0	0	0	0	0	0	0	0
Tennessee	16	67	65	0	0	0	0	0	0	0	0	1
Alabama	26	51	51	0	2	0	0	1	0	0	0	9
Mississippi [3]	0	------	0	0	0	0	0	0	0	0	1	1
WEST SOUTH CENTRAL												
Arkansas	5	51	33	0	0	12	0	0	0	0	2	0
Louisiana	2	14	14	0	1	0	0	0	0	0	0	0
Oklahoma	7	22	23	0	0	0	0	0	0	0	0	0
Texas	263	548	374	0	13	476	0	1	0	0	2	29
MOUNTAIN												
Montana	1	22	22	0	0	0	0	0	0	1	1	0
Idaho	0	3	3	0	0	0	0	1	0	0	1	0
Wyoming	1	1	3	0	0	0	0	0	0	1	0	0
Colorado	21	17	19	0	0	0	0	0	0	2	0	0
New Mexico	4	10	40	0	1	2	0	0	0	0	0	0
Arizona	16	23	23	0	0	0	34	0	0	0	0	0
Utah	72	66	52	0	0	0	0	0	0	0	0	0
Nevada	0	0	0	0	0	0	0	0	0	0	0	0
PACIFIC												
Washington	8	57	57	0	0	0	0	0	0	0	0	0
Oregon	5	28	20	0	0	0	0	0	0	0	0	0
California	90	378	378	0	0	3	0	0	0	0	0	0
Total	1,722	4,081	3,806	0	25	571	117	10	0	16	10	64
21 weeks	37,697	85,198	83,808	17	534	5,446	1,549	226	13	47	221	941
21 weeks, 1943	------	------	------	28	626	4,342	1,042	230	10	70	364	967

[1] Exclusive of delayed reports (included in cumulative totals only) as follows: *Measles*—Maine, week ended Apr. 22, 236 cases; *meningococcus meningitis*—Virginia, 7 cases; *scarlet fever*—Oklahoma, week ended Apr. 22, 19 cases.

[2] New York City only.

[3] Period ended earlier than Saturday.

[4] Including paratyphoid fever reported separately as follows: Massachusetts 7, Illinois 1, Michigan 1, Maryland 1, Florida 1.

