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RICKETTSIALPOX—A NEWLY RECOGNIZED RICKETTSIAL DISEASE

IV. ISOLATION OF A RICKETTSIA APPARENTLY IDENTICAL WITH THE CAUSATIVE AGENT OF RICKETTSIALPOX FROM *ALLODERMANYSSUS SANGUINEUS*, A RODENT MITE¹

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The purpose of this paper is to report the isolation of a rickettsia from each of two pools of mites (*Allodermanyssus sanguineus* Hirst, a rodent ectoparasite²) collected in a housing development in New York, N. Y., where more than 80 cases of rickettsialpox have occurred. Evidence is presented which serves to establish the strains of rickettsia isolated from mites as identical with the M. K. strain isolated from a patient ill with rickettsialpox (1).

The presence of *A. sanguineus* in the housing development was discovered in the last week in July 1946 by one of us (C. P.). The presence of large numbers of house mice (*Mus musculus*), a concomitant infestation with a blood-sucking mite, both previously reported (2, 3), and consistent clinical and epidemiological features (4, 5) led to the establishment of a field laboratory in the involved housing develop-

¹ From the Division of Infectious Diseases, National Institute of Health, Bethesda, Md., and the Rocky Mountain Laboratory of the Division of Infectious Diseases, National Institute of Health, Hamilton, Mont.

² Original specimens were identified by Dr. E. W. Baker, of the Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture. A communication from C. F. W. Muesebeck, in charge of the Division of Insect Identification of the U. S. Department of Agriculture, described the history of the mites in this country:

Allodermanyssus sanguineus (Hirst) was first recorded in publication for the United States in 1923 although the first specimens to be received in this unit were collected in the District of Columbia in 1909. Between 1909 and 1938 only one additional record of the occurrence of this mite in the United States was brought to our notice. Since 1938, however, we have received a number of samples. These have been from Tucson, Ariz., the District of Columbia, New York, N. Y. (several samples), Philadelphia, Indianapolis, and Boston. In most cases the specimens were submitted with notes indicating merely that they had been taken in houses or in apartments, but some lots were said to have been taken on man, "causing rash."

ment for the purpose of studying the mice and the mites as a possible reservoir and vector, respectively, of the disease.

Several hundred specimens of *A. sanguineus* in various stages of development and engorgement were collected. Some of the mites were found on freshly trapped house mice—in one instances 10 mites were found feeding on the rump of a young mouse. The majority of the mites, however, were found crawling on the external walls of basement incinerators. It was not unusual to collect as many as 100 mites from the walls of a single incinerator. Many of the mites were fully engorged and bright red in color at the time of collection. Typical mammalian erythrocytes were found in smears of these freshly engorged mites. No other rodents or rodent parasites were found by us at this location.

It may be noted, moreover, that in two widely separated apartment developments in New York where cases of rickettsialpox have occurred, a careful search has established the presence of large numbers of mice and mites (*A. sanguineus*).

One of us (W. L. J.) developed a typical clinical attack of rickettsialpox three weeks after engaging in the work of collecting and processing large numbers of mites. He was not aware of being bitten until he observed the initial lesion 7 days before the onset of fever.

MATERIALS AND METHODS

Mites found on walls or in mouse nests were drawn into vials by the use of several types of suction apparatus. Large numbers of mites could thus be collected in a few minutes. In the field laboratory the engorged and the flat mites were separated and representative samples were used for mounting and identification.

The flat mites were fed on normal 1- to 10-day-old white mice and on the clipped or shaved abdomens of male guinea pigs. The period of attachment and engorgement varied from less than 15 minutes in some instances on guinea pigs to occasionally as much as 36 hours on the older mice. Most of the flat mites, when offered an opportunity, engorged promptly.

The freshly engorged mites as well as those previously engorged when collected were put into vials, labelled as to source and placed in an incubator at 30° C. After approximately 4 days of incubation, during which time many of the females were observed to deposit eggs on the side of the tube, the various pools of mites were ground in a mortar, suspended in saline and inoculated intraperitoneally into adult Swiss mice and adult male guinea pigs. Despite the fact that the mites were not washed with a bactericidal solution, no evidence of contaminating bacterial infection was encountered in many such inoculations.

ISOLATION OF MITE STRAIN NO. 1

On September 12, 1946, a number of mites were collected from the walls of the basement incinerator servicing the apartment of M. K. from whose blood the M. K. strain of rickettsialpox had been previously isolated (1). Five subsequent cases of rickettsialpox have been successively reported from the apartments serviced by this incinerator, the most recent being that of E. K. (a sister of M. K.), who became ill on September 3, 1946.

Four days after engorging on a normal young white mouse, six of the afore-mentioned mites were inoculated into the peritoneal cavity of an adult male guinea pig. On the fourth day after inoculation an indurated skin lesion at the site of inoculation, redness, swelling of the scrotum and a temperature of 40.8° C. were noted. On the following day, the signs of disease having persisted, the animal was sacrificed. Autopsy revealed a peritoneal cavity free from exudate, a moderately enlarged spleen, and a marked periorchitis. The pulmonary and gastrointestinal systems were normal. Tunica washings and blood were used for passage into guinea pigs, white mice, and the yolk sacs of fertile eggs that had been incubated for 6 days. Heart blood failed to produce signs of disease in any of the animals inoculated.

Four days after inoculation with tunica washings, four guinea pigs responded with scrotal reaction and fever. The scrotal reaction was marked and persistent but in no case progressed to necrosis; the fever was intermittent and ephemeral.

Seven days after inoculation with tunica washings, four mice showed ruffled fur, inactivity, and rapid breathing. Two mice died on the eighth day but were not autopsied. Two mice were living 20 days after inoculation.

On the seventh day after yolk-sac inoculation of tunica washings, two of six chick embryos were dead. Yolk-sac films from the two dead embryos (stained by Machiavello's method) showed numerous intracellular and extracellular red diplobacilli morphologically similar to the rickettsiae. On the following day the remaining four eggs were found to be exceedingly rich in organisms resembling in morphology the rickettsia of rickettsialpox (1).

An ether-extracted antigen (6) was tested in the complement-fixation test (7) with convalescent-guinea-pig serums representing the following diseases: rickettsialpox (M. K. strain), Rocky Mountain spotted fever, Q fever, and endemic typhus. Serum from M. K., a rickettsialpox patient, and normal human serum were included in the test. The behavior pattern shown by the antigen of mite strain No. 1 (table 1) was identical with that shown by the similarly prepared M. K. antigens.

TABLE 1.—Comparative reactions of antigens prepared from yolk sacs infected with two mite strains and the M. K. strain of rickettsialpox (antigen titration)

Antigen	Serum used in 1:16 dilution	Results with various antigen dilutions						Results with antigen-control dilutions		
		1:2	1:4	1:8	1:16	1:32	1:64	1:128	1:2	1:4
Mite strain No. 1.....	Normal human.....	0	0	0	0	0	0	0	0	0
	Endemic typhus.....	0	0	0	0	0	0	0	0	0
	Q fever.....	0	0	0	0	0	0	0	0	0
	Rocky Mt. spotted fever.....	4	4	4	4	4-	1-	0	0	0
	M. K. guinea pig.....	4	4	4	4	4	3	0	0	0
Mite strain No. 2.....	M. K. human.....	4	4	4	4	4-	0	0	0	0
	Normal human.....	0	0	0	0	0	0	0	0	0
	Endemic typhus.....	0	0	0	0	0	0	0	0	0
	Q fever.....	0	0	0	0	0	0	0	0	0
	Rocky Mt. spotted fever.....	4	3	(¹)	0	0	0	0	0	0
M. K. strain.....	M. K. guinea pig.....	4	4	1	0	0	0	0	0	0
	M. K. human.....	4	2	1-	0	0	0	0	0	0
	Normal human.....	0	0	0	0	0	0	0	0	0
	Endemic typhus.....	0	0	0	0	0	0	0	0	0
	Q fever.....	0	0	0	0	0	0	0	0	0
Rocky Mt. spotted fever.....	Rocky Mt. spotted fever.....	4	4	4	4	4-	0	0	0	0
	M. K. guinea pig.....	4	4	4	4	4	3	0	0	0
	M. K. human.....	4	4	4	4	(¹)	0	0	0	0

¹ Transient.

To examine further the relationships of mite strain No. 1 and the M. K. strain, convalescent-guinea-pig serums from each strain were tested with several antigens—M. K. No. 4, mite No. 1, R162 (a Rocky-Mountain-spotted-fever antigen) and a Q-fever antigen. The results shown on table 2 clearly indicate the close relationship of the two strains.

TABLE 2.—Serum titers on guinea pigs convalescent from various rickettsial diseases—complement-fixation results with four antigens

Guinea pig sera	Antigens used in constant dilution			
	Mite No. 1	M. K.	Rocky Mt. spotted fever	Q fever
Mite strain No. 1.....	1:128	1:128	1:8 (2+)	0
M. K. strain of rickettsialpox.....	1:64	1:64	1:16	0
Rocky Mt. spotted fever.....	1:64	1:32	1:128	0
Q fever.....	0	0	0	1:512
Normal.....	0	0	0	0

Cross-protection studies show thus far that guinea pigs convalescent from the M. K. strain are solidly immune to mite strain No. 1. The converse experiment has not been completed.

ISOLATION OF MITE STRAIN NO. 2

A group of approximately 10 to 14 flat mites collected from several basement incinerator walls were permitted to engorge on a mouse 3 to 4 days old. After feeding overnight the mites were removed

and used for other purposes. The mouse was returned to its mother. Ten days later the experimental mouse appeared disinterested in nursing and was less active than its litter mates. The following day the mouse was obviously ill, inactivity, rapid breathing and ruffled fur being the most apparent signs. At this time the brain was removed and a saline suspension was injected into four fertile eggs. Seven days after inoculation all the embryos were dead—three showing numerous rickettsiae on films of the yolk sacs. When tested on blood agar, both the original brain inoculum and the chick-embryo fluids were sterile. Antigens prepared from these yolk sacs and tested in the complement-fixation test gave a reaction pattern typical of the M. K. and mite No. 1 antigens (table 1). A viable yolk-sac suspension injected into the peritoneal cavity of guinea pigs produced signs typical of rickettsialpox.

Four additional strains which produced typical disease in guinea pigs have been isolated from mites. Yolk-sac cultivation, however, has so far been unsuccessful. Two of these strains were established with pools of mites which were found engorged in nature and were inoculated into the peritoneal cavities of guinea pigs without further feeding.

Guinea pigs used for feeding mites have not as yet shown definite signs of disease. One guinea pig, however, developed a vesiculopapular lesion at the site where a mite was permitted to engorge 8 days previously.

SUMMARY

The recovery of a rickettsia (mite strain No. 1) from a saline suspension of the tissues of mites (*Allodermanyssus sanguineus*) has been described. A rickettsia (mite strain No. 2), which is morphologically, culturally, and serologically indistinguishable from mite strain No. 1, has been isolated from a mouse "bitten" by *A. sanguineus*.

