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SCARLET-FEVER STREPTOCOCCUS ANTITOXIN IN THE TREATMENT OF SCARLET FEVER[1]

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INTRODUCTION

PURPOSE OF THE STUDY

Our present conception of the use of a hemolytic streptococcus immune serum as a form of specific sero-therapy in the treatment of scarlet fever goes back to the work of Marmorek (1), in 1895, and Moser (2) in 1903. Due to the difficulties encountered by other workers, particularly Jochmann (3), in the duplication of this earlier work, belief in the hemolytic streptococcus as the causative factor in scarlet fever abated. The use of the Moser serum accompanied the hemolytic streptococcus into disfavor and so remained until the announcement of Dochez (4), and Dick and Dick (5), that they had succeeded in their efforts to produce by horse immunization an antiserum against the hemolytic streptococcus previously isolated from scarlet fever patients. There quickly followed a renewed interest in this form of sero-therapy. Blake, Trask, and Lynch (6), demonstrated the specificity of the Dochez serum by the production of the skin blanching phenomenon (Schultz-Charlton reaction) when this immune serum was injected intradermally into patients acutely ill with scarlet fever and also by its curative value in treating such cases. Dick and Dick (7) similarly demonstrated the specific curative value of the serum produced by them. They also showed that persons reacting to sterile scarlet fever streptococcus toxin when injected intradermally failed to develop such a reaction provided the toxin had previously been mixed *in vitro* with their concentrated serum and incubated for a brief period before making the injections.

The commercial producers of scarlet fever streptococcus antitoxin have now had several years in which to develop methods of production, and sufficient time has elapsed to permit a more mature observation

[1] The clinical observations on the cases reported in this study were made by Doctor Stevenson, Doctor Veldee prepared the statistical analysis and the manuscript, and Doctor Mitchell acted as consultant.

of its therapeutic value. Therefore, it seemed that the time was opportune for a carefully controlled clinical study. The purpose of the present paper is to present a detailed statistical analysis of such a study which has been conducted by the authors in the Cincinnati General Hospital.

METHOD OF SELECTING CASES

Every effort was made to avoid any form of case selection, the object being to obtain a series of control and serum-treated patients who would comprise individual groups as nearly identical as mechanical allocation would permit. However, before this could be done it seemed necessary to exclude certain types of patients who for reasons other than the nature of the disease itself could not be included.

TABLE 1.—*Number of scarlet fever cases admitted to the contagious wards during the period of the study herein reported and the disposition made of each case*

Number of cases included in antitoxin A group	74
Number of cases included in antitoxin B group	38
Number of cases included in control group	84
Total cases in study group	196
Number of cases excluded because of—	
1. Patient a nurse or medical student	16
2. Patient a private case	9
3. Patient a negro	37
4. Patient entered hospital after acute symptoms	34
5. An additional disease on admission	49
6. Uncertainty in the diagnosis on admission	31
7. Exposed to other contagious disease shortly before admission	7
8. History on case unobtainable	8
9. Patient dead on admission	1
10. Patient removed from hospital	1
11. Attending physician on leave or ill	22
Total cases admitted	411

The actual disposition of the 411 patients who were admitted to the hospital during the period of this study is recorded in Table 1. Internes, nurses, and medical students were omitted, as were private patients, since they did not come under our absolute control. The negro patients were excluded because they constituted too small a group for separate study. The 34 patients admitted to the hospital after the acute symptoms had subsided came for isolation or for the treatment of secondary complications. Those admitted only for isolation required no medication, and it did not seem advisable simply to make a study of the effects of antitoxin on secondary complications in this group of patients. Certain patients on admission were suffering from one or more diseases entirely independent of the scarlet fever infection, or had been intimately exposed to another contagious disease

and were still within its incubation period. Other patients presented atypical symptoms or signs on admission which necessitated their exclusion because of the delay involved in making the diagnosis.

The clinical observation of each case was made exclusively by one of us so that there might be a uniformity of interpretation throughout. Patients admitted to the hospital during this physician's absence therefore were omitted.

It will be seen from Table 1 and the foregoing explanation that no case was excluded from our study groups on clinical grounds, except such as were admitted late in the disease when all signs of the acute symptoms had disappeared. The 196 patients admitted to our series were automatically allocated to their respective groups purely on the basis of the time of arrival at the admitting ward. At the beginning only antitoxin A was used, during which time every alternate case coming to the receiving ward was placed in the serum-treated series, the other becoming the control. With the addition of antitoxin B the patients were allocated on admission so that out of each three cases admitted one received antitoxin A, the second became a control, and the third received antitoxin B.

TABLE 2.—*Distribution of cases into the three study groups, according to the apparent severity on admission and the day of the disease on which the eruption appeared*

Apparent severity on admission	Control groups					Antitoxin A					Antitoxin B				
	Total cases	Day of disease on which eruption appeared: Mean	Per cent on— First day	Second day	Third day or later	Total cases	Day of disease on which eruption appeared: Mean	Per cent on— First day	Second day	Third day or later	Total cases	Day of disease on which eruption appeared: Mean	Per cent on— First day	Second day	Third day or later
Mild	17	2	35.3	23.5	41.2	8	2	50.0	25.0	25.0	1	2			
Moderate	62	2	32.3	43.5	24.2	61	2	29.5	46.0	24.5	33	2	30.3	48.5	21.2
Severe	4	2	0.0	100.0	0.0	3	2	0.0	100.0	0.0	3	2	33.3	66.7	0.0
Total	83	2	31.3	42.2	26.5	72	2	30.6	45.8	23.6	37	2	29.7	51.4	18.9

That this method of distributing cases actually built up three groups which contained, at the time of admission, patients with very similar clinical manifestations is shown in Table 2. On admission, 75 per cent of the control cases, 85 per cent of those in series antitoxin A, and 90 per cent of those in series antitoxin B were moderately ill. The percentage of patients who on admission had a temperature of 101° F. or higher was 55 per cent for the control group, 64 per cent for antitoxin A, and 76 per cent for antitoxin B.

The control group did by chance receive a few more patients of a milder type. The interval before the appearance of the eruption in each group was very short, as is shown by the data given in Table 2 which to some extent suggests a similarity in the cases.

FORM OF TREATMENT USED

Aside from the use of antitoxins A and B the form of routine treatment given to the individuals comprising the three study groups during the acute stage of the disease was the same. This included catharsis as indicated, alkalies in small doses, hot salt and soda gargle, and a hypnotic when indicated. Therapeutic variations were permitted later in the disease for the treatment of complications, including serum sickness.

The antitoxin injections were always given intramuscularly, and, with the exception of four cases in the antitoxin A series, no case received more than one therapeutic dose. The injection of the antitoxin was made as promptly as the hospital routine would permit, usually within the half day of entrance. There was delay in some instances when desensitization became necessary.

SCARLET FEVER STREPTOCOCCUS ANTITOXIN USED

Antitoxins from two separate manufacturers were used which for our purposes are designated as antitoxin A and antitoxin B.

Antitoxin A.—This antitoxin was purchased in the open market on competitive bid. It was a concentrated serum prepared with four strains of hemolytic streptococci which originally had been isolated from cases of scarlet fever. The antitoxin was released by the National Institute of Health at 400 units per cubic centimeter on the manufacturer's protocol. The therapeutic package was labeled to contain 6,000 units of antitoxin which would make a volume of 15 c. c. per dose. However, there is an allowance made for deterioration, and so the actual volume of each therapeutic dose used was slightly in excess of 20 c. c. The titer of this lot was tested by one of us on January 8, 1931, when the mean of four satisfactory neutralization tests gave a potency of 360 units per cubic centimeter. These two separate potency determinations indicated that each therapeutic dose contained from 7,200 to 8,000 units (360,000 to 400,000 neutralizing skin-test doses) in a volume of about 20 c. c.

Antitoxin B.—This antitoxin was not for sale in the open market, but was available only for free distribution. The therapeutic doses supplied us were taken from the regular stock of therapeutic packages. The antitoxin was an unconcentrated serum prepared with a single strain of hemolytic streptococcus which had previously been isolated from a case of scarlet fever. The manufacturer's potency test of 800 units per cubic centimeter was corroborated by tests at the National

Institute of Health. Each therapeutic package was labeled 5,000 units, with a volume per dose of 8 c. c. Therefore, as administered, each dose contained approximately 6,400 units (320,000 neutralizing skin-test doses).

ANALYSIS OF THE CASE RECORDS

The distribution of cases into the three categories of mild, moderate, and severe, as determined by the apparent severity of the disease on admission, is indicated in Table 2. Whatever variations existed between the severity of the cases present in the antitoxin and control groups were such as occurred through chance alone, since the placing of a case in either group was determined by the time of its entrance into the admitting room of the hospital. Except for the moderately severe group, the numbers are too small to permit of individual study.

ERUPTION

The eruption has been interpreted to include both the diffuse erythema and the enlarged papillae. Likewise in our study groups the skin manifestations were not recorded as completely subsided until the papillae had returned to normal. Table 3 shows that the mean duration of the eruption in the control group, irrespective of the apparent severity of the disease, was 6.8 days—4.3 days in those treated with antitoxin A, and 4.4 days in those receiving antitoxin B. The average time of the appearance of the eruption was on the second day of the disease (i. e., about 24 hours after the onset) in those patients of moderate illness and treated with antitoxin A or B (Table 2). These same patients received their antitoxin on the third day of the disease (i. e., about 48 hours after the onset). Thus the patients had had their skin manifestations on an average for one day before receiving antitoxin. With a mean eruption duration of slightly more than four days it is evident that the rash continued for a mean of three days after the injection of the antitoxin.

TABLE 3.—*Duration of the skin eruption tabulated according to the treatment given and the apparent severity of the disease on admission*

Apparent severity on admission	Control group				Antitoxin A				Antitoxin B			
	Total cases	Duration in days			Total cases	Duration in days			Total cases	Duration in days		
		Mean	Per cent			Mean	Per cent			Mean	Per cent	
			4 days or less	8 days or less			4 days or less	8 days or less			4 days or less	8 days or less
Mild	16	6.0	37.5	93.7	8	3.8	75.0	100.0	1	2.0	------	------
Moderate	61	6.9	13.1	83.5	61	4.4	64.0	98.4	33	4.2	69.7	97.0
Severe	3	8.7	------	------	3	2.7	------	------	3	8.3	------	------
Total	80	6.8	17.5	85.0	72	4.3	66.7	98.6	37	4.4	65.0	91.9

It might be assumed that there is a direct correlation between the time of antitoxin administration and the duration of the rash. Analysis of the individual case records shows (Table 4) that such a correlation exists. Those receiving antitoxin on the first day of the disease had a skin eruption for only 3.6 days; but if the antitoxin was not given until the fifth day of the disease, the total period of the eruption averaged 6 days. The figures in Table 4 for the serum-treated group are in contrast to a mean of 6.8 days' duration for the 80 patients in the control group.

The influence of the antitoxin on the appearance of the erythema was even more marked than these figures indicate. In the vast majority of the cases the erythema had faded in the first 12 hours following antitoxin so as to represent only a half or even a fourth of its original intensity. Unfortunately, a daily record was not kept which would have shown the degree of fading that occurred each day. Disappearance of the enlarged papillae seemed to lag behind the fading of the erythema.

TABLE 4.—*Correlation between the day of the disease on which antitoxin was given*[1] *and the duration of the skin eruption in days for the two serum-treated groups of cases studied*

Day of disease	All treated cases		Treated with antitoxin A		Treated with antitoxin B	
	Number of cases	Mean duration	Number of cases	Mean duration	Number of cases	Mean duration
First	8	3.6	8	3.6	0	----
Second	29	3.8	17	3.9	12	3.7
Third	38	4.3	28	4.3	10	4.1
Fourth	21	4.6	13	4.7	8	4.5
Fifth	8	6.0	3	5.3	5	6.4
Sixth [2]	3	----	1	----	2	----
Mean for all cases	----	4.3	70	4.3	37	4.4

[1] The mean day of the disease on which antitoxin was injected was the third day in each of the above groups.
[2] Number of cases treated on the sixth day are too few for a reliable mean.

DESQUAMATION

The interval between the first appearance of the eruption and the beginning of desquamation showed no significant variation in the three groups of cases. The mean number of days (Table 5) intervening in the control group was 5.4—in antitoxin A group 6.4, and in antitoxin B group 5.4 days. Similarly, the percentage of cases beginning desquamation within the first week was essentially the same.

TABLE 5.—*Interval between the appearance of the rash and the beginning of desquamation in the scarlet fever cases studied arranged according to the apparent severity of the disease on admission*

Apparent severity on admission	Control group				Antitoxin A				Antitoxin B			
	Total cases	Interval in days			Total cases	Interval in days			Total cases	Interval in days		
		Mean for all cases	Per cent			Mean for all cases	Per cent			Mean for all cases	Per cent	
			7 days or less	More than 7 days			7 days or less	More than 7 days			7 days or less	More than 7 days
Mild	16	6.1	75.0	25.0	8	10.0	50.0	50.0	1	0	-----	-----
Moderate	60	5.3	82.0	18.0	61	6.1	82.0	18.0	32	5.5	75.0	25.0
Severe	3	4.3	100.0	0.0	3	5.0	100.0	0.0	3	6.0	75.0	25.0
Total	79	5.4	81.0	19.0	72	6.4	79.2	20.8	36	5.4	75.0	25.0

The desquamation period in the control group of patients averaged 26.2 days (Table 6) as contrasted with 21.6 days for patients treated with antitoxin A and 20 days for those with antitoxin B. More specifically it will be observed from Table 6 that only 1.3 per cent of the control cases completed their desquamation within 14 days, whereas in the antitoxin A group 21.1 per cent were desquamation-free within the 2-week period and in the antitoxin B group 27.8 per cent. Also all patients in the control group went on to desquamation, whereas in antitoxin A group 2 patients and in antitoxin B group 4 patients went through convalescence without having any indication of desquamating.

TABLE 6.—*Duration of desquamation in the scarlet fever cases studied, arranged according to the apparent severity of the disease on admission*

Apparent severity on admission	Control group						Antitoxin A						Antitoxin B					
	Total cases	Duration in days					Total cases	Duration in days					Total cases	Duration in days				
		Mean duration	Per cent 14 days or less	Per cent 21 days or less	Per cent 28 days or less	Per cent 35 days or less		Mean duration	Per cent 14 days or less	Per cent 21 days or less	Per cent 28 days or less	Per cent 35 days or less		Mean duration	Per cent 14 days or less	Per cent 21 days or less	Per cent 28 days or less	Per cent 35 days or less
Mild	16	25.3	6.7	18.7	75.0	100.0	8	16.8	50.0	62.5	87.5	100.0	1	0	-----	-----	-----	-----
Moderate	60	26.8	0.0	16.7	65.0	91.7	60	22.3	18.3	31.7	86.7	100.0	32	19.3	28.1	40.6	78.1	97.0
Severe	3	29.1	0.0	0.0	33.3	100.0	3	22.0	0.0	0.0	33.3	100.0	3	34.0	0.0	0.0	33.3	100.0
Total	79	26.2	1.3	16.5	65.8	93.7	71	21.6	21.1	33.8	84.5	100.0	36	20.0	27.8	38.9	75.0	94.5

Differences in the character and extent of the desquamation between the three study groups were even more striking than the duration of the peeling. In the control group desquamation was marked in 41.8 per cent (Table 7), whereas in only 9.6 per cent of antitoxin A group and 19.4 per cent of antitoxin B group was the desquamation of the same character. In the serum-treated groups the tendency was for the desquamation to be moderate or mild in character as contrasted to moderate or marked in the control group.

TABLE 7.—*The character of the desquamation in the scarlet fever cases studied, cases arranged according to the apparent severity of the disease on admission and the type of treatment given*

Apparent severity on admission	Character of desquamation	Control group		Antitoxin A		Antitoxin B	
		Number	Per cent	Number	Per cent	Number	Per cent
Mild	Desquamation absent	0	0.0	1	----------	1	----------
	Desquamation mild	10	62.5	6	----------	0	----------
	Desquamation moderate	4	25.0	1	----------	0	----------
	Desquamation marked	2	12.5	0	----------	0	----------
Total		16	100.0	8	----------	1	----------
Moderate	Desquamation absent	0	----------	1	1.6	3	9.4
	Desquamation mild	14	23.4	41	66.1	13	40.6
	Desquamation moderate	17	28.3	15	24.2	12	37.5
	Desquamation marked	29	48.3	5	8.1	4	12.5
Total		60	100.0	62	100.0	32	100.0
Severe	Desquamation absent	0	----------	0	----------	0	----------
	Desquamation mild	0	----------	0	----------	0	----------
	Desquamation moderate	1	----------	1	----------	0	----------
	Desquamation marked	2	----------	2	----------	3	----------
Total		3	----------	3	----------	3	----------
All cases	Desquamation absent	0	0.0	2	2.7	4	11.2
	Desquamation mild	24	30.4	47	64.4	13	36.1
	Desquamation moderate	22	27.8	17	23.3	12	33.3
	Desquamation marked	33	41.8	7	9.6	7	19.4
Total		79	100.0	73	100.0	36	100.0

The distribution of the desquamation showed a definite tendency to remain much more circumscribed in the serum-treated cases. Of all the control cases 91.1 per cent desquamated generally over the entire body. Similar desquamation occurred in 37 per cent of the patients treated with antitoxin A and 58.3 per cent of those with antitoxin B. (Table 8.) This leaves in the control group only 8.9 per cent whose desquamation remained localized, while in 56 per cent of the serum-treated patients desquamation was either absent or remained localized.

TABLE 8.—*The extent of the desquamation in the scarlet fever cases studied, cases arranged according to the apparent severity of disease on admission and the type of treatment given*

Apparent severity on admission	Extent of desquamation	Control group		Antitoxin A		Antitoxin B	
		Number	Per cent	Number	Per cent	Number	Per cent
Mild	Desquamation absent	0	0 0	1	12 5	1	
	Desquamation localized	3	18.7	6	75.0	0	
	Desquamation generalized	13	81 3	1	12.5	0	
Total		16	100.0	8	100 0	1	
Moderate	Desquamation absent	0		1	1.6	3	9.3
	Desquamation localized	4	6.6	36	58.1	11	34.4
	Desquamation generalized	56	93.4	25	40 3	18	56.2
Total		60	100.0	62	100.0	32	100.0
Severe	Desquamation absent	0		0		0	
	Desquamation localized	0		2		0	
	Desquamation generalized	3		1		3	
Total		3		3		3	
All cases	Desquamation absent	0	0.0	2	2.7	4	11.1
	Desquamation localized	7	8.9	44	60.3	11	30.6
	Desquamation generalized	72	91.1	27	37.0	21	58.3
Total		79	100.0	73	100.0	36	100.0

The variations in the character and extent of the desquamation between the control and serum-treated groups may be shown even more conclusively by combining the data from Tables 7 and 8. The distribution of cases then stands as follows, showing a tendency for the desquamation in the control cases to be generalized and marked, while in the serum-treated cases the tendency is definitely toward localized and mild desquamation:

Character of desquamation	Number	Control group	Treated with antitoxin A or B	
			Number	Per cent
		Per cent		
Absent	0	0.0	6	5.6
Localized and mild	7	8.8	47	43.1
Localized and moderate	0	0.0	7	6.4
Localized and marked	0	0.0	1	0.9
Generalized and mild	16	20.3	13	11.9
Generalized and moderate	22	27.9	22	20.2
Generalized and marked	34	43.0	13	11.9

TEMPERATURE

The hospital routine required that the patient's temperature should be taken every four hours during the definitely febrile period and thereafter at 6 a. m. and 2 p. m. For the purposes of tabulation and comparison the temperature readings reported in this study represent the mean morning and afternoon temperatures. In order to provide further uniformity a mean half day temperature in the control group was not recorded until it represented the mean of the three required readings for the half day. Similarly in the antitoxin-treated groups, the tabulation of the temperatures began on the first full half day of readings following the injection of the antitoxin. This gives entirely comparable readings both between individual cases and also between the three groups. By requiring a full half day's mean for the first recorded reading following the administration of antitoxin there has been eliminated the immediate rise which sometimes follows an injection of serum.

The mean morning and afternoon temperatures for each patient in the study series are reported in Table 9 as the group average morning and afternoon temperatures for the corresponding day of the disease. As explained in the previous paragraph, the first recorded half day of temperature in the serum-treated groups represents the mean of the first half day of temperature readings following the administration of antoxin. Differences between the control and serum-treated groups are not striking. It will be observed from Table 9 that the highest mean temperature in the control group scarcely exceeded 101° F., and this only on two afternoons. The mean temperatures in the serum-treated groups are only slightly different.

TABLE 9.—*The mean morning and afternoon temperatures of all cases included within the groups designated, irrespective of age, severity of disease, or the development of complications*

Day of disease	Control group, mean of 82 cases		Combined A and B groups, mean of 104 cases		Group treated with—			
					Antitoxin A		Antitoxin B	
	A. M.	P. M.	A. M.	P. M.	A. M.	P. M.	A. M.	P. M.
First								
Second		101.3	101.7	101.5	102.0	101.7		
Third	100.7	101.3	100.5	100.7	101.0	100.9	99.5	100.2
Fourth	100.4	100.7	99.9	100.2	100.1	100.4	99.5	99.8
Fifth	99.8	100.1	99.4	99.7	99.7	99.8	99.1	99.6
Sixth	99.4	99.8	99.0	99.5	99.1	99.6	99.0	99.4
Seventh	99.2	99.6	98.9	99.6	99.1	99.7	98.9	99.7
Eighth	98.9	99.2	99.0	99.5	99.1	99.5	99.0	99.6
Ninth	98.6	99.2	98.8	99.2	98.9	99.3	98.7	99.2
Tenth	98.5	99.1	98.7	99.0	98.7	99.0	98.8	99.3
Eleventh	98.4	98.9	98.5	98.9	98.5	99.0	98.5	98.9
Twelfth	98.2	98.8	98.4	98.8	98.4	98.8	98.4	98.9
Thirteenth	98.2	98.7	99.2	98.2	98.3	98.7	98.2	99.0
Fourteenth	98.1	98.7	98.2	98.9	98.1	98.7	98.6	98.9

The control and serum-treated groups were not entirely similar in that the distribution of cases according to apparent severity on admission and according to age was not the same. Correction should be made for these two factors. This has been accomplished in Table 10, which contains a record of the mean temperatures on groups of patients, the severity of whose illnesses was recorded as moderate on admission and whose ages ranged from 5 to 15 years, both inclusive. A study of this table fails to reveal differences in the mean temperatures between the control and serum-treated groups which are any more significant than is shown by the evidence contained in Table 9.

TABLE 10.—*The mean morning and afternoon temperatures of a group of scarlet fever patients ranging in age from 5 to 15, both inclusive, who were regarded as moderately ill on admission and who developed no complications other than serum sickness during the course of the disease, cases grouped according to treatment given*

Day of disease	Control group, mean of 25 cases		Group treated with antitoxin					
			A or B, mean of 44 cases		A only		B only	
	A. M.	P. M.	A. M.	P. M.	A. M.	P. M.	A. M.	P. M.
First								
Second								
Third	101.1	101.5	100.3	100.1	100.8	100.6	99.5	100.3
Fourth	100.5	100.6	99.6	99.9	99.8	100.1	99.4	99.8
Fifth	99.6	99.8	99.1	99.5	99.3	99.6	98.8	99.5
Sixth	99.2	99.6	98.7	99.2	98.8	99.2	98.5	99.0
Seventh	98.9	99.2	98.7	99.5	98.9	99.6	98.5	99.4
Eighth	98.6	98.9	98.8	99.5	99.1	99.6	98.4	99.2
Ninth	98.3	99.0	98.6	99.0	99.1	99.3	98.1	98.7
Tenth	98.1	98.8	98.5	98.9	98.7	98.9	98.2	98.8
Eleventh	98.1	98.7	98.1	98.7	98.3	98.8	98.0	98.6
Twelfth	97.9	98.6	98.2	98.6	98.2	98.6	98.2	98.2
Thirteenth	97.9	98.6	98.1	98.6	98.2	98.5	97.8	98.9
Fourteenth	97.6	98.5	98.1	98.8	97.8	98.8	98.4	98.9

It may be that the cause of fever in persons ill with scarlet fever is not exclusively due to a specific toxemia. Direct extension of the hemolytic streptococcus infection and the associated infection of the throat with other organisms may also assist in the production of fever. If such a supposition is correct, it then follows that the portion of the fever which is due to the specific toxin is in direct relation to the height of the fever. Therefore it would seem logical that the most pronounced results of specific sero-therapy should be obtained in patients who show the most pronounced toxic symptoms. In order to permit a study of the fever curve in a more toxic group of cases, a tabulation has been arranged in Table 11, which includes only such cases as showed an admission temperature of 101° F. or more. It will be seen from the footnote to this table that the cases included in the three groups are almost identical as to the mean admission temperatures and the duration of the disease. The resultant temperature reductions in the two serum-treated groups are very slight, being somewhat more pronounced in antitoxin B group.

TABLE 11.—*The mean temperatures of control and treated cases, each case of which on admission had a temperature of 101° F. or higher, recorded as the day of disease*

Day of disease	Control group		Antitoxin A		Antitoxin B	
	A. M.	P. M.	A. M.	P. M.	A. M.	P. M.
First						
Second						
Third	101.1	101.7	101.2	101.4	99.6	100.4
Fourth	100.9	101.1	100.5	100.7	99.8	100.0
Fifth	100.3	100.5	99.9	100.0	99.2	99.8
Sixth	99.9	100.2	99.2	99.8	99.1	99.6

Mean admission temperatures: Control, 102.5; antitoxin A, 102.7; antitoxin B, 102.3. Mean duration of disease when temperature readings began: Control, 3.5 days, antitoxin A, 3.6 days; antitoxin B, 3.8 days. Number of cases included: Control, 45; antitoxin A, 43; antitoxin B, 28.

The data given in Table 11 have been further restricted in Table 12 so as to include only the temperature records of those patients who received their antitoxin injection on or before the fourth day of the disease. The method of tabulating the temperature has been changed from the day of the disease to the day of temperature recording, which in the case of the control group dates from the first half day following admission to the hospital and for the serum treated groups from the first half day following antitoxin administration.

The data presented in the footnote to Table 12 indicate that the cases included within the three groups were very similar as to the temperature on admittance and the duration of disease.

The first recorded temperature reading in antitoxin A group is higher than the corresponding reading in the control group. Actually 27 per cent of the individual patients treated with antitoxin A showed a mean temperature for the first half day following antitoxin administration which was higher than their admission temperatures. These initial elevations may, however, have been due to the considerable volume of the antitoxin (foreign protein) injected. No similar elevations developed in the antitoxin B group and it will be observed from Table 12 that the mean temperature readings in the antitoxin B group are somewhat lower than either those in the control or the antitoxin A groups.