WEEKLY REPORTS FROM CITIES

City reports for week ended May 13, 1944

This table lists the reports from 83 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	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
NEW ENGLAND												
Maine:												
Portland	0	0	0	0	48	0	2	0	15	0	1	1
New Hampshire:												
Concord	0	0	------	0	0	0	0	0	0	0	0	0
Massachusetts:												
Boston	1	0	------	0	198	7	13	0	82	0	0	17
Fall River	0	0	------	0	36	0	1	0	0	0	0	1
Springfield	0	0	------	0	54	1	0	0	25	0	1	11
Worcester	0	0	------	0	3	0	10	0	45	0	0	7
Rhode Island:												
Providence	0	0	1	0	47	0	3	0	4	0	0	6
Connecticut:												
Bridgeport	0	0	------	0	2	0	0	0	2	0	0	1
Hartford	0	0	------	0	13	0	3	0	26	0	0	0
New Haven	0	0	1	0	62	0	1	0	4	0	0	3
MIDDLE ATLANTIC												
New York:												
Buffalo	0	0	------	0	13	1	9	0	9	0	0	0
New York	8	0	5	2	691	24	67	0	289	0	4	29
Syracuse	0	0	------	0	7	0	2	0	1	0	0	5
New Jersey:												
Camden	0	0	1	1	4	0	1	0	29	0	0	0
Newark	0	0	1	0	236	4	10	0	37	0	0	5
Trenton	0	0	1	0	4	1	4	0	8	0	0	0
Pennsylvania:												
Philadelphia	2	0	1	0	57	7	20	0	123	0	1	7
Pittsburgh	0	1	2	2	15	10	10	0	28	0	0	8
Reading	0	0	------	0	1	1	2	0	1	0	0	0
EAST NORTH CENTRAL												
Ohio:												
Cincinnati	3	0	1	0	42	0	2	0	72	0	0	2
Cleveland	0	0	4	0	45	7	9	0	137	0	1	9
Columbus	0	0	------	0	24	0	2	0	5	0	0	5
Indiana:												
Fort Wayne	0	0	------	0	0	0	3	0	4	0	0	0
Indianapolis	4	0	------	0	80	0	4	0	52	0	1	6
South Bend	0	0	------	0	1	1	0	0	1	0	0	0
Terre Haute	0	0	------	0	1	0	4	0	0	0	1	0
Illinois:												
Chicago	2	0	2	1	145	15	26	0	175	0	1	7
Springfield	0	0	------	0	36	0	3	0	3	0	0	0
Michigan:												
Detroit	3	0	------	1	89	14	14	0	135	0	1	28
Flint	0	0	------	0	6	0	2	0	3	0	0	6
Grand Rapids	0	0	------	1	13	2	0	0	10	0	0	0
Wisconsin:												
Kenosha	0	0	------	0	260	0	0	0	1	0	0	6
Milwaukee	0	0	------	0	202	3	0	0	62	0	0	14
Racine	0	0	------	0	72	0	1	0	1	0	0	8
Superior	0	0	------	0	6	0	1	0	9	0	0	0
WEST NORTH CENTRAL												
Minnesota:												
Minneapolis	0	0	------	0	248	1	3	0	36	0	0	5
St. Paul	0	0	------	0	108	1	4	0	19	0	0	3
Missouri:												
Kansas City	1	0	------	0	66	3	9	0	37	0	0	1
St. Joseph	0	0	------	0	2	0	0	0	8	0	0	0
St. Louis	1	0	2	1	56	11	10	0	32	0	1	10

City reports for week ended May 13, 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	1	0	8	0	0	0
Nebraska:												
Omaha	2	0	------	0	111	0	3	0	23	0	0	0
Kansas:												
Wichita	0	0	------	0	53	0	2	0	7	0	0	0
SOUTH ATLANTIC												
Delaware:												
Wilmington	0	0	------	0	0	0	1	0	0	0	0	0
Maryland:												
Baltimore	5	0	------	0	285	6	8	0	89	0	0	42
Cumberland	0	0	------	0	0	0	0	0	0	0	0	0
Frederick	0	0	------	0	0	0	0	0	3	0	0	0
District of Columbia:												
Washington	0	0	2	2	194	3	6	0	119	0	0	3
Virginia:												
Lynchburg	0	0	1	0	6	0	0	0	1	0	0	1
Roanoke	1	0	------	0	6	0	0	0	1	0	0	4
West Virginia:												
Charleston	0	0	------	0	0	0	0	0	8	0	0	0
Wheeling	0	0	------	0	48	0	0	0	11	0	0	2
North Carolina:												
Raleigh	0	0	------	0	129	0	1	0	0	0	0	0
Wilmington	0	0	------	0	16	0	1	0	0	0	0	4
Winston-Salem	1	0	------	0	28	0	1	0	0	0	0	0
South Carolina:												
Charleston	0	0	------	0	0	0	2	0	1	0	0	0
Georgia:												
Atlanta	2	0	6	0	4	0	2	0	12	0	0	0
Brunswick	0	0	------	0	2	0	1	0	0	0	0	0
Savannah	0	0	------	0	3	2	3	0	1	0	0	0
Florida:												
Tampa	1	0	3	0	19	0	2	0	1	0	0	1
EAST SOUTH CENTRAL												
Tennessee:												
Memphis	0	0	2	1	17	4	2	0	28	0	0	3
Alabama:												
Birmingham	0	0	6	0	8	1	3	0	1	0	0	1
Mobile	0	0	------	0	1	0	1	0	0	0	0	1
WEST SOUTH CENTRAL												
Arkansas:												
Little Rock	0	0	------	0	3	1	5	0	1	0	0	0
Louisiana:												
New Orleans	0	0	1	0	21	2	2	4	6	0	1	1
Texas:												
Dallas	0	0	------	0	132	0	2	0	1	0	2	3
Galveston	1	0	------	0	3	0	0	0	0	0	0	0
Houston	0	0	------	0	5	1	9	0	4	0	1	0
San Antonio	1	0	1	0	1	0	5	0	0	0	0	0
MOUNTAIN												
Montana:												
Billings	0	0	------	0	29	0	1	0	0	1	0	0
Great Falls	0	0	------	0	4	0	0	0	4	0	0	1
Helena	0	0	------	0	4	0	0	0	0	0	0	0
Missoula	0	0	------	0	23	0	0	0	2	0	0	0
Idaho:												
Boise	0	0	------	0	6	0	0	0	5	0	0	0
Colorado:												
Denver	1	0	1	0	92	3	6	0	20	0	0	13
Pueblo	0	0	------	0	2	0	3	0	7	0	0	1
Utah:												
Salt Lake City	0	0	------	0	23	0	3	0	30	0	0	8