The behavior of the two mite strains in producing disease in guinea pigs, mice, and chick embryos, and as antigens in the complement-fixation test would seem to establish them as identical with the M. K. strain of rickettsialpox. Further evidence of this identity has been provided by the solid immunity afforded guinea pigs by rickettsialpox against one of the mite strains.

The recovery of apparently identical strains of rickettsia from a man ill with rickettsialpox and from bloodsucking mites collected from the domicile of the same man indicates that human infection is acquired from the mites, probably through biting.

The isolation of this agent from mites has established further its characteristics as a micro-organism of the rickettsial group. The name *Rickettsia akari* (GREEK, mite) is proposed.

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THE PURIFICATION AND CONCENTRATION OF INFLUENZA VIRUS BY MEANS OF ALCOHOL PRECIPITATION ¹

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The widespread use of the chick embryo for the cultivation of viruses and the markedly increased use of antigenic materials from this source for human vaccination make it desirable that influenza virus obtained from chick embryos be highly refined in order to eliminate or reduce the possibilities of sensitizing human beings to chick-embryo proteins. Of the various methods that have been devised to concentrate influenza virus so as to secure a more potent preparation for use as an immunizing vaccine, the one developed by Stanley (1, 2) and by Taylor et al. (3), in which the Sharples Laboratory's Super-Centrifuge is used, appears to be the method of choice for obtaining concentrated and purified preparations relatively free from large amounts of inactive nonviral protein.

However, the Sharples centrifuge method cannot be considered ideal for the production of influenza vaccines on a large scale since a single machine operating under optimal conditions can handle the relatively low volume of only 1.5 to 2.0 liters of infected chorio-allantoic fluid per hour. Furthermore, these machines are subject to frequent mechanical breakdowns when they are maintained in continuous operation.

With these facts in mind, efforts were made to develop a procedure that would retain the desirable features of the Sharples centrifuge

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method and, in addition, possess the essential property of being readily adaptable to large-scale production.

In experiments to be reported in detail elsewhere, it was found that ethyl or methyl alcohol could be used to concentrate and partially purify the PR-8, Weiss, and Lee strains of influenza virus under carefully controlled conditions of alcohol concentration, temperature, and pH. Methyl alcohol was found to be superior to ethyl alcohol since its optimal concentration was of broader range and since it caused less denaturation of virus protein. Precipitation with methyl alcohol under carefully controlled conditions produced no virus denaturation or loss of activity, as judged by chick-cell agglutinating (CCA) activity, infectivity titers in chick embryos, or immunizing potency of killed vaccines for mice. The method of methyl alcohol precipitation is readily applicable to the concentration and purification of influenza virus, using either the bucket, angle-head, or Sharples continuous-flow types of centrifuges. The method is particularly valuable from the standpoint of producing vaccines on a large scale since it may be combined readily with the Sharples centrifuge method and thus effect great savings in man- and machine-hours. Preliminary experiments also show that the method of methyl-alcohol precipitation may have wide application in the concentration and purification of other viral and rickettsial agents.

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THE EFFECT OF TOPICALLY APPLIED SODIUM FLUORIDE ON DENTAL CARIES EXPERIENCE

III. REPORT OF FINDINGS FOR THE THIRD STUDY YEAR^{1 2}

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In 1942 examinations were made to determine the dental caries experience in the permanent teeth of two groups of Minnesota school children who had been selected for participation in a topical fluoride

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² The Council on Dental Therapeutics of the American Dental Association and the American College of Dentists furnished grants which were used to defray part of the expenses of this investigation.

study. The 337 children in the first of these groups then received 7 to 15 topical applications of 2-percent sodium fluoride solution to the teeth in the upper and lower left quadrants of the mouth. The second group, consisting of 392 control children, did not receive any applications. Subsequent to 1942, annual examinations of the teeth of both groups of children were made and the dental caries experience was recorded. At the end of the first and second study years, the incidence of dental caries in the fluoride-treated as compared with that of the untreated permanent teeth of the treated group of children was reported (1, 2). The incidence of caries in the teeth of treated and control groups was compared also. During the 3-year period since the beginning of the study, the number of children included in the original group who were available for reexamination has declined. At the conclusion of the third study year, only 242 children of the original treated group were available for reexamination.

At the end of the first year it was reported that the number of previously undecayed teeth attacked by caries during that study period was 39.8 percent less in fluoride-treated than in untreated teeth, and the number of additional tooth surfaces attacked in previously decayed teeth was 12.4 percent less in treated than in untreated carious teeth. Analysis of the data at the end of the second year revealed that initial caries attack on fluoride-treated teeth continued to be approximately 40 percent less than on untreated teeth. Moreover, the number of additional tooth surfaces attacked in previously decayed teeth not only continued to be less than in untreated carious teeth, but the magnitude of the difference had increased to 23.1 percent.

It is the purpose of this report to present data on the dental caries experience in the permanent teeth of the treated group of children for the 3-year period ending May 1945, and for the third study year. In summary, the data indicate that the number of teeth initially attacked by caries during the 3-year study period was 36.7 percent less in treated than in untreated teeth. Furthermore, the number of additional tooth surfaces attacked in teeth which were carious at the time of treatment was 23.9 percent less in treated than in untreated carious teeth.

MATERIAL AND METHODS

Three small urban communities in Minnesota—Arlington, North Mankato and St. Louis Park—provided the school populations from which the children participating in this study were selected. When the study was begun, the children ranged in age from 7 to 15 years. The treated group consisted originally of 337 children, and the control group included 392 children. The former group received applications

of sodium fluoride to the teeth in the upper and lower left quadrants of the mouth, the teeth in the upper and lower right quadrants serving as controls. The control group of children did not receive fluoride treatments.

During an 8-week period in April and May 1942, each child in the study groups was given a dental prophylaxis and a detailed dental examination. In addition, the children in the treated group received 7 to 15 topical applications of fluoride to the teeth in the left quadrants of the mouth. The fluoride-treatment procedure consisted of isolating the teeth with cotton rolls, drying the teeth with compressed air, and wetting the crown surfaces of the teeth with a 2-percent sodium fluoride solution. The applied solution was allowed to dry in air for approximately 4 minutes. During the 8-week treatment period, roughly two-thirds of the children in the treated group received 2 fluoride applications weekly to a maximum of 15, and the remaining one-third received 1 application weekly to a maximum of 8 treatments.

The fluoride treatments were completed in May 1942. The first and all subsequent dental examinations were made at yearly intervals by the same examiner. The treated and control children in any one school were examined at random. The decline which has occurred in the numbers of children in each study group since 1942 has been due to changes in residence, absence from school at the time reexaminations were conducted, or withdrawal from school. Throughout the analysis consideration is confined to the dental caries experience in the erupted permanent teeth present at the beginning of the study. The analysis prepared for the first year is based on 289 children in the treated group and 326 in the control group, and that for the second year is based on 270 treated and 320 control children. The report for the third year is based on 242 treated cases only. Previous data on the control group of children have demonstrated adequately that the occurrence of caries was bilaterally equal and at approximately the same rate as in the untreated teeth of the treated group of children. Therefore, a continuation of reports of findings in the control group does not seem warranted.

FINDINGS

The caries experience in the permanent teeth of the treated group of children for the 3-year period ending May 1945, is presented, by mouth quadrants, in table 1. Caries experience is expressed in terms of numbers of teeth and tooth surfaces initially attacked during this time period and additional tooth surfaces attacked in teeth that were carious in April 1942. The data on caries experience are limited to

those permanent teeth present in the mouths in 1942 when the initial dental examinations were made.

TABLE 1.—*Treated group. Dental caries experience during the 3-year period ending May 1945, for the permanent teeth in the fluoride-treated and untreated quadrants of the mouths of 242 Minnesota children*

Quadrant	Number of non-carious teeth (April 1942)	New DF ¹ teeth (May 1945)	DF ¹ surfaces in new DF teeth	New DF ¹ surfaces in previously carious teeth	Total new DF ¹ surfaces
<i>UPPER</i>					
Treated (left)-----	838	130	167	107	274
Untreated (right)-----	842	205	282	149	431
<i>LOWER</i>					
Treated (left)-----	1,032	84	120	109	229
Untreated (right)-----	1,046	133	182	135	317

¹ DF=carious (decayed or filled).

According to data presented in table 1, 130 sound teeth became carious in the upper left or fluoride-treated quadrant as compared with 205 in the upper right or untreated quadrant. In the lower mouth quadrants, 84 became carious in the left or treated quadrant and 133 in the right or untreated quadrant. In the treated quadrants the total number of newly carious teeth was 214, as compared with 338 in the untreated quadrants. Thus, there were 36.7 percent less previously sound teeth attacked by caries in the fluoride-treated than in the untreated teeth, during the 3-year period ending May 1945. This difference is only slightly less in magnitude than the difference of 39.8 percent observed 1 year after treatment and the difference of 41.4 percent noted 2 years following treatment. Comparison of the number of tooth surfaces subsequently attacked by caries, in teeth which were noncarious at the time of treatment, shows results in close accord with the findings reported above. During the 3-year period there were 287 surfaces involved in newly carious teeth in treated mouth quadrants as compared with 464 surfaces in such teeth in untreated quadrants, a difference of 38.1 percent.

The number of additional tooth surfaces attacked by caries in previously carious teeth was also considerably less in treated than in untreated mouth quadrants. In the upper quadrants there were 107 newly carious surfaces in teeth that had been carious at the time of treatment as compared with 149 newly carious tooth surfaces in untreated teeth. In the lower quadrants there were 109 newly carious tooth surfaces in the previously carious teeth of treated quadrants as compared with 135 newly carious surfaces in untreated quadrants.

Thus, there were 23.9 percent less newly carious surfaces in previously decayed teeth which had been treated with topical fluoride than in untreated carious teeth.