TABLE 12.—*The mean temperatures of control and treated cases, each case of which on admission had a temperature of 101° F. or higher and a disease duration of not more than four days*

[Mean temperatures are recorded as the day of temperature readings since admission irrespective of the actual duration of the disease]

Day of temperature record	Control group		Antitoxin A		Antitoxin B	
	A. M.	P. M.	A. M.	P. M.	A. M.	P. M.
First	101.3	101.7	101.6	101.5	100.2	100.2
Second	100.8	100.9	100.4	100.7	99.1	99.8
Third	100.1	100.4	99.4	99.8	99.3	99.7
Fourth	99.7	100.0	99.1	99.7	98.9	99.5
Fifth	99.4	99.7	99.2	99.8	98.8	99.4
Sixth	99.1	99.4	99.3	99.6	98.7	99.1

Mean admission temperatures: Control, 102.5; antitoxin A, 102.8; antitoxin B, 102.4. Mean duration of disease when temperature readings began: Control, 3.2 days; antitoxin A, 3.1 days; antitoxin B, 3.4 days. Number of cases included: Control, 41; antitoxin A, 33; antitoxin B, 20.

COMPLICATIONS

The severity of scarlet fever has diminished to such an extent in most sections of the United States that the probability of a fatal termination has become greatly minimized. Complications continue to develop in a fairly high percentage of cases, and, therefore, are more to be feared than the chances of death itself. In addition to the knowledge that complications frequently occur during the period of convalescence there is the uncertainty as to what organic damage such a toxemia may have produced in the patient which will not become apparent until later in life.

Otitis media represents the most frequently occurring major complication in the control series. (Table 13.) A total of 14 cases developed simple catarrhal otitis media in one or both ears, of which number 6 went on to suppuration and one of these 6 extended to a mastoid infection requiring surgical intervention. Similarly in the 110 patients treated either with antitoxin A or B there developed 8 cases of catarrhal otitis media, of which number 4 went on to suppuration. One of these four suppurative otitis cases was reported to have had chronic otitis media before the onset of the scarlet fever. However, there was no discharge from the ear on admission.

TABLE 13.—*A record of the complicating diseases developing in the scarlet fever patients included in the three study groups*

Complications	Control group		Patients treated with antitoxin					
			A or B		A		B	
	Number	Mean duration	Number	Mean duration	Number	Mean duration	Number	Mean duration
Total cases in each group	82		110		73		37	
Otitis media, suppurative, bilateral	1	50	1	43	1	43		
Otitis media, suppurative, unilateral	5	38	3	27	3	27		
Otitis media, nonsuppurative, bilateral	3	16	3	16	2	15	1	19
Otitis media, nonsuppurative, unilateral	5	3	1	6	1	6		
Mastoiditis with operation	1	35	0					
Adenitis, cervical	16	22	6	31	3	25	3	38
Adenitis, cervical suppurative	0		1	32	1	32		
Arthritis, toxic	5	3	0					
Early albuminuria	7	2	9	2	6	2	3	1
Early albuminuria with hematuria	1	3	0					
Late albuminuria with hypertension	0		1	57	1	57		
Late albuminuria with hematuria	7	25	0					
Late albuminuria with hematuria and casts	3	34	0					
Sinusitis	3	15	0					
Rhinitis, purulent	2	27	2		1		1	17
Stomatitis, ulcerative	1	31	0					
Tonsillitis, acute	4	6	2	7	1	2	1	12
Paronychia	3	24	3		2		1	5
Acute bronchitis	1	10	1	19			1	19
Acute pharyngitis	1	3	0					
Upper respiratory infection	1	6	3	6	3	6		
Abscess peri-tonsillar	0		2	3	2	3		
Abscess peri-rectal	1	23	0					
Impetigo bullosa	0		1	33	1	33		
Infection of finger	1	15	1	4	1	4		
Infection of lip	1	27	0					

Using the 14 cases occurring in the control series as the expectancy when serum is not used, there should then have occurred in the serum-treated groups 19 cases of simple catarrhal otitis, and of these 8 should have suppurated.

In the control group the day of onset of simple catarrhal otitis symptoms varied from the first to the thirty-seventh day of the disease (mean eleventh day), whereas those going on to suppuration developed their first symptoms on the fifth to the thirty-seventh day of the disease. In the serum-treated series simple catarrhal otitis developed on the fifth to the fifty-ninth day (mean twentieth day), and those ears which ultimately suppurated developed their simple otitis on the fifteenth to fifty-ninth day.

Nephritis was the second most frequently occurring major complication. Early simple albuminuria is not considered as an indication of actual renal damage, but an occurrence common to any acute febrile condition. Seven such early cases did occur in the 82 control cases as against 9 in the 110 serum-treated cases. One case of late albuminuria with an occasional cast and no hematuria, but with definite hypertension, did develop in the serum-treated cases. No similar case occurred in the control group. There developed 10 cases of late albuminuria with hematuria, with or without casts, in the control series while no case of this type appeared in the serum-treated groups against an expectancy of 13 such cases.

Arthritis.—Five cases of so-called "scarlatinal rheumatism" developed in the 82 patients of the control series against no cases among the 110 treated patients (expectancy 7 cases). The symptoms consisted of local swelling, heat, and tenderness with no indication of fluid formation in the joint. The signs appeared on the eleventh day (range sixth to twenty-first day) and persisted for an average of 3 days (range 1 to 6 days). The involved joints included both wrists in 2 cases, both knees in 1, both wrists and one thumb in 1, and wrist, elbow and knee in 1 case. Recovery was complete in all cases.

Adenitis.—A mild general adenopathy appeared in practically every case early in the acute stage. Sixteen cases in the control group developed enlarged cervical glands which were out of proportion to any signs in the fauces, and these were considered as true complications of the disease itself. The earliest time of definite localization was on the third day of the disease, and the latest on the thirty-first day (mean twelfth day). Similar enlargement of the glands developed in 7 patients of the serum-treated series as against an expectancy of 21. One of the seven cases developed fluctuation in the enlarged gland. It was, therefore, incised and a small amount of sero-purulent discharge resulted.

Other complications.—Other ailments developed during the convalescing period (Table 13), some of which may be regarded as true

scarlet-fever complications, while others are only incident to debilitation of any sort. The more significant were as follows: Clinically evident *sinusitis*, 3 cases in the control series and none in the serum-treated; *purulent rhinitis*, 2 in the control and a like number in the serum-treated; *ulcerative stomatitis*, 1 in the control and none in the serum-treated; and *acute tonsillitis*, 4 in the control and 2 in the serum-treated series.

The percentage distribution of the major complications occurring in the control and serum-treated series as reported in Table 13 are as follows:

Complication	Control group	Combined serum-treated group
	Per cent	*Per cent*
Cervical adenitis	19.5	6.4
Otitis media, all types	17.1	7.3
Otitis media, suppurative	7.3	3.6
Mastoiditis	1.2	0.0
Nephritis	12.2	0.9
Arthritis, toxic	6.1	0.0

REPORT OF SPECIAL CASES

The convalescence of case Q 3468 was uneventful until the nineteenth day of the disease, when measles developed. The subsequent clinical course proved very stormy, which can be entirely explained as complications of the measles infection, but from which the possible influence of the earlier scarlet fever infection can not be entirely eliminated. The case should have been omitted from our series; but because it fell into one of the antitoxin groups, we are reporting the facts in detail, thereby permitting the reader to form his own conclusions. The case, however, has been omitted from all tabulations.

Case Q 3468.—White; female; age, 4 years; was admitted at 11.30 p. m. on March 23, 1931, which was the first day of symptoms. Examination on admittance showed an average toxic case of scarlet fever. Temperature, 102.8° F.; pulse, 140; respirations, 48; and white blood count, 15,600. Within 12 hours 5,000 units of scarlet fever streptococcus antitoxin B were given. The temperature gradually subsided, so that from April 4 to 9, both inclusive, the temperature remained normal and other signs of the scarlet fever infection were greatly lessened. Fever began again on April 10, and on the following day a maculopapular eruption appeared, particularly on the extremities. Up until April 16 the ears had remained free from signs of infection, but now the right drum appeared red and bulging. Paracentesis resulted in a profuse purulent discharge. Definite Koplik's spots appeared on April 19, and on the same day the left drum showed redness and bulging. Paracentesis was followed by a profuse purulent discharge. The patient continued to run a septic temperature, and on May 1 there were physical and X-ray signs of acute pulmonary infection. A question of pulmonary abscess formation also arose. The white blood count was now 29,500. Against the advice of the attending physician the patient was removed

from the hospital on May 6. The patient was returned to the hospital May 28 by the parents because of pain in both ears, particularly the left. On June 8 a right mastoidectomy was performed, and on June 23 a similar operation on the left. The child was discharged on July 9, 1931, apparently well.

The first 18 days of this infection indicated a case of scarlet fever with a favorable prognosis. The appearance of a measles infection on the nineteenth day, accompanied by bilateral suppurative otitis media and followed by signs of general septicemia and localized pulmonary infection, greatly alters the picture. It is our opinion that the developments following the eighteenth scarlet fever day must be attributed primarily to the measles infection, though aggravated, perhaps, in part by the debilitating effect of the recent attack of scarlet fever.

Three cases terminated fatally. The circumstances and clinical aspects in these three instances differed considerably from others admitted to our series, and we are therefore reporting each case record in abstract form but excluding each from all tabulations.

Case P 14030.—White, male, age 9½ years, admitted on the fifth day of the disease with a temperature of 105° F., pulse 148, respirations 48, and white blood count 21,500. The patient was delirious and had a very intense generalized skin eruption which was hemorrhagic in places. The tonsils and pharynx showed signs of a severe infection. The lungs were clear. The heart was not enlarged, its rate was very rapid and regular, with sounds of fair quality. There was no definite evidence of meningeal involvement. The left knee joint was larger than the right. The skin of left thigh was mottled and felt warmer than the right. The left thigh was tender to deep pressure over the femur. There was a loss of sphincter control. An admission diagnosis of *scarlet fever, severe septic type,* was made, complicated by arthritis of left knee with the possibility of an acute osteomyelitis of the left femur.

TREATMENT: The patient was immediately given two therapeutic doses of scarlet fever streptococcus antitoxin A intramuscularly followed by 40 c. c. of convalescent scarlet fever serum intravenously.

TERMINATION: The patient steadily grew worse and died 6¼ hours after admission to the hospital.

Case P 14054.—White; male; age 8 years; admitted to the hospital on the sixth day of the disease with a temperature of 104° F., pulse 164, and respirations 32. The onset was abrupt and severe. The patient was delirious on the second day of the disease and much worse on the fifth day, when he became unable to swallow. He was in a stuporous condition from which he was aroused with difficulty.

PHYSICAL EXAMINATION: There was an intense skin eruption with a cyanotic flush. The tongue was swollen and dry, with a black exudate. The buccal surfaces were dull red, with ulcerations. The pharynx was injected and ulcerated. The tonsils were injected and ulcerated, with an extensive necrotic membrane, and there was also a post-pharyngeal membrane. The nose showed profuse muco-purulent discharge, with ulcerations and membrane on the nasal mucosa. The left ear drum was injected and slightly bulging. There was profuse purulent discharge from the right ear. The cervical lymph nodes were enlarged and tender. Auscultation revealed a few râles in the lungs. The heart was not enlarged, but rapid, with sounds of fair quality. On admission a diagnosis of *scarlet fever, severe septic type,* was made, complicated by rhinitis, sinusitis (?) (or pansinusitis), cervical adenitis, suppurative otitis media, pharyngitis, tonsillitis, and a question of beginning pulmonary infection. The total white count was 51,000, with 84 per cent polymorphonuclears, 9 per cent lymphocytes, and 7 per cent large mononuclears.

TREATMENT: 24,000 units of scarlet fever streptococcus antitoxin A were given intramuscularly. Intravenous glucose solution was administered and local medication was applied to the throat.

TERMINATION: Two days later the general condition seemed improved, though the patient was still very ill. The prognosis was questionable. The heart was now apparently slightly enlarged to the left; the sounds were distant and the rate was rapid, but there were no murmurs. The mean temperature for this p. m. was 100.9° F., pulse 140, and respirations 28. An additional diagnosis of toxic myocarditis was made. The patient died 66 hours after admission, probably from cardiac failure.

Case Q 3528.—White, female, age 10 years, admitted to the hospital on the second day of the disease and the first day of the rash, with a temperature of 106° F., pulse 148, respirations 42, and white blood count 9,000. The patient was semidelirious and appeared extremely ill. An intense generalized rash was present. Otherwise physical findings on admission were not unusual. On the second hospital day the patient vomited repeatedly with a show of blood in the vomitus. The rash had now disappeared and the patient looked very pale. The heart was not enlarged, but the sounds were weak. On admission, a diagnosis of *scarlet fever, severe toxic type,* was made, complicated by a toxic myocarditis. The rash had disappeared by the afternoon of the first hospital day (12 to 18 hours after antitoxin).

TREATMENT: About one week prior to onset, the patient had received a prophylactic dose of scarlet fever streptococcus antitoxin. On admission, this case normally fell into the control group of the study series; but because of the evident desperate character of the illness, 6,000 units of antitoxin A were given immediately upon admission. This was accompanied by glucose infusions, and on the second hospital day a human blood transfusion of 200 c. c. was given.

TERMINATION: The temperature fell to 103° F. by 6 a. m. on the second hospital day, but by 9 p. m. on that day it had risen to over 106° F. The pulse was 140 at 6 a. m. and by 9 p. m. it was more than 180, with weak heart sounds. The condition steadily grew worse and the patient died 30 hours after admission.

NOTE: The history of serum administration in this case is of interest and may also have some relation to the severity and termination of this case. In 1929 the patient received the usual immunizing doses of diphtheria toxin-antitoxin mixture. On March 18, 1931, a prophylactic dose of scarlet fever streptococcus antitoxin was given. The patient became ill of scarlet fever on March 24. Between 11.30 p. m. on March 25 and 2.30 a. m. March 26, 6,000 units of antitoxin A, representing a volume of about 20 c. c. of concentrated serum, was given intramuscularly. On the afternoon of March 26 the patient complained of pain in the injected buttock. The area surrounding the site of the needle insertion was greatly swollen, firm, tender to touch, and had a hemorrhagic appearance, the center of which suggested early necrosis. The patient died at 4.50 a. m. on March 27, which was 30 hours after admission.

The early fatal termination of this case prevented observation of the entire reaction in the injected buttock. At the time of death the reaction gave evidence of a beginning Arthus phenomenon. The severity of the illness in this case was far greater than usual, and the clinical manifestations were in some respects not typical of scarlet fever. As later information revealed, this patient received the therapeutic dose of antitoxin seven days after an injection of a prophylactic dose. On admission, the symptoms were probably largely due to a developing serum sickness, particularly since it had previously been sensitized to horse serum by the diphtheria T-A mixture given in 1929. The evidence further very strongly suggests that this child possessed a peculiar tissue hypersensitivity similar to the cases reported by Gatewood and Baldridge (8).

SERUM THERAPY

THERAPEUTIC EFFECT

Specific serum therapy in the treatment of scarlet fever is rationalized at the present time by the rather general belief that scarlet fever is a disease produced by a hemolytic streptococcus which, in turn, is capable of elaborating a true exotoxin, the disease abating when there is present sufficient antitoxin to neutralize the toxin. The Schultz-Charlton blanching test, the Dick intradermal test, toxin-antitoxin neutralization tests performed on susceptible individuals, and the work of Blake (9), Blake and Trask (10), and Birkhaug (11), all tend to confirm this theory. However, what portion of the elevated temperature during the acute stage is the result of reaction to the toxin and what portion, if any, to direct bacterial invasion, either with the hemolytic streptococcus of scarlet fever or some pyogenic organism, is a question which still remains to be solved. It probably can be said with certainty that the influence of the exotoxin in sustaining an elevated temperature diminishes as the disease progresses.

The clinical data accumulated as a result of our studies fail to build up an irrefutable case for the use of scarlet fever streptococcus antitoxin in the treatment of scarlet fever. However, a study of the data presented does show that the antitoxin has a specific action. It may well be that failure to obtain complete and constant results was due to inadequate dosage, delayed administration, or to an improper mode of injection.

The mean duration of the eruption in the combined serum-treated groups (Table 3) was 4.4 days, as against 6.8 days in the control group. On an average, the eruption was in its second day (i. e., about 24 hours after its appearance) when the antitoxin was injected. Thus the eruption actually remained for slightly more than 3 days after administering antitoxin.

Apparently antitoxin had no influence on the time interval before desquamation began (Table 5), nor did it have a pronounced influence on the duration of the desquamating period (Table 6). The average desquamating period in the combined serum-treated group continued for 21 days, and in the control series for 26 days. Twenty-three and three-tenths per cent of 107 serum-treated cases completed their desquamation in 14 days or less, while only 1.3 per cent of the control cases equaled this record.

The character and extent of the desquamation showed a very pronounced difference between the serum-treated and control groups, as will be seen from Tables 7 and 8 and the tabulation on page 3031. The character of the desquamation in the combined serum-treated group was recorded as *marked* in 12.8 per cent, *moderate* in 26.6 per cent *mild* in 55.1 per cent and *absent* in 5.5 per cent. Corresponding figures

for the control group are 41.8, 27.8, 30.4, and 0.0 per cent, respectively. Similarly, the extent of the desquamation in the combined serum-treated group was *generalized* in 44.0 per cent, *localized* in 50.5 per cent, and *absent* in 5.5 per cent, in contrast to 91.1, 8.9, and 0.0 per cent, respectively, in the control group. These differences are even more strikingly shown by the figures given in the text on page 3031. These show a definite trend for the desquamation to be localized and mild in the serum-treated cases as against generalized and marked in the control cases.

An analysis of the temperature readings in the serum-treated and control groups as recorded in Tables 9, 10, 11, and 12 fails to reveal any definite febrile reductions following the administration of antitoxin. Certain individual cases did show a pronounced reduction from the admission temperature following the injection of antitoxin, but equally great reductions occurred in certain control cases without other treatment than rest in bed.

In the absence of a relatively high scarlet fever mortality rate, the next best measure of the real value of antitoxin in the treatment of this disease is the effect produced on the occurrence of major complications. What this effect has been in our study group may be determined through an analysis of the data in Table 13. In the 82 control cases there were 10 cases of nephritis, 5 of toxic arthritis, 16 of cervical adenitis, 3 of clinically evident sinusitis, and 14 of all types of otitis media, of which last number 6 went on to suppuration with 1 developing mastoiditis. Using these figures as the normal expectancy for the entire group, there should have developed in the 110 treated cases 13 cases of nephritis, 7 of toxic arthritis, 21 of cervical adenitis, 4 of sinusitis, and 19 of all types of otitis media, of which 8 should have suppurated with 1 or possibly 2 of these developing mastoiditis. Actually there developed in the 110 serum-treated cases 1 case of nephritis, no cases of toxic arthritis, 7 cases of cervical adenitis, no cases of sinusitis, and 8 cases of all types of otitis media, of which 4 went on to suppuration. No mastoid infections developed. This gives a total of 48 major complications occurring in 31 patients of the control group, which equals an expectancy of 64 complications in 42 patients for the serum-treated group. There actually developed only 16 major complications in the serum-treated patients and these were restricted to 12 individual patients. Thus 37.8 per cent of the control patients were involved in at least one complication, as against 10.9 per cent of the serum-treated patients. Correspondingly, the serum-treated patients show a 75 per cent decrease in the major complication expectancy and a 71.4 per cent decrease in the expected number of serum-treated patients to be involved.

TABLE 14.—*A detailed record of certain cases treated with antitoxin and which later developed secondary diseases which may be definitely regarded as complications of the scarlet fever infection*

Case No.	Age	Sex	Apparent severity on admission	Duration of rash	Duration of desquamation	Complication	Day of disease antitoxin was given	Temperature on days following the administration of antitoxin											
								First		Second		Third		Fourth		Fifth		Sixth	
								A. M.	P. M.	A. M.	P. M.	A. M.	P. M.	A. M.	P. M.	A. M.	P. M.	A. M.	P. M.
Q 1106	6	F.	Mod..	3	.....	Sup. otitis media-sup. cer. adenitis	First	102.9	101.6	100.8	101.4	99.3	100.7	99.6	100.6	100.4	100.6	100.1	101.0
Q 2206	2	F.	Mod..	7	24	Sup. otitis media-cervical adenitis	Third	102.6	102.3	100.7	100.5	99.1	99.3	98.6	99.4	99.0	99.1	98.6	99.6
Q 4943	4	M.	Mod..	5	24	do	Fifth	100.7	102.0	101.1	101.1	99.9	100.6	99.9	101.8	100.6	101.3	98.9	101.1
Q 2717	3	F.	Sev...	7	25	Nonsup. otitis cervical adenitis	Sixth	101.7	100.1	99.5	103.3	103.6	102.9	103.1	103.5	103.4	103.3	102.5	102.5
Q 5461	11	F.	Mod..	4	28	Sup. otitis media	Fourth	100.4	100.3	99.9	100.7	98.7	100.0	98.8	100.8	99.0	100.0	98.4	99.0
P 13873	5	M.	Mod..	4	27	Nonsup. otitis media	Third	101.0	101.7	100.1	100.3	99.8	100.1	100.7	101.5	100.7	101.0	101.0	100.3
Q 1471	2	M.	Mod..	6	30	do	Fourth	101.0	100.9	99.9	100.0	99.1	98.9	99.2	99.2	99.2	99.2	99.3	98.9
Q 2742	5	M.	Mod..	6	6	do	Third	.....	102.3	103.3	99.6	100.0	100.5	99.6	102.0	98.0	100.3	97.8	98.4
Q 5194	3	F.	Mod..	2	36	Cervical adenitis	Fourth	101.2	101.7	100.0	101.1	100.1	99.8	98.6	99.3	98.6	98.9	99.6	99.0
Q 5274	3	F.	Mod..	6	12	do	Second	102.7	102.8	99.8	100.5	99.5	100.0	98.3	98.3	98.0	98.8	102.6	101.7
Q 2478	2	F.	Sev...	9	43	do	Fifth	100.8	101.3	100.4	101.5	100.5	100.9	100.7	99.3	99.3	100.0	97.9	98.8
Q 2924	21	F.	Mod..	3	14	Albuminuria with hypertension	First	100.7	100.6	99.9	100.3	98.0	100.0	97.8	99.0	97.2	99.2	97.8	99.0
Mean				5	25		Third	101.4	101.4	100.4	100.8	99.8	100.3	99.5	100.3	99.4	100.1	99.5	99.9
Mean for all moderate and severe treated cases				4	21		do	101.6	100.6	99.7	100.0	98.1	99.6	98.9	99.5	98.9	99.5	99.0	99.4

Presumably the use of antitoxin failed to prevent the occurrence of the 16 complications occurring in the 12 serum-treated patients. A more detailed analysis of these 12 cases is made in Table 14. All were considered moderately ill on admission, except two who were reported severely ill. In spite of this impression on admission it will be seen that the mean duration of the skin eruption exceeded the mean for all moderate or severe serum-treated cases, and the individual temperatures remained sufficiently high following treatment to give a mean for these 12 cases which is higher than the mean for all serum-treated cases. The day of the disease on which antitoxin was injected varied in a manner similar to that of the entire serum-treated group. The combined evidence given in Table 14 suggests that these 12 cases may have been more acutely ill than the average for all the serum-treated cases and that the antitoxin failed to effect prompt and complete neutralization.

SERUM COMPLICATIONS

It is of the utmost importance to realize that the administration of a foreign serum by any hypodermic injection method is not entirely free from danger. The frequency of serum sickness and the less frequent occurrence of more serious developments following serum therapy is of sufficient moment to cause the observing clinician to weigh carefully the consequences before adopting such a method. The therapeutic results must definitely outweigh the reaction produced or the chance of more serious complication.

Gordon and Creswell (12) have studied the frequency of serum sickness following the use of both diphtheria and scarlet fever antitoxin. Their findings are very illuminating in view of the frequently made statement that scarlet fever antitoxin is particularly likely to cause serum sickness. If patients had previously received toxin-antitoxin mixture, 75.3 per cent developed serum sickness following scarlet fever antitoxin, and 73.5 per cent following diphtheria antitoxin. Further, those having had toxin-antitoxin injections constituted 37.6 per cent of all scarlet fever patients and only 18.1 per cent of the diphtheria patients. In the entire group of patients treated, 55.3 per cent of the scarlet fever patients and 76 per cent of the diphtheria patients were presumably nonsensitive to horse serum on admission. Gordon and Creswell observe that, if allowances are made for these sensitization differences, the frequency of serum sickness following the injection of either diphtheria or scarlet fever antitoxin is very nearly the same.

In 107 of our group of scarlet fever patients treated with either antitoxin A or antitoxin B, 71, or 66.3 per cent, developed serum sickness of varying degrees of severity. The relation of serum sick-

ness to the two antitoxins used and to the history of previous injections of horse serum is given in Table 15.

TABLE 15.—*A record of the occurrence of serum sickness among those patients treated with either scarlet fever streptococcus antitoxin A or B*

Patient's history	Severity of serum sickness	Antitoxin A		Antitoxin B	
		Number	Per cent	Number	Per cent
Had received horse serum previous to present illness.	No reaction	4	11.4		16.7
	Mild reaction	9		0	
	Moderate reaction	11 } 31	88.6	3 } 10	83.3
	Severe reaction	11		7	
Total		35	100.0	12	100.0
Had received no horse serum previous to present illness.	No reaction	8	33.3	21	84.0
	Mild reaction	5		2	
	Moderate reaction	8 } 16	66.7	1 } 4	16.0
	Severe reaction	3		1	
Total		24	100.0	25	100.0
Patient uncertain as to history of horse serum.	No reaction	1			
	Mild reaction	3			
	Moderate reaction	6 } 10			
	Severe reaction	1			
Total		11			

If the patient had previously received horse serum in any form, such as diphtheria toxin-antitoxin mixture, diphtheria antitoxin, tetanus antitoxin, antimeningococcus serum, and the like, there was an 87.2 per cent chance (antitoxin A 88.6 per cent and antitoxin B 83.3 per cent) that he would develop serum sickness following the administration of scarlet fever antitoxin. There was a 38.3 per cent possibility that this reaction would be severe. However, if the patient had at no time previously received horse serum in any form, the chance of developing serum sickness was 40.8 per cent (with antitoxin A 66.7 per cent and with antitoxin B 16.0 per cent). In this group the serum sickness reaction was severe in 8.2 per cent of those injected.

Of the 47 patients who previously had received horse serum in any form, 34 had received only such amount as is contained in the three immunizing doses of diphtheria toxin-antitoxin mixture, and of this number 29, or 85.3 per cent (antitoxin A 88.5 per cent and antitoxin B 75.0 per cent), developed serum sickness following the injection of scarlet fever antitoxin, 13 of whom were severely ill. Some persons had received the toxin-antitoxin mixture as recently as two months prior to the scarlet fever antitoxin and others as much as 10 years previously, both extremes developing serum sickness.