City reports for week ended May 13, 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								
PACIFIC												
Washington:												
Seattle	0	0	------	0	53	0	11	0	29	0	1	0
Spokane	0	0	------	0	46	1	2	0	4	0	0	2
Tacoma	0	0	------	0	12	1	0	0	34	0	0	0
California:												
Los Angeles	6	0	7	0	546	7	8	1	24	0	0	6
Sacramento	0	0	------	0	75	0	2	0	13	0	0	2
San Francisco	0	0	2	0	380	6	7	0	36	0	0	11
Total	46	1	54	12	5,383	152	361	6	2,064	1	15	320
Corresponding week, 1943	55	------	81	27	8,142	------	424	------	1,670	1	11	1,174
Average, 1939–43	69	------	90	[1] 21	[2] 6,969	------	[1] 340	------	1,465	5	18	1,198

[1] 3-year average, 1941–43.
[2] 5-year median.

Dysentery, amebic.—Cases: Columbus, 1; Detroit, 1; St. Louis, 1; Baltimore, 1.
Dysentery, bacillary.—Cases: Worcester, 32; Providence, 3; New York, 4; Philadelphia, 1; Detroit, 1; Wheeling, 2; Charleston, S. C., 8.
Dysentery, unspecified.—Cases: San Antonio, 21.
Leprosy.—Cases: Newark, 1; Baltimore, 1.
Typhus fever, endemic.—Cases: Atlanta, 1; Tampa, 5; Birmingham, 1; Houston, 2; San Antonio, 1.

Rates (annual basis) per 100,000 population, by geographic groups, for the 88 cities in the preceding table (estimated population, 1943, 33,580,400)

	Diphtheria case rates	Encephalitis, infectious, case rates	Influenza		Measles case rates	Meningitis, meningococcus, case rates	Pneumonia death rates	Poliomyelitis 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	2.5	0.0	5.0	0.0	1,163	20.1	82.9	2.5	510	0.0	5.0	118
Middle Atlantic	4.7	0.5	5.1	2.3	480	22.4	58.3	0.0	245	0.0	0.9	25
East North Central	7.3	0.0	4.3	1.8	623	25.6	43.3	0.0	409	0.0	3.1	56
West North Central	8.4	0.0	4.2	2.1	1,349	33.5	67.0	0.0	356	0.0	2.1	40
South Atlantic	17.4	0.0	20.9	3.5	1,290	19.2	48.8	0.0	431	0.0	0.0	99
East South Central	0.0	0.0	57.8	7.2	188	36.1	43.3	0.0	210	0.0	0.0	29
West South Central	6.0	0.0	6.0	0.0	492	11.9	68.5	11.9	36	0.0	11.9	12
Mountain	7.9	0.0	7.9	0.0	1,450	23.8	103.0	0.0	539	7.9	0.0	182
Pacific	9.9	0.0	14.8	0.0	1,834	24.7	49.5	1.6	231	0.0	1.6	35
Total	7.2	0.2	8.4	1.9	838	23.7	56.2	0.9	321	0.2	2.3	50