Data on caries experience for the year ending May 1945 are presented in table 2. These data are concerned only with teeth and tooth surfaces which were noncarious in May 1944 and those attacked by caries during the ensuing year. In the upper left or treated mouth quadrant, 41 teeth became carious during the year as compared with 53 teeth in the upper right or untreated quadrant, a difference of 22.6 percent. In the lower quadrants, 29 teeth became carious during the year on the left or treated side of the mouth, as compared with 37 on the right or untreated side of the mouth, a difference of 21.6 percent. The gross difference for upper and lower quadrants is 22.2 percent. This difference is appreciably lower than the differences observed for the first and for the second study years. However, the actual lessening, if any, of the caries-inhibiting effect of the topical fluoride treatments during the third year of a follow-up cannot be determined from an analysis of these data. Comparison of the caries experience in the fluoride-treated and untreated teeth by separate years becomes progressively less valid as elapsed time after treatment increases, because of two basic factors. First, the difference in the number of treated and untreated noncarious teeth available for attack becomes greater as time after treatment increases. Second, marked differences in the susceptibility to caries of the several morphological types of teeth, and the early attack of the more susceptible teeth, in greater numbers among untreated than treated teeth, decreases the comparability of the rates at which remaining

TABLE 2.—*Treated group. Dental caries experience during the year ending May 1945, for the permanent teeth in the fluoride-treated and untreated quadrants of the mouths of 233 Minnesota children*

Quadrant	Number of noncarious teeth (May 1944)	New DF ¹ teeth (May 1945)	DF ¹ surfaces in new DF teeth	New DF ¹ surfaces in previously carious teeth	Total new DF ¹ surfaces
UPPER					
Treated (left)-----	712	41	48	43	91
Untreated (right)-----	659	53	74	68	142
LOWER					
Treated (left)-----	940	29	39	38	77
Untreated (right)-----	911	37	45	53	98

¹ DF=carious (decayed or filled).

treated and untreated teeth are attacked. Therefore, the observed differences in caries attack, on fluoride-treated as compared with untreated teeth, become more conservative estimates of the real differences as the observation period increases.

To continue the examination of the data presented in table 2, there were 43 newly carious surfaces in previously decayed teeth in the upper left or treated quadrant as compared with 68 in the upper right or untreated quadrant, and 38 in the lower left or treated quadrant as compared with 53 in the lower right or untreated quadrant. Thus, for the year ending May 1945, as shown in table 3, there were 33.1 percent less newly carious surfaces in previously decayed teeth which were treated than in those which were untreated. This difference is greater than that observed for the first year (12.4 percent) and for the second year (25.2 percent).

TABLE 3.—*Treated group. Percent less new caries experience in the fluoride-treated mouth quadrants (left) than in the untreated quadrants (right) of a selected group of Minnesota children*

Year	Upper jaw	Lower jaw	Both jaws
PERCENT LESS NEWLY CARIOUS TEETH			
1942-43	46.0	30.3	39.8
1942-44	43.9	37.4	41.4
1942-45	36.6	36.8	36.7
1943-44	48.2	43.8	46.6
1944-45	22.6	21.6	22.2
PERCENT LESS NEWLY CARIOUS SURFACES IN PREVIOUSLY CARIOUS TEETH			
1942-43	14.0	11.1	12.4
1942-44	21.7	24.6	23.1
1942-45	28.2	19.3	23.9
1943-44	18.6	34.4	25.2
1944-45	36.8	28.3	33.1

SUMMARY

Data on the incidence of dental caries in the permanent teeth of a fluoride-treated group of children, for a 3-year period and for the third year of a longitudinal study, have been presented and analyzed. The data for the first and for the second study years have been presented previously. During an 8-week period, April and May 1942, the children in the treated group received 7 to 15 topical applications of sodium fluoride solution to the teeth in the left quadrants of the mouth. A summary of the data presented here for the first time and of those previously reported indicates:

1. During the 3-year period ending May 1945, the number of permanent teeth initially attacked by caries was 36.7 percent less in

fluoride-treated than in untreated teeth. This percentage difference is somewhat smaller than that observed for the first year (39.8) and for the 2-year period ending May 1944 (41.4).

2. During the third study year, or the year ending May 1945, initial caries attack was 22.2 percent less in fluoride-treated than in untreated permanent teeth. This yearly difference is substantially less than that observed for the second year, 46.6, and for the first study year, 39.8.

3. Among permanent teeth which were carious at the beginning of the study in 1942, the number of additional surfaces which became carious during the 3-year period ending May 1945 was 23.9 percent less in treated than in untreated carious teeth. The percentage difference observed for the first study year was 12.4 and for the first 2-year period was 23.1. By individual study years there were 12.4, 25.2, and 33.1 percent less newly carious surfaces in fluoride-treated than in untreated carious teeth, for the first, second and third years, respectively.

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TRENDS IN DENTIST-POPULATION RATIOS ¹

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The full significance of the basic data on personnel resources which form the body of this paper can best be emphasized by introducing a few facts regarding the need for dental service. Among the more widely publicized findings on the dental situation are those revealed by selective service examinations. During the early months of conscription, the rate of rejections because of defective teeth was so high that even the simple requirements of six opposing anterior and six opposing posterior teeth had to be waived. While comparison of dental findings among persons called for military service in World Wars I and II are difficult to make, studies by Perrott (1) and others would seem to indicate that dental needs among young adults are greater now than they were a quarter of a century ago.

¹ From the States Relations Division, Bureau of State Services.

Annual rates for new carious lesions and fillings provide another index of dental need. In Hagerstown, Md., Klein and Palmer (2) found that among the school children between 6 and 15 years of age an average of 1.3 permanent tooth surfaces were attacked by caries each year. More than four-fifths of these defective surfaces received no care. According to a more recent report by Klein (3), only about 40 percent of the estimated yearly increment of 144,000,000 dental services needed by the adult white population are received. Besides this annual increment of need there is a tremendous accumulation resulting from previous neglect. It has been estimated that for each child 6 to 15 years of age, 7.5 tooth surfaces require fillings (2). In addition, the findings of Walls, Lewis, and Dollar (4) indicate an average of more than four fillings and two extractions per adult, which, together with crowns, bridges, dentures, gum treatments, prophylaxes, and other services needed, represent an approximate backlog for the general population of more than 1,000,000,000 additional services (5).

With present limited knowledge of the causes of dental caries, reliance for prevention of further decay and tooth loss rests upon early detection and repair of defective tooth surfaces (6). Yet, according to Klein (7), care for the yearly number of caries occurring in the total population probably would require double the present volume of dentist manpower. Furthermore, the previously estimated backlog represents approximately 800,000,000 hours of dentist time. At an annual rate of 1,800 man-hours per dentist (2) this is equivalent to the total professional time of 74,000 additional dentists over a period of 6 years. These figures point to a great lack of dentists. This deficiency, however, as is well known, is more acute in some sections of the country than in others.

The authors will present comparative dentist-population ratios in selected years for States and counties with different characteristics to show the prewar distribution of dentists and to aid in determining the factors which influence their location, the types of areas where deficiencies are greatest, and trends in distribution over the prewar decade. Comparable data are not available which would portray the current situation; however, it is reasonable to assume that the postwar distribution pattern will show a somewhat exaggerated effect of the forces that determined previous trends.

Comparison of dentist-population ratios based on data released by the Bureau of the Census (8) indicates a steady increase in the ratio of dentists to population from 1870 to 1930 (table 1). In addition, higher educational requirements, advanced techniques in dentistry and dental surgery, improved equipment, and trained dental assistants make possible a greater quantity and higher quality of dental

service than has been possible heretofore. In 1940, however, there were only 70,601 dentists or 53.6 per 100,000 population. This was about 4 less to serve each 100,000 individuals than had obtained a decade earlier. The small decline in the number of dentists is not as significant in itself, however, as is the fact that the steadily increasing trend in the dentist-population ratio which prevailed up to 1930 was reversed during the last decade.

TABLE 1.—*Population, number of dentists gainfully employed, and dentists per 100,000 population for each census year from 1870 to 1940*¹

Year	Population	Dentists	
		Number	Per 100,000 population
1940.....	131,669,275	70,601	53.6
1930.....	122,775,046	71,055	57.9
1920.....	105,710,620	56,152	53.1
1910.....	91,972,266	39,997	43.5
1900.....	75,994,575	29,665	39.0
1890.....	62,947,714	17,498	27.8
1880.....	50,155,783	12,314	24.6
1870.....	38,558,371	7,988	20.7

¹ Sixteenth Census of the United States, 1940: Population, First Series, Number of Inhabitants, United States Summary; and Comparative Occupation Statistics for the United States, 1870 to 1940, Bureau of the Census.

Geographic grouping of the States calls attention to the magnitude of differences among various sections of the country (fig. 1). For example, in the Southern States² in 1940 there were only 28 dentists for each 100,000 persons; corresponding ratios for the Central, Northeastern, and Western States were 62, 66, and 68, respectively. Whereas a decrease between 1930 and 1940 of 3 to 4 dentists per 100,000 population characterized the country as a whole, in the Western States the difference averaged 14 per 100,000. This variation may be attributed to a greater expansion in the population of the West than occurred in other sections without proportionate increases in the number of dentists.

The range of the dentist-population ratios in 1940 was of course much greater for individual States than for broad geographic areas. Of the 17 States with less than 40 dentists per 100,000 population, however, 14 are in the South. Three States, Arkansas, Mississippi, and South Carolina, had less than 20 dentists per 100,000, while at

² The four geographic areas referred to in figure 1 were composed by grouping the States as follows:

Northeastern: Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, and the District of Columbia.

Southern: Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma, and Texas.

Central: Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas.

Western: Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada, Washington, Oregon, and California.

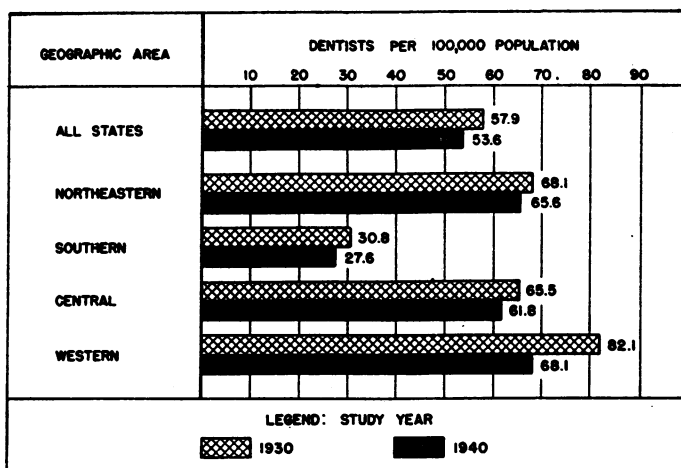


FIGURE 1.—Number of dentists per 100,000 population in each geographic area in 1930 and in 1940 based on data from the Bureau of the Census.

the other end of the scale California had 79, and Oregon, New York, and Illinois each had more than 75 dentists per 100,000 population.

O'Rourke (9) found that the high Negro population and low per capita income in the South Atlantic, East South Central, and West South Central geographic divisions apparently influence dentist-population ratios. He further points out that while these sections average from 11,000 to 18,000 Negroes for each Negro dentist, the ratio of white population to white dentists is also less favorable in these States than is true in other parts of the country. Although, to a limited extent, white and Negro dentists each serve both races (9, 10), it would seem necessary to emphasize the training of both white and Negro dentists to meet the large needs in these areas. A total of more than 13,000 additional dentists, white and Negro, would be required to bring the dentist-population ratio in Southern States up to that for the next lowest geographic group.