THERAPEUTIC VARIATIONS WITH ANTITOXINS A AND B

The differences in the two antitoxins used were discussed in detail in an earlier section of this report. It will be recalled that antitoxin A was a concentrated antiserum produced with the combined sterile

antigen prepared with four separate hemolytic streptococcus cultures. It possessed a potency of 360 to 400 units per cubic centimeter, and the volume of the individual therapeutic dose measured slightly more than 20 c. c. On the other hand, antitoxin B was an unconcentrated antiserum prepared with a single culture of hemolytic streptococcus. It showed a potency of approximately 800 units per cubic centimeter, with the volume of the individual dose measuring 8 c. c.

The mean duration of the period of eruption in those moderately ill and treated with antitoxin A was 4.4 days (Table 3) and the mean duration of the period of desquamation was 22.3 days (Table 6). Similar figures for a like group of cases treated with antitoxin B were 4.2 and 19.3 days, respectively. The character of the desquamation in the two groups of moderately ill cases was mild or absent in 67.7 per cent of the antitoxin A cases, as against 50.0 per cent in the antitoxin B cases. (Table 7.) Similarly, the extent of the desquamation was localized or absent in 59.7 and 43.8 per cent, respectively. (Table 8.) Desquamation failed to appear in 1.6 per cent of the antitoxin A cases, as against 9.3 per cent with antitoxin B.

Complications developed in patients treated with either antitoxin. If we combine those complications which in a previous section of this report were referred to as major complications, namely, otitis media of all types, nephritis, cervical adenitis, toxic arthritis, and sinusitis, we find that 12 such complications developed in antitoxin A group. (Table 13.) Using this as the normal expectancy for serum-treated groups the expectancy for the patients treated with antitoxin B becomes 6 complications as against 4 which actually developed. Further, of these 4 complications 3 were simple cervical adenitis and 1 nonsuppurative catarrhal otitis, whereas there were among the 12 complications occurring in the antitoxin A series 4 instances of suppurative otitis, 1 of nephritis, and 1 of suppurative cervical adenitis.

Differences in the mean temperature readings in the two groups were very slight. The readings for all cases have been tabulated in Table 9 and again in Table 10, the latter comprising more nearly comparable cases. It was thought that possibly something more striking might be demonstrated if the case records used in Table 10 were retabulated on the basis of the day of antitoxin rather than the day of disease. Such an arrangement is given in Table 16, which shows essentially the same temperature distribution as in Tables 9 and 10. The mean temperatures for a group of cases with a minimum admission temperature of 101° F. and a disease duration of four days or less (Table 12) indicate an appreciably greater temperature reduction following antitoxin B than was obtained with antitoxin A.

TABLE 16.—*The temperature readings of a group of scarlet fever patients who were treated with antitoxin A or B, tabulated as days following the administration of antitoxin without regard for the actual day of the disease*

[Patients are 5 to 15 years of age, both inclusive, and were considered moderately ill on admission]

Day of antitoxin	Treated with antitoxin A		Treated with antitoxin B		Day of antitoxin	Treated with antitoxin A		Treated with antitoxin B	
	A. M.	P. M.	A. M.	P. M.		A. M.	P. M.	A. M.	P. M.
First	100.9	100.9	99.9	100.0	Seventh	98.8	99.2	98.1	98.9
Second	99.7	99.8	98.8	99.5	Eighth	98.6	98.9	98.0	98.6
Third	98.9	99.4	98.8	99.5	Ninth	98.4	98.7	97.8	98.5
Fourth	98.7	99.3	98.4	99.2	Tenth	98.1	98.7	98.1	98.7
Fifth	98.8	99.4	98.6	99.3	Eleventh	98.0	98.6	97.9	98.6
Sixth	99.0	99.3	98.2	98.9	Twelfth	98.0	98.8	99.1	99.3

The frequency of serum sickness in these two groups of cases was more at variance. (Table 15.) If the patient had previously received horse serum, the chance of his developing serum sickness following the administration of scarlet fever antitoxin of either type was essentially the same. However, in those patients who had never been sensitized to horse serum, 66.7 per cent developed serum sickness following the use of antitoxin A and only 16 per cent following the use of antitoxin B. It will be remembered that there are two differences in the antitoxins used: Antitoxin A was concentrated and given in a volume of 20 c. c.; antitoxin B was unconcentrated and required only 8 c. c. per dose.

DOSAGE

The question of the correct dosage can not be properly determined until more accurate knowledge is at hand as to the amount of toxin elaborated in various types of the infection; also whether the elaboration of toxin is limited to a few days at the outset of the disease or continued throughout the febrile period. The collection of such data becomes extremely difficult, because of the absence of suitable laboratory methods for measuring both toxin and antitoxin. Dick and Dick (13) report the production of a typical scarlet fever rash following the subcutaneous injection of 0.1 c. c. of undiluted toxin. However they do not state the titer of the toxin used. Birkhaug (11) found that blood serum drawn from the scarlet fever patients on the eighth day of the disease was capable of producing the Schultz-Charlton rash extinction phenomenon. Trask (14) is of the opinion that "the amount of scarlet fever toxin found in the blood of scarlet fever patients during the acute stage of the disease varies between very wide limits." He regards a possible range from one-fourth to 330 skin-test doses of toxin per cubic centimeter, though he recognized the possibility of a large error in his method of measuring the toxin. Therefore, he concludes that, "because of the difficulty of estimating the actual degree of toxemia by clinical observation, a generous excess

of antitoxin should be used in the treatment of scarlet fever if the best results are to be obtained." Blake and Trask (10) believe that "the duration of the specific toxemia of scarlet fever parallels the duration of the rash" and is dependent largely on the presence and severity of septic complications. Birkhaug (11) also reports that he obtained the blanching phenomenon in 100 per cent of his cases during the first 60 hours of the rash, but that the response was less satisfactory in cases of longer duration.

In 1925 Dick and Dick (7) employed as the therapeutic dose that amount of antitoxin necessary to neutralize 20,000 skin-test doses of toxin, which, in terms of standard units, equals 400 units of antitoxin per dose. Blake and Trask (15) concluded that the full amount of the antitoxin should be given promptly following the diagnosis. The dose recommended by them when injected intramuscularly varied from 3,000 to 12,000 units. Eley (16) injected as much as 10,000 units intravenously. The commercial package now supplied to the trade contains 6,000 units as a therapeutic dose.

Perhaps equally as important as the size of the dose is the route of injection. The onset of general symptoms, the appearance of the rash, and the rise in the temperature all occur within the space of a few hours; in our cases the rash, on an average, appeared on the second day. These facts undoubtedly mean that toxin is elaborated promptly and in large quantity.

It is well known that scarlet fever toxin when injected intradermally produces a visible reaction in as short a time as six hours (the Dick test). It has also been observed that, in the routine preparation of scarlet-fever toxin in the usual liquid media, practically the entire growth and toxin production occur within the first 24 hours.

Birkhaug and Howard (17) studied the pathologic changes in rabbits by the intravenous injection of scarlet fever toxin prepared from the Dochez N. Y. 5 strain. They found that when death occurred it came in less than 18 hours. One of us (unpublished data) studied the lethal effect of scarlet fever toxin prepared from the same strain. Altogether 96 rabbits were injected intravenously with doses varying from 25,000 to 150,000 skin-test doses. Fifty-six of these rabbits appeared acutely ill within a few hours and all were dead within an average of 16 hours. Nine rabbits similarly injected recovered from their early, acute symptoms but sickened again later and died within an average of 123 hours. Thirty-one rabbits developed the acute symptoms to a lesser degree and finally recovered. The most pronounced gross pathologic changes observed were the vascular disturbances, particularly in the thymus.

These observations, when viewed together, at least suggest that in a human case of scarlet fever the toxin appears early in the course of the disease, very quickly reaches its maximum, and exerts its

toxic action without delay. If these assumptions are correct, it becomes imperative that the patient receive the antitoxin very early in the disease and by a route which will distribute the antitoxin to all parts of the body within the shortest possible time. It indicates the need for intravenous rather than intramuscular therapy.

Eley (16) obtained his best results in those cases which received intravenous medication, some of which were given as high as 10,000 units. Banks and MacKenzie (18) treated 404 cases, admitted from May to December, 1928, by the intravenous route. The dose administered usually was 20 c. c. for adults and 10 c. c. for children of a serum of unstated titer. A parallel control group was not observed. No cases of otitis media, nephritis, or arthritis developed in the 404 intravenously treated cases. Sixty-seven cases of apparently the same severity were admitted late in 1927 or early 1928 and were given antitoxin by intramuscular injection, and of these 10.4 per cent developed otitis media, nephritis, or arthritis. During the year 1927, 285 scarlet fever patients were admitted who received no antitoxin, and in this group 11.9 per cent developed otitis, nephritis, or arthritis. They considered patients as unsuitable for intravenous treatment who were particularly subject to bronchitis, asthma, or other acute respiratory diseases, and those who were serum-sensitive. In fully 60 per cent of those treated, an immediate serum reaction developed which apparently was of a rather severe nature, but which passed off in about one-half hour. Only 2.8 per cent developed the usual serum sickness.

Banks (19) used intravenous antitoxin in the treatment of a severe outbreak of scarlet fever in a boys' school in February, 1929. The first nine cases to develop were treated without antitoxin, and in these there developed two cases of suppurative otitis media, two of nonsuppurative otitis media, seven of albuminuria or nephritis, one case of antrum disease, one of dacryocystitis, one of pneumonia, one of jaundice, and six cases of nasal discharge. Sixteen cases subsequently developed which apparently were of the same severe type as the first nine. These received intravenous antitoxin within the first four days of the disease, and the only complications were one case of adenitis and one of hordeolum. One exception occurred in a boy, not included in the above groups, who was not given antitoxin until the seventh day, which was subsequent to the onset of several severe complications. Other serious complications developed in this boy following the administration of the antitoxin.

The results obtained by these clinicians with the intravenous method of administering antitoxin, considered with the evidence we have presented in the foregoing section on the action of the toxin, suggest rather definitely that, in order to be effective, the dose of

antitoxin, in addition to being ample promptly to neutralize all the free toxin present and provide a reserve for the neutralization of any additional toxin which may be elaborated, must be administered by a route which will provide quick distribution throughout the body.

DISCUSSION

We have attempted to present in this report a detailed anlaysis of each case included within our study, the purpose being not only to note the more obvious clinical variations in our three groups but also to analyze the records more minutely with a view to determining wherein, if at all, scarlet fever streptococcus antitoxin fails to accomplish its purpose.

That the antitoxin has a specific neutralizing effect on the toxin *in vivo* is indicated by the decrease in the duration of the rash, by a change in the character and extent of the desquamation, and by a reduction in the number of complications. That it failed to neutralize completely the damaging effect of the toxic substances produced by the scarlet fever infection is suggested by the failure of the rash to disappear promptly, by the continuation of the fever, and by the appearance of complications in a certain number of serum-treated cases.

These failures may have been caused by (*a*), too small a therapeutic dose, (*b*) an improper method of administration, (*c*) administration too late in the disease, or (*d*) an inadequacy of antitoxin to neutralize all of the toxic substances elaborated in this disease. It is our belief, and this is confirmed by other clinicians and by investigations of the action of scarlet fever toxin, that early administration of antitoxin and its rapid dissemination throughout the body of the patient are essential; the toxin being elaborated very early in the disease and effecting its tissue damage without delay.

The probability of serum sickness must also be weighed in the use of scarlet fever antitoxin. However, the frequency of this complication can not be attributed entirely to a peculiar property of an antistreptococcic serum itself, since it was shown that previous sensitization to horse serum played an important rôle in its incidence. With the introduction of a more effective method of producing active immunity against diphtheria by the use of toxoid instead of toxin-antitoxin mixture, there will be a corresponding reduction in the percentage of children sensitized to horse serum. There is also the fervent hope that ultimately an improved method of manufacture will become available so that the volume of the therapeutic dose of scarlet fever streptococcus antitoxin may be greatly reduced, which in itself will minimize the probability of serum sickness.

BIBLIOGRAPHY

(1) Mamorek, A.: (1895) Le streptocoque et le serum antistreptococcique. Ann. de l'Inst. Pasteur, vol. 9, pp. 592–620.

(2) Moser, P.: (1902) Über die Behandlung des Scharlachs mit einer Scharlachstreptokkenserum. Wien. Klin. Wchnschr., vol. 15, pp. 1053–1055.

(3) Jochmann, G.: (1905) Die Bakterienbefunde bei Scharlach und ihre Bedeutung für den Krankheitsprocess. Ztschr. f. klin. Med., vol. 56, pp. 316–368.

(4) Dochez, A. R., and Sherman, L.: (1924) The significance of streptococcus hemolyticus in scarlet fever and the preparation of a specific anti-scarlatinal serum by immunization of the horse to streptococcus hemolyticus-scarlatinae. J. A. M. A., vol. 82, pp. 542–544 (Feb. 16).

(5) Dick, G. F., and Dick. G. H.: (1924) A scarlet fever antitoxin. J. A. M. A., vol. 82, pp. 1246–1247 (April 19).

(6) Blake, F. G., Trask, J. D., and Lynch. J. F.: (1924) Observations on the treatment of scarlet fever with scarlatinal antistreptococcic serum. J. A. M. A., vol. 82, pp. 712–714 (March 1).

(7) Dick, G. F., and Dick, G. H.: (1925) Therapeutic results with concentrated scarlet-fever antitoxin. Preliminary report: preparation, standardization, and dosage of the antitoxin. J. A. M. A., vol. 84, pp. 803–805 (March 14).

(8) Gatewood, W. E., and Baldridge, C. W.: (1927) Tissue hypersensitiveness following the administration of toxin-antitoxin. J. A. M. A., vol. 88, pp. 1068–1071 (April 2).

(9) Blake, F. G.: (1924) The treatment of scarlet fever with Dochez's anti-scarlatinal serum. Boston Med. and Surg. J., vol. 191, pp. 43–47.

(10) Blake, F. G., and Trask, J. D.: (1926). Studies in scarlet fever: II. The relation of the specific toxemia of scarlet fever to the course of the disease. J. Clin. Invest., vol. 3, pp. 397–409 (December 20).

(11) Birkhaug, K. E.: (1925) Studies in scarlet fever. I. Studies concerning the blanching phenomenon in scarlet fever. J. Clin. Invest., vol. 1, pp. 273–294 (February 20).

(12) Gordon, J. E., and Creswell, S. M.: (1924) To what extent do toxin-antitoxin mixtures sensitize to therapeutic serum? J. Prevent. Med., vol. 3, pp. 21–30 (January).

(13) Dick, G. F., and Dick, G. H.: (1924) Scarlet fever toxin in preventive immunization. J. A. M. A., vol. 82, pp. 544–545 (February 16).

(14) Trask, J. D.: (1926) Studies in scarlet fever. I. The amount of scarlatinal toxin in the blood of patients with scarlet fever. J. Clin. Invest., vol. 3, pp. 391–396 (December 20).

(15) Blake, F. G., and Trask, J. D.: (1925) The treatment of scarlet fever with antitoxin. Boston Med. and Surg. Jour., vol. 193, pp. 659–665 (October 8).

(16) Eley, R. C.: (1928) Scarlet-fever antitoxin—Report of four hundred and sixty-five cases. Am. J. Dis. Child., vol. 35, pp. 14–17 (January).

(17) Birkhaug, K. E., and Howard, R. P.: (1930) Pathological lesions produced in rabbits following intravenous injection of concentrated scarlet fever toxin. Proc. Soc., Exp. Biol. and Med., vol. 28, pp. 95–100 (November).

(18) Banks, H. S., and MacKenzie, J. C. H.: (1929) Intravenous antitoxin in scarlet fever. Lancet, vol. 216, pp. 381–384 (February 23).

(19) Banks, H. S.: (1929) Intravenous antitoxin in an outbreak of scarlet ever in a public school. Brit. Med. J., vol. 2, p. 50 (July 13).

WHOLE-TIME COUNTY HEALTH OFFICERS, 1931

The following directory has been compiled from data furnished as of January 1, 1931, by State health officers. Similar directories for the years 1922 to 1930, inclusive, have been published in the PUBLIC HEALTH REPORTS. The directory for 1930 was issued as Reprint No. 1436.

In the questionnaire sent for the purpose of obtaining the necessary information, a "whole-time" county health officer was defined as "one who does not engage in the practice of medicine or in any other business, but devotes all his time to official duties."

Directories of State health departments have been published annually by the Public Health Service for the years 1912 to 1931, inclusive. The directory for 1930 was issued as Reprint No. 1425 from the PUBLIC HEALTH REPORTS.

Directories of city health officers have been published annually for the years 1916 to 1931, inclusive, the directory for 1930 being Reprint No. 1426.

Directories of State and city health officers for 1931 have been published in PUBLIC HEALTH REPORTS of December 4, 1931 (Reprints Nos. 1531 and 1532, respectively).

State and county	Name of health officer	Post-office address	Official title
Alabama:			
Baldwin	J. Chason, M. D.	Bay Minette	County health officer.
Barbour	E. M. Moore, M. D.	Clayton	Do.
Blount	C. V. Hendrix, M. D.	Oneonta	Do.
Bullock	A. M. Shelamer, M. D.	Union Springs	Do.
Calhoun	G. A. Cryer, M. D.	Anniston	Do.
Chambers	D. D. Carr, M. D.	Lafayette	Do.
Cherokee	S. C. Tatum, M. D.	Center	Do.
Choctaw	W. G. Carnathan, M. D.	Butler	Do.
Clarke	R. D. Neal, M. D.	Grove Hill	Do.
Cleburne	F. R. Wood, M. D.	Heflin	Do.
Coffee	W. A. Stanley, M. D.	Enterprise	Do.
Colbert	W. T. Burkett, M. D.	Tuscumbia	Do.
Conecuh	E. L. Kelly, M. D.	Evergreen	Do.
Covington	B. B. Matthews, M. D.	Andalusia	Do.
Crenshaw	J. O. Foster, M. D.	Luverne	Do.
Cullman	A. C. Bradham, M. D.	Cullman	Do.
Dale	W. L. Orr, M. D.	Ozark	Do.
Dallas	L. T. Lee, M. D.	Selma	Do.
De Kalb	Lee Weathington, M. D.	Fort Payne	Do.
Elmore	W. S. Owsley, M. D.	Wetumpka	Do.
Escambia	George T. Rowe, M. D.	Brewton	Do.
Etowah	C. L. Murphree, M. D.	Gadsden	Do.
Franklin	J. E. McClellan, M. D.	Russellville	Do.
Geneva	L. S. Nichols, M. D.	Geneva	Do.
Houston	R. E. Neff, M. D.	Dothan	Do.
Jackson	M. H. Lynch, M. D.	Scottsboro	Do.
Jefferson	J. D. Dowling, M. D.	Birmingham	Do.
Lamar	J. A. Jackson, M. D.	Vernon	Do.
Lauderdale	W. D. Hubbard, M. D.	Florence	Do.
Lawrence	R. E. Harper, M. D.	Moulton	Do.
Lee	O. L. Chason, M. D.	Opelika	Do.
Limestone	W. J. Donald, M. D.	Athens	Do.
Lowndes	E. F. Leatherwood, M. D.	Hayneville	Do.
Macon	E. S. Miller, M. D.	Tuskegee	Do.
Madison	W. C. Hatchett, M. D.	Huntsville	Do.
Marengo	E. T. Norman, M. D.	Linden	Do.
Marion	L. L. Parks, M. D.	Hamilton	Do.
Marshall	D. C. Jordan, M. D.	Guntersville	Do.
Mobile	C. A. Mohr, M. D.	Mobile	Do.
Monroe	T. E. Tucker, M. D.	Monroeville	Do.
Montgomery	J. L. Bowman, M. D.	Montgomery	Do.

State and county	Name of health officer	Post-office address	Official title
Alabama—Continued.			
Morgan	H. C. McRee, M. D	Decatur	County health officer.
Perry	J. R. Long, M. D	Marion	Do.
Pickens	J. L. Conyers, M. D	Carrollton	Do.
Pike	W. H. Abernethy, M. D	Troy	Do.
Shelby	J. M. Kimmey, M. D	Columbiana	Do.
Sumter	J. S. Hough, M. D	Livingston	Do.
Talladega	J. H. Hill, M. D	Talladega	Do.
Tallapoosa	C. C. Fargason, M. D	Dadeville	Do.
Tuscaloosa	A. A. Kirk, M. D	Tuscaloosa	Do.
Walker	A. M. Waldrop, M. D	Jasper	Do.
Washington	I. C. Sumner, M. D	Chatom	Do.
Wilcox	E. L. McIntosh, M. D	Camden	Do.
Winston	R. Lee Hill, M. D	Double Springs	Do.
Arizona:			
Cochise	R. B. Durfee	Bisbee	County health officer.
Coconino	G. F. Manning, M. D	Flagstaff	Do.
Gila	A. C. McKean, M. D	Globe	Director, county health unit.
Maricopa	G. H. Spivey, M. D	Phoenix	Do.
Pima	A. N. Crain, M. D	Tucson	Do
Yuma	Harry A. Reese, M. D	Yuma	City-county health officer.
Arkansas:			
Arkansas	A. B. Jemison, M. D	Stuttgart	Director, health unit.
Ashley	A. M. Gibbs, M. D	Hamburg	Do.
Clark	T. T. Ross, M. D	Arkadelphia	Do.
Conway	W. H Bruce, M. D	Morrilton	County health officer.
Cross	J. D. McKie, M. D	Wynne	Do.
Desha	J. C. Miller, M. D	McGehee	Do.
Drew	G. C. De Bolt, M. D	Monticello	Do.
Garland	J. F. Merritt, M. D	Hot Springs	County and city health officer.
Jackson	M. B. Owens, M. D	Newport	County health officer.
Little River	J. W. Ringgold, M. D	Ashdown	Do.
Lonoke-Jefferson [1]	Geo. A. Hays, M. D	Pine Bluff	Supervising director.
Mississippi	A. M. Washburn, M. D	Blytheville	County health officer.
Monroe	C. A. Henry, M. D	Clarendon	Do.
Ouachita	R. C. Kennerly, M. D	Camden	Do.
Phillips	W. R. Bruce, M. D	Helena	County and city health officer.
Pope	A. B. Tate, M. D	Russellville	County health officer.
Pulaski	C. McA. Wassell, M. D	Little Rock	Do.
Saline	T. C. Watson, M. D	Benton	Do.
Sebastian	J. E. Johnson, M. D	Fort Smith	County and city healt officer.
Union	Ernest W. Prothro, M. D	El Dorado	Director of health unit.
White	Orlie Parker, M. D	Searcy	County health officer.
Woodruff	J. F. Hays, M. D	McCrory	Do.
Yell	T. J. Pool, M. D	Ola	Do.
California:			
Contra Costa	Paul G. Capps, M. D	Martinez	Do.
Imperial	Warren F. Fox, M. D	El Centro	Do.
Los Angeles	J. L. Pomeroy, M. D	Los Angeles	Do.
Madera	H. B. Neagle, M. D	Madera	Do.
Monterey	Roy M. Fortier, M. D	Salinas	Do.
Orange	K. H. Sutherland, M. D	Santa Ana	Do.
Riverside	W. B. Wells, M. D	Riverside	Do.
San Diego	Alex. M. Lesem, M. D	San Diego	City and county health officer.
San Joaquin	J. J. Sippy, M. D	Stockton	District health officer.
San Luis Obispo	Allen F. Gillihan, M. D	San Luis Obispo	County health officer.
Santa Barbara	R. C. Main, M. D	Santa Barbara	Do.
Stanislaus	L. M. Coulter, M. D	Modesto	Director.
Yolo	F. R. Fairchild, M. D	Woodland	County health officer.
Colorado:			
Otero	Guy A. Ashbaugh, M. D	Rocky Ford	Health officer.
Connecticut:			
Fairfield	Lawrence E. Poole, M. D	Bridgeport	Do.
Delaware:			
Kent	C. A. Sargent, M. D	Dover	County unit officer.
New Castle	R. C. Strode, M. D	Newark	Do.
Sussex	E. F. Smith, M. D	Georgetown	Do.
Florida:			
Leon	L. J. Graves, M. D	Tallahassee	County health officer.
Manatee	J. W. Henagan, D. V. M	Manatee	Health officer.
Taylor	W. H. Y. Smith, M. D	Perry	County health officer.
Georgia:			
Baldwin	O. F. Moran, M. D	Milledgeville	Commissioner of health.
Bartow	A. C. Shamblin, M. D	Cartersville	Do.
Bibb	J. D. Applewhite, M. D	Macon	Do.
Brooks	R. E. McClure, M. D	Quitman	Do.
Chatham	V. H. Bassett, M. D	Savannah	Do.
Clarke	T. H. Johnston, M. D	Athens	Do.

[1] Bi-county project.