TERRITORIES AND POSSESSIONS

Hawaii Territory

Honolulu—Dengue fever.—For the period April 16–30, 1944, 5 cases of dengue fever were reported in Honolulu, T. H., bringing the total number of cases reported since the beginning of the outbreak to 1,478. These 5 cases represent a decrease of 12 cases from the

preceding semimonthly period and is the lowest semimonthly incidence of the disease since the inauguration of the dengue mosquito control program.

Puerto Rico

Communicable diseases—Year 1943.—During the year 1943 cases of certain communicable diseases were reported in Puerto Rico as follows:

Disease	Cases	Disease	Cases
Chickenpox	566	Ophthalmia neonatorum	17
Diphtheria	814	Poliomyelitis	31
Dysentery	136	Puerperal fever	19
Erysipelas	26	Syphilis	12,102
Filariasis	36	Tetanus	90
Gonorrhea	3,607	Tetanus, infantile	8
Influenza	13,041	Tuberculosis (all forms)	7,158
Leprosy	6	Typhoid fever	270
Malaria	16,032	Typhus fever (endemic)	102
Measles	37	Whooping cough	916
Mumps	66	Other diseases	18

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended April 29, 1944.—During the week ended April 29, 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		10		159	348	46	44	59	194	860
Diphtheria	2	10	6	33		2	3	2		58
Dysentery (bacillary)				2						2
Encephalitis, infectious							1			1
German measles		1		153	201	7	30	9	74	475
Influenza			1		47		193		4	245
Measles	1	25	11	1,012	552	335	98	135	40	2,209
Meningitis, meningococcus			1	1	4		1			7
Mumps	1	11	1	287	309	51	17	24	66	767
Poliomyelitis			1							1
Scarlet fever		27	10	76	280	51	32	72	88	636
Tuberculosis (all forms)			1	138	46	15	16		20	236
Typhoid and paratyphoid fever				17	3			6	2	28
Undulant fever				1	2					3
Whooping cough		26		63	52	10	43	8	35	237

GREAT BRITAIN

England and Wales—Infectious diseases—4 weeks ended February 26, 1944.—During the 4 weeks ended February 26, 1944, cases of certain infectious diseases were reported in England and Wales as follows:

Disease	Cases	Disease	Cases
Cerebrospinal fever	275	Pneumonia	3,856
Diphtheria	2,799	Puerperal pyrexia and puerperal sepsis	666
Dysentery	892	Scarlet fever	7,913
Measles, excluding German measles	5,823	Typhoid fever	24
Ophthalmia neonatorum	302	Whooping cough	7,760
Paratyphoid fever	23		

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

Egypt—Ismailiya.—Plague has been reported in Ismailiya, Egypt, as follows: Week ended May 13, 1944, 39 cases with 21 deaths, including 12 cases with 4 deaths in the southern areas; week ended May 20, 1944, 49 cases with 28 deaths, including 9 cases in the southern areas.

French West Africa—Dakar.—During the week ended May 20, 1944, 1 case of plague was reported in Dakar, French West Africa.

India—Calcutta.—For the week ended April 22, 1944, 2 deaths from plague were reported in Calcutta, India.

Peru.—Plague has been reported in Peru by Departments, as follows: January—Libertad, 2 cases, 1 death, Lima, 5 cases, 3 deaths; February—Libertad, 2 cases, 2 deaths, Lima, 5 cases; March—Libertad, 1 case, Lima, 6 cases, 1 death.

Smallpox

British East Africa—Uganda.—Smallpox has been reported in Uganda, British East Africa, as follows: Week ended April 15, 1944, 92 cases; week ended April 22, 1944, 171 cases.

French Equatorial Africa.—Smallpox has been reported in French Equatorial Africa as follows: February 1944, 137 cases; March 1944, 221 cases, 36 deaths.