Another consideration in any study of the distribution of dentists is the amount of service represented. Age composition of the dentist population is the most readily available and commonly used index of service capacity. Pennell (11) based his formulas for estimating physician resources upon this factor. Studies made of the patient load of dentists during the war (12) indicate that those under 40 years of age are able to increase their hours of work under pressure to a greater extent than can the older dentists. Klein (7) considered only dentists under 65 years of age in estimating the number of active dentists required. The Procurement and Assignment Service sought dentists under 45 years of age for military service, while those selected for combat areas were usually much younger. Figure 2 shows, how-

ever, increasing proportions of dentists in the older age brackets. For instance, in 1930 more than one-third of the male dentists in practice were under 35 years of age; in 1940 less than one-fourth were below that age. The reduction in the proportion of young dentists reflects a marked decline in the enrollment of dental schools which began after 1925 and continued with some fluctuation through 1939. Only 8 percent of the male dentists were as much as 60 years of age in 1930, while a decade later 15 percent were in that category. The modal-age class in 1930 was 30-34; in 1940, 40-44. Similarly, over this period, the median age of male dentists increased from 39.4 to 43.5 years.

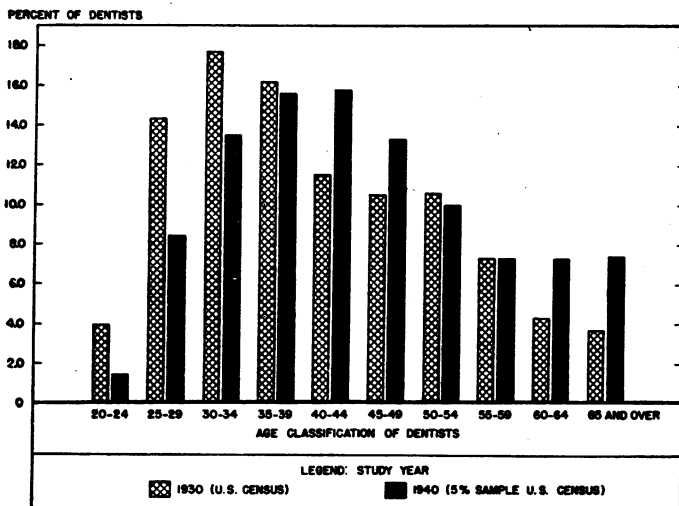


FIGURE 2.—Percentage of male dentists in selected age groups, 1930 and 1940.

A more localized picture than that afforded by State averages is desirable in studying the characteristics of places where dentists serve in greater or lesser numbers. The Bureau of the Census, however, releases no counts of dentists for political subdivisions other than States and large cities. For this reason, the authors used data from other sources for investigating dentist-population ratios in counties with different characteristics. Totals by county for 1941 were secured for 44 States from releases by the Committee on Dental Economics of the American Dental Association (13).³ National totals, where needed in the comparisons, were projected from the figures covering these States on the assumption that the relationship between the 1941 national total and the total for the 44 States would be the same as that which obtained in 1940 according to the United

³ Data presented by the committee (13) are in general based on the 1941 State dental registration lists. For two States, however, it was necessary to use 1940 and 1942 lists, respectively.

States Census Bureau figure. For the purpose of studying trends for different types of counties over a period of years, totals were summated for each county from listings of dentists published in Polk's 1928 Dental Register and Directory (14).

Buying power of the population in a locality is usually considered an element in determining effective demand for professional service. Counties were grouped according to their per capita ⁴ income in 1940 and appropriate dentist and population totals were combined, respectively, to show the influence of this factor upon the location of dentist personnel as well as to depict any trend between 1928 and 1941. In general, counties with the lower per capita income classifications had fewer dentists per unit of population in both years than had those counties in progressively higher per capita income brackets (fig. 3). For example, in the 107 counties of the lowest income class,

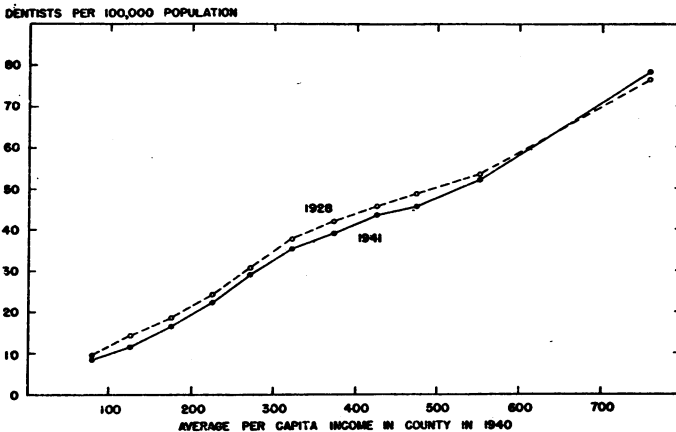


FIGURE 3.—Dentists per 100,000 population, 1928 and 1941, in counties grouped according to the average per capita income in 1940.

there were less than 10 dentists per 100,000 population in 1928; in 1941 this ratio had declined to 8. On the other hand, in counties where the average per capita income was \$600 or more, the number of dentists per 100,000 population increased from 76 in 1928 to 78 in 1941. Only counties within this per capita income classification showed a higher ratio of dentists to population in the later than in the earlier year. In each of the two years approximately one-half of the population resided in counties where the average per capita income in 1940 was \$600 or more, whereas the dentists in such areas represented two-thirds of the national total.

Location of dentists in counties appears to be affected also by con-

⁴ The 1940 per capita income figure which was used for classifying counties was obtained by dividing the effective buying income reported for the county in the April 10, 1941 issue of Sales Management by its population as revealed in the 1940 U. S. census reports.

centration of population in urban locations. Both in 1928 and in 1941, the ratios of dentists to population were greater in those counties which in 1940 had large urban places within their borders than were the ratios for counties which were entirely rural or whose urban development was limited to relatively small population centers. In 1941 the dentist-population ratio was 24 for counties without places classified as urban in the 1940 United States census, while for those containing the largest cities it was 4 times as high (fig. 4). Comparison of ratios for the 2 years indicates that trends, if any, which occurred over the period accounted for only minor changes in ratios for counties in any given group. There was a very slight decrease in the relative number of dentists resident in counties without urban places or in those containing small cities of less than 10,000 persons. Ratios for counties in which there were cities of between 10,000 and 250,000 population showed little change over the period, while those counties with cities of from 250,000 to 499,999 evidenced some decline. Where cities of 500,000 or more were found, however, the dentist-population ratios increased.

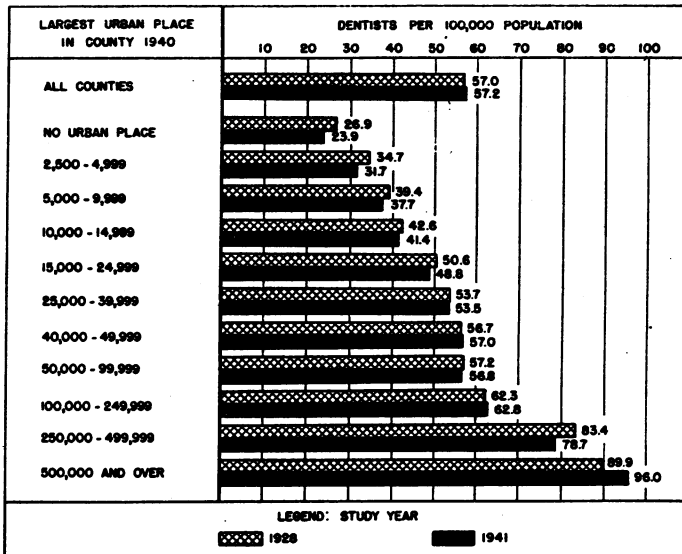


FIGURE 4.—Dentists per 100,000 population, 1928 and 1941, in counties grouped according to size of the largest urban place in 1940.

Dentists were located in 40 more counties in 1941 than in 1928.⁵ Added to such factors as improved roads and better transportation facilities, this may denote some progress in the distribution of dental services. There remained in 1941, however, about 215 counties with

⁵ This comparison excludes counties in the States of South Carolina, Washington, and West Virginia for which comparable county data are not available.

no dentists (15). For the majority of the counties without dentists, the average 1940 per capita income was less than \$200, and in less than one percent of the counties without dentists was there an incorporated place with a population as great as 2,500 inhabitants. These counties averaged only 5 persons per square mile, and were concentrated in a few States. For example, of Georgia's 159 counties, 36, comprising 9 percent of the State's population, were without a dentist. Likewise, no dentists were listed for 34 counties in Texas, 12 counties each in Virginia and Colorado, 11 in South Dakota, and 10 counties each in Montana and Tennessee. Since some dentists, particularly in the South, travel from place to place, the absence of practicing or resident dentists in these counties does not necessarily imply a total lack of care for all of the population. It does signify, however, that for many persons in these counties dental service can be had only by traveling a considerable distance.

Camalier and Altman (16, 17) found in studying the postwar plans of dental officers in the armed forces that there seemed to be a trend among new practitioners toward medium-sized cities rather than to large cities or rural communities. Moreover, they observed that "among former practitioners who are considering a change of community, the trend is away from communities of less than 5,000 persons, and, though to a lesser extent, away from cities of 100,000 population or more." They pointed out that the prewar shortages in rural areas will be intensified by the tendency of returning dental officers to locate in cities of between 5,000 and 100,000 population. Such a pattern was noted by Mountin and others (18) in studying location changes made by migrating physicians between 1923 and 1938.

Statistics presented in the preceding pages demonstrate that dentists were not distributed in proportion to the population before the war; rather they were concentrated in areas of high per capita income and in large urban communities. Changes which occurred in the decade of 1930 to 1940, as well as the plans of dentists in the armed services, also indicate that the trend is away from low-income and rural areas. Thus, unless steps are taken to make such areas more attractive as places to practice, these inequalities in the availability of dentists will continue and may be even further accentuated. At the same time, other factors such as greater appreciation of dental service and improved standards of living are operating to increase demands for dental service, thus making shortages of dentists more acutely felt in many areas.

Any estimates of personnel shortages imply the assumption of some measure of adequacy for application to population groups to determine minimum needs. As a first approach to this problem the authors have considered the 1941 ratio of dentists to

population which prevailed in the five contiguous States of Connecticut, Massachusetts, Rhode Island, New Jersey, and New York as a possible minimum standard for estimating the need for dentists in the country as a whole. These States, which have a relatively high per capita income and in general represent a heavily populated industrial area, average 76 dentists per 100,000 population. While the sufficiency of this ratio cannot be established on the basis of data at hand, it at least represents a figure which had actually been attained under the prevailing scheme of dental practice prior to the onset of World War II. Application of this ratio to the combined population of the country reveals a total requirement of about 110,000 dentists, or nearly 34,000 more than were registered in 1941. Accumulation of the differences between existing dentists and those needed, on the basis of this standard, shows an excess of approximately 7,000 dentists in the wealthy and more densely populated counties. If it can be assumed that these dentists might be willing to move to areas of scarcity, 27,000 new practitioners would still be required to provide all counties with 76 dentists per 100,000 population.