State and county	Name of health officer	Post-office address	Official title
Georgia—Continued.			
Clinch	J. H. Sessions, M. D.	Homerville	Commissioner of health.
Cobb	J. E. Lester, M. D.	Marietta	Do.
Coffee	J. W. Wallace, M. D.	Douglas	Do.
Colquitt	T. H. Chesnutt, M. D.	Moultrie	Do.
Decatur	M. A. Fort, M. D.	Bainbridge	Do.
De Kalb	J. R. Evans, M. D.	Decatur	Do.
Dougherty	Hugo Robinson, M. D.	Albany	Do.
Floyd	B. V. Elmore, M. D.	Rome	Do.
Glynn	H. L. Akridge, M. D.	Brunswick	Do.
Grady	J. R. Dykes, M. D.	Cairo	Do.
Hall	C. J. Wellborn, M. D.	Gainesville	Do.
Jefferson	L. R. Bryson, M. D.	Louisville	Do.
Jenkins	Guy G. Lunsford, M. D.	Millen	Do.
Laurens	O. H. Cheek, M. D.	Dublin	Do.
Lowndes	G. T. Crozier, M. D.	Valdosta	Do.
Mitchell	C. O. Rainey, M. D.	Camilla	Do.
Richmond	E. E. Murphey, M. D.	Augusta	Do.
Spalding	W. C. Humphries, M. D.	Griffin	Do.
Sumter	R. A. Berry, M. D.	Americus	Do.
Thomas	H. B. Jenkins, M. D.	Thomasville	Do.
Troup	S. C. Rutland, M. D.	Lagrange	Do.
Walker	J. H. Hammond, M. D.	La Fayette	Do.
Ware	Geo. E. Atwood, M. D.	Waycross	Do.
Washington	O. L. Rogers, M. D.	Sandersville	Do.
Idaho:			
Twin Falls	George C. Halley, M. D.	Twin Falls	Director, Twin Falls County health unit.
Illinois:			
Du Page	William V. Hopf, D. D. S.	Wheaton	County superintendent public health.
Morgan	V. H. de Somoskeoy, M. D.	Jacksonville	Health officer.
Iowa:			
Washington	C. W. Stewart, M. D.	Washington	Medical director.
Woodbury	W. S. Petty, M. D.	Sioux City	Do.
Kansas:			
Brown	R. B. Stafford, M. D.	Hiawatha	Health officer.
Butler	R. J. Cabeen, M. D.	Eldorado	County health officer.
Cherokee	C. R. Hepler, M. D.	Columbus	Health officer.
Dickinson	C. H. Munger, M. D.	Abilene	Do.
Geary	H. R. Ross, M. D.	Junction City	County health officer.
Greenwood	J. G. Walker, M. D.	Eureka	Health officer.
Lyon	J. S. Fulton, M. D.	Emporia	Do.
Marion	J. H. Saylor, M. D.	Marion	County health officer.
Ottawa	H. L. Hendricks, M. D.	Minneapolis	Health officer.
Sedgwick	M. H. Hostetler, M. D.	Wichita	Do.
Seward	W. G. Emery, M. D.	Liberal	Do.
Shawnee	F. E. McCord, M. D.	Topeka	Do.
Kentucky:			
Bell	M. D. Hoskins, M. D.	Pineville	Do.
Boyd	R. D. Higgins, M. D.	Ashland	Do.
Breathitt	Sam R. Page, M. D.	Jackson	Do.
Bullitt	G. W. Kirk, M. D.	Shepherdsville	Do.
Calloway	Jas. A. Outland, M. D.	Murray	Do.
Carlisle	J. F. Harrell, M. D.	Bardwell	Do.
Carter	E. H. Maggard, M. D.	Grayson	Do.
Daviess	G. L. Thompson, M. D.	Owensboro	Do.
Estill	S. T. Scrivner, M. D.	Irvine	Do.
Fayette	R. E. May, M. D.	Lexington	Do.
Floyd	Marvin Ransdell, M. D.	Prestonsburg	Do.
Fulton	H. E. Prather, M. D.	Hickman	Do.
Henderson	R. K. Galloway, M. D.	Henderson	Do.
Hickman	Chas. Hunt, M. D.	Clinton	Do.
Hopkins	C. R. Morton, M. D.	Madisonville	Do.
Jefferson	E. P. Whistler, M. D.	Louisville	Do.
Kenton	H. C. White, M. D.	Covington	Do.
Knott	J. W. Duke, M. D.	Hindman	Do.
Knox	John O. Salyers, M. D.	Barbourville	Do.
Lawrence	M. H. Skaggs, M. D.	Louisa	Do.
Lee	R. H. MacLeod, M. D.	Beattyville	Do.
Leslie	H. C. Capps, M. D.	Hyden	Do.
Letcher	R. D. Collins, M. D.	Whitesburg	Do.
Lincoln	W. F. Lamb, M. D.	Stanford	Do.
Madison	H. W. Sterling, M. D.	Richmond	Do.
Magoffin	L. C. Coleman, M. D.	Salyersville	Do.
Martin	Wm. N. Keith, M. D.	Inez	Do.
Mason	J. H. Hutchings, M. D.	Maysville	Do.
McLean	J. W. Scudder, M. D.	Calhoun	Do.
Menifee	E. T. Riley, M. D.	Frenchburg	Do.
Monroe	G. W. Bushong, M. D.	Tompkinsville	Do.
Morgan-Elliott [1]	W. H. Wheeler, M. D.	West Liberty	Do.
Muhlenberg	Roy M. Orsburn, M. D.	Greenville	Do.

[1] Bi-county project.

State and county	Name of health officer	Post-office address	Official title
Kentucky—Continued.			
Ohio	A. D. Park, M. D	Hartford	Health officer.
Owsley	Don E. Wilder, M. D	Booneville	Do.
Perry	F. W. Caudill, M. D	Hazard	Do.
Pike	F. W. Forge, M. D	Pikeville	Do.
Scott	A. Stewart, M. D	Georgetown	Do.
Trigg	G. M. Wells, M. D	Cadiz	Do.
Union	J. F. Lynn, M. D	Morganfield	Do.
Wayne	C. F. Holtegel, M. D	Monticello	Do.
Webster	C. M. Smith, M. D	Dixon	Do.
Louisiana: [3]			
Assumption	P. M. Payne, M. D	Napoleonville	Director.
Avoyelles	T. B. Wilson, M. D	Marksville	Parish health officer.
Caddo	W. J. Sandidge, M. D	Shreveport	Do.
Caldwell	Thos. Burk, M. D	Columbia	Director.
Catahoula	W. C. Coney, M. D	Harrisonburg	Do.
Claiborne	H. R. Marlatt, M. D	Homer	Parish health officer.
Concordia	John Schreiber, M. D	Vidalia	Director.
De Soto	R. A. Tharp, M. D	Mansfield	Parish health officer.
East Carroll	W. J. Barber, M. D	Lake Providence	Director.
Franklin	R. E. Applewhite, M. D	Winnsboro	Do.
Iberia	B. L. Stinson, M. D	New Iberia	Parish health officer.
Iberville	J. C. Eby, M. D., Phar. D	Plaquemine	Director.
Lafayette	R. S. Hernandez, M. D	Lafayette	Parish health officer.
Lafourche	H. S. Smith, M. D	Thibodaux	Do.
La Salle	H. H. Bishop, M. D	Jena	Director.
Lincoln	R. H. Allen, M. D	Ruston	Do.
Madison	E. S. Freeman, M. D	Tallulah	Do.
Morehouse	N. P. Liles, M. D	Bastrop	Do.
Natchitoches	W. W. Knipmeyer, M. D., C. P. H.	Natchitoches	Parish health officer.
Ouachita	John W. Williams, M. D., C. P. H.	Monroe	Do.
Pointe Coupee	F. F. Rougon, Ph. G., M. D.	New Roads	Do.
Rapides	Edmond Klamke, M. D., M. P. H.	Alexandria	Do.
Richland	R. O. C. Green, M. D	Rayville	Director.
St. Landry	J. A. Coleman, M. D	Opelousas	Do.
St. Martin	P. H. Fleming, M. D	St. Martinville	Do.
St. Mary	L. R. Craig, M. D	Franklin	Do.
Tensas			
Terrebonne	M. F. Houston, M. D	Houma	Do.
Washington	F. A. Williams, M. D	Franklinton	Do.
Webster	W. C. Summer, M. D	Minden	Parish health officer.
West Carroll	W. L. Stone, M. D	Oak Grove	Director.
Maine:			
Motbov Union [4]	H. L. Jackson, M. D	Old Town	
Rumford [4]	Thomas S. Barr, M. D	Rumford	
Sanford [4]	W. H. Kelly, M. D	Sanford	
Vassalboro [4]	A. R. Daviau, M. D	Vassalboro	
Maryland:			
Allegany	J. P. Franklin, M. D	Cumberland	County health officer.
Anne Arundel	C. F. Moriarty, M. D	Annapolis	Do.
Baltimore	J. S. Bowen, M. D	Towson	Do.
Calvert	I. N. King, M. D	Prince Frederick	Do.
Carroll	W. C. Stone, M. D	Westminster	Do.
Cecil	C. A. Kane, M. D	Elkton	Do.
Frederick	E. C. Kefauver, M. D	Frederick	Do.
Harford	T. A. Callahan, M. D	Bel Air	Do.
Kent	R. G. Beachley, M. D	Chestertown	Do.
Montgomery	W. T. Pratt, M. D	Rockville	Do.
Prince Georges	A. B. Hooton, M. D	Upper Marlboro	Do.
Talbot	A. L. Oilar, M. D	Easton	Do.
Washington	W. Ross Cameron, M. D	Hagerstown	Do.
Wicomico	Seth H. Hurdle, M. D	Salisbury	Do.
Massachusetts:			
Barnstable	A. P. Goff, M. D	Hyannis	Do.
Michigan:			
Genesee	Leslie A. Lambert, M. D	Flint	Commissioner.
Isabella	M. R. Kinde, M. D	Mount Pleasant	County health officer.
Kent	J. D. Brook, M. D	Grand Rapids	Do.
Midland	Arthur Newitt, M. D	Midland	Do.
Oakland	J. D. Monroe, M. D	Pontiac	Commissioner.
Ottawa	Ralph Ten Have, M. D	Grand Haven	County health officer.
Saginaw		Saginaw	Do.
Wexford	S. C. Moore, M. D	Cadillac	Commissioner.

[3] Parishes. [5] District. [4] Town.

State and county	Name of health officer	Post-office address	Official title
Michigan—Continued.			
District No. 1—Crawford. Kalkaska. Missaukee. Roscommon.	R. B. Howard, M. D.	Grayling	Director.
District No. 2—Alcona. Iosco. Ogemaw. Oscoda.	F. T. Zieske, M. D.	West Branch	Do.
District No. 3—Antrim. Charlevoix. Emmet. Otsego.	Carleton Dean, M. D.	Charlevoix	Do.
District No. 4—Alpena. Cheboygan. Montmorency. Presque Isle.	Stanley Stealy, M. D.	Rogers City	Do.
Minnesota:			
St. Louis	G. J. Ferreira, M. D.	Duluth	County health officer.
Mississippi:			
Adams	Loren Wallin, M. D.	Natchez	Director of health.
Bolivar	R. D. Dedwylder, M. D.	Cleveland	Do.
Clarke	D. S. Johnson, M. D.	Quitman	Do.
Coahoma	D. V. Galloway, M. D.	Clarksdale	Do.
Copiah	A. L. Gray, M. D.	Hazlehurst	Director.
Forrest	W. D. Beacham, M. D.	Hattiesburg	Do.
Hancock	C. M. Shipp, M. D.	Bay St. Louis	Do.
Harrison	Daniel J. Williams, M. D.	Gulfport	Do.
Hinds	W. E. Noblin, M. D.	Jackson	Do.
Holmes	C. J. Vaughn, M. D.	Lexington	Do.
Humphreys	W. W. Scott, M. D.	Belzoni	Do.
Jackson	R. G. Lander, M. D.	Pascagoula	Do.
Lamar	J. N. Mason, M. D.	Purvis	Do.
Lauderdale	J. T. Googe, M. D.	Meridian	Do.
Lee	W. H. Cleveland, M. D.	Tupelo	Do.
Leflore	C. P. Coogle, M. D.	Greenwood	Do.
Lincoln	W. R. May, M. D.	Brookhaven	Do.
Monroe	C. H. Love, M. D.	Aberdeen	Do.
Pearl River	G. E. Godman, M. D.	Poplarville	Do.
Perry	B. T. Robinson, M. D.	New Augusta	Do.
Sharkey-Issaquena[1]	A. K. Barrier, M. D.	Rolling Fork	Do.
Sunflower	J. H. Janney, M. D.	Indianola	Do.
Tishomingo	J. W. Barkley, M. D.	Iuka	Do.
Union	L. A. Barnett, M. D.	New Albany	Do.
Warren	F. Michael Smith, M. D.	Vicksburg	Do.
Washington	J. W. Shackelford, M. D.	Greenville	Do.
Yazoo	Hugh L. McCalip, M. D.	Yazoo City	Do.
Missouri:			
Boone	Finis Suggett, M. D.	Columbia	Health officer.
Buchanan	W. S. Hull, M. D.	St. Joseph	Do.
Dunklin	Wheeler David, M. D.	Kennett	Do.
Greene	J. W. Williams, M. D.	Springfield	Do.
Jackson	Joseph T. Brennan, M. D.	Independence	Do.
Marion	E. M. Lucke, M. D.	Hannibal	Do.
Miller	E. K. Musson, M. D.	Eldon	Do.
New Madrid	Wm. N. O'Bannon, M. D.	New Madrid	Do.
Nodaway	C. P. Fryer, M. D., C. P. H.	Maryville	Do.
Pemiscot	Fred L. Ogilvie, M. D.	Caruthersville	Do.
St. Francois	W. W. Johnston, M. D.	Flat River	Do.
St. Louis	Louis Obrock, M. D.	Clayton	Do.
Scott	U. P. Haw, M. D.	Benton	Do.
Montana:			
Cascade	F. L. Watkins, M. D.	Great Falls	Do.
Gallatin	A. D. Brewer, M. D.	Bozeman	Do.
Lewis and Clark	A. Jordan, M. D.	Helena	Do.
Missoula	F. D. Pease, M. D.	Missoula	Do.
New Mexico:			
Bernalillo	J. R. Scott, M. D.	Albuquerque	County health officer.
Dona Ana	C. W. Gerber, M. D.	Las Cruces	Do.
Eddy	O. E. Puckett, M. D.	Carlsbad	Do.
Lea	M. A. Elstein, M. D.	Lovington	Do.
McKinley	R. H. Wilson, M. D.	Gallup	Do.
Santa Fe	E. B. Godfrey, M. D.	Santa Fe	Do.
Union	H. M. Batson, M. D.	Clayton	Do.
Valencia	P. H. McNellis, M. D.	Los Lunas	Do.

[1] Bicounty project.

State and county	Name of health officer	Post-office address	Official title
New York:			
Cattaraugus	R. M. Atwater, M. D., Dr. P. H.	Olean	County health commissioner.
Cortland	Daniel R. Reilly, M. D.	Cortland	Do.
Suffolk	Arthur T. Davis, M. D.	Riverhead	Do.
Westchester	Matthias Nicoll, jr., M. D.	White Plains	Do.
North Carolina:			
Beaufort	T. C. Britt, M. D.	Washington	Health officer.
Bertie	S. O. Saunders, M. D.	Windsor	Do.
Bladen	R. S. Cromartie, M. D.	Elizabethtown	Do.
Buncombe	R. E. Fox, M. D.	Asheville	Do.
Cabarrus	D. G. Caldwell, M. D.	Concord	Do.
Cherokee	W. C. Morrow, M. D.	Murphy	Do.
Columbus	Floyd Johnson, M. D.	Whiteville	Do.
Craven	D. E. Ford, M. D.	New Bern	Do.
Cumberland	L. L. Williams, M. D.	Fayetteville	Do.
Davidson	G. C. Gambrell, M. D.	Lexington	Do.
Durham	J. H. Epperson, Ph. D.	Durham	Do.
Edgecomb	R. E. Broadway, M. D.	Tarboro	Do.
Forsythe	J. R. Hege, M. D.	Winston-Salem	Do.
Franklin	R. F. Yarborough, M. D.	Louisburg	Do.
Gaston	R. E. Rhyne, M. D.	Gastonia	Do.
Granville	J. A. Morris, M. D.	Oxford	Do.
Guilford	R. M. Buie, M. D.	Greensboro	Do.
Halifax	Z. P. Mitchell, M. D.	Weldon	Do.
Henderson	J. H. Woodcock, M. D.	Hendersonville	Do.
Johnston	C. C. Massey, M. D.	Smithfield	Do.
Lenoir	Z. V. Moseley, M. D.	Kinston	Do.
Mecklenburg	W. A. McPhaul, M. D.	Charlotte	Do.
Moore	J. Symington, M. D.	Carthage	Do.
Nash	G. F. Reeves, M. D.	Nashville	Do.
New Hanover	J. H. Hamilton, M. D.	Wilmington	Do.
Northampton	M. H. Seawell, M. D.	Jackson	Do.
Pitt	R. S. McGeachy, M. D.	Greenville	Do.
Randolph	G. H. Sumner, M. D.	Asheboro	Do.
Richmond	C. N. Sisk, M. D.	Rockingham	Do.
Robeson	E. R. Hardin, M. D.	Lumberton	Do.
Rowan	C. W. Armstrong, M. D.	Salisbury	Do.
Rutherford	J. C. Twitty, M. D.	Rutherfordton	Do.
Sampson	John D. Kerr, M. D.	Clinton	Do.
Surry	M. T. Foster, M. D.	Mount Airy	Do.
Vance	F. R. Harris, M. D.	Henderson	Do.
Wake	A. C. Bulla, M. D.	Raleigh	Do.
Wayne	F. M. Register, M. D.	Goldsboro	Do.
Wilkes	J. W. White, M. D.	Wilkesboro	Do.
Wilson	L. J. Smith, M. D.	Wilson	Do.
Ohio:			
Allen	J. J. Sutter, M. D.	Lima	Health commissioner.
Ashtabula	W. S. Weiss, M. D.	Jefferson	Do.
Belmont	F. R. Dew, M. D.	St. Clairsville	Do.
Butler	C. J. Baldridge, M. D.	Hamilton	Do.
Clinton	W. K. Ruble, M. D.	Wilmington	Do.
Columbiana	T. T. Church, M. D.	Lisbon	Do.
Coshocton	D. M. Criswell, M. D.	Coshocton	Do.
Crawford	G. T. Wasson, M. D.	Bucyrus	Do.
Cuyahoga	Robert Lockhart, M. D.	Cleveland	Do.
Darke	W. D. Bishop, M. D.	Greenville	Do.
Delaware	B. B. Barber, M. D.	Delaware	Do.
Erie	F. M. Houghtaling, M. D.	Sandusky	Do.
Fayette	J. F. Wilson, M. D.	Washington C. H.	Do.
Franklin	James A. Beer, M. D.	Columbus	Do.
Hamilton	C. R. Campbell, M. D.	Cincinnati	Do.
Hancock	S. F. Whisler, M. D.	Findlay	Do.
Hocking	M. W. Bland, M. D.	Logan	Do.
Huron	B. C. Pilkey, M. D.	Norwalk	Do.
Jackson	J. W. Clark, M. D.	Jackson	Do.
Jefferson	J. P. Young, M. D.	Steubenville	Do.
Lorain	C. D. Barrett, M. D.	Oberlin	Do.
Lucas	F. F. De Vore, M. D.	Toledo	Do.
Mahoning	J. F. Elder, M. D.	Youngstown	Do.
Marion	N. Sifritt, M. D.	Marion	Do.
Meigs	Mrs. J. N. Gilliford, M. D.	Pomeroy	Do.
Mercer	F. E. Ayers, M. D.	Celina	Do.
Miami	E. R. Hiatt, M. D.	Troy	Do.
Montgomery	H. H. Pansing, M. D.	Dayton	Do.
Morrow	R. L Pierce, M. D.	Mount Gilead	Do.
Muskingum	Beatrice Hagen, M. D.	Zanesville	Do.
Perry	F. J. Crosbie, M. D.	New Lexington	Do.
Pickaway			Do.
Preble	J. I. Nisbet, M. D.	Eaton	Do.
Richland	T. R. Meyer, M. D.	Marsfield	Do.
Ross	R. E. Bower, M. D.	Chillicothe	Do.
Sandusky	O. H. Thomas, M. D.	Fremont	Do.
Scioto	R. W. De Crow, M. D.	Portsmouth	Do.
Seneca	J J. Heaton, M. D.	Tiffin	Do.

State and county	Name of health officer	Post-office address	Official title
Ohio—Continued			
Shelby	B. S. Stephenson, M. D.	Sidney	Health commissioner.
Stark	Floyd Stamp, M. D.	Canton	Do.
Summit	R. H. Markwith, M. D.	Akron	Do.
Trumbull	L. A. Connell, M. D.	Warren	Do.
Tuscarawas	J. Blickensderfer, M. D.	New Philadelphia	Do.
Washington	A. G. Sturgiss, M. D.	Marietta	Do.
Wayne	W. G. Rhoten, M. D.	Wooster	Do.
Wood	H. J. Powell, M. D.	Bowling Green	Do.
Oklahoma:			
Carter	John L. Dorough, M. D.	Ardmore	County superintendent of health.
Le Flore	W. F. Lunsford, M. D.	Poteau	Do.
McCurtain	R. D. Williams, M. D.	Idabel	Do.
Muskogee	G. S. Atkinson, M. D.	Muskogee	Do.
Okmulgee	Thomas M. Berry, M. D.	Okmulgee	Do.
Ottawa	F. P. Helm, M. D.	Miami	Do.
Pittsburg	Chas. M. Pearce, M. D.	McAlester	Do.
Pottawatomie	H. L. Wright, M. D.	Shawnee	Do.
Seminole	George Hunter, M. D.	Wewoka	Do.
Oregon:			
Clackamas	W. H. Miller, M. D.	Oregon City	County health officer.
Coos	Milton V. Walker, M. D.	Coquille	Do.
Douglas	B. R. Shoemaker, M. D.	Roseburg	Do.
Jackson	B. C. Wilson, M. D.	Medford	Do.
Klamath	G. S. Newsom, M. D.	Klamath Falls	Do.
Lane	S. M. Kerron, M. D.	Eugene	Do.
Marion	Vernon Douglas, M. D.	Salem	Do.
Multnomah	H. R. Cliff, M. D.	Portland	Do.
Pennsylvania:			
Allegheny	John R. Conover, M. D.	Pittsburgh	District director.
Bucks	Charles W. Many, M. D.	Doylestown	Do.
Luzerne	W. F. Davison, M. D.	Wilkes-Barre	Do.
South Carolina:			
Aiken	W. G. Bodie, M. D.	Aiken	Health officer.
Anderson	E. E. Epting, M. D.	Anderson	Do.
Beaufort	H. B. Senn, M. D.	Beaufort	Do.
Berkeley	W. K. Fishburne, M. D.	Moncks Corner	Do.
Charleston	Leon Banov, M. D.	Charleston	Do.
Cherokee	E. P. White, M. D.	Gaffney	Do.
Darlington	W. A. Carrigan, M. D.	Darlington	Do.
Dillon	G. E. McDaniel, M. D.	Dillon	Do.
Dorchester	A. R. Johnston, M. D.	St. George	Do.
Fairfield	J. L. Bryson, M. D.	Winnsboro	Do.
Florence	J. G. McMaster, M. D.	Florence	Do.
Georgetown	S. S. Simons, M. D.	Georgetown	Do.
Greenville	Baylis Earle, M. D.	Greenville	Do.
Greenwood	J. E. Brodie, M. D.	Greenwood	Do.
Horry	H. F. Wilson, M. D.	Conway	Do.
Kershaw	A. W. Humphries, M. D.	Camden	Do.
Lexington	M. B. Woodward, M. D.	Lexington	Do.
Marion	M. B. Montgomery, M. D.	Marion	Do.
Newberry	H. G. Callison, M. D.	Newberry	Do.
Oconee	T. G. Hall, M. D.	Walhalla	Do.
Orangeburg	G. C. Bolin, M. D.	Orangeburg	Do.
Richland	John B. Setzler, M. D.	Columbia	Do.
Spartanburg	J. Moss Beeler, M. D.	Spartanburg	Do.
South Dakota:			
Pennington	F. J. Austin, M. D.	Rapid City	Director Pennington County Health Department.
Tennessee:			
Blount	K. A. Bryant, M. D.	Maryville	Director.
Bradley	H. M. Roberson, M. D.	Cleveland	Do.
Carter	W. W. King, M. D.	Elizabethton	Do.
Davidson	J. J. Lentz, M. D.	Nashville	Health officer.
Dyer	J. E. Powers, M. D.	Dyersburg	Do.
Gibson	F. L. Roberts, M. D.	Trenton	Do.
Giles	A. F. Barr, M. D.	Pulaski	Director.
Greene	R. S. Cowles, M. D.	Greeneville	Health officer.
Hamilton	J. C. Eldridge, M. D.	Chattanooga	Director.
Hardeman	R. L. Cobb, M. D.	Bolivar	Do.
Humphreys	W. M. Dedman, M. D.	Waverly	Do.
Knox	A. G. Hufstedler, M. D.	Knoxville	Do.
Lake	J. P. Moon, M. D.	Tiptonville	Do.
Lauderdale	R. B. Griffin, M. D.	Ripley	Do.
Lewis	S. P. Simpson, M. D.	Hohenwald	Do.
Lincoln	D. D. Howser, M. D.	Fayetteville	Do.
Maury	H. C. Busby, M. D.	Columbia	Do.
Monroe	H. M. Kelso, M. D.	Madisonville	Do.
Montgomery	F. J. Malone, M. D.	Clarksville	Health officer.
Obion	J. W. Frost, M. D.	Union City	Do.
Roane	J. C. Fly, M. D.	Kingston	Do.
Rutherford	J. B. Black, M. D.	Murfreesboro	Do.
Sevier	C. P. Wilson, M. D.	Sevierville	Director.

State and county	Name of health officer	Post-office address	Official title
Tennessee—Continued			
Shelby	W. P. Moore, M. D	Memphis	Health officer.
Sullivan	F. L. Moore, M. D	Blountville	Do.
Sumner	G. M. Morris, M. D	Gallatin	Director.
Tipton	A. J. Butler, M. D	Covington	Do.
Unicoi	W. J. Abel, M. D	Erwin	Do.
Washington	S. S. Moody, M. D	Jonesboro	Do.
Weakley	M. D. Ingram, M. D	Dresden	Do.
Williamson	W. C. Williams, M. D	Franklin	Health officer.
Wilson	W. D. Cagle, M. D	Lebanon	Director.
District No. 1	E. W. Clark, M. D	Livingston	Do.
Fentress.			
Overton.			
Pickett.			
District No. 2	F. B. Clark, M. D	Gainesboro	Do.
Clay.			
Jackson.			
District No. 3	J. B. White, M. D	Dayton	Do.
Meigs.			
Rhea.			
District No. 4	U. B. Bowden, M. D	Pelham	Do.
Bledsoe.			
Grundy.			
Sequatchie.			
Texas:			
Cameron	W. E. Spivey, M. D	San Benito	Do.
Hidalgo	J. R. Mahone, M. D	Edinburg	Do.
Jefferson	J. D. Blevins, M. D	Beaumont	Do.
McLennan	W. F. Curran, M. D	Waco	Do.
Nolan	M. H. Jensen, M. D	Sweetwater	Do.
Potter	B. M. Primer, M. D	Amarillo	Do.
Tarrant	T. C. Colley, M. D	Fort Worth	Do.
Utah:			
Davis	Sumner Gleason, M. D	Kaysville	Director Davis County health unit.
Utah	Palmer Romaine Bowdish, M. D.	Provo	Director Utah County health unit.
Virginia:			
Accomac-Northampton.[1]	C. J. Bradshaw, M. D	Accomac	Health officer.
Albemarle	G. B. Young, M. D	Charlottesville	Do.
Arlington	P. M. Chichester, M. D	Clarendon	Do.
Augusta	H. M. Wallace, M. D	Staunton	Do.
Brunswick-Greensville.[1]	T. H. Valentine, M. D	Lawrenceville	Do.
Fairfax	R. E. Feagans, M. D	Fairfax	Do.
Halifax	Kolbe Curtice	South Boston	Do.
Henrico	A. L. McLean, M. D	Richmond	Do.
Nansemond-Isle of Wight.[1]	C. H. Dawson, M. D	Suffolk	Do.
Norfolk-Princess Anne.[1]	J. Leake, M. D	Portsmouth	Do.
Rockbridge	R. P. Cooke, M. D	Lexington	Do.
Southampton	P. P. Causey, M. D	Courtland	Do.
Wise	W. R. Culbertson, M. D	Norton	Do.
Southside health district (9-county project).	W. A. Brumfield, M. D	Farmville	District health officer.
Amelia.			
Appomattox.			
Buckingham.			
Charlotte.			
Cumberland.			
Lunenburg.			
Nottoway.			
Powhatan.			
Prince Edward.			
Washington:			
Chelan	Paul L. West, M. D	Wenatchee	
Clarke	Geo. H. T. Sparling, M. D	Vancouver	
King	C. L. Dixon, M. D	Seattle	
Snohomish	H. L. Eldridge, M. D	Everett	
Spokane	W. M. Newman, M. D	Spokane	
Walla Walla	J. E. Vanderpool, M. D	Walla Walla	
Whitman	R. J. Skaife, M. D	Colfax	
Yakima	Lloyd Moffitt, M. D	Yakima	
West Virginia:			
Berkeley	Edwin Cameron, M. D	Martinsburg	County health officer.
Boone	A. M. Price, M. D	Madison	Do.
Brooke	W. J. MacDonald, M. D	Wellsburg	Do.
Fayette	H. H. Puckett, M. D	Fayetteville	Do.
Gilmer	T. E. Cato, M. D	Glenville	Do.
Hancock	J. E. Fisher, M. D	New Cumberland	Do.