India—Bombay.—For the week ended April 22, 1944, 99 cases of smallpox with 42 deaths were reported in Bombay, India.

Nigeria.—Smallpox has been reported in Nigeria as follows: Week ended April 15, 1944, 55 cases, 20 deaths; week ended April 22, 1944, 140 cases, 21 deaths.

Typhus Fever

Bulgaria.—For the period March 2–9, 1944, 89 cases of typhus fever were reported in Bulgaria.

Hungary.—For the week ended April 29, 1944, 250 cases of typhus fever (including 179 cases in Subcarpathia) were reported in Hungary.

Slovakia.—For the 3 weeks ended April 15, 1944, 34 cases of typhus fever were reported in Slovakia.

Turkey.—For the month of March 1944, 561 cases of typhus fever were reported in Turkey.

Union of South Africa—Cape Province.—Typhus fever has been reported in Cape Province, Union of South Africa, as follows: Weeks ended—April 1, 1944, 65 cases; April 8, 1944, 43 cases; April 15, 1944, 95 cases.

* * *

COURT DECISION ON PUBLIC HEALTH

Convictions under Federal filled milk act upheld.—(United States Circuit Court of Appeals, 4th Circuit; *Carolene Products Co. et al.* v. *United States*, 140 F. 2d 61; decided January 10, 1944.) The Federal filled milk act declared that filled milk, as defined in the act, was an adulterated article of food, injurious to the public health, and that its sale constituted a fraud upon the public. Among other things, the act made unlawful the shipment or delivery for shipment, in interstate commerce, of any filled milk, which term was defined as meaning "any milk, cream, or skimmed milk, whether or not condensed, evaporated, concentrated, powdered, dried, or desiccated, to which has been added, or which has been blended or compounded with, any fat or oil other than milk fat, so that the resulting product is in imitation or semblance of milk, cream, or skimmed milk, whether or not condensed, evaporated, concentrated, powdered, dried, or desiccated." Distinctive proprietary food compounds meeting certain requirements were excluded from the definition. The appellant company and two of its officials were convicted of violating the said statute. Two products were involved—one resulting from the mixture of skimmed milk, coconut oil, and fish oil, and the other the same except that cottonseed oil was substituted for coconut oil. Both of these products were sold under the name of "Carolene." In its statement of the facts the trial court said: "'Carolene' looked, tasted, and smelled like condensed whole milk and was of practically the same texture and consistency. It was packed in cans of the same size and shape customarily employed by packers of condensed, whole milk."

The defendants appealed to the circuit court of appeals, contending that the filled milk act did not apply to Carolene because that product (1) was a wholesome and nutritive food, (2) was not "in imitation or semblance of milk, cream, or skimmed milk, whether or not condensed," etc., and (3) was properly branded, so that no fraud was perpetrated on the public in its sale. The defendants further contended that the act, if held to prohibit Carolene, was unconstitutional when so applied. The argument was that when Congress passed the law in 1923 medical science knew very little about vitamins and that the Congressional intent, therefore, in enacting the statute was to protect the public

against milk products from which the essential vitamins had been removed. Since the addition of fish oil to Carolene replaced the lost vitamins, the defendants urged, there was no justification in fact or in law for their conviction under the statute as written and enacted. The lower court had rejected these contentions and the appellate court agreed with the conclusions. "The fact," said the latter court, "that the inclusion of Carolene within the ambit of the statute leads to a seemingly harsh and inequitable result does not justify our giving to the statute the restrictive construction for which the defendants contend." According to the court the matter was one for the consideration of the legislature and not the courts, and the court's notion of expediency and propriety could not be substituted for the considered will of Congress expressed in the clear and unambiguous terms of the act. The power of the legislature could not be denied merely because an innocent article might conceivably fall within the class prohibited by the statute and Congress may with constitutional impunity bar from interstate commerce goods which may be the subject of a fraudulent sale, although the goods themselves may not be injurious.

The judgment of the district court was affirmed.

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