Many people, however, within the five States which furnish the basis for the foregoing estimate lack sufficient dental care. Some higher standard should, therefore, be investigated. Various estimates by competent persons in the field suggest that at least 100 dentists for each 100,000 persons would be necessary to serve adequately a population which had been receiving good care. Klein's calculations (7) presented earlier in this paper indicated that care of the yearly incidence of dental need would require about twice the dental manpower available in 1940, or 130,000 dentists under 65 years of age. Dollar (19) estimated the number needed for an adequate maintenance program at 135,000. Earlier, in a study of the essentials of good medical care and the services involved, Lee and Jones (20) calculated, in various combinations, the number of dentists and auxiliary personnel required by a population which had been receiving adequate dental service. Of these estimates, the one providing the largest proportion of auxiliary personnel called for 98.6 dentists per 100,000 population. These estimates do not make allowance for the care of the tremendous backlog of dental defects that now exists;⁶ yet, approximately 60,000 additional dentists would be needed to meet the suggested standard of 100 dentists to 100,000 population. Since only about a thousand dentists more

⁶ Without changes in methods of practice, it seems doubtful that 100 dentists of any age can provide adequate maintenance care for a population of 100,000. For instance in Hagerstown, Md., in 1936, at a time when studies of the dental problems of elementary school children were made, there were 32 practicing dentists, a ratio of about 1 dentist per 1,000 population (6), yet dental caries were accruing in permanent teeth of school children approximately six times as fast they were being filled. It was estimated that "less than 2 percent of the total professional time of each dentist is devoted to the filling of permanent teeth in that 15 percent of the population which attends elementary schools."

than this minimum live in counties which now have a surplus in terms of this standard, inducing them to move to areas where the need is greater would contribute little toward supplying the 60,000 estimated as required.

The main source for obtaining additional dental manpower to meet the increasing need and demand for care is an expanded training program. The annual output of dental schools has fluctuated sharply from time to time with the raising of pre-dental requirements, the lengthening of the course of study, and availability of funds to prospective students. Data compiled by O'Rourke and Miner (21) for early years and by the Dental Students Register published in the Journal of the American Dental Association (22) for later periods, shows that beginning in 1911 there was a gradual rise in the number of graduating dentists until a peak of approximately 3,600 was reached in 1919. In 1920 the graduation of only 900 students produced a sharp decline in the trend, which may reflect to an important extent adjustments to the lengthening of the curriculum which became effective in 1917. The number began to climb again and in 1924 reached a height of more than 3,400. Between 1925 and 1941 a downward trend was again evident, until in the latter year less than 1,600 students were graduated. Stimulated no doubt by special accelerated courses, increased purchasing power of the population, and special needs associated with war activities, the annual number of graduates after 1941 again increased so that a new peak of 3,212 was reached in 1945, the highest for any year since 1924. This increase in the number of dental graduates seems likely to be lost temporarily, since the enrollment in dental schools dropped appreciably between 1943 and 1945. Freshman enrollment as of October 1945 was 1,201 students which may be compared with a 1942 enrollment of 2,702. This, obviously, will result in a much reduced number of graduates 4 years hence. If allowances are made for the usual shrinkage in class enrollment between entrance and graduation, by 1949 the number of graduates will be smaller than for any year since 1920. Although qualified veterans will fill entering classes to capacity this year (23), return of the majority of the schools to their prewar schedules, including summer vacations, will tend to reduce the yearly output of graduates even in the next few years. Moreover, because of the increasing proportion of dentists in the older age categories (24), greater losses from the profession through retirement and death may be expected than formerly.

Since this report is confined to a comparison of dentist-population ratios and trends, no attempt will be made to discuss methods of alleviating the great need for dental graduates other than to indicate the views of some observers in the field. Full use of auxiliary workers such as hygienists and dental assistants would, quite likely, make

possible an increased volume of service in relation to the number of graduate dentists. Bunting (25), in an able discussion of the problems of postwar dentistry, stated that a large number of auxiliary aids could add to the efficiency and capacity of the private practitioners. Klein (12) found that the average dentist with one chair and one assistant serves one-third more patients than does a like dentist with no assistant. O'Rourke (26) reports that approximately half of the active dentists in the country have no office assistants. His comparison reveals that there are an average of five to six auxiliary workers for each physician and an average of only two-thirds of an aid for each dentist. Among other proposals for advancing dental health are: emphasis on children's dentistry (27, 28); dental health education (25, 29); and continuance and expansion of fundamental, clinical, and epidemiological research (7, 25).

In summary, the outstanding facts in this paper are:

1. There were relatively fewer dentists to serve the population in 1940 than in 1930.
2. Dentists are poorly distributed in relation to population. In the South the dentist-population ratio is less than half that for the section of the country with the next lowest proportion.
3. Wide disparity exists between the number of dentists available to population units of comparable size in counties with low per capita income and in those where the income is high. Similarly, dentist-population ratios in counties with large urban centers are much higher than those for counties with little or no urban development.
4. The median age of dentists advanced 4 years between 1930 and 1940. During this period the proportion of dentists under 35 years of age decreased from more than one-third to less than one-fourth of the total, while the proportion of those over 60 increased from 8 to 15 percent. This indicates a gain in the number of dentists at ages where the service potential is relatively low and a loss from age groups in which capacity to render care is greatest.
5. There were 25 percent fewer dental graduates between 1930 and 1940 than in the previous decade. Although the number increased during the war years and reached a new peak in 1945, the freshman enrollment in that year was lower than at any time since 1920.

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CHANGES IN STATE AND TERRITORIAL HEALTH AUTHORITIES

Change No. 3 to Directory of State and Territorial Health Authorities (Supplement No. 180 to the Public Health Reports—1945 Revision)

The following changes and additions have been received since compilation of Change No. 2.¹ Notice of further changes should be addressed to the Records and Reports Unit, Bureau of States Services, United States Public Health Service, Washington 25, D. C.

ALASKA TERRITORIAL DEPT. OF HEALTH

Local health administration:

(Delete **David M. Cowgill**), district health officer
Interior Service.

Sanitation activities (all):

(Delete **Richard S. Green**), director
Division of Sanitation and Engineering.

ARKANSAS STATE DEPT. OF HEALTH

Public health education:

Roy M. Reid, acting director
Division of Public Health Education.

Sanitation activities:

Milk sanitation—
C. R. Jones, director
Division of Dairy Products Services.

COLORADO STATE DEPT. OF HEALTH

Sanitation activities:

General sanitation,
Sanitation of hotels, camps, and bathing places, and
Sanitation of water supplies and sewerage systems—
Gerald E. Reipe, State sanitary engineer

Division of Sanitary Engineering.

ILLINOIS STATE DEPT. OF HEALTH.

Dental services:

Leslie W. Knott, M. D., M. P. H., acting chief
Division of Public Health Dentistry.

Venereal disease control:

Charles H. Miller, Jr., M. D., assistant chief, Division of Communicable Diseases
Section of Venereal Disease Control.

Miscellaneous activities:

Hospital survey—
Henrietta Herbolsheimer, M. D., chief
Division of Maternal and Child Hygiene.

Mobile public health unit—

Nettie M. Dorris, M. D.
Division of General Administration.

IOWA STATE DEPARTMENT OF HEALTH

Sanitation activities (all):

Paul J. Houser, acting director
Division of Engineering.

KANSAS STATE DEPARTMENT OF HEALTH

Administration, general:

Personnel administration—
W. W. Wilmore, personnel officer.

Cancer services:

Robert H. Riedel, M. D., director
Division of Cancer Control.

¹ Change No. 1 appeared in PUBLIC HEALTH REPORTS, **61**: 1386-1387 (Sept. 20, 1946).

Change No. 2 appeared in PUBLIC HEALTH REPORTS, **61**: 1544-1547 (Oct. 25, 1946).

Tuberculosis control:

Paul V. Joliet, M. D., director
Division of Tuberculosis Control.

Venereal disease control:

(Delete **R. M. Sorensen**, Surgeon (R),
USPHS), director
Division of Venereal Disease Control.

MAINE STATE DEPARTMENT OF HEALTH

Cancer control:

A. H. Morrell, M. D.
Cancer Control.

Industrial hygiene:

Elmer W. Campbell, D. P. H., di-
rector
Division of Sanitary Engineering.

Public health education:

(Delete **Miriam Campbell, C. P. H.**),
director of public health informa-
tion
Division of Public Health Education.

MONTANA STATE DEPT. OF HEALTH

B. K. Kilbourne, M. D., Executive
Officer

Administration, general:

B. K. Kilbourne, M. D., executive
officer.

Cancer services:

B. K. Kilbourne, M. D., acting direc-
tor
Division of Epidemiology.

Crippled children's services:

Maternity, infant, and child (preschool)
health services:

School health services:

R. E. Mattison, M. D., director
Division of Maternal and Child
Health.

Dental health services:

_____, director
Division of Dental Hygiene.

Local health administration:

B. K. Kilbourne, M. D., acting di-
rector
Division of Epidemiology.

Public health nursing:

Helen Murphy, R. N., director
Division of Public Health Nursing.

MINNESOTA STATE DEPT. OF HEALTH

Administration, general:

Personnel administration—
Jerome W. Brower, director
Division of Administration.

Communicable disease control, general:

Dean S. Fleming, M. D., M. P. H.,
director
Division of Preventable Diseases.

Dental services:

William A. Jordan, D. D. S., M. P. H.,
director
Division of Dental Health.

Public health education:

William Griffiths, director
Public Health Education Unit.

Sanitation activities:

General sanitation—
(Delete **H. A. Whittaker**), director
Division of Sanitation.

Garbage collection and disposal and
Milk sanitation—

F. L. Woodward, engineer
Division of Sanitation.

Miscellaneous activities:

Hospital licensing and
Hospital and child health survey—
Viktor O. Wilson, M. D., M. P. H.,
director

Ethel of Child Hygiene.

Ethel McClure, R. N., supervisor
Division of Child Hygiene.

NEBRASKA STATE DEPT. OF HEALTH

Administration, general:

Accounting and financing—
Helen J. McAllister, fiscal officer.
Personnel administration—
Vivian E. Johnson, clerk.

Dental services:

D. M. Alderson, M. D., acting director
Division of Dental Health.

Venereal disease control:

(Delete **W. B. Quisenberry, M. D.**,
M. P. H.), director
Division of Venereal Disease Control.

NEW HAMPSHIRE STATE DEPARTMENT
OF HEALTH

Communicable disease control, general:

George F. Campana, M. D., M. P. H.,
acting director
Division of Communicable Disease.

NEW MEXICO STATE DEPT. OF HEALTH

Sanitation activities:

General sanitation,
Rodent control and control of gar-
bage collection and disposal,
Sanitation of hotels, camps, and
bathing places, and
Sanitation of water supplies and sew-
erage systems—

W. H. Booker, director
Division of Sanitary Engineering
and Sanitation.

Tuberculosis control:

Walter Richards, M. D., director
Division of Tuberculosis Control.