[1] Bicounty project.

State and county	Name of health officer	Post-office address	Official title
West Virginia—Con.			
Harrison	V. A. Selby, M. D., D. P. H.	Clarksburg	County health officer.
Kanawha	John Thames, M. D	Charleston	Do.
Logan	V. A. Deason, M. D	Logan	Do.
Marion	F. F. Sowers, M. D	Fairmont	Do.
Marshall	W. G. C. Hill, M. D	Moundsville	Do.
Monongalia	R. C. Farrier, M. D	Morgantown	Do.
Ohio	W. H. McLain, M. D	Wheeling	Do.
Preston	L. T. Browning, M. D	Kingwood	Do.
Raleigh	A. F. Murphy, M. D	Beckley	Do.
Wood	Arthur D. Knott, M. D., D. P. H.	Parkersburg	Do.

COMPARATIVE CURRENT STATE MORTALITY STATISTICS[1]

The present report on mortality from certain causes covers, for a majority of the States included, the months January to September, 1931. For some of the States the data for all of these months are not available. Similar reports have been previously published, covering periods of approximately 3 months and 6 months.[2] It is impossible to present data for all of the States on this basis of 3, 6, and 9 months, but each State is included in each report for as many months as possible with rates in each case for the "year to date" and comparative rates for the same period in preceding years. This arrangement makes it possible to compare the mortality of the current calendar year with the mortality of preceding years in the same State.

The rates are computed from current and generally preliminary reports furnished by State departments of health. Because of (*a*) some lack of uniformity in the method of classifying deaths according to cause, (*b*) some delayed death certificates, and (*c*) various other reasons, these preliminary rates can not be expected to agree in all instances with final rates published by the Bureau of the Census, which are based on a complete review and retabulation of the individual death certificates from each State. The preliminary rates given in the accompanying table are intended to serve only as a current index of mortality until final figures are issued by the Bureau of the Census.

Populations used in computing rates are estimates as of July 1 of each year, based on the 1920 and 1930 censuses.

[1] From the Office of Statistical Investigations, United States Public Health Service.

[2] Public Health Reports, Vol. 46 No. 27, page 1578 and No. 36, page 2120.

Death rates from certain causes in stated periods of 1931, with comparative data for corresponding periods in preceding years

State	Period	Year	Rate per 1,000 population, all causes	Rate per 1,000 live births			Rates per 100,000 population (annual basis)																			
				Infant mortality	All except malformations and early infancy	Maternal mortality (143-150)	Typhoid fever (1)	Measles (7)	Scarlet fever (8)	Whooping cough (9)	Diphtheria (10)	Influenza (11)	Poliomyelitis (22)	Lethargic encephalitis (23)	Meningococcus meningitis (24)	Tuberculosis, all forms (31-37)	Cancer, all forms (45-49)	Diabetes (57)	Diseases of the nervous system (70-86)	Cerebral hemorrhage, apoplexy (74)	Diseases of the circulatory system (87-96)	Diseases of the heart (87-90)	Diseases of the respiratory system (97-107)	Pneumonia, all forms (100-101)	Diseases of the digestive system (106-127)	Diarrhea and enteritis under 2 years (113)	Nephritis (128, 129)
16 States*	January to September	1931	11.2	63	30	6.4	2.6	3.4	2.3	3.3	2.7	29.5	1.3	1.0	2.5	64.6	96.9	20.2	117.0	91.3	214.7	214.0	95.2	83.8	72.2	12.9	85.6
		1930	11.4	63	30	6.3	3.0	3.9	1.9	4.6	4.0	19.6	1.0	1.0	3.7	68.2	96.9	19.7	118.2	90.9	228.1	210.5	94.8	82.4	78.9	17.0	91.8
Alabama	do	1931	10.6	67	41	7.8	6.1	8.0	1.0	3.4	4.4	45.2	.8	1.2	3.3	84.0	56.2	10.0	89.9	58.3	126.6	116.8	96.8	87.6	73.3	20.2	88.5
		1930	11.3	74	45	7.8	7.4	3.4	.8	10.4	3.4	34.4	.8	.7	1.5	82.3	50.8	8.1	93.9	60.1	144.0	127.1	97.6	86.8	88.2	30.5	98.3
		1929	12.4	78	47	8.9	7.5	2.8	1.0	10.3	5.7	143.9	1.0	1.1	1.0	82.9	46.6	8.5	96.8	58.3	136.8	127.4	98.7	91.4	101.3	28.5	89.8
		1928	12.0	81	50	8.5	8.9	10.2	.2	7.6	5.0	60.6	.8	(1)	(1)	89.3	47.6	9.7	(1)	57.1	(1)	127.4	(1)	103.9	(1)	37.1	87.7
		1927	10.1	63	34	7.4	11.9	4.6	.7	15.3	5.7	26.6	.7	(1)	(1)	86.7	47.2	7.6	(1)	47.0	(1)	97.9	(1)	60.4	(1)	29.8	73.4
Arizona	January	1931	16.6	182	131	13.5	2.6	15.8	(2)	5.3	10.5	84.1	(2)	2.6	18.4	346.9	39.4	7.9	113.0	57.8	165.6	128.8	349.5	247.0	81.5	15.8	63.1
		1930	16.3	136	97	4.2	8.1	(2)	2.7	8.1	10.7	43.0	(2)	2.7	56.4	351.9	51.0	13.4	145.1	61.8	163.9	150.4	314.3	263.3	86.0	37.6	37.6
		1929	14.7	119	78	3.2	13.7	(1)	(2)	5.5	(2)	11.0	(2)	2.7	11.0	316.1	41.2	(2)	79.7	46.7	142.9	131.9	112.7	74.2	236.4	151.2	44.0
California	January to June	1931	11.7	60	29	6.3	1.5	3.3	1.3	2.7	2.7	19.2	.7	.8	3.1	96.2	124.5	19.8	110.0	78.9	290.9	256.1	89.8	76.1	74.7	10.3	85.6
		1930	11.9	60	29	5.9	1.4	8.6	1.8	3.8	3.6	10.5	1.4	1.1	3.9	108.0	122.2	20.3	114.8	83.3	291.4	248.2	95.1	80.9	78.4	15.1	84.6
		1929	12.6	68	36	5.3	1.5	.3	2.5	6.4	3.0	30.8	.8	1.5	9.8	116.2	117.0	19.4	119.0	83.4	304.1	267.8	109.0	95.0	76.4	10.9	96.1
		1928	12.3	63	34	5.7	1.7	.8	1.0	5.8	6.1	16.8	1.8	1.1	1.9	120.2	119.7	19.2	120.4	84.9	276.8	239.4	99.2	87.6	79.1	13.9	99.9
Connecticut	January to September	1931	10.3	59	(1)	(1)	.8	2.7	.8	2.7	.8	20.6	6.3	1.3	.8	53.4	109.9	22.2	(2)	(1)	(1)	197.1	(2)	76.3	(2)	7.2	84.3
		1930	10.8	59	(2)	(1)	.7	.1	2.0	1.9	2.4	15.8	1.4	1.0	1.2	61.8	115.7	17.9	(2)	(2)	(2)	186.0	(2)	94.3	(2)	9.2	71.7
		1929	11.5	69	(1)	(1)	.8	4.0	1.2	2.9	3.5	47.1	.3	1.4	1.0	66.3	114.4	17.2	(2)	(1)	(1)	195.7	(1)	113.7	(2)	14.1	71.6
		1928	11.4	64	(1)	(1)	.9	4.8	1.8	7.3	5.2	23.7	.8	1.4	1.0	71.4	107.4	(1)	(1)	(1)	(1)	175.7	(1)	111.4	(2)	7.2	(2)
		1927	10.7	61	(1)	(1)	1.0	1.8	1.3	2.5	5.3	20.9	.8	(2)	.8	69.8	104.7	(1)	(1)	(1)	(1)	182.3	(1)	86.4	(1)	9.9	(2)
District of Columbia	do	1931	15.8	71	35	5.9	3.3	3.3	.5	4.1	5.2	21.7	.8	.5	6.8	121.0	133.7	25.2	158.4	108.2	359.3	295.3	170.0	147.3	110.6	17.1	145.1
		1930	15.1	70	36	9.8	3.8	.3	2.5	3.6	3.3	6.6	.3	.5	1.4	120.3	134.5	28.2	143.5	101.4	373.4	318.8	137.2	116.4	107.7	19.4	158.3
		1929	15.4	73	36	6.0	3.0	(2)	2.8	5.0	6.6	25.5	.8	.8	2.2	122.6	129.2	26.8	130.9	79.1	372.6	319.5	170.7	147.7	100.4	20.5	165.2
		1928	15.1	(1)	(1)	(1)	2.5	4.7	1.7	3.6	7.5	15.6	1.4	1.1	.8	125.3	126.7	29.0	146.3	102.7	347.8	308.5	161.9	135.7	99.9	15.6	158.6
		1927	15.0	(1)	(1)	(1)	2.3	(2)	.8	3.7	5.6	24.0	.8	2.0	.8	132.7	127.0	22.3	153.6	106.7	331.4	292.1	145.1	121.7	91.2	10.7	179.2

Florida	do	1931	11.9	64	31	10.4	6.7	3.1	.5	1.8	3.1	51.4	.3	.5	.7	70.5	68.1	14.2	124.9	104.8	201.2	185.5	69.6	56.6	88.1	11.7	114.5
		1930	12.2	65	32	9.7	5.3	5.5	.3	4.0	3.3	23.5	1.1	.5	.5	68.5	69.6	14.6	128.3	104.8	199.5	174.6	76.7	58.3	92.0	17.4	121.0
Georgia	January to July	1931	11.3	75	(1)	10.8	10.1	3.2	1.8	4.5	3.0	66.3	.7	.4	2.0	75.4	51.4	10.6	118.5	(1)	149.2	135.2	109.2	100.0	70.3	17.1	110.0
		1930	12.1	85	(1)	10.2	10.9	6.9	.9	10.3	2.6	43.4	1.1	.3	3.9	76.5	50.6	11.5	131.7	(1)	156.1	141.1	115.3	99.4	85.3	24.0	136.5
		1929	12.0	(1)	(1)	(1)	8.2	1.7	.8	8.2	3.3	132.4	(1)	(1)	(1)	77.8	45.6	9.8	(1)	(1)	(1)	123.0	(1)	88.8	(1)	18.5	132.5
Hawaii	January to September	1931	9.9	74	(1)	(1)	2.8	10.8	(2)	.3	5.9	11.9	1.0	(2)	2.8	99.8	52.7	12.9	(1)	56.2	(1)	108.2	(1)	100.9	115.2	50.3	74.7
		1930	10.4	81	(1)	(1)	2.9	5.4	.4	4.7	11.9	8.7	(2)	(2)	5.1	98.8	54.1	13.0	(1)	45.1	(1)	122.7	(1)	118.0	143.2	84.4	70.6
		1929	12.8	104	(1)	(1)	4.5	6.7	(2)	36.2	9.7	22.0	1.1	.7	26.9	103.7	64.2	12.7	(1)	54.9	(1)	119.9	(1)	156.1	179.6	112.4	(1)
		1928	11.8	(1)	(1)	(1)	7.7	2.3	1.5	2.7	13.8	21.8	(2)	(2)	4.2	125.9	62.4	6.5	(1)	57.0	(1)	113.7	(1)	153.5	146.6	83.4	(1)
Idaho	do	1931	9.8	59	26	2.9	2.4	2.4	2.1	7.8	1.8	10.8	.9	2.4	7.2	31.1	66.7	10.2	122.3	98.1	184.5	162.1	88.2	79.6	58.0	4.5	38.0
		1930	9.5	45	19	4.7	2.4	1.2	1.5	4.5	3.6	9.0	(2)	(2)	6.0	33.9	61.1	6.0	99.5	66.8	186.1	163.6	119.9	102.8	61.4	3.6	36.9
Illinois	January to July	1931	(1)	(1)	(1)	(1)	1.1	7.1	6.4	2.5	5.3	30.9	.5	.6	4.3	63.8	(1)	(1)	(1)	(1)	(1)	(1)	(1)	89.8	(1)	(1)	(1)
		1930	(1)	(1)	(1)	(1)	1.2	1.6	5.0	2.0	7.4	14.2	.2	.4	3.2	63.9	(1)	(1)	(1)	(1)	(1)	(1)	(1)	74.1	(1)	(1)	(1)
		1929	(1)	(1)	(1)	(1)	1.2	5.8	4.8	3.1	9.8	52.9	.1	1.0	4.0	77.2	(1)	(1)	(1)	(1)	(1)	(1)	(1)	100.0	(1)	(1)	(1)
		1928	(1)	(1)	(1)	(1)	1.2	1.4	2.2	4.1	7.9	(1)	(1)	(1)	3.2	77.9	(1)	(1)	(1)	(1)	(1)	(1)	(1)	116.8	(1)	(1)	(1)
		1927	(1)	(1)	(1)	(1)	1.5	6.7	2.9	4.5	8.0	(1)	(1)	(1)	1.8	81.3	(1)	(1)	(1)	(1)	(1)	(1)	(1)	86.9	(1)	(1)	(1)
Indiana	January to September	1931	11.6	60	28	6.4	2.4	5.8	3.7	4.1	2.9	39.6	.6	.9	5.9	59.1	103.2	16.0	(1)	107.3	(1)	170.0	(1)	87.9	(1)	11.9	74.8
		1930	11.8	58	27	6.1	3.7	2.0	2.2	3.6	3.6	19.8	.6	1.2	9.4	66.6	101.3	15.8	(1)	108.7	(1)	186.1	(1)	82.3	(1)	18.1	87.1
		1929	13.7	68	(1)	7.2	3.3	5.4	3.9	6.7	4.2	77.3	.2	.6	1.5	79.5	108.9	16.6	(1)	119.2	(1)	225.9	(1)	110.5	(1)	20.3	89.3
		1928	11.9	64	(1)	6.2	3.6	2.5	2.1	4.9	4.5	44.8	(1)	(1)	(1)	70.9	101.1	(1)	(1)	109.7	(1)	177.5	(1)	96.6	(1)	18.5	80.7
		1927	11.5	60	(1)	7.0	3.9	2.2	2.4	6.3	5.4	27.2	(1)	(1)	(1)	73.2	102.4	(1)	(1)	99.7	(1)	168.1	(1)	75.2	(1)	16.4	82.0
Iowa	do	1931	10.7	52	23	5.1	1.5	.2	2.1	2.6	1.3	30.4	.9	2.0	3.2	28.4	115.0	20.5	140.8	111.6	218.0	207.1	87.0	72.1	72.0	5.6	46.0
		1930	10.7	55	21	7.7	1.4	10.4	3.1	4.1	1.7	26.6	1.5	2.5	3.4	34.2	111.0	21.3	135.1	95.1	243.9	191.4	87.4	79.2	74.2	6.1	41.6
		1929	10.5	54	21	5.9	1.6	1.2	2.2	4.9	1.1	62.5	.8	1.2	1.8	35.4	109.0	18.1	132.4	96.8	249.5	217.6	76.9	62.8	63.1	4.1	51.1
		1928	10.2	57	22	5.5	2.3	(2)	1.8	3.2	2.1	41.2	.7	1.4	1.1	36.2	111.4	18.3	134.4	98.2	233.9	207.7	75.6	65.4	68.2	6.0	52.7
Kansas	do	1931	9.9	52	22	6.3	1.9	.6	1.3	1.3	1.8	34.8	.6	.6	1.3	38.2	94.5	22.4	120.9	94.9	188.2	147.7	62.2	54.2	74.4	8.0	96.6
		1930	10.4	53	23	7.6	2.2	5.5	2.6	4.1	3.1	31.5	2.9	.7	3.2	38.8	95.3	20.4	127.8	99.2	199.7	172.3	64.7	55.3	77.1	11.7	101.4
		1929	10.5	61	29	6.7	2.7	3.1	3.1	4.3	2.4	60.5	.5	.7	2.9	42.1	91.8	20.8	137.4	108.9	186.9	162.3	68.9	58.3	74.9	10.9	88.9
		1928	10.7	60	29	8.0	2.4	1.3	2.5	5.5	2.2	58.7	.4	1.0	1.0	41.0	95.9	20.1	139.2	106.4	197.7	171.5	69.7	56.8	88.1	18.0	90.2
Louisiana	January to August	1931	11.1	72	42	9.5	12.6	.8	.7	5.7	4.0	54.9	1.0	.6	2.8	86.5	66.3	14.0	78.1	54.3	201.4	183.8	101.8	91.1	92.3	22.2	110.4
		1930	11.9	86	53	10.4	10.8	6.6	.4	6.4	4.3	41.2	2.3	.7	4.4	90.1	66.6	13.3	92.8	62.3	215.7	198.7	103.5	95.5	91.2	24.9	112.5
		1929	11.8	80	58	11.1	9.9	3.2	.5	6.4	4.3	101.2	.6	.4	2.5	89.3	63.6	10.7	89.3	56.8	204.3	189.2	94.3	83.8	91.5	27.2	107.5
		1928	12.2	83	52	11.7	11.3	12.6	.3	9.7	4.9	64.4	.9	1.0	.8	96.8	63.0	12.2	95.4	64.7	190.7	178.6	112.2	100.7	95.1	28.0	112.2
Maryland	January to September	1931	13.4	77	43	6.3	4.4	7.8	2.0	6.6	2.3	25.2	.6	1.5	2.1	99.0	112.0	22.2	138.2	110.0	288.9	252.7	146.3	133.5	89.6	28.8	139.0
		1930	13.3	71	37	5.7	5.3	.5	2.3	5.2	2.5	11.3	.3	1.3	1.6	105.3	112.9	22.3	141.7	104.8	279.5	244.0	130.9	116.6	88.7	28.6	151.5
Michigan	do	1931	10.0	57	23	6.2	1.3	.7	2.7	4.0	3.0	20.2	2.1	.7	2.9	56.2	91.4	18.5	112.9	89.2	230.4	187.8	74.3	61.9	71.3	7.7	59.3
		1930	10.8	64	27	6.3	1.5	6.1	3.1	4.1	6.5	12.9	.6	.9	9.3	62.7	91.2	17.5	118.9	90.2	230.0	203.2	88.2	72.6	82.6	13.4	63.4
		1929	12.1	68	33	6.3	1.7	3.5	3.4	6.2	10.0	46.0	.9	1.2	20.9	70.3	92.9	20.5	134.1	93.7	249.7	218.1	110.9	95.1	88.0	16.3	67.6

* The States included are Alabama, District of Columbia, Florida, Idaho, Indiana, Iowa, Kansas, Maryland, Michigan, Minnesota, New Jersey, New York (exclusive of New York City), Ohio, Pennsylvania, Tennessee, Virginia.

[1] Not available.

[2] No deaths.

Death rates from certain causes in stated periods of 1931, with comparative data for corresponding periods in preceding years—Continued

State	Period	Year	Rate per 1,000 population, all causes	Rate per 1,000 live births			Rates per 100,000 population (annual basis)																				
				Infant mortality	All except malformations and early infancy	Maternal mortality (143-150)	Typhoid fever (1)	Measles (7)	Scarlet fever (8)	Whooping cough (9)	Diphtheria (10)	Influenza (11)	Poliomyelitis (22)	Lethargic encephalitis (23)	Meningococcus meningitis (24)	Tuberculosis, all forms (31-37)	Cancer, all forms (45-49)	Diabetes (57)	Diseases of the nervous system (70-86)	Cerebral hemorrhage, apoplexy (74)	Diseases of the circulatory system (87-96)	Diseases of the heart (87-90)	Diseases of the respiratory system (97-107)	Pneumonia, all forms (100-101)	Diseases of the digestive system (108-127)	Diarrhea and enteritis under 2 years (113)	Nephritis (128, 129)
Minnesota	January to September	1931	9.9	48	18	4.0	0.3	0.4	0.9	2.5	1.1	25.7	2.0	1.2	1.8	43.3	120.5	19.7	100.4	76.6	199.3	179.3	80.4	72.0	72.7	4.1	51.5
		1930	9.7	44	15	5.2	1.0	4.3	1.6	2.8	1.4	15.6	1.4	1.5	2.1	48.4	118.3	18.0	103.7	78.9	188.2	171.2	73.9	68.0	70.0	6.4	52.1
		1929	10.0	50	19	4.1	1.0	3.6	2.6	5.1	2.3	46.6	.4	2.4	2.0	58.0	112.1	18.7	101.6	75.2	199.1	154.3	75.4	68.1	67.1	4.1	55.0
		1928	9.9	(1)	(1)	(1)	.6	.4	2.6	2.6	2.5	34.8	2.2	2.5	1.6	58.8	114.4	19.6	(1)	(1)	(1)	151.7	(1)	66.6	(1)	(1)	57.4
Mississippi	January to August	1931	10.3	(1)	(1)	(1)	7.5	.4	.4	2.9	3.8	50.7	.3	.1	2.1	77.2	49.5	7.4	(1)	73.3	(1)	100.4	(1)	65.7	(1)	15.0	87.8
		1930	11.4	(1)	(1)	(1)	9.0	1.9	.4	8.9	3.4	33.9	.5	.2	9.2	85.1	47.0	8.9	(1)	70.2	(1)	106.9	(1)	68.3	(1)	13.9	101.9
		1929	12.1	(1)	(1)	(1)	9.3	6.0	(2)	11.2	2.7	146.4	.8	.5	.6	77.5	44.1	6.5	(1)	64.0	(1)	99.2	(1)	64.1	(1)	21.4	92.4
Montana	January to September	1931	9.9	57	(1)	6.1	2.7	.2	2.2	10.7	1.7	37.5	2.0	1.0	2.5	60.9	71.8	14.2	97.2	68.6	153.6	133.0	80.5	70.8	83.5	7.7	65.4
		1930	9.7	(1)	(1)	(1)	3.0	3.0	3.0	3.0	.5	22.7	.5	1.5	5.5	63.9	78.8	17.5	96.8	63.9	155.6	141.2	96.3	84.3	88.1	12.5	73.2
Nebraska	January to July	1931	9.8	51	22	5.5	1.1	.1	2.2	5.5	2.5	28.8	1.0	.4	2.6	26.5	96.4	22.8	115.2	91.4	195.0	167.1	73.4	65.0	70.8	6.0	70.3
		1930	9.9	48	18	5.6	.9	10.5	3.2	3.5	3.2	20.1	.4	.7	3.1	27.4	106.7	23.4	117.7	91.1	201.5	177.5	85.8	74.6	73.3	5.2	58.8
		1929	10.4	59	30	6.6	1.5	2.9	5.9	14.0	3.5	69.6	.3	.9	3.1	33.7	96.7	23.4	119.3	89.9	200.6	179.2	83.4	72.9	73.1	5.1	57.7
New Jersey	January to September	1931	10.6	62	(1)	6.4	.9	3.2	2.5	3.2	3.4	15.6	3.8	.9	1.9	66.6	110.9	24.0	105.8	78.3	260.3	218.3	93.5	84.8	61.1	9.2	95.6
		1930	10.7	57	(1)	5.4	1.0	4.0	1.6	2.2	8.9	8.8	.3	1.0	1.9	71.5	105.6	23.7	108.8	80.6	254.7	230.1	91.6	81.4	73.1	11.4	99.5
		1929	11.6	62	(1)	5.5	1.1	1.0	1.1	5.4	10.3	30.1	.4	1.2	2.4	73.9	109.0	22.8	112.1	82.0	267.4	245.6	124.0	110.2	73.5	11.8	100.0
		1928	11.5	(1)	(1)	(1)	1.5	8.3	1.8	5.0	12.1	13.8	(1)	(1)	(1)	74.9	103.1	(1)	113.6	(1)	251.1	(1)	121.2	73.7	77.2	14.8	103.6
		1927	11.2	(1)	(1)	(1)	1.1	.7	3.0	5.0	9.2	12.3	(1)	(1)	(1)	76.0	103.6	(1)	122.1	(1)	230.5	(1)	106.6	57.4	80.0	17.2	94.7
New York[3]	do	1931	12.6	61	24	6.2	.9	1.8	2.7	3.0	1.6	15.8	2.6	1.1	1.0	64.8	132.0	26.5	128.5	102.3	351.6	362.2	92.0	79.0	71.9	9.6	114.8
		1930	12.6	60	24	5.7	1.3	1.8	1.4	4.2	2.7	10.7	1.9	.8	1.3	69.3	126.2	23.1	134.6	103.2	337.0	293.5	99.6	85.1	76.7	10.6	118.5
		1929	13.6	65	27	5.6	1.5	3.1	2.1	4.1	3.1	46.3	1.2	1.0	1.2	75.2	124.9	26.6	149.4	114.1	366.1	319.3	126.0	109.8	73.3	10.8	112.7
		1928	13.1	66	27	6.7	1.7	4.1	2.2	4.2	4.2	17.5	1.6	.9	.7	77.7	123.4	25.1	152.3	117.1	349.8	300.3	112.3	98.6	76.9	12.6	110.5
		1927	12.9	64	26	6.3	2.1	3.3	1.9	4.0	4.5	14.4	.7	.9	.2	80.9	124.8	24.8	148.9	111.7	331.0	285.3	105.5	88.2	78.3	13.3	115.3

North Carolina	do	1931	10.4	75	(1)	8.3	5.1	3.9	1.8	6.0	4.5	41.6	.5	.5	.7	72.2	(1)	(1)	(1)	(1)	(1)	(1)	(1)	93.9	(1)	23.3	(2)
		1930	11.5	79	(1)	7.7	4.2	.1	.9	10.3	5.0	26.8	.3	.6	.8	77.1	(1)	(1)	(1)	(1)	(1)	(1)	(1)	94.4	------	34.5	(2)
		1929	11.8	(1)	(1)	(1)	5.7	.7	1.4	9.3	6.7	95.2	.7	(1)	.6	84.1	(1)	(1)	(1)	(1)	(1)	(1)	(1)	89.5	(1)	32.5	(2)
		1928	11.4	(1)	(1)	(1)	5.5	21.8	1.2	7.0	6.2	33.9	.5	.6	(1)	81.3	(1)	(1)	(1)	(1)	(1)	(1)	(1)	94.8	(1)	42.9	(2)
Ohio	do	1931	11.1	60	27	6.6	2.1	2.6	3.4	2.2	2.0	34.3	.8	.9	1.7	64.6	97.9	21.0	131.2	108.4	253.2	218.5	92.5	82.4	63.4	10.3	74.7
		1930	11.5	57	24	5.6	2.7	3.6	2.2	3.3	2.6	20.5	1.3	1.0	2.0	66.0	106.6	21.6	118.4	107.4	256.3	226.3	85.9	75.1	65.6	16.0	79.6
		1929	12.6	(1)	(1)	(1)	1.9	4.6	2.2	9.5	2.9	74.3	.7	(1)	2.9	73.5	103.1	(1)	(1)	101.2	(1)	214.4	(1)	92.2	(1)	12.9	83.5
		1928	12.0	(1)	(1)	(1)	1.8	3.7	2.1	3.4	5.4	38.3	1.2	(1)	1.9	75.3	107.2	(1)	(1)	102.1	(1)	(1)	(1)	90.5	(1)	13.7	69.4
Pennsylvania	do	1931	11.4	67	35	6.1	1.5	5.2	2.5	2.7	3.1	32.7	.7	1.1	2.1	58.9	94.0	24.4	109.8	82.6	262.9	232.2	114.0	100.2	73.0	17.0	93.1
		1930	11.3	68	36	5.7	2.1	2.6	2.0	4.3	5.0	20.7	.5	1.0	2.3	61.4	95.4	21.4	112.0	82.7	258.1	229.2	108.6	95.0	81.3	21.2	101.7
		1929	12.4	72	39	6.3	2.0	4.6	2.7	6.4	6.7	67.7	.5	1.1	2.3	67.3	100.3	21.9	119.8	86.6	260.5	234.9	126.7	109.1	80.4	19.7	104.8
		1928	12.3	70	36	5.9	1.8	6.0	2.5	4.5	8.6	33.6	.8	1.2	1.0	72.6	99.4	22.3	(1)	90.2	(1)	230.4	(1)	114.7	(1)	22.6	111.0
South Carolina	January to August	1931	(1)	(1)	(1)	(1)	13.3	3.1	.5	5.8	2.6	87.5	1.5	1.1	2.8	70.2	47.6	9.7	(1)	(1)	277.6	(1)	(1)	112.4	(1)	(1)	122.5
		1930	(1)	(1)	(1)	(1)	16.7	.3	.3	13.5	4.5	43.3	1.0	2.8	4.7	78.9	38.5	8.3	(1)	(1)	316.3	(1)	(1)	106.2	(1)	(1)	119.6
		1929	(1)	(1)	(1)	(1)	14.2	.1	.6	14.2	5.4	104.2	.6	2.5	2.4	82.1	42.0	8.8	(1)	(1)	309.0	(1)	(1)	95.0	(1)	(1)	102.4
		1928	(1)	(1)	(1)	(1)	17.3	23.8	.3	12.1	4.6	51.7	1.0	2.9	1.7	88.8	44.2	8.3	(1)	(1)	303.6	(1)	(1)	118.7	(1)	(1)	108.2
		1927	(1)	(1)	(1)	(1)	21.5	3.5	.2	12.8	3.8	20.0	1.3	3.0	1.7	92.6	40.7	7.3	(1)	(1)	295.3	(1)	(1)	108.2	(1)	(1)	96.6
South Dakota	January to June	1931	8.4	60	28	4.6	1.4	(3)	.6	4.9	2.6	36.0	2.0	.6	.3	34.0	81.8	20.5	100.1	62.5	153.5	131.7	89.0	72.3	69.1	6.0	38.3
		1930	7.9	57	27	6.8	.9	5.2	1.2	3.5	2.0	27.4	.6	.3	(3)	42.0	68.5	19.2	82.8	53.0	135.2	112.2	75.5	62.9	52.5	7.3	46.9
		1929	9.1	69	37	6.3	1.8	3.5	4.1	5.0	1.5	87.8	2.1	.9	2.6	54.0	63.4	20.6	89.3	54.9	150.3	133.9	94.8	80.7	63.1	4.4	34.9
		1928	8.9	64	30	4.4	1.8	2.1	3.5	4.4	3.0	51.6	(1)	(1)	(1)	71.7	69.0	18.6	95.0	53.1	140.5	120.7	95.0	80.0	64.6	8.0	40.7
Tennessee	January to September	1931	10.7	71	46	7.7	9.3	5.1	2.1	5.4	4.0	44.4	.7	.4	4.9	109.9	55.1	10.1	95.6	59.5	127.1	112.3	99.5	88.5	86.3	23.3	65.9
		1930	11.3	69	41	8.4	11.2	6.2	1.3	6.4	3.6	33.8	1.0	.8	11.7	118.7	56.1	10.6	103.3	62.4	135.1	120.9	96.7	86.2	95.7	27.1	76.1
		1929	12.2	82	56	8.2	10.6	.5	1.9	7.8	4.5	128.9	1.1	.7	1.9	125.3	56.3	9.8	98.4	56.4	141.1	129.1	99.9	88.5	89.1	26.0	70.7
		1928	11.9	(1)	(1)	(1)	12.2	10.3	1.3	5.5	4.0	56.6	1.3	.8	.5	125.4	58.0	9.3	(1)	(1)	(1)	121.0	(1)	101.4	(1)	34.6	(2)
		1927	11.3	(1)	(1)	(1)	20.5	4.9	1.5	14.6	4.9	31.6	.9	.4	.5	131.2	(1)	(1)	(1)	(1)	(1)	(1)	(1)	76.4	(1)	29.3	(2)
Virginia	do	1931	12.0	75	(1)	7.7	6.9	4.2	1.3	5.9	3.7	58.0	.5	.5	2.0	90.0	61.9	15.3	128.5	100.3	214.3	192.9	96.6	86.3	73.8	23.2	104.1
		1930	11.8	72	(1)	6.5	5.6	4.9	1.1	12.5	3.7	30.1	.9	1.0	2.8	87.7	62.6	14.6	128.3	97.3	204.6	177.9	93.2	80.7	85.0	29.1	107.8
		1929	12.2	77	(1)	7.1	3.9	1.8	.7	11.6	4.9	115.1	1.2	1.2	1.5	93.6	63.7	11.1	126.5	89.3	194.1	175.9	83.3	71.9	74.7	21.8	101.7
West Virginia	do	1931	9.1	(1)	(1)	5.4	8.3	2.2	1.7	7.6	3.4	40.8	1.0	.5	.8	58.1	58.9	11.0	93.4	66.6	128.7	107.6	94.0	85.4	98.5	46.5	60.4
		1930	10.1	(1)	(1)	6.0	10.2	5.8	1.9	13.4	4.4	26.9	.4	.5	1.4	65.8	58.0	11.9	88.4	59.4	143.9	113.6	88.8	80.7	119.2	64.7	52.3
		1929	10.9	(1)	(1)	5.8	9.9	5.6	1.2	13.7	3.4	114.5	1.0	.6	.9	68.8	58.7	9.0	86.2	48.4	153.5	110.8	96.1	80.5	112.6	63.0	53.8
Wisconsin	do	1931	10.5	56	(1)	4.0	.7	1.8	2.4	2.2	1.7	21.8	1.7	1.8	1.5	50.6	115.3	(1)	(1)	(1)	(1)	(1)	(1)	70.7	(1)	10.2	(2)
		1930	10.3	56	(1)	4.9	.7	4.2	3.2	3.6	2.4	16.0	.8	1.0	2.4	52.0	111.2	(1)	(1)	(1)	(1)	(1)	(1)	71.3	(1)	9.7	(2)
		1929	10.9	64	(1)	(1)	1.3	3.0	2.6	4.1	2.4	51.9	.5	1.8	4.4	54.5	108.9	(1)	(1)	(1)	(1)	(1)	(1)	76.7	(1)	12.3	(2)
		1928	(1)	61	(1)	(1)	.7	.4	2.4	2.3	3.2	32.9	.6	1.7	3.1	59.5	(1)	(1)	(1)	(3)	(1)	(1)	(3)	82.9	(3)	11.8	(2)

[1] Not available.

[2] No deaths

[3] Exclusive of New York City.

COURT DECISION RELATING TO PUBLIC HEALTH

Liability of municipality for damage resulting from sewage disposal.—(Georgia Court of Appeals; City of Barnesville *v.* Parham, 160 S. E. 879; decided Oct. 3, 1931.) In an action brought against a city for damages caused by the emptying of sewage by the city into a stream which flowed through the plaintiff's land, the court of appeals in a syllabus opinion stated, in part, as follows:

A landowner may recover damages for the impaired rental value of his land and tenant houses thereon, resulting from a continuing nuisance caused by the emptying by a municipality of obnoxious and deleterious sewage into a stream which flows through the land, and also for damage to him while living in a dwelling house on the land, resulting from the contaminated atmosphere, poisonous gases, offensive odors and vapors caused by the contamination of the stream by the defendant. The measure of damages for the impaired rental value of the land is the difference between the rental value before the creation of the nuisance and the rental value afterwards. [Cases cited.]

DEATHS DURING WEEK ENDED NOVEMBER 28, 1931

Summary of information received by telegraph from industrial insurance companies for the week ended November 28, 1931, and corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

	Week ended Nov. 28, 1931	Corresponding week, 1930
Policies in force	74, 138, 400	75, 166, 430
Number of death claims	11, 566	11, 701
Death claims per 1,000 policies in force, annual rate	8. 1	8. 1
Death claims per 1,000 policies, first 48 weeks of year, annual rate	9. 6	9. 5

Deaths [1] from all causes in certain large cities of the United States during the week ended November 28, 1931; infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon midyear population estimates derived from the 1930 census]

City	Week ended Nov. 28, 1931				Corresponding week, 1930		Death rate [2] for the first 48 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Total (82 cities)	7,167	10.5	516	[4] 40	10.7	652	11.8	11.9
Akron	33	6.5	3	30	5.9	5	7.5	7.8
Albany [5]	41	16.6	1	20	11.8	3	14.0	14.8
Atlanta [6]	90	16.9	8	79	9.0	2	15.1	15.3
White	54	15.3	7	104	5.5	1	11.7	11.4
Colored	36	20.1	1	29	16.1	1	21.8	23.0
Baltimore [5 6]	173	11.1	13	45	12.1	19	14.2	14.0
White	127	9.9	9	40	10.9	14	12.9	12.7
Colored	46	16.3	4	64	17.8	5	20.1	19.8

See footnotes at end of table.

Deaths [1] from all causes in certain large cities of the United States during the week ended November 28, 1931; infant mortality, annual death rate, and comparison with corresponding week of 1930—Continued

City	Week ended Nov. 28, 1931				Corresponding week, 1930		Death rate [2] for the first 48 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Birmingham [6]	51	9.9	3	30	12.8	2	13.1	13.6
White	22	6.9	2	34	11.6	0	10.1	10.1
Colored	29	14.7	1	24	14.6	2	18.1	19.3
Boston	188	12.5	12	35	13.6	31	14.2	14.1
Bridgeport	32	11.3	4	67	6.7	1	11.0	10.8
Buffalo	125	11.2	9	41	11.5	14	12.9	12.9
Cambridge	29	13.3	6	124	11.5	1	12.1	11.8
Camden	37	16.2	6	104	14.9	3	14.1	13.5
Canton	15	7.3	1	25	6.4	1	10.0	9.9
Chicago [6]	582	8.8	34	31	9.9	50	10.5	10.4
Cincinnati	98	11.2	4	24	13.7	8	15.8	15.6
Cleveland	166	9.5	3	9	9.2	9	11.1	11.1
Columbus	78	13.8	2	19	13.8	7	13.5	15.4
Dallas [6]	50	9.5	9	-------	10.9	9	11.1	11.5
White	41	9.5	7	-------	10.3	7	9.8	10.5
Colored	9	9.9	2	-------	13.8	2	17.8	16.2
Dayton	35	7.9	3	43	8.1	2	10.5	9.5
Denver	79	14.1	6	60	13.9	10	13.8	14.9
Des Moines	26	9.4	1	19	7.3	4	11.0	11.6
Detroit	247	7.8	32	51	7.4	30	8.1	9.2
Duluth	21	10.8	1	27	7.7	2	11.2	11.4
El Paso	26	12.9	4	-------	11.1	3	15.2	17.0
Erie	19	8.4	1	21	9.9	1	10.2	11.2
Fall River [5] [7]	22	10.0	2	47	11.8	2	11.1	11.6
Flint	20	6.4	0	0	4.6	1	6.9	9.1
Fort Worth [6]	23	7.2	1	-------	8.9	4	10.5	10.8
White	19	7.1	0	-------	9.1	4	10.1	10.3
Colored	4	7.7	1	-------	7.9	0	12.3	13.5
Grand Rapids	31	9.4	3	46	9.9	2	9.1	10.1
Houston [6]	60	10.1	4	-------	11.1	12	11.0	12.1
White	39	9.0	3	-------	10.6	6	10.2	10.7
Colored	21	13.2	1	-------	12.6	6	13.4	15.9
Indianapolis [6]	93	13.1	6	46	12.1	4	13.7	14.5
White	74	11.9	5	44	11.7	4	13.2	13.5
Colored	19	21.9	1	61	15.3	0	17.2	21.3
Jersey City	61	10.0	9	80	10.5	10	11.3	11.3
Kansas City, Kans. [6]	23	9.8	1	22	11.1	4	12.6	11.7
White	17	8.9	1	27	10.0	4	11.8	11.0
Colored	6	13.3	0	0	15.9	0	15.6	15.0
Kansas City, Mo	77	9.8	6	48	10.3	2	12.9	13.2
Knoxville [6]	30	14.3	4	87	14.7	0	12.4	13.6
White	25	14.3	4	98	11.7	0	11.7	12.7
Colored	5	14.6	0	0	30.1	0	16.4	18.3
Long Beach	25	8.6	3	75	10.2	0	9.9	10.0
Los Angeles	267	10.6	15	44	11.1	21	10.6	11.0
Louisville [6]	65	11.0	3	27	9.8	5	13.8	13.5
White	46	9.2	0	0	9.4	5	12.4	12.0
Colored	19	20.8	3	215	12.1	0	21.5	21.5
Lowell [7]	23	12.0	2	52	10.4	2	12.7	13.4
Lynn	19	9.6	2	58	6.6	0	9.4	10.3
Memphis [6]	72	14.5	7	74	16.4	10	16.5	16.9
White	37	12.1	1	17	11.9	3	13.5	13.2
Colored	35	18.5	6	174	23.7	7	21.4	22.9
Miami [6]	16	7.4	0	0	10.8	1	11.7	10.9
White	11	6.6	0	0	9.1	0	10.8	9.6
Colored	5	10.3	0	0	16.6	1	14.8	15.3
Milwaukee	96	8.4	5	22	8.4	16	9.1	9.6
Minneapolis	76	8.4	4	26	9.7	5	11.0	10.7
Nashville [6]	47	15.8	3	45	15.2	8	16.8	16.5
White	31	14.3	2	40	15.0	7	14.4	14.0
Colored	16	19.5	1	63	15.8	1	22.9	23.1
New Bedford [7]	30	13.9	4	105	12.5	3	12.1	11.0
New Haven	30	9.6	2	30	10.3	2	12.4	12.7
New Orleans [6]	128	14.3	12	67	15.7	23	16.6	17.3
White	82	12.8	9	76	13.0	16	13.6	14.3
Colored	46	17.8	3	50	22.6	7	24.2	24.9

See footnotes at end of table.

Deaths [1] from all causes in certain large cities of the United States during the week ended November 28, 1931; infant mortality, annual death rate, and comparison with corresponding week of 1930—Continued

City	Week ended Nov. 28, 1931				Corresponding week, 1930		Death rate [2] for the first 48 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
New York	1,257	9.2	94	40	9.6	102	11.0	10.7
Bronx Borough	172	6.7	8	23	7.0	13	8.1	7.8
Brooklyn Borough	440	8.7	32	34	9.4	42	10.2	9.8
Manhattan Borough	469	13.5	38	51	14.0	40	16.6	15.9
Queens Borough	138	6.2	14	56	5.7	6	7.1	7.0
Richmond Borough	38	12.1	2	38	11.4	1	13.5	13.9
Newark, N. J	84	9.8	7	37	9.8	9	11.4	12.0
Oakland	82	14.6	3	38	11.3	4	10.6	11.0
Oklahoma City	33	8.7	5	70	18.6	7	10.6	10.8
Omaha	43	10.3	4	46	12.6	3	13.7	13.6
Paterson	31	11.6	2	34	10.2	1	13.2	12.0
Peoria	26	12.5	2	53	15.3	7	12.5	12.3
Philadelphia	412	10.9	28	41	10.6	32	12.9	12.6
Pittsburgh	151	11.6	19	66	12.6	15	14.3	13.8
Portland, Oreg	55	9.3	0	0	10.8	1	11.5	12.1
Providence	57	11.7	5	46	12.6	7	12.6	12.8
Richmond [6]	63	17.8	6	87	10.8	2	15.4	14.8
White	41	16.3	2	44	10.0	1	13.0	12.1
Colored	22	21.7	4	173	12.8	1	21.4	21.4
Rochester	70	11.0	4	37	9.2	3	11.8	11.6
St. Louis	229	14.4	20	72	11.3	14	14.9	14.0
St. Paul	52	9.8	4	41	9.8	3	10.4	10.1
Salt Lake City [5]	27	9.8	2	30	10.0	6	12.0	12.5
San Antonio	63	13.7	10		12.1	8	14.1	15.8
San Diego	41	13.7	1	21	18.1	3	13.5	14.4
San Francisco	139	11.2	1	7	13.9	3	12.9	13.0
Schenectady	24	13.0	0	0	10.3	2	10.8	11.1
Seattle	66	9.3	2	20	11.2	4	11.3	10.8
Somerville	17	8.4	1	31	7.5	2	8.8	9.6
South Bend	15	7.2	0	0	12.4	1	8.0	9.0
Spokane	35	15.7	1	26	9.9	2	12.4	12.4
Springfield, Mass	31	10.6	1	17	12.5	2	11.5	12.1
Syracuse	49	12.0	2	25	11.7	7	11.5	11.6
Tacoma	36	17.4	1	28	12.7	3	12.2	12.5
Toledo	69	12.1	5	47	9.1	5	11.8	12.6
Trenton	26	10.9	1	18	10.6	3	16.2	16.4
Utica	24	12.2	1	28	8.7	2	14.3	14.7
Washington, D. C. [6]	136	14.4	9	50	16.2	11	15.9	15.2
White	78	11.4	7	58	14.1	4	13.6	13.1
Colored	58	22.4	2	34	21.9	7	22.0	20.9
Waterbury	12	6.2	0	0	8.9	5	9.6	9.4
Wilmington, Del. [7]	28	13.7	2	45	17.6	4	13.8	14.4
Worcester	47	12.4	5	72	10.4	5	12.0	12.7
Yonkers	32	12.0	1	24	11.5	7	8.4	8.2
Youngstown	30	9.0	3	41	9.5	3	9.9	10.4

[1] Deaths of nonresidents are included. Stillbirths are excluded.

[2] These rates represent annual rates per 1,000 population, as estimated for 1931 and 1930 by the arithmetical method.

[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.

[4] Data for 77 cities.

[5] Deaths for week ended Friday.

[6] For the cities for which deaths are shown by color the percentages of colored population in 1930 were as follows: Atlanta, 33; Baltimore, 18; Birmingham, 38; Dallas, 17; Fort Worth, 16; Houston, 27; Indianapolis, 12; Kansas City, Kans., 19; Knoxville, 16; Louisville, 15; Memphis, 38; Miama, 23; Nashville, 28; New Orleans, 29; Richmond, 29; and Washington, D. C., 27.

[7] Population Apr. 1, 1930; decreased 1920 to 1930, no estimate made.

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

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended December 5, 1931, and December 6, 1930

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended December 5, 1931, and December 6, 1930

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Dec. 5, 1931	Week ended Dec. 6, 1930	Week ended Dec. 5, 1931	Week ended Dec. 6, 1930	Week ended Dec. 5, 1931	Week ended Dec. 6, 1930	Week ended Dec. 5, 1931	Week ended Dec. 6, 1930
New England States:								
Maine	----	3	1	----	180	23	0	0
New Hampshire	----	5	----	----	5	19	0	0
Vermont	1	2	----	----	42	1	0	0
Massachusetts	63	69	2	5	237	230	2	4
Rhode Island	2	7	2	----	236	2	0	1
Connecticut	6	18	12	1	38	89	0	4
Middle Atlantic States:								
New York	118	132	[1] 21	[1] 7	408	167	10	17
New Jersey	34	84	8	14	14	147	1	2
Pennsylvania	128	133	----	----	673	465	4	5
East North Central States:								
Ohio	131	51	7	4	26	73	3	3
Indiana	91	59	8	11	14	161	15	9
Illinois	167	160	6	21	39	129	9	7
Michigan	41	51	----	2	19	55	4	1
Wisconsin	23	12	8	25	42	148	0	3
West North Central States:								
Minnesota	44	18	1	----	16	12	2	0
Iowa	21	8	----	----	10	4	3	1
Missouri	84	43	2	3	20	492	0	1
North Dakota	1	12	----	----	----	3	0	0
South Dakota	16	10	1	----	6	1	0	0
Nebraska	36	17	6	3	8	3	0	2
Kansas	65	27	----	2	35	10	0	0

[1] New York City only.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended December 5, 1931, and December 6, 1930—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Dec. 5, 1931	Week ended Dec. 6, 1930	Week ended Dec. 5, 1931	Week ended Dec. 6, 1930	Week ended Dec. 5, 1931	Week ended Dec. 6, 1930	Week ended Dec. 5, 1931	Week ended Dec. 6, 1930
South Atlantic States:								
Delaware	19	3			2	1	0	0
Maryland [2]	75	38	6	13	5	6	2	1
District of Columbia	21	15	1		2	3	0	2
Virginia								
West Virginia	43	30	29	43	213	9	1	1
North Carolina	140	107	56	10	42	20	2	4
South Carolina [3]	32	33	415	629	31		0	1
Georgia [3]	24	18	33	72	4	36	4	4
Florida	8	15		3		26	0	0
East South Central States:								
Kentucky	91						1	2
Tennessee	75	29	13	54	14	13	4	5
Alabama [3]	60	70	22	31	20	42	1	6
Mississippi	46	35					0	0
West South Central States:								
Arkansas	34	19	10	15	24	1	0	0
Louisiana	56	20	3	15	1	4	0	2
Oklahoma [4]	98	68	27	51		53	0	1
Texas [3]	216	121	42	52		44	1	1
Mountain States:								
Montana	6	1			126	3	0	0
Idaho	7					18	0	0
Wyoming	2						0	0
Colorado	7	9			6	23	0	2
New Mexico	9	18	1	2	5	26	1	2
Arizona	11	5	9	7	2	49	0	0
Utah [3]	1		5	6	1	2	2	3
Pacific States:								
Washington	22	32		18	37	17	4	3
Oregon	4	9	33	15	6	20	0	0
California	109	57	69	63	187	255	5	8

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Dec. 5, 1931	Week ended Dec. 6, 1930	Week ended Dec. 5, 1931	Week ended Dec. 6, 1930	Week ended Dec. 5, 1931	Week ended Dec. 6, 1930	Week ended Dec. 5, 1931	Week ended Dec. 6, 1930
New England States:								
Maine	1	1	43	19	0	0	3	18
New Hampshire	0	0	2	4	0	0	0	1
Vermont	0	0	5	7	10	1	0	1
Massachusetts	3	5	254	204	0	0	3	5
Rhode Island	0	0	17	18	0	0	0	0
Connecticut	2	1	52	57	39	0	2	8
Middle Atlantic States:								
New York	17	8	408	468	10	6	15	28
New Jersey	4	1	94	119	1	0	7	6
Pennsylvania	3	1	421	379	0	0	28	15
East North Central States:								
Ohio	4	16	456	473	14	46	27	31
Indiana	1	1	85	216	10	47	9	12
Illinois	20	9	283	304	12	43	36	19
Michigan	8	5	205	209	13	29	9	18
Wisconsin	3	4	87	83	4	8	4	5
West North Central States:								
Minnesota	13	7	64	61	4	15	1	1
Iowa	3	2	44	50	58	21	2	3
Missouri	0	2	71	90	7	9	11	5
North Dakota	0	1	13	17	3	5	1	4
South Dakota	0	5	13	7	15	17	1	0
Nebraska	0	5	42	44	8	63	1	2
Kansas	1	5	70	63	8	53	1	14

[2] Week ended Friday.
[3] Typhus fever, 1931, 11 cases: 3 cases in South Carolina, 3 cases in Georgia, 3 cases in Alabama, and 2 cases in Texas.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended December 5, 1931, and December 6, 1930—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Dec. 5, 1931	Week ended Dec. 6, 1930	Week ended Dec. 5, 1931	Week ended Dec. 6, 1930	Week ended Dec. 5, 1931	Week ended Dec. 6, 1930	Week ended Dec. 5, 1931	Week ended Dec. 6, 1930
South Atlantic States:								
Delaware	0	1	9	14	0	0	0	1
Maryland [2]	2	1	100	79	0	0	10	7
District of Columbia	0	0	16	20	0	0	0	0
Virginia	2				1			
West Virginia	0	0	65	58	0	18	40	19
North Carolina	0	1	129	109	2	0	9	3
South Carolina [3]	0	0	11	20	0	3	7	11
Georgia [3]	0	1	32	56	0	0	2	8
Florida	0	0	8	12	0	0	11	2
East South Central States:								
Kentucky	0	2	75	71	3	0	29	20
Tennessee	2	0	41	58	5	3	16	11
Alabama [3]	1	0	52	82	1	0	18	5
Mississippi	0	1	26	22	17	10	10	16
West South Central States:								
Arkansas	0	0	25	16	0	8	10	25
Louisiana	0	0	23	18	4	3	20	15
Oklahoma [4]	0	0	25	65	1	23	25	32
Texas [3]	1	4	96	80	8	45	14	8
Mountain States:								
Montana	0	0	34	41	3	16	8	0
Idaho	0	0	2	6	3	0	0	0
Wyoming	0	0	11	1	1	0	1	0
Colorado	1	0	42	11	10	29	3	1
New Mexico	0	2	9	13	0	0	6	5
Arizona	1	0	8	2	0	0	0	1
Utah [2]	0	0	14	6	0	0	0	1
Pacific States:								
Washington	3	2	44	51	16	32	9	5
Oregon	0	2	13	8	15	30	1	3
California	5	12	127	99	16	36	6	12

[2] Week ended Friday.
[3] Typhus fever, 1931, 11 cases: 3 cases in South Carolina, 3 cases in Georgia, 3 cases in Alabama, and 2 cases in Texas.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
October, 1931										
Florida		101	1	33	126	8	3	18	0	17
Mississippi		725	564	4,720	14	414	5	229	77	114
Wisconsin	10	86	52	2	51		130	221	7	17
November, 1931										
Arizona	5	73	12	7	5	1	1	26	2	9
Connecticut	1	17	22		99		35	167	0	12
Florida		89	4	27	35	2	2	24	2	12
Georgia	10	179	173	110	25	27	0	149		69
Tennessee	14	524	123	136	26	14	3	345	20	117