NORTH DAKOTA STATE DEPT. OF HEALTH

Sanitation activities (all):

J. H. Svore, director
Division of Sanitary Engineering.

OKLAHOMA STATE DEPT. OF HEALTH

Administration, general:
 Accounting and financing and
 Personnel administration—
Floyd Harrington, director of fiscal
 services.

Communicable disease control:
Mark I. Shanholtz, M. D., director
 Division of Preventable Disease.

Industrial hygiene:
E. C. Warkentin, engineer
 Division of Industrial Hygiene.

Local health administration:
John W. Shackelford, M. D., director
 Division of Local Health Service.

Maternity, infant, and child (preschool)
 health services:

School health services:
Gertrude Nielsen, M. D., director
 Division of Maternal and Child
 Health.

Sanitation activities:
 Housing and plumbing control,
 Rodent control and control of garbage
 collection and disposal, and
 Sanitation of bathing places—
Harold L. Malone, engineer
 Division of General Sanitation.

Milk sanitation—
Dale I. Hunt, milk sanitarian
 Division of Milk Control.

Sanitation of water supplies and
 sewerage systems—
H. J. Darcey, chief sanitary en-
 gineer
 Division of Water and Sewage.

Venereal disease control:
A. B. Colyar, M. D., director
 Division of Venereal Disease Control.

PENNSYLVANIA STATE DEPT. OF HEALTH

Cancer services:
Robert F. McNattin, M. D., director
 Cancer Division.

PUERTO RICO DEPARTMENT OF HEALTH

Angel M. Marchand, M. D., Acting
 Commissioner of Health

SOUTH DAKOTA STATE DEPT. OF HEALTH

Dental services:
A. L. Russell, D. D. S., director
 Division of Dental Health.

Local health administration:
G. J. Van Heuvelen, M. D., M. P. H.,
 acting director
 Division of Local Health Services.

Nutrition services:
A. Triolo, M. D., director
 Division of Maternal and Child
 Health and Crippled Children.

VIRGINIA STATE DEPT. OF HEALTH

Crippled children's services:
 (Delete **E. C. Harper, M. D.**), director
 Bureau of Crippled Children.

Public health education:
 (Delete **J. C. Funk**), director
 Bureau of Health Education.

Tuberculosis control:
 Field services—
 (Delete **E. C. Harper, M. D.**),
 director
 Bureau of Tuberculosis Out-Patient
 Service.

WASHINGTON STATE DEPT. OF HEALTH

Crippled children's services:
 Maternal, infant, and child (preschool)
 health services:

Nutrition:
J. L. Jones, M. D., D. P. H., acting
 head
 Maternal and Child Health and
 Crippled Children's Section.

Sanitation activities:
 General sanitation—
Roy M. Harris, chief
 Division of Public Health Engineer-
 ing.

Housing and plumbing control,
 Rodent control and control of garbage
 collection and disposal, and
 Sanitation of hotels, camps, and
 bathing places—
Emil C. Jensen, head
 Sanitary Engineering Section.

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 NOVEMBER 2, 1946

Summary

A total of 564 cases of poliomyelitis was reported for the week, as compared with 716 last week and a 5-year (1941-45) median of 285. Although the decline for the country as a whole was less sharp than during the preceding week, decreases occurred in all of the 9 major geographic divisions of the country. Of 30 States reporting 5 or more cases currently, 17 showed a decline (525 to 358), while an increase (125 to 177) occurred in the other 13 States. The geographic distribution of cases reported for the period March 9 (the approximate date of lowest incidence) to November 2, and corresponding periods of 1945 and 1944 is as follows, in the chronological order stated: New England 738, 834, 724; Middle Atlantic 1,710, 3,315, 7,795; East North Central 5,353, 2,232, 3,022; West North Central 6,798, 959, 1,065; South Atlantic 1,094, 1,173, 2,727; East South Central 891, 663, 1,050; West South Central 1,893, 1,281, 409; Mountain 1,552, 520, 174; Pacific 2,442, 967, 659.

A total of 22,937 cases has been reported to date this year, as compared with 12,342 in 1945, 17,888 in 1944, and a 5-year (1941-45) median of 11,379 cases for the corresponding period. These years include the three consecutive high years of 1943, 1944, and 1945. For the same period in 1942, only 3,624 cases had been reported for this period.

The total numbers of cases reported for the current week of diphtheria, influenza, measles, meningococcus meningitis, scarlet fever, smallpox, typhoid and paratyphoid fever, and whooping cough are below the respective corresponding 5-year medians, and for all of these except measles and whooping cough are below those for the preceding week.

A total of 8,616 deaths was recorded during the week in 93 large cities of the United States, as compared with 8,739 last week, 9,023 and 8,969, respectively, for the corresponding weeks of 1945 and 1944, and a 3-year (1943-45) average of 8,919. The cumulative figure for these cities is 397,205, as compared with 393,890 for the corresponding period last year.

Telegraphic morbidity reports from State health officers for the week ended Nov. 2, 1946, and comparison with corresponding week of 1945 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 1941-45	Week ended—		Median 1941-45	Week ended—		Median 1941-45	Week ended—		Median 1941-45
	Nov. 2, 1946	Nov. 3, 1945		Nov. 2, 1946	Nov. 3, 1945		Nov. 2, 1946	Nov. 3, 1945		Nov. 2, 1946	Nov. 3, 1945	
NEW ENGLAND												
Maine.....	1	11	1	-----	-----	-----	114	5	5	1	0	0
New Hampshire.....	0	0	0	-----	-----	-----	9	-----	-----	0	0	0
Vermont.....	0	0	0	-----	-----	-----	47	-----	2	0	0	0
Massachusetts.....	15	2	2	-----	-----	-----	139	225	157	2	1	4
Rhode Island.....	0	0	1	1	9	-----	2	-----	-----	0	0	0
Connecticut.....	1	0	1	1	-----	-----	33	12	18	0	2	2
MIDDLE ATLANTIC												
New York.....	11	16	13	17	12	14	91	58	101	9	15	15
New Jersey.....	13	3	4	3	4	6	14	12	17	5	4	4
Pennsylvania.....	9	7	8	4	-----	3	182	58	112	2	4	4
EAST NORTH CENTRAL												
Ohio.....	18	41	21	6	7	7	69	7	26	2	5	5
Indiana.....	1	8	8	-----	12	12	4	6	6	1	2	2
Illinois.....	5	2	9	5	4	4	6	142	38	3	7	7
Michigan ¹	1	24	10	-----	-----	-----	36	117	117	0	3	3
Wisconsin.....	4	0	4	27	34	12	47	14	54	1	3	2
WEST NORTH CENTRAL												
Minnesota.....	13	7	7	-----	-----	-----	7	4	5	0	3	2
Iowa.....	3	9	8	-----	-----	-----	8	5	17	3	1	0
Missouri.....	4	17	3	1	3	-----	2	14	6	0	3	3
North Dakota.....	2	6	5	9	-----	-----	-----	10	10	0	1	0
South Dakota.....	0	0	3	-----	-----	-----	1	2	4	0	1	0
Nebraska.....	1	3	3	5	6	1	3	5	5	1	0	0
Kansas.....	8	2	2	-----	-----	-----	5	8	5	0	0	0
SOUTH ATLANTIC												
Delaware.....	0	1	0	-----	-----	-----	-----	-----	1	0	1	0
Maryland ²	11	33	6	1	1	2	6	6	14	0	2	5
District of Columbia.....	4	0	0	-----	-----	-----	6	2	2	0	0	1
Virginia.....	13	29	25	203	211	115	7	11	11	0	1	1
West Virginia.....	10	15	10	4	-----	2	6	-----	7	1	0	0
North Carolina.....	14	123	65	-----	-----	-----	55	17	17	1	1	3
South Carolina.....	7	23	23	130	488	293	2	18	18	0	3	0
Georgia.....	12	41	29	12	4	25	13	8	5	0	0	0
Florida.....	6	8	8	7	7	3	1	-----	3	4	2	2
EAST SOUTH CENTRAL												
Kentucky.....	31	13	13	-----	2	5	-----	55	14	2	1	2
Tennessee.....	7	43	16	3	16	16	3	3	8	0	1	1
Alabama.....	13	33	33	28	32	32	1	3	3	0	1	1
Mississippi ²	10	26	20	-----	-----	-----	-----	-----	-----	0	0	1
WEST SOUTH CENTRAL												
Arkansas.....	12	31	27	19	93	41	26	2	2	0	0	0
Louisiana.....	7	12	12	-----	3	3	-----	2	1	2	0	0
Oklahoma.....	8	13	13	16	44	44	-----	25	9	1	0	0
Texas.....	29	65	64	750	1,535	759	48	51	34	8	8	7
MOUNTAIN												
Montana.....	1	0	0	4	5	4	49	17	17	2	0	0
Idaho.....	0	0	0	8	7	-----	3	56	27	0	0	0
Wyoming.....	0	0	0	1	-----	4	3	2	4	0	0	0
Colorado.....	6	10	5	8	46	29	4	9	12	1	2	0
New Mexico.....	0	3	1	2	-----	-----	34	1	1	0	0	0
Arizona.....	2	1	2	36	34	60	8	3	4	0	1	1
Utah ²	2	0	0	-----	-----	-----	9	17	11	0	1	0
Nevada.....	0	0	0	-----	-----	-----	-----	-----	2	0	0	0
PACIFIC												
Washington.....	13	3	3	-----	-----	-----	17	119	26	0	2	2
Oregon.....	2	3	1	2	5	13	8	10	22	0	0	1
California.....	19	32	27	11	9	22	40	222	191	3	7	7
Total.....	349	719	619	1,366	2,623	1,576	1,168	1,363	1,678	55	88	88
44 weeks.....	13,263	14,102	12,408	202,824	85,595	92,654	647,020	110,156	564,188	5,134	7,103	7,103

¹ New York City only.

² Period ended earlier than Saturday.

Telegraphic morbidity reports from State health officers for the week ended Nov. 2, 1946, and comparison with corresponding week of 1945 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever ¹		
	Week ended—		Median 1941-45	Week ended—		Median 1941-45	Week ended—		Median 1941-45	Week ended—		Median 1941-45
	Nov. 2, 1946	Nov. 3, 1945		Nov. 2, 1946	Nov. 3, 1945		Nov. 2, 1946	Nov. 3, 1945		Nov. 2, 1946	Nov. 3, 1945	
NEW ENGLAND												
Maine.....	2	4	0	15	30	19	0	0	0	0	2	0
New Hampshire.....	7	0	1	0	6	7	0	0	0	0	0	0
Vermont.....	1	2	1	7	0	3	0	0	0	0	1	0
Massachusetts.....	19	20	8	58	87	140	0	0	0	2	3	3
Rhode Island.....	2	1	0	6	5	5	0	0	0	0	0	0
Connecticut.....	6	11	5	19	14	23	0	0	0	0	0	0
MIDDLE ATLANTIC												
New York.....	39	41	41	208	178	181	0	0	0	5	6	7
New Jersey.....	10	13	13	55	40	48	0	0	0	1	1	2
Pennsylvania.....	12	13	13	77	121	161	0	0	0	3	6	6
EAST NORTH CENTRAL												
Ohio.....	17	11	9	218	230	230	0	0	0	5	4	4
Indiana.....	13	8	2	34	82	62	0	0	1	0	1	1
Illinois.....	72	30	23	78	125	128	0	0	0	8	1	2
Michigan ¹	30	7	7	141	99	118	0	0	1	6	2	2
Wisconsin.....	41	43	7	55	74	111	1	0	0	0	1	1
WEST NORTH CENTRAL												
Minnesota.....	32	8	7	19	27	46	0	0	0	0	1	1
Iowa.....	29	18	2	18	53	53	0	0	1	0	0	0
Missouri.....	17	21	4	14	49	48	0	0	0	1	3	3
North Dakota.....	5	0	0	4	9	10	0	1	0	1	0	0
South Dakota.....	8	1	1	1	9	19	0	0	0	0	0	0
Nebraska.....	17	1	1	11	29	23	0	0	0	0	0	0
Kansas.....	33	8	4	27	73	73	0	0	0	0	0	0
SOUTH ATLANTIC												
Delaware.....	0	1	1	4	7	6	0	0	0	0	0	0
Maryland ²	7	9	6	18	33	54	0	0	0	2	3	3
District of Columbia.....	0	4	0	9	19	14	0	0	0	0	3	0
Virginia.....	6	3	3	34	99	72	0	0	0	3	4	4
West Virginia.....	0	1	1	58	107	75	0	0	0	0	2	3
North Carolina.....	5	2	2	31	104	106	0	0	0	1	0	4
South Carolina.....	1	1	1	1	15	15	0	0	0	1	0	2
Georgia.....	1	3	3	13	32	32	0	0	0	1	7	7
Florida.....	3	4	4	3	9	8	0	0	0	0	1	1
EAST SOUTH CENTRAL												
Kentucky.....	1	1	2	41	78	64	0	0	0	2	5	5
Tennessee.....	1	11	2	18	83	59	0	0	0	1	6	2
Alabama.....	0	3	2	16	39	39	0	0	0	1	2	2
Mississippi ²	9	5	2	9	20	20	1	0	0	0	2	2
WEST SOUTH CENTRAL												
Arkansas.....	8	3	3	8	32	11	0	0	0	2	2	2
Louisiana.....	10	6	2	6	29	9	0	0	0	1	1	4
Oklahoma.....	3	3	1	9	28	28	0	0	0	0	3	3
Texas.....	7	8	8	28	149	48	0	0	0	11	11	9
MOUNTAIN												
Montana.....	4	2	1	3	10	10	2	0	0	0	0	0
Idaho.....	0	4	0	4	14	14	0	0	0	2	0	0
Wyoming.....	5	0	0	3	0	5	0	0	0	0	0	0
Colorado.....	6	4	2	26	29	28	0	0	0	0	2	1
New Mexico.....	2	2	1	3	25	3	0	0	0	0	1	3
Arizona.....	4	1	0	8	6	6	0	0	0	0	1	1
Utah ²	7	7	4	15	16	9	0	0	0	0	1	1
Nevada.....	0	0	0	0	1	1	0	0	0	0	0	0
PACIFIC												
Washington.....	17	4	4	36	32	42	0	0	0	3	0	1
Oregon.....	4	1	2	19	26	20	0	0	0	2	2	1
California.....	41	36	17	78	221	148	0	0	0	2	3	3
Total.....	564	390	285	1,566	2,601	2,556	4	1	6	67	94	95
44 weeks.....	22,937	12,342	11,379	97,673	151,284	116,334	310	302	655	3,602	4,365	4,910

² Period ended earlier than Saturday.

¹ Including paratyphoid fever reported separately as follows: Massachusetts 2 (salmonella infection); New Jersey 1; Michigan 3; South Carolina 1; Georgia 1; Tennessee 1; Texas 1.

Telegraphic morbidity reports from State health officers for the week ended Nov. 2, 1946, and comparison with corresponding week of 1945 and 5-year median—Con.

Division and State	Whooping cough			Week ended Nov. 2, 1946							
	Week ended—		Median 1941- 45	Dysentery			En- ceph- alitis, infec- tious	Rocky Mt. spot- ted fever	Tula- remia	Ty- phus fever en- demic	Un- du- lant fever
	Nov. 2, 1946	Nov. 3, 1945		Ame- bic	Bacil- lary	Un- spec- ified					
NEW ENGLAND											
Maine.....	16	23	23								1
New Hampshire.....		8	3								
Vermont.....	10	24	24								1
Massachusetts.....	155	188	168		3						1
Rhode Island.....	18	17	28								
Connecticut.....	25	65	76				1				1
MIDDLE ATLANTIC											
New York.....	205	274	274	10	15		1				5
New Jersey.....	145	145	145			1					3
Pennsylvania.....	97	199	199								5
EAST NORTH CENTRAL											
Ohio.....	72	159	138								3
Indiana.....	7	31	28								6
Illinois.....	110	92	130	5	2		3				9
Michigan ²	145	91	122						2		1
Wisconsin.....	182	63	151								6
WEST NORTH CENTRAL											
Minnesota.....	3	22	42								3
Iowa.....	7	4	11			1					*69
Missouri.....	12	10	11								
North Dakota.....			8				1				1
South Dakota.....		3	6								1
Nebraska.....	4		6								
Kansas.....	15	16	30				1				2
SOUTH ATLANTIC											
Delaware.....	2	1	3								
Maryland ²	30	40	40							2	5
District of Columbia.....	5	7	7								
Virginia.....	73	21	44			19		1			2
West Virginia.....	5	13	13						2		
North Carolina.....	24	53	63								1
South Carolina.....	22	31	51	2	4						
Georgia.....	3	15	15	2	2			1	1	16	3
Florida.....	20	3	18	2		1	1			8	
EAST SOUTH CENTRAL											
Kentucky.....	32	21	30								1
Tennessee.....	4	38	29			1	1				2
Alabama.....	8	8	8								5
Mississippi ²											4
WEST SOUTH CENTRAL											
Arkansas.....	22	14	17						4		1
Louisiana.....	3	1	2	1	1						8
Oklahoma.....	7	10	1								1
Texas.....	136	98	88	17	187	2		1			13
MOUNTAIN											
Montana.....	1		12								
Idaho.....		20	6								
Wyoming.....			8								
Colorado.....	9	31	31								
New Mexico.....	5	15	6		10	2	1				1
Arizona.....	8	5	5			17	1				
Utah ²	6	10	12								1
Nevada.....		5	1								
PACIFIC											
Washington.....	14	20	20								2
Oregon.....	15	6	9								
California.....	60	135	135	2	10		2				3
Total.....	1,742	2,055	2,379	39	234	44	13	3	9	61	92
Same week, 1945.....	2,055			45	334	113	12	5	6	130	88
Average, 1943-45.....	2,043			45	460	106	8	4	10	*128	
44 weeks: 1946.....	83,800			2,051	14,002	5,602	556	552	784	3,003	*4,468
1945.....	106,880			1,663	21,979	9,630	564	456	632	4,285	4,058
Average, 1943-45.....	115,738		*152,531	1,685	18,919	8,049	577	449	605	3,716	

² Period ended earlier than Saturday.

⁴ 5-year median, 1941-45.

* Delayed reports, included in cumulative total only.

Anthrax. New York 3. *Psittacosis*. California 1.

WEEKLY REPORTS FROM CITIES

City reports for week ended Oct. 26, 1946

This table lists the reports from 88 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.

Division, State, and City	Diphtheria cases	Erysipelas, infections, 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								
NEW ENGLAND												
Maine:												
Portland.....	0	0	-----	0	2	0	2	0	3	0	0	-----
New Hampshire:												
Concord.....	0	0	-----	0	2	0	0	0	0	0	0	-----
Vermont:												
Barre.....	0	0	-----	0	0	0	0	0	0	0	0	-----
Massachusetts:												
Boston.....	11	0	-----	0	3	0	12	16	9	0	1	54
Fall River.....	0	0	-----	0	0	0	0	0	1	0	0	6
Springfield.....	0	0	-----	0	6	0	0	2	1	0	0	17
Worcester.....	1	0	-----	0	0	0	1	4	1	0	0	10
Rhode Island:												
Providence.....	0	0	-----	0	2	0	1	1	1	0	0	31
Connecticut:												
Bridgeport.....	0	0	-----	0	0	0	0	0	0	0	0	-----
Hartford.....	0	0	2	0	0	0	1	1	2	0	0	1
New Haven.....	0	0	-----	0	6	0	0	0	0	0	0	4
MIDDLE ATLANTIC												
New York:												
Buffalo.....	9	0	-----	1	1	0	5	1	6	0	0	6
New York.....	11	1	3	1	7	4	47	41	34	0	5	40
Rochester.....	0	0	-----	0	1	0	2	0	5	0	0	4
Syracuse.....	0	0	-----	0	0	0	3	3	2	0	0	5
New Jersey:												
Camden.....	1	0	1	0	0	0	1	0	0	0	0	10
Newark.....	2	0	3	0	2	0	1	0	5	0	0	15
Trenton.....	0	0	-----	0	0	0	2	1	0	0	0	1
Pennsylvania:												
Philadelphia.....	0	1	2	1	3	1	13	2	26	0	2	14
Pittsburgh.....	3	0	-----	0	59	1	9	9	4	0	0	-----
Reading.....	0	0	-----	0	2	0	0	0	0	0	0	2
EAST NORTH CENTRAL												
Ohio:												
Cincinnati.....	1	0	-----	0	1	2	4	1	6	0	0	2
Cleveland.....	0	0	8	0	25	1	8	7	17	0	0	11
Columbus.....	0	0	-----	0	1	0	1	0	11	0	0	10
Indiana:												
Fort Wayne.....	0	0	-----	0	5	0	2	0	1	0	0	1
Indianapolis.....	1	0	-----	0	0	0	2	2	10	0	1	6
South Bend.....	0	0	-----	0	0	0	0	1	0	0	0	-----
Terre Haute.....	0	0	-----	0	0	0	2	0	0	0	0	-----
Illinois:												
Chicago.....	0	0	-----	2	7	3	22	32	33	0	0	54
Springfield.....	0	0	-----	0	0	0	4	2	3	0	0	4
Michigan:												
Detroit.....	1	0	-----	0	2	1	6	5	44	0	1	46
Flint.....	0	0	-----	0	0	0	0	1	3	0	0	3
Grand Rapids.....	0	0	-----	0	1	0	1	2	4	0	0	6
Wisconsin:												
Kenosha.....	0	0	-----	0	0	0	0	0	0	0	0	-----
Milwaukee.....	2	0	-----	0	1	0	1	6	5	0	0	56
Racine.....	0	0	-----	0	0	0	0	4	5	0	0	1
Superior.....	1	0	-----	0	2	0	0	0	0	0	0	-----
WEST NORTH CENTRAL												
Minnesota:												
Duluth.....	1	0	-----	0	0	0	2	3	0	0	0	1
Minneapolis.....	3	0	-----	0	3	1	1	9	14	0	0	-----
St. Paul.....	2	0	-----	1	0	1	4	1	5	0	0	3
Missouri:												
Kansas City.....	2	0	-----	0	0	0	5	6	4	0	0	3
St. Joseph.....	0	0	-----	0	0	0	0	0	0	0	0	-----
St. Louis.....	6	0	-----	1	0	0	7	9	7	0	3	-----