October, 1931	Cases
Chicken pox:	
Florida	3
Mississippi	153
Wisconsin	382
Dengue:	
Mississippi	2
Dysentery:	
Mississippi (amebic)	27
German measles:	
Wisconsin	9
Hookworm disease:	
Mississippi	154
Lethargic encephalitis:	
Wisconsin	3
Mumps:	
Florida	8
Mississippi	36
Wisconsin	352
Ophthalmia neonatorum:	
Mississippi	14
Wisconsin	1
Puerperal septicemia:	
Mississippi	28
Trachoma:	
Mississippi	2
Wisconsin	2
Tularaemia:	
Wisconsin	1
Typhus fever:	
Florida	2
Undulant fever:	
Wisconsin	1
Whooping cough:	
Florida	18
Mississippi	252
Wisconsin	559

November, 1931	
Chicken pox:	
Arizona	99
Connecticut	206
Florida	12
Georgia	61
Tennessee	73
Dysentery:	
Connecticut (bacillary)	9
Florida	1
Georgia	12
Tennessee	5
Tennessee (amebic)	11
German measles:	
Connecticut	13
Tennessee	3
Hookworm disease:	
Tennessee	1
Impetigo contagiosa:	
Tennessee	2
Lead poisoning:	
Connecticut	1
Lethargic encephalitis:	
Connecticut	1
Tennessee	2
Milk sickness:	
Tennessee	6
Mumps:	
Arizona	10
Connecticut	118
Florida	13
Georgia	20
Tennessee	29
Ophthalmia neonatorum:	
Tennessee	2
Paratyphoid fever:	
Connecticut	6
Georgia	11
Rabies in animals:	
Connecticut	7
Septic sore throat:	
Connecticut	10
Georgia	34
Tennessee	24
Thrush:	
Tennessee	1
Trachoma:	
Arizona	14
Tennessee	3
Trichinosis:	
Connecticut	1
Tularaemia:	
Tennessee	1
Typhus fever:	
Connecticut	1
Georgia	19
Undulant fever:	
Arizona	2
Connecticut	3
Vincent's angina:	
Tennessee	4
Whooping cough:	
Arizona	14
Connecticut	148
Florida	5
Georgia	35
Tennessee	277

Cases of Certain Communicable Diseases Reported for the Month of September, 1931, by State Health Officers

State	Chicken pox	Diphtheria	Measles	Mumps	Scarlet fever	Smallpox	Tuberculosis	Typhoid and paratyphoid fever	Whooping cough
Maine	11	13	36	17	18	0	50	18	35
New Hampshire	----	2	----	----	5	0	----	6	----
Vermont	10	7	24	22	13	4	22	0	69
Massachusetts	63	146	80	121	358	0	498	30	546
Rhode Island	1	16	36	25	51	0	45	13	20
Connecticut	32	20	17	26	26	0	81	27	258
New York	163	227	233	233	463	1	1,711	210	1,562
New Jersey	33	57	43	31	137	0	396	66	880
Pennsylvania	167	297	289	284	456	0	639	282	1,541
Ohio	116	265	91	127	586	8	664	374	803
Indiana	21	56	28	22	112	31	205	66	120
Illinois	131	202	167	102	381	26	921	177	1,016
Michigan	85	73	59	110	285	9	453	97	848
Wisconsin	156	58	80	248	88	5	169	29	559
Minnesota	66	61	29	----	124	6	[1] 160	46	71
Iowa	17	33	9	19	50	17	35	14	92
Missouri	10	211	18	11	86	26	205	136	413
North Dakota	9	5	7	51	15	6	21	17	83
South Dakota	39	22	15	28	27	11	14	13	23
Nebraska	6	33	4	16	26	4	14	9	30
Kansas	35	46	28	57	99	4	49	41	51
Delaware	2	----	1	11	----	0	20	----	31
Maryland	34	103	24	16	119	0	210	158	510
District of Columbia	1	35	3	----	23	0	90	11	89
Virginia	29	360	94	----	219	5	162	253	415
West Virginia	20	122	39	----	94	2	35	281	96
North Carolina	47	453	31	----	297	0	----	202	363
South Carolina	15	171	24	21	46	2	85	211	52
Georgia	7	162	13	11	71	0	243	203	17
Florida	----	46	----	----	17	0	----	23	----
Kentucky [2]	----	----	----	----	----	----	----	----	----
Tennessee	17	273	13	11	150	10	195	293	79
Alabama	21	299	26	13	156	3	420	127	81
Mississippi	162	534	8	42	106	16	131	169	266
Arkansas	6	149	12	14	66	4	----	134	14
Louisiana	5	151	7	0	54	11	[1] 152	265	19
Oklahoma [3]	13	205	3	1	83	18	63	202	19
Texas	----	94	----	----	93	----	----	125	----
Montana	31	11	43	1	33	3	42	28	40
Idaho	21	14	13	12	32	9	11	30	3
Wyoming	8	1	5	2	14	2	1	9	18
Colorado	23	26	11	29	47	1	50	29	57
New Mexico	2	15	4	----	8	0	42	29	24
Arizona	5	16	10	7	15	0	103	27	3
Utah [2]	----	----	----	----	----	----	----	----	----
Nevada	2	----	1	----	4	0	[1] 2	6	----
Washington	78	30	33	20	126	26	210	31	181
Oregon	30	8	25	29	24	17	28	34	30
California	212	230	299	209	327	18	937	117	583

[1] Pulmonary. [2] Reports received weekly. [3] Exclusive of Oklahoma City and Tulsa.

Case Rates per 100,000 Population (Annual Basis) for the Month of September, 1931

State	Chicken pox	Diphtheria	Measles	Mumps	Scarlet fever	Smallpox	Tuberculosis	Typhoid and paratyphoid fever	Whooping cough
Maine	17	20	55	26	27	0	76	27	53
New Hampshire		5			13	0		16	
Vermont	34	24	81	74	44	14	74	0	253
Massachusetts	18	41	23	34	101	0	141	8	155
Rhode Island	2	28	63	44	89	0	78	23	35
Connecticut	24	15	13	19	19	0	60	20	192
New York	15	21	22	22	44	0	162	20	148
New Jersey	10	17	13	9	40	0	116	19	258
Pennsylvania	21	37	36	35	57	0	80	35	192
Ohio	21	48	16	23	106	1	120	67	145
Indiana	8	21	10	8	42	12	76	25	45
Illinois	21	32	26	16	60	4	144	28	159
Michigan	21	18	14	27	70	2	111	24	207
Wisconsin	64	24	33	101	36	2	69	12	229
Minnesota	31	29	14		58	3	[1] 75	22	83
Iowa	8	16	4	9	25	8	17	7	45
Missouri	3	70	6	4	29	9	68	45	137
North Dakota	16	9	12	91	27	11	37	30	147
South Dakota	68	38	26	49	47	19	24	23	40
Nebraska	5	29	4	14	23	4	12	8	26
Kansas	22	30	18	37	64	3	31	26	33
Delaware	10		5	56		0	101		157
Maryland	25	76	18	12	88	0	155	116	375
District of Columbia	2	86	7		57	0	222	27	220
Virginia	14	180	47		109	2	81	126	207
West Virginia	14	84	27		65	1	24	194	66
North Carolina	18	170	12		111	0		76	136
South Carolina	10	119	17	15	32	1	59	147	36
Georgia	3	68	5	5	30	0	102	85	7
Florida		37			14	0		18	
Kentucky [2]									
Tennessee	8	125	6	5	69	5	90	134	36
Alabama	10	136	12	6	71	1	190	58	37
Mississippi	97	319	5	25	68	10	78	101	159
Arkansas	4	97	8	9	43	3		87	9
Louisiana	3	86	4	0	31	6	[1] 86	151	11
Oklahoma [3]	8	119	2	1	48	10	37	117	11
Texas		19			19			25	
Montana	70	25	97	2	75	7	95	63	91
Idaho	57	38	35	33	87	25	30	82	8
Wyoming	42	5	27	11	74	11	5	48	95
Colorado	27	30	13	34	55	1	58	34	66
New Mexico	6	42	11		23	0	119	82	68
Arizona	14	43	27	19	41	0	280	73	8
Utah [2]									
Nevada	26		13		52	0	[1] 26	79	
Washington	60	28	25	15	96	20	161	24	139
Oregon	37	10	31	36	30	21	35	42	37
California	43	47	61	43	67	4	192	24	119

[1] Pulmonary. [2] Reports received weekly. [3] Exclusive of Oklahoma City and Tulsa.

ADMISSIONS TO HOSPITALS FOR THE INSANE, JULY, 1929

Reports for the month of July, 1929, showing new admissions to hospitals for the care and treatment of the insane were received by the Public Health Service from 121 hospitals, located in 40 States, the District of Columbia, and the Territory of Hawaii. The 121 hospitals had 185,226 patients on July 31, 1929, 98,946 males and 86,280 females—115 males per 100 females.

The following table shows the number of new admissions for the month of July, 1929, by psychoses:

Psychoses	Number of first admissions		
	Male	Female	Total
1. Traumatic psychoses	18	3	21
2. Senile psychoses	170	141	311
3. Psychoses with cerebral arteriosclerosis	217	130	347
4. General paralysis	214	48	262
5. Psychoses with cerebral syphilis	30	10	40
6. Psychoses with Huntington's chorea	3	3	6
7. Psychoses with brain tumor	4	1	5
8. Psychoses with other brain or nervous disease	23	17	40
9. Alcoholic psychoses	183	20	203
10. Psychoses due to drugs and other exogenous toxins	20	9	29
11. Psychoses with pellagra	22	55	77
12. Psychoses with other somatic diseases	50	51	101
13. Manic-depressive psychoses	189	281	470
14. Involution melancholia	25	62	87
15. Dementia præcox (schizophrenia)	348	283	631
16. Paranoia and paranoid conditions	30	36	66
17. Epileptic psychoses	62	22	84
18. Psychoneuroses and neuroses	25	46	71
19. Psychoses with psychopathic personality	25	13	38
20. Psychoses with mental deficiency	68	62	130
21. Undiagnosed psychoses	142	118	260
22. Without psychosis	142	65	207
Total	2,010	1,476	3,486

During the month of July, 1929, there were 3,486 new admissions to the institutions, 57.7 per cent of these being males and 42.3 per cent females—136 males per 100 females. Four hundred and sixty-seven of the new admissions were reported to be undiagnosed or "without psychosis." There were 3,019 new admissions for whom provisional diagnoses were made. Of these 3,019 patients, dementia præcox was the diagnosis in 20.9 per cent of the cases; manic-depressive psychoses in 15.6 per cent; psychoses with cerebral arteriosclerosis in 11.5 per cent; senile psychoses in 10.3 per cent; and 8.7 per cent of these first admissions were diagnosed as cases of general paralysis. These five classes accounted for 2,021 cases, or 66.9 per cent of the new admissions for whom a diagnosis was given.

The following table shows the number of patients in hospitals and on parole on July 31, 1929:

	Total patients on books		
	Male	Female	Total
Total patients on books last day of month:			
In hospitals	88,703	78,384	167,087
On parole or otherwise absent, but still on books	10,243	7,896	18,139
Total	98,946	86,280	185,226

Of the 185,226 patients, 10,243 males and 7,896 females were on parole or otherwise absent but still on the books at the end of the month—10.4 per cent of the males, 9.2 per cent of the females, and 9.8 per cent of the total being absent.

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 94 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 33,045,000. The estimated population of the 88 cities reporting deaths is more than 31,530,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Week ended November 28, 1931, and November 29, 1930

	1931	1930	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	2,078	1,544	----------
94 cities	540	545	980
Measles:			
45 States	2,414	2,330	----------
94 cities	578	673	----------
Meningococcus meningitis:			
46 States	59	89	----------
94 cities	35	37	----------
Poliomyelitis:			
46 States	108	124	----------
Scarlet fever:			
46 States	3,611	3,236	----------
94 cities	988	1,096	996
Smallpox:			
46 States	383	428	----------
94 cities	16	51	19
Typhoid fever:			
46 States	411	396	----------
94 cities	43	64	48
Deaths reported			
Influenza and pneumonia:			
88 cities	567	706	----------
Smallpox:			
88 cities	0	0	----------

City reports for week ended November 28, 1931

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1922 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	9	1	0		0	2	1	2
New Hampshire:								
Concord	0	0	0		0	0	0	0
Nashua	0	0	0		0	0	0	0
Vermont:								
Barre	0	C	1		0	1	0	0
Massachusetts:								
Boston	32	34	14		0	3	8	22
Fall River	2	4	0		0	2	1	1
Springfield	3	5	0		0	2	10	0
Worcester	7	6	5		0	1	51	1
Rhode Island:								
Pawtucket	0	2	0		0	0	0	7
Providence	24	9	8		0	120	2	0
Connecticut:								
Bridgeport	2	5	0		0	0	0	3
Hartford	4	5	0	1	0	0	5	4
New Haven	30	1	0		0	0	1	1
MIDDLE ATLANTIC								
New York:								
Buffalo	49	15	10		0	7	0	16
New York	74	165	92	15	10	28	27	114
Rochester	8	4	0		0	10	38	3
Syracuse	19	2	0		0	1	6	4
New Jersey:								
Camden	2	7	3	1	2	1	1	3
Newark	14	16	3	3	0	3	1	6
Trenton	5	2	0	1	1	0	9	3
Pennsylvania:								
Philadelphia	69	59	9	3	6	6	19	42
Pittsburgh	46	25	12		1	128	55	25
Reading	9	2	0		0	0	2	3
Scranton	4		0		0	0	0	0
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	6	11	8		0	1	0	4
Cleveland	98	38	8	7	0	6	60	12
Columbus	5	7	0	1	2	0	2	3
Toledo	52	8	3	1	1	2	1	2
Indiana:								
Fort Wayne	4	5	5		0	0	0	0
Indianapolis	46	11	2		0	0	0	11
South Bend		2						
Terre Haute	9	1	0		0	0	0	1
Illinois:								
Chicago	94	118	61	10	3	12	6	27
Peoria	6	0	5		0	0	0	1
Springfield	0	2	0		0	0	0	2
Michigan:								
Detroit	51	60	29	4	1	0	16	16
Flint	21	3	0		0	0	11	2
Grand Rapids	1	1	0		0	0	0	3

City reports for week ended November 28, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST NORTH CENTRAL—Con.								
Wisconsin:								
Kenosha	3	1	1		0	0	5	0
Madison	12	1	9			0	0	
Milwaukee	46	14	3	2	2	3	25	3
Racine	12	2	0		0	0	18	0
Superior	1	0	0		0	2	9	1
WEST NORTH CENTRAL								
Minnesota:								
Duluth	1	0	0		1	0	0	1
Minneapolis	45	22	4		0	2	11	4
St. Paul		7						
Iowa:								
Davenport	8	1	0			0	0	
Des Moines	0	2	2			0	0	
Sioux City	16	2	[1] 4			0	1	
Waterloo	7	0	0			1	0	
Missouri:								
Kansas City	22	8	12		0	1	1	10
St. Joseph	1	1	5		0	0	0	2
St. Louis	15	44	20	1		0	2	11
North Dakota:								
Fargo	7	0	0		0	0	0	0
Grand Forks	0	0	0			0	0	
South Dakota:								
Aberdeen	13	0	0			18	0	
Nebraska:								
Lincoln	3	1	0		0	0	3	0
Omaha	24	9	11		0	2	0	5
Kansas:								
Topeka	2	2	1		0	0	2	0
Wichita	4	2	14		0	1	0	1
SOUTH ATLANTIC								
Delaware:								
Wilmington	0	2	2		0	0	0	1
Maryland:								
Baltimore	26	24	10	3	1	2	34	26
Cumberland	1	0	0		0	1	0	1
Frederick	0	0	1		0	0	0	0
District of Columbia:								
Washington	9	17	16		0	5	0	9
Virginia:								
Lynchburg	2	3	5		0	0	1	0
Norfolk	0	3	6		0	0	0	6
Richmond	2	17	17		1	0	0	6
Roanoke	2	4	10		0	0	1	0
West Virginia:								
Charleston	8	2	1		0	0	0	2
Huntington	0		2		0	0	0	0
Wheeling	4	1	0		0	0	0	1
North Carolina:								
Raleigh	15	2	3		0	2	0	1
Wilmington	9	0	1		0	1	0	0
Winston-Salem	4	5	2	2	0	2	1	2
South Carolina:								
Charleston	1	1	1	22	0	0	0	1
Columbia	1	1	0		0	0	0	0
Greenville	2	2	0		0	0	0	0
Georgia:								
Atlanta	4	7	0	7	0	0	1	10
Brunswick	0	0	0		0	0	5	0
Savannah	0	2	3	2	1	1	0	1
Florida:								
Miami	4	2	2		0	0	0	1
Tampa	0	3	1		0	0	1	1

[1] 1 case nonresident.

City reports for week ended November 28, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST SOUTH CENTRAL								
Kentucky:								
Covington	0	1	0		0	1	0	1
Lexington	0		0		0	0	1	1
Louisville	5		3		1	0	0	6
Tennessee:								
Memphis	6	9	7		0	0	0	2
Nashville	2	3	5		0	0	0	4
Alabama:								
Birmingham	0	8	9	5	1	0	0	5
Mobile	1	1	2		1	0	0	5
Montgomery	0	3	2			5	1	
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith		2						
Little Rock	0	2	2		0	1	0	1
Louisiana:								
New Orleans	0	15	12	4	4	1	0	3
Shreveport	2	0	2	1	0	5	0	1
Oklahoma:								
Muskogee	2		9		0	0	0	0
Oklahoma City	2	4	9	18	0	1	0	4
Tulsa	0	5	12			0	0	
Texas:								
Dallas	4	19	18		0	0	0	1
Fort Worth	2	6	19		0	0	0	1
Galveston	0	1	3		0	0	0	2
Houston	0	10	18		0	0	0	4
San Antonio	0	5	5		1	0	0	2
MOUNTAIN								
Montana:								
Billings	0	0	0		0	126	0	0
Great Falls	0	0	0		0	1	0	2
Helena	0	0	0		0	14	0	0
Missoula	1	0	0		0	0	0	1
Idaho:								
Boise	1	0	0		0	0	0	0
Colorado:								
Denver	40	10	3		2	1	4	0
Pueblo	6	1	0		0	0	0	1
New Mexico:								
Albuquerque	5	1	0		0	0	0	1
Arizona:								
Phoenix	0	0	1		0	0	0	0
Utah:								
Salt Lake City	64	4	0		1	0	1	1
Nevada:								
Reno		0						
PACIFIC								
Washington:								
Seattle	39	5	0			25	13	
Spokane	7	2	0			0	0	
Tacoma	17	4	1		0	0	4	2
California:								
Los Angeles	17	36	33	24	1	3	8	18
Sacramento	5	3	0		0	31	0	3
San Francisco	35	14	1	4	2	4	4	8

City reports for week ended November 28, 1931—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
NEW ENGLAND											
Maine:											
Portland	2	3	0	0	0	0	1	0	0	1	24
New Hampshire:											
Concord	1	0	0	0	0	0	0	0	0	0	7
Nashua	0	0	0	0	0	0	0	0	0	0	1
Vermont:											
Barre	0	0	0	0	0	0	0	0	0	0	2
Massachusetts:											
Boston	57	56	0	0	0	9	2	0	0	15	188
Fall River	3	7	0	0	0	5	0	0	0	2	22
Springfield	5	5	0	0	0	1	0	0	0	2	32
Worcester	12	20	0	0	0	2	0	0	0	8	47
Rhode Island:											
Pawtucket	1	0	0	0	0	0	0	0	0	0	18
Providence	11	10	0	0	0	0	0	0	0	8	57
Connecticut:											
Bridgeport	6	3	0	0	0	4	0	0	0	2	32
Hartford	5	5	0	0	0	4	0	1	1	2	47
New Haven	3	0	0	0	0	0	0	0	0	3	30
MIDDLE ATLANTIC											
New York:											
Buffalo	21	25	0	0	0	9	1	0	0	23	123
New York	107	125	0	0	0	82	14	6	1	122	1,257
Rochester	7	33	0	0	0	0	1	0	0	8	67
Syracuse	8	13	0	0	0	0	0	0	0	32	49
New Jersey:											
Camden	3	2	0	0	0	1	0	0	0	0	37
Newark	12	11	0	0	0	10	0	0	0	50	92
Trenton	3	11	0	0	0	2	0	0	0	2	26
Pennsylvania:											
Philadelphia	65	61	0	0	0	26	4	2	0	151	412
Pittsburgh	34	47	0	0	0	9	0	0	0	13	151
Reading	2	1	0	0	0	1	0	0	0	2	29
Scranton	2	11	----	0	0	0	----	0	0	2	----
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	17	41	0	0	0	5	1	2	0	3	98
Cleveland	30	33	0	0	0	13	1	0	0	96	166
Columbus	10	15	1	0	0	1	0	1	2	4	78
Toledo	11	9	0	0	0	2	0	4	0	19	69
Indiana:											
Fort Wayne	3	1	0	0	0	0	0	0	0	0	21
Indianapolis	14	4	2	0	0	7	0	0	0	8	----
South Bend	4	----	0	----	----	----	0	----	----	----	----
Terre Haute	3	1	0	0	0	0	0	1	0	0	18
Illinois:											
Chicago	103	93	1	0	0	36	3	2	0	152	582
Peoria	----	3	----	0	0	0	----	0	0	5	26
Springfield	3	6	0	0	0	0	0	0	0	2	14
Michigan:											
Detroit	79	46	0	0	0	25	1	3	0	55	247
Flint	11	9	0	0	0	0	0	0	0	5	20
Grand Rapids	9	2	0	0	0	0	0	0	0	2	31
Wisconsin:											
Kenosha	2	2	0	0	0	1	0	0	0	8	----
Madison	2	0	0	0	----	----	0	0	----	0	----
Milwaukee	17	19	0	0	0	7	0	0	0	73	96
Racine	4	2	0	0	0	1	0	0	0	1	9
Superior	3	4	0	0	0	0	0	0	0	0	10
WEST NORTH CENTRAL											
Minnesota:											
Duluth	10	1	0	0	0	2	0	0	0	0	21
Minneapolis	37	15	0	0	0	3	1	0	0	8	76
St. Paul	16	----	1	----	----	----	0	----	----	----	----

City reports for week ended November 28, 1931—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
WEST NORTH CENTRAL—CON.											
Iowa:											
Davenport	1	1	1	1			0	0		0	
Des Moines	9	11	1	3			0	0		0	26
Sioux City	2	4	0	5			0	0		0	
Waterloo	2	0	1	0			0	0		3	
Missouri:											
Kansas City	14	11	0	0	0	2	0	0	0	7	77
St. Joseph	3	1	0	0	0	0	0	0	0	0	25
St. Louis	36	10	0	0	0	13	2	0	1	43	229
North Dakota:											
Fargo	2	1	0	0	0	0	0	0	0	3	9
Grand Forks	0	0	1				0	0		0	
South Dakota:											
Aberdeen	0	3	0	0			0	0		7	
Nebraska:											
Lincoln	1	0		0	0	0	0	1	0	3	
Omaha	6	2	2	1	0	0	0	0	1	2	43
Kansas:											
Topeka	3	4	0	0	0	0	0	4	0	2	9
Wichita	5	9	0	0	0	0	0	0	0	1	22
SOUTH ATLANTIC											
Delaware:											
Wilmington	2	1	0	0	0	0	0	0	0	1	28
Maryland:											
Baltimore	20	21	0	0	0	7	3	5	2	108	173
Cumberland	0	4	0	0	0	0	0	1	0	1	7
Frederick	0	1	0	0	0	0	0	0	0	1	2
District of Columbia:											
Washington	17	18	0	0	0	8	1	2	0	14	136
Virginia:											
Lynchburg	1	1	0	0	0	0	0	0	0	2	7
Norfolk	4	9	0	0	0	1	0	0	0	0	
Richmond	9	22	0	0	0	5	0	0	0	5	53
Roanoke	3	1	0	0	0	1	0	0	0	0	10
West Virginia:											
Charleston	2	0	0	0	0	1	0	[1]6	2	2	21
Huntington		1		0	0	0		0	0	0	
Wheeling	2	2	0	0	0	0	0	0	0	1	16
North Carolina:											
Raleigh	1	3	0	0	0	2	0	0	0	0	9
Wilmington	1	0	0	0	0	3	0	0	0	11	9
Winston-Salem	2	5	0	0	0	4	0	0	0	9	22
South Carolina:											
Charleston	1	4	0	0	0	0	0	1	1	0	22
Columbia	0	0	0	0	0	0	0	0	0	0	
Greenville		1	0	0	0	0	0	0	0	0	
Georgia:											
Atlanta	7	6	0	0	0	5	1	0	0	1	90
Brunswick	0	0	0	0	0	0	0	0	0	0	4
Savannah	1	0	0	0	0	1	0	0	0	0	37
Florida:											
Miami	1	0	0	0	0	1	0	0	0	0	16
Tampa	1	0	0	0	0	1	0	2	0	0	22
EAST SOUTH CENTRAL											
Kentucky:											
Covington	2	2	0	0	0	0	0	0	0	0	12
Lexington		1		0	0	1		0	0	6	11
Louisville		10		0	0	3		1	1	16	65
Tennessee:											
Memphis	7	5	0	1	0	4	2	1	1	13	72
Nashville	3	0	0	0	0	4	0	0	0	2	47
Alabama:											
Birmingham	6	13	0	0	0	6	1	0	0	0	51
Mobile	0	0	0	0	0	1	0	0	0	0	29
Montgomery	1	1	0	0			0	0		1	

[1] 4 cases nonresidents.