City reports for week ended Oct. 26, 1946—Continued

Division, State, and City	Diphtheria cases	Enecephalitis, 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								
WEST NORTH CENTRAL—continued												
North Dakota:												
Fargo.....	0	0		0		1	1	2	1	0	0	
Nebraska:												
Omaha.....	0	0		0		0	2	10	3	0	0	
Kansas:												
Topeka.....	0	0		0		0	1	3	3	0	0	
Wichita.....	0	0		0	1	0	5	0	2	0	0	8
SOUTH ATLANTIC												
Delaware:												
Wilmington.....	0	0		0	1	0	1	1	3	0	0	
Maryland:												
Baltimore.....	9	0	1	1	1	0	5	4	4	0	0	19
Cumberland.....	0	0		0		0	0	0	0	0	0	
Frederick.....	0	0		0	1	0	0	0	0	0	0	
District of Columbia:												
Washington.....	1	0	1	1	3	0	8	1	11	0	0	7
Virginia:												
Richmond.....	0	0	19	0	3	0	0	1	2	0	0	
Roanoke.....	1	0		0		0	1	0	1	0	0	
West Virginia:												
Charleston.....	0	0		0		0	0	0	0	0	0	
Wheeling.....	0	0		0		0	1	0	0	0	0	
North Carolina:												
Raleigh.....	0	0		0		0	0	1	0	0	0	2
Wilmington.....	4	0		0		0	0	0	1	0	0	
Winston-Salem.....	0	0		0	11	0	1	0	7	0	0	1
South Carolina:												
Charleston.....	0	0	6	0		0	0	0	0	0	0	
Georgia:												
Atlanta.....	0	0		0		0	0	0	4	0	0	
Brunswick.....	0	0		0		0	1	0	0	0	0	
Savannah.....	0	0		0	6	0	0	0	0	0	0	
Florida:												
Tampa.....	2	0		0		0	0	0	1	0	0	
EAST SOUTH CENTRAL												
Tennessee:												
Memphis.....	3	0		0	1	0	6	2	4	0	0	4
Nashville.....	0	0		0		0	3	0	0	0	0	
Alabama:												
Birmingham.....	0	0	2	0		0	1	0	3	0	0	
Mobile.....	0	0		0		2	0	0	1	0	0	
WEST SOUTH CENTRAL												
Arkansas:												
Little Rock.....	1	0		0		0	0	2	1	0	0	
Louisiana:												
New Orleans.....	1	0		0	2	0	5	5	1	0	0	
Shreveport.....	1	0		0		0	5	1	0	0	0	
Texas:												
Dallas.....	1	0		0	3	0	2	2	3	0	1	
Galveston.....	1	0		0		0	0	0	0	0	0	
Houston.....	0	0		0		0	5	2	2	0	0	
San Antonio.....	1	0	1	0	2	0	6	1	1	0	0	1
MOUNTAIN												
Montana:												
Billings.....	0	0		0		0	0	0	0	0	0	
Great Falls.....	0	0		0	1	0	1	1	0	0	0	
Helena.....	0	0		0		0	0	0	0	0	0	
Missoula.....	0	0		0		0	1	0	0	0	0	
Idaho:												
Boise.....	0	0		0		0	2	1	0	0	0	
Colorado:												
Denver.....	3	0	8	0	1	0	2	1	3	0	0	16
Pueblo.....	0	1		0		0	2	3	2	0	0	
Utah:												
Salt Lake City.....	0	0		0	2	0	3	3	5	0	0	1

City reports for week ended Oct. 26, 1946—Continued

Division, State, and City	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	3	0	3	6	3	0	0	5
Spokane.....	0	0	-----	0	-----	0	2	1	1	0	0	-----
California:												
Los Angeles.....	1	0	6	0	1	0	5	9	20	0	0	10
Sacramento.....	1	0	-----	0	-----	0	0	0	0	0	0	-----
San Francisco.....	1	0	1	0	2	1	6	0	11	0	0	4
Total.....	90	3	64	9	189	19	259	236	377	0	14	505
Corresponding week, 1945.....	84	-----	59	14	332	-----	334	-----	535	1	28	625
Average, 1941-45.....	88	-----	62	16	339	-----	315	-----	586	0	20	779

¹ 3-year average, 1943-45.

² 5-year median, 1941-45.

Anthrax.—Cases: Philadelphia 1.

Dysentery, amebic.—Cases: Boston 1; New York 3; Chicago 6; San Francisco 2.

Dysentery, bacillary.—Cases: Providence 1; New York 80; Philadelphia 1; St. Louis 1; Charleston, S. C., 5; Denver 1; Los Angeles 4.

Dysentery, unspecified.—Cases: San Antonio 12.

Tularemia.—Cases: St. Louis 1.

Typhus fever, endemic.—Cases: Atlanta 1; Tampa 1; New Orleans 2; Houston 1.

Rates (annual basis) per 100,000 population, by geographic groups, for the 88 cities in the preceding table (estimated population, 1943, 34,229,100)

	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.....	31.4	0.0	5.2	0.0	55	0.0	44.4	62.7	47	0.0	2.6	322
Middle Atlantic.....	12.0	0.9	4.2	1.4	35	2.8	38.4	26.4	38	0.0	3.2	45
East North Central.....	3.6	0.0	4.9	1.2	27	4.3	32.2	38.3	87	0.0	1.2	122
West North Central.....	27.9	0.0	0.0	4.0	8	6.0	55.7	85.5	78	0.0	6.0	30
South Atlantic.....	28.1	0.0	44.7	3.3	43	0.0	29.8	14.9	56	0.0	0.0	48
East South Central.....	17.7	0.0	11.8	0.0	6	11.8	59.0	11.8	47	0.0	0.0	24
West South Central.....	17.2	0.0	2.9	0.0	20	0.0	66.0	37.3	23	0.0	2.9	3
Mountain.....	23.8	7.9	63.5	0.0	32	0.0	87.4	71.5	79	0.0	0.0	135
Pacific.....	4.9	0.0	11.5	0.0	10	1.6	26.3	26.3	58	0.0	0.0	31
Total.....	13.7	0.5	9.8	1.4	29	2.9	39.6	36.0	58	0.0	2.1	77

TERRITORIES AND POSSESSIONS

Puerto Rico

Notifiable diseases—4 weeks ended October 5, 1946.—During the 4 weeks ended October 5, 1946, cases of certain notifiable diseases were reported in Puerto Rico as follows:

Disease	Cases	Disease	Cases
Chickenpox.....	10	Syphilis.....	111
Diphtheria.....	36	Tetanus.....	4
Dysentery, unspecified.....	5	Tuberculosis (all forms).....	768
Gonorrhoea.....	140	Typhoid and paratyphoid fever.....	6
Influenza.....	50	Typhus fever (murine).....	6
Malaria.....	487	Whooping cough.....	63
Poliomyelitis.....	62		

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended October 12, 1946.—During the week ended October 12, 1946, 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		28	111	52	9	68	48	322
Diphtheria.....	1	2	1	30	13	5		3	1	56
German measles.....		1		2	5			3	1	12
Influenza.....						2				2
Measles.....		5	1	65	98	24	39	63	12	307
Meningitis, meningococcus.....				1				1		2
Mumps.....				29	130	27	46	22	60	314
Poliomyelitis.....		3	2	56	36	2		2		101
Scarlet fever.....	2	9	8	56	62	10	1	2	12	162
Tuberculosis (all forms).....		27	10	86	35	65	8	1	59	302
Typhoid and paratyphoid fever.....				2	1				3	6
Undulant fever.....					1			4		5
Veneral diseases:										
Gonorrhoea.....	2	15	21	138	146	47	46	56	98	569
Syphilis.....	6	15	4	109	59	19	11	11	66	300
Whooping cough.....		9	1	21	63	4	4	5	3	110

JAMAICA

Notifiable diseases—4 weeks ended October 19, 1946.—For the 4 weeks ended October 19, 1946, 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.....	2	1	Puerperal sepsis.....		1
Chickenpox.....	3	2	Scarlet fever.....	1	1
Diphtheria.....	4	11	Tuberculosis (pulmonary).....	19	54
Dysentery, unspecified.....	2	5	Typhoid fever.....	5	98
Erysipelas.....	2		Typhus fever (murine).....		1
Leprosy.....		2			

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-named diseases, except yellow fever, during recent months. 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 of each month.

Cholera

Manchuria—Kirin Province—Changchun.—For the period August 11–20, 1946, 197 cases of cholera were reported in Changchun, Kirin Province, Manchuria.

Plague

Ecuador—Loja Province.—For the month of September 1946, 5 cases of plague with 2 deaths were reported in Loja Province, Ecuador.

Smallpox

China—Hong Kong.—For the week ended October 26, 1946, 85 cases of smallpox were reported in Hong Kong, China.

Typhus Fever

Ecuador.—For the month of September 1946, 112 cases of typhus fever with 14 deaths were reported in Ecuador. Provinces reporting the highest incidence are: Pichincha, 32 cases, 6 deaths; Cotopaxi, 20 cases, 1 death; Chimborazo, 12 cases, 1 death; Tungurahua, 10 cases, 2 deaths; Canar, 10 cases.

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DEATHS DURING WEEK ENDED OCT. 26, 1946

[From the Weekly Mortality Index, issued by the National Office of Vital Statistics]

	Week ended Oct. 26, 1946	Correspond- ing week, 1945
Data for 93 large cities of the United States:		
Total deaths.....	8, 739	8, 814
Average for 3 prior years.....	8, 918	
Total deaths, first 43 weeks of year.....	388, 559	384, 867
Deaths under 1 year of age.....	789	586
Average for 3 prior years.....	622	
Deaths under 1 year of age, first 43 weeks of year.....	28, 181	26, 098
Data from industrial insurance companies:		
Policies in force.....	67, 327, 830	67, 291, 931
Number of death claims.....	10, 849	12, 086
Death claims per 1,000 policies in force, annual rate.....	8.4	9.4
Death claims per 1,000 policies, first 43 weeks of year, annual rate.....	9.5	10.1

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