City reports for week ended November 28, 1931—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	0	----	0	----	----	----	0	----	----	----	----
Little Rock	3	2	1	0	0	1	0	0	0	0	----
Louisiana:											
New Orleans	9	13	0	6	0	10	2	0	0	0	128
Shreveport	1	1	0	0	0	2	1	0	0	3	30
Oklahoma:											
Muskogee	----	3	----	0	0	0	----	0	0	2	----
Oklahoma City	4	4	1	0	0	2	0	4	1	0	33
Tulsa	3	1	0	0	----	----	0	0	----	1	----
Texas:											
Dallas	8	7	1	0	0	2	1	0	0	0	50
Fort Worth	3	10	0	0	0	4	0	1	0	0	23
Galveston	0	1	0	0	0	0	0	1	0	0	5
Houston	3	3	0	0	0	3	0	1	0	1	60
San Antonio	2	0	0	0	0	7	0	0	0	0	63
MOUNTAIN											
Montana:											
Billings	1	0	0	0	0	0	0	0	0	0	3
Great Falls	2	4	1	0	0	0	0	0	0	0	7
Helena	0	0	0	0	0	0	0	0	0	0	6
Missoula	0	6	0	0	0	0	0	0	0	0	4
Idaho:											
Boise	0	0	0	0	0	0	0	0	0	0	3
Colorado:											
Denver	13	9	0	0	0	5	0	0	1	3	74
Pueblo	1	1	0	0	0	0	0	0	0	0	9
New Mexico:											
Albuquerque	0	3	0	0	0	4	0	0	0	0	10
Arizona:											
Phoenix	1	1	0	0	0	6	0	0	0	0	----
Utah:											
Salt Lake City	3	2	2	0	0	1	1	0	0	0	27
Nevada:											
Reno	0	----	0	----	----	----	0	----	----	----	----
PACIFIC											
Washington:											
Seattle	9	9	2	0	----	----	1	0	----	0	----
Spokane	8	1	2	1	----	----	0	0	----	0	----
Tacoma	3	2	1	0	0	1	0	0	0	4	36
California:											
Los Angeles	25	35	1	0	0	24	1	1	0	9	267
Sacramento	3	3	0	0	0	0	0	0	0	0	26
San Francisco	13	5	1	2	0	8	1	0	0	8	161

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
NEW ENGLAND									
Maine:									
Portland	0	0	0	0	0	0	0	1	0
Massachusetts:									
Boston	1	0	0	0	0	0	2	1	0
Fall River	0	0	0	0	0	0	0	1	0
Springfield	0	0	0	0	0	0	0	3	0
Worcester	0	0	0	0	0	0	1	1	0
Connecticut:									
Hartford	0	0	0	0	0	0	0	1	0

City reports for week ended November 28, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
MIDDLE ATLANTIC									
New York:									
New York	6	4	2	1	0	0	3	2	0
Rochester	0	0	0	0	0	0	0	1	0
Syracuse	1	0	0	0	0	0	1	0	0
New Jersey:									
Newark	2	0	0	0	0	0	0	2	0
Pennsylvania:									
Philadelphia	1	1	0	0	0	0	0	1	0
Pittsburgh	2	2	0	0	0	0	0	0	0
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	1	0	0	0	0	0	0	0	0
Cleveland	1	1	0	0	0	0	1	0	0
Indiana:									
Indianapolis	0	1	0	0	0	0	0	0	0
Illinois:									
Chicago [1]	7	1	0	0	0	0	1	3	1
Michigan:									
Detroit	2	1	0	0	0	0	1	0	0
Flint	0	0	1	0	0	0	0	0	0
Grand Rapids	0	0	0	0	0	0	0	1	0
WEST NORTH CENTRAL									
Minnesota:									
Minneapolis	2	1	0	0	0	0	0	1	0
Iowa:									
Waterloo	1	0	0	0	0	0	0	0	0
SOUTH ATLANTIC [2]									
Maryland:									
Baltimore	1	1	0	1	0	0	0	1	1
North Carolina:									
Winston-Salem	0	0	0	0	1	0	0	0	0
South Carolina:									
Charleston [3]	0	0	0	0	7	0	0	0	0
Georgia: [2]									
Savannah [2]	0	0	0	0	1	1	0	0	0
Florida:									
Miami	0	0	0	0	1	0	0	0	0
EAST SOUTH CENTRAL									
Tennessee:									
Memphis	1	0	0	0	0	0	0	0	0
Alabama:									
Birmingham	0	1	0	0	0	0	0	1	0
WEST SOUTH CENTRAL [2]									
Louisiana:									
New Orleans	0	0	0	0	1	0	0	0	0
Texas:									
Dallas	0	0	0	0	1	1	0	0	0
Houston	1	1	0	0	0	0	0	0	0
MOUNTAIN									
Colorado:									
Denver	0	1	0	0	0	0	0	0	0
Utah:									
Salt Lake City	2	1	0	0	0	0	0	0	0
PACIFIC									
Washington:									
Tacoma	1	0	0	0	0	0	0	2	0
California:									
Los Angeles	1	0	0	0	0	1	0	0	0
Sacramento	1	0	0	0	0	0	0	0	0
San Francisco [3]	0	1	0	0	1	0	1	0	0

[1] Rabies in man: 1 case and 1 death.
[2] Typhus fever, 4 cases: 1 case at Norfolk, Va.; 1 case at Atlanta, Ga.; and 2 cases at Savannah, Ga.
[3] Dengue, 2 cases and 1 death: 1 case at Charleston, S. C.; 1 death at Little Rock, Ark.; and 1 case at San Francisco, Calif.

The following table gives the rates per 100,000 population for 98 cities for the 5-week period ended November 28, 1931, compared with those for a like period ended November 29, 1930. The population figures used in computing the rates are estimated mid-year populations for 1930 and 1931, respectively, derived from the 1930 census. The 98 cities reporting cases have an estimated aggregate population of more than 33,000,000. The 91 cities reporting deaths have more than 31,500,000 estimated population.

Summary of weekly reports from cities, October 25 to November 28, 1931—Annual rates per 100,000 population compared with rates for the corresponding period of 1930 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	Oct. 31, 1931	Nov. 1, 1930	Nov. 7, 1931	Nov. 8, 1930	Nov. 14, 1931	Nov. 15, 1930	Nov. 21, 1931	Nov. 22, 1930	Nov. 28, 1931	Nov. 29, 1930
98 cities	85	90	94	[2] 82	96	89	[3] 96	100	[4] 85	87
New England	63	92	84	85	50	82	70	123	67	87
Middle Atlantic	41	44	32	33	52	44	53	52	58	48
East North Central	82	130	97	109	80	128	91	124	[5] 72	122
West North Central	174	93	155	[2] 77	184	107	174	110	[6] 151	110
South Atlantic	146	116	182	86	146	120	172	154	144	66
East South Central	204	293	268	215	227	185	169	275	145	138
West South Central	162	101	203	199	233	160	[3] 238	171	[7] 207	153
Mountain	9	35	44	123	61	26	17	26	[8] 27	79
Pacific	92	67	100	93	127	63	98	63	67	95

MEASLES CASE RATES

98 cities	37	59	44	[2] 59	55	91	[3] 87	126	[4] 91	107
New England	115	138	161	128	238	172	233	179	315	162
Middle Atlantic	30	27	27	34	38	68	92	76	82	69
East North Central	18	18	18	16	18	17	29	31	[5] 15	28
West North Central	11	294	15	[2] 282	17	502	19	767	[6] 15	649
South Atlantic	12	20	12	48	10	26	34	64	28	44
East South Central	23	42	12	84	12	18	20	149	35	66
West South Central	17	0	27	0	24	0	[3] 15	3	[7] 24	10
Mountain	61	414	444	229	400	308	757	326	[8] 1,277	282
Pacific	125	24	104	24	135	32	149	28	123	10

SCARLET FEVER CASE RATES

98 cities	139	161	169	[2] 169	170	187	[3] 189	195	[4] 156	174
New England	142	213	202	225	221	276	260	237	262	264
Middle Atlantic	127	132	134	133	131	126	163	159	147	148
East North Central	161	218	239	231	215	287	241	263	[5] 171	221
West North Central	136	163	140	[2] 140	149	143	132	219	[6] 123	139
South Atlantic	158	166	190	158	239	154	259	216	176	188
East South Central	198	245	99	293	198	275	145	209	122	215
West South Central	47	66	95	91	122	118	[3] 63	94	[7] 93	132
Mountain	165	344	252	282	313	388	218	282	[8] 198	229
Pacific	133	47	121	95	96	99	129	87	108	83

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimated as of July 1, 1931, and 1930, respectively.
[2] Waterloo, Iowa, not included.
[3] New Orleans, La., not included.
[4] South Bend, Ind., St. Paul, Minn., Fort Smith, Ark., and Reno, Nev., not included.
[5] South Bend, Ind., not included.
[6] St. Paul, Minn., not included.
[7] Fort Smith, Ark., not included.
[8] Reno, Nev., not included.

Summary of weekly reports from cities, October 25 to November 28, 1931—Annual rates per 100,000 population compared with rates for the corresponding period of 1930—Continued

SMALLPOX CASE RATES

	Week ended—									
	Oct. 31, 1931	Nov. 1, 1930	Nov. 7, 1931	Nov. 8, 1930	Nov. 14, 1931	Nov. 15, 1930	Nov. 21, 1931	Nov. 22, 1930	Nov. 28, 1931	Nov. 29, 1930
98 cities	2	3	3	[2] 2	1	4	[3] 1	3	[4] 3	8
New England	0	0	0	0	0	0	0	0	0	0
Middle Atlantic	0	0	0	0	0	0	0	0	0	0
East North Central	1	1	0	4	0	2	0	0	[5] 0	4
West North Central	6	19	11	[2] 6	4	21	10	23	[6] 13	68
South Atlantic	0	0	0	0	0	0	0	0	0	0
East South Central	0	0	12	0	6	0	0	0	6	0
West South Central	0	3	3	7	3	3	[3] 0	3	[7] 21	3
Mountain	0	9	0	9	9	0	0	44	[8] 0	35
Pacific	12	14	6	6	4	18	6	6	6	8

TYPHOID FEVER CASE RATES

98 cities	16	14	12	[2] 11	12	15	[3] 11	15	[4] 7	10
New England	5	5	10	5	7	24	10	17	2	12
Middle Atlantic	11	9	11	5	6	4	8	5	4	3
East North Central	16	7	6	9	11	5	5	9	[5] 6	4
West North Central	19	14	21	[2] 4	13	19	8	23	[6] 9	8
South Atlantic	38	32	30	32	36	34	24	28	34	32
East South Central	6	102	17	24	23	48	41	12	6	12
West South Central	17	14	30	28	24	87	[3] 24	84	[7] 7	70
Mountain	0	0	9	18	0	26	9	53	[8] 0	9
Pacific	25	18	0	16	10	10	18	10	2	6

INFLUENZA DEATH RATES

91 cities	5	9	7	9	8	9	[3] 7	10	[8] 7	9
New England	10	2	12	2	14	5	7	7	0	2
Middle Atlantic	4	9	8	12	10	8	6	7	9	11
East North Central	6	6	5	6	2	9	4	5	[5] 5	7
West North Central	0	9	6	3	6	6	6	6	[6] 3	0
South Atlantic	4	18	4	10	6	6	12	24	6	10
East South Central	6	13	0	26	0	39	25	13	13	26
West South Central	0	21	17	14	7	28	[3] 10	36	17	14
Mountain	17	18	17	9	27	9	17	62	[8] 27	26
Pacific	2	2	5	7	12	5	5	7	7	7

PNEUMONIA DEATH RATES

91 cities	82	99	88	101	86	115	[3] 102	116	[8] 86	109
New England	90	104	67	89	101	114	84	126	99	77
Middle Atlantic	96	109	107	116	106	129	116	133	98	118
East North Central	63	87	64	74	52	85	70	82	[5] 52	78
West North Central	75	96	80	87	88	78	115	138	[6] 119	98
South Atlantic	113	134	117	152	97	172	152	156	122	180
East South Central	101	65	120	136	151	188	183	175	107	136
West South Central	86	103	66	110	55	103	[3] 95	114	66	153
Mountain	52	167	139	194	148	220	174	167	[8] 126	229
Pacific	46	32	53	42	70	67	50	50	74	70

[2] Waterloo, Iowa, not included.
[3] New Orleans, La., not included.
[4] South Bend, Ind., St. Paul, Minn., Fort Smith, Ark., and Reno, Nev., not included.
[5] South Bend, Ind., not included.
[6] St. Paul, Minn., not included.
[7] Fort Smith, Ark., not included.
[8] Reno, Nev., not included.
[9] South Bend, Ind., St. Paul, Minn., and Reno, Nev., not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended November 21, 1931.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the week ended November 21, 1931, as follows:

Province	Cerebro-spinal fever	Dysentery	Lethargic encephalitis	Influenza	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]							
Nova Scotia	1			5			2
New Brunswick [1]							
Quebec					22		29
Ontario	2				5	3	27
Manitoba			1			1	2
Saskatchewan						12	
Alberta					1		
British Columbia		1					
Total	3	1	1	5	28	16	60

[1] No case of any disease included in the table was reported during the week.

Quebec Province—Communicable diseases—Week ended November 21, 1931.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended November 21, 1931, as follows:

Disease	Cases	Disease	Cases
Chicken pox	121	Poliomyelitis	22
Diphtheria	58	Scarlet fever	91
Erysipelas	5	Tuberculosis	16
German measles	4	Typhoid fever	29
Measles	169	Whooping cough	44
Mumps	18		

Ontario—Communicable diseases—Comparative—Five weeks ended October 31, 1931.—Cases of certain communicable diseases were reported in the Province of Ontario, Canada, for the five weeks ended October 31, 1931, and the corresponding period of 1930, as follows:

Disease	1930		1931	
	Cases	Deaths	Cases	Deaths
Cerebrospinal meningitis	7	2	11	6
Chancroid	3			
Chicken pox	380		324	
Diphtheria	373	11	348	13
Dysentery		17	20	7
Erysipelas			4	
German measles	7		21	
Gonorrhea	95		371	
Influenza	9	5	3	1
Jaundice			8	
Lethargic encephalitis	1	1	2	
Measles	57		307	
Mumps	152		313	
Paratyphoid fever	8		30	1
Pneumonia		101		106
Poliomyelitis	174	18	31	1
Puerperal fever	1			
Scarlet fever	435	1	269	1
Smallpox	34		19	
Syphilis	109	3	189	1
Tetanus		1	2	1
Trachoma			1	
Trench mouth			12	
Tuberculosis	134	48	176	64
Tularaemia			3	
Typhoid fever	126	11	146	8
Undulant fever	13	1	7	
Whooping cough	315	2	389	

CUBA

Provinces—Communicable diseases—Four weeks ended September 26, 1931.—During the four weeks ended September 26, 1931, cases of certain communicable diseases were reported in the provinces of Cuba as follows:

Disease	Pinar del Rio	Habana	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer		1		3			4
Diphtheria		10		5		2	17
Malaria		6		2	3	14	25
Measles		44	3				47
Paratyphoid fever			1	2			3
Scarlet fever		1	1				2
Typhoid fever		20	4	30	2	7	63

Habana—Communicable diseases—Four weeks ended October 10, 1931.—During the four weeks ended October 10, 1931, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Diphtheria	8	1	Scarlet fever	2	
Leprosy	1		Tuberculosis	27	11
Malaria [1]	8		Typhoid fever [1]	10	2
Measles	46				

[1] Many of the cases of malaria and typhoid fever are from the island of Cuba outside of Habana.

DENMARK

Communicable diseases—September, 1931.—During the month of September, 1931, cases of certain communicable diseases were reported in Denmark as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	6	Paratyphoid fever	113
Chicken pox	19	Poliomyelitis	6
Diphtheria and croup	259	Scabies	654
Erysipelas	280	Scarlet fever	228
German measles	1	Syphilis	103
Gonorrhea	1,002	Tetanus	2
Influenza	5,245	Typhoid fever	18
Lethargic encephalitis	12	Undulant fever (Bac. abort. Bang)	54
Measles	900	Whooping cough	1,694
Mumps	101		

JAMAICA

Communicable diseases—Four weeks ended November 7, 1931.—During the four weeks ended November 7, 1931, cases of certain communicable diseases were reported in Kingston, Jamaica, and in the island of Jamaica, outside of Kingston, as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Chicken pox	2	4	Puerperal fever		3
Diphtheria		1	Scarlet fever	1	1
Dysentery		5	Tuberculosis	46	73
Leprosy		3	Typhoid fever	15	71
Poliomyelitis		1			

PANAMA CANAL ZONE

Communicable diseases—October, 1931.—During the month of October, 1931, certain communicable diseases, including imported cases, were reported in the Panama Canal Zone and terminal cities as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Chicken pox	17		Pneumonia		28
Diphtheria	9		Scarlet fever	1	
Dysentery (amebic)	4		Tuberculosis		23
Leprosy	2	1	Typhoid fever	1	
Malaria	111	6	Whooping cough	12	1
Measles	18				

TRINIDAD

Port of Spain—Vital statistics—October, 1930, 1931.—The following statistics for the months of October, 1930 and 1931, are taken from a report issued by the public health department of Port of Spain, Trinidad:

	1930	1931		1930	1931
Number of births	201	155	Death rate per 1,000 population	16.8	14.9
Birth rate per 1,000 population	35.1	26.0	Deaths under 1 year	14	12
Number of deaths	96	89	Deaths under 1 year per 1,000 births	69.6	77.4

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		May 31–June 27, 1931	June 28–July 25, 1931	July 26–Aug. 22, 1931	Week ended— Aug. 29, 1931	September, 1931				October, 1931					November, 1931				Dec. 5, 1931
						5	12	19	26	3	10	17	24	31	7	14	21	28	
Ceylon: Colombo	C	1		3														1	
	D	1		3														1	
China:																			
Canton	C	1			1	1													
Hankow	C										8		5	18					
	D										6			1					
Shanghai	C		1	7	1	58	30	36	35	29	17	17	8						
	D					3	4	2	5	8			4						
Swatow	C	10	7																
Tientsin	C	10																	
	D	1																	
India	C	18,001	22,074	36,514	10,734	9,834	9,740	8,915	7,552	10,172									
	D	10,337	12,093	20,276	6,044	5,518	5,321	4,800	3,716	4,808									
Bombay	C		23	44	27	5	5	5	1	1	2		4	1			1		
	D		16	25	9	5	2	1		1	2			1			1		
Calcutta	C	292	237	110	10	3	15	18	18	23	3	7	14	13	19	28	22		
	D	168	155	30	4	2	3	6	6	12		5	9	4	10	14	10		
Chittagong	C											1							
Karikal	C			1	1			1	1										
	D			1	1			1											
Madras	C	9	4	6	3	1	1												
	D	4																	
Moulmein	C		1																
	D		1																
Negapatam	C				1														
Rangoon	C	4	4	1					1				1						
	D	2	1	1					1				1						
Vizagapatam	C	1																	
India (French):																			
Chandernagor	C	3	5	7		1	1		1				1						
	D	3	1	7		1	1		1				1						
Pondicherry	C	3	3	3	2			2		1									
	D	3	3	2	1			1											

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		May 31–June 27, 1931	June 28–July 25, 1931	July 26–Aug. 22, 1931	Week ended—														
					Aug. 29, 1931	September, 1931				October, 1931					November, 1931				Dec. 5, 1931
						5	12	19	26	3	10	17	24	31	7	14	21	28	
India (Portuguese)	C	1	2	2	1	2	25	6		17	19								
	D		1	2	1	1	10	6		10	4								
Indo-China (see also table below):																			
Cochin-China—Rachgia	C			P															
Pnompenh	C	1	5	2			1	1		1				2	2				
	D	1	2	1			1	1		1									
Saigon and Cholon	C	61	14								1								
	D	41	7								1								
Iraq:																			
Abulkhasib	C				6														
	D				5														
Amara	C			2	22	35	8	1			2	2	2			3	3		
	D			1	21	30	7	1				1	1			2	4		
Amara Province	C				6	11	106	73	32	21	15	27	13	7	15			3	
	D				5	4	67	44	29	24	14	17	10	6	8			2	
Basra	C			547	148		54	91	77	19	29	32	38	30	9	1			
	D			287	76		30	48	34	11	13	26	7	18	10	1			
Basra Province	C			5	14	6	10	23	26	14	1	1	3	7					
	D			2	10	3	7	10	9	8	1	1	1	4					
Dinwaniyah	C								1										
Dinwaniyah Province	C								15	8	14	24	22	1					
	D								11	6	5	22	10	5					
Iwaniyah	C								22										
	D								15										
Kut Province	C													17	3				
	D													12	2				
Muntafiq Province	C				10	21	66	128	55	54	45	55	17	19	9	23	1	1	
	D				8	20	42	75	38	57	28	37	10	18	6	17	3		
Nasiriyah	C					22	50	16	4	4	18	7	4	7	6	7	2	6	
	D					15	40	20	3	4	18	3	3	6	3	6		7	
Suqelshuyukh	C				2														
	D				2														
Japan: Taiwan—Kelung	C														2				
Persia: [1]																			
Abadan	C											1		3			1		
Ahwaz	C											12		84	16	3			
	D											7		69	21	8			

Khorramabad	C																18		
	D																10		
Mohammerah	C											1							
Philippine Islands: [2] Provinces—																			
Capiz	C	4				9	9	17	49	21	5	4		7	5			4	16
	D	4				5	6	5	35	16	5	3		5	4			4	10
Cebu	C			3															
	D			3															
Iloilo	C	26	27																
	D	21	25																
Negros: Occidental	C	2																	
	D	1																	
Siam	C	4	3	1	1														
	D	2	1		1														
Bangkok	C	1	4	1	1														
	D	1	2																
On vessel:																			
S. S. City of Eastborne, at Calcutta, from Cocanada	C	1																	
S. S. Tairea, at Penang, from Calcutta	C	1																	
S. S. Bandar Shalpour, at Bushire, Persia, from Basra	C		1																
	D		1																
S. S. Kohistan, at Basra, from Bushire, Persia	C		2																
S. S. Cathay, at Kobe, Japan, from Shanghai	C			4															
	D			1															
S. S. Kasagi Maru, at Moji, from Shanghai	C					1													
S. S. Ankoo, at Nagasaki, from Shanghai	C						2												
	D						1												

Place		May, 1931	June, 1931	July, 1931	August, 1931			September, 1931			October, 1931			Nov. 1–10, 1931
					1–10	11–20	21–31	1–10	11–20	21–30	1–10	11–20	21–31	
Indo-China (French) (see also table above):														
Cambodia [3]	C	117	308	241	12				8	6	1	16	2	3
	D	63	109	60	2				4	3	1	16	1	
Cochin-China [3]	C	174	140	143	39				9	9	11	2	1	4
	D	133	106	42	32				6	7	10	2	1	5

[1] On Oct. 23, 1931, cholera was reported at Mohammerah, Abadan, and Ahwaz, Persia. During the period from Oct. 22 to Nov. 7, 1931, 141 cases and 97 deaths were reported. The diagnosis of cholera was not confirmed upon bacteriological examination.
[2] Figures for cholera in the Philippine Islands are subject to correction.
[3] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE

[C indicates cases; D, deaths; P, present]

Place		May 31–June 27, 1931	June 28–July 25, 1931	July 26–Aug. 22, 1931	Week ended— Aug. 29, 1931	September, 1931 5	12	19	26	October, 1931 3	10	17	24	31	November, 1931 7	14	21	28	Dec. 5, 1931
Algeria:																			
Algiers	C			2															
Bone	C	1																	
Philippeville	C		1	2															
	D		1	1															
Argentina: San Juan Province	C		P																
Belgian Congo	C	1																	
	D	1																	
British East Africa (see also table below):																			
Tanganyika	C	17	6	8				4	8	2									
	D	10	6	2				4	4										
Uganda	C	298	418	285	59	59	107	84	83	62									
	D	286	400	281	61	56	107	83	82	63									
Ceylon: Colombo	C	2	1	6		1	1	1	1	1	2							1	
	D	2	1	6		1	1	1	1	1	1							1	
Plague-infected rats				8															
Chile: Santiago	C											1							
	D											1							
China: [1]																			
Shansi Province [2]	C													P					
Shensi Province	C													P					
Dutch East Indies:																			
Batavia and West Java	C	116	75	58	19	18	8	20	21	31		29	28		1				
	D	66	75	58	19	18	8	20	21	31		29	28						
Java and Madura	D	192	212	205	58	68	51	56	77	69	85	94	97	133					
Ecuador (see table below).																			
Egypt:																			
Alexandria	C	4	13	9	2	2		1	1				1	1	3	1		1	1
	D	4	5	3	1	1									1	1	1	1	
Assiout	C	11																	
	D	1																	
Beheira	C					2													
Dakahlia	C		1	2															
Deirout	C	3																	
	D	1																	

Gharbieh	C	1																	
	D	1																	
Girga	C		1																1
Kena	C																	2	
	D																	1	
Minieh	C	3	12												1	3			1
	D	1	4												1	1			
Port Said	C	3	5	2									1			1	2		2
	D	2	1														2		
Tanta	C			2		1		1									2		
	D																2		
France: Rouen—Deville les	C													P					
Hawaii Territory:																			
Hawaii—Hamakua—Plague-infected rats				1															
Maui Island—																			
Hallimaile—Plague-infected rats								1											
Kula District	C			1															
	D			1															
Makawao—Plague-infected rats								1											
Paia—Plague-infected rats									1										
Paaulo—Plague-infected rats														1					
India	C	88	221	684	282	337	554	659	723	527									
	D	51	128	440	140	179	238	209	355	222									
Bassein	C		4	2		1	2	1	1				1						
	D		3	2		1	2	1	1				1						
Bombay	C		12								1		1					1	
	D		6								1							1	
Plague-infected rats		37	48	47	23	17	7	10	9	9	12	12	4		11	7	11		
Burma	C		16																
	D		10																
Madras Presidency	C	6	21		9	75	88	114		62	30	90							
	D	1	9		4	51	52	55		16	30	59							
Moulmein	C		9		P	5													
	D		1			4	3	2	2										
Rangoon	C	1	2	1	2	1							5				1		
	D	1	1	1	1	1							1				1		
Plague-infected rats		3	6	3	1	1	1	1	1	1	1	1	1						
Indo-China (see also table below): Pnompenh	C	3																	
	D	2																	
Iraq:																			
Baghdad	C	23	3	1		2	1							1			1		
	D	9	2			1											1		
Maudhan	C														2	1	1		
	D														1		1		
Madagascar (see also table below): Tamatave	C			1			2		1										
Morocco	C								10			8	2	2					
	D											8		4					

[1] On July 27, 1931, 1,250 cases of plague were reported in Chiobe and Changchow, China, since April. On Sept. 19, 1931, 18 deaths were reported in Changchuanpu and new cases in Kaitung and Fengtien.

[2] On Oct. 17, 1931, plague epidemic was reported in western Shansi Province, China, with 2,000 deaths at Hsinghsien.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		May 31–June 27, 1931	June 28–July 25, 1931	July 26–Aug. 22, 1931	Week ended— Aug. 29, 1931	Sept. 5	Sept. 12	Sept. 19	Sept. 26	Oct. 3	Oct. 10	Oct. 17	Oct. 24	Oct. 31	Nov. 7	Nov. 14	Nov. 21	Nov. 28	Dec. 5, 1931
Peru (see table below).																			
Senegal (see table below).																			
Siam	C	1		1	1	1	1	1	1	1	1	1					1		
	D	1			1	1		1	1	1		1							
Spain: Hospitalet—Barcelona Province	C			5	1			1	1	1			5		1	1			
	D			2				1		1			1						
Syria: Beirut	C		2	1			1	1	1	2					1				
Tunisia: Tunis	C	11					1				1								
	D	1																	
Union of South Africa:																			
Cape Province—Plague-infected rats				1															
Orange Free State	C						P					P							

Place		June, 1931	July, 1931	August, 1931	September, 1931	October, 1931	November, 1931
British East Africa (see also table above):							
Kenya	C	154	484	235	14	19	-------
Ecuador:							
Alamor Parish—Los Hoyos	C	-------	-------	-------	1	3	-------
Amaluza Parish—Cangochapa	C	-------	-------	-------	-------	2	-------
Calvas Canton—							
Cariamanga	C	-------	-------	-------	4	1	-------
Ovejeria	C	-------	1	-------	-------	-------	-------
Celicis Canton—Choras	C	-------	-------	-------	-------	1	-------
Loja Canton—							
Lapaz	C	-------	-------	-------	20	-------	-------
Naimuro	C	-------	-------	-------	-------	2	-------
Paterillo	C	-------	1	-------	-------	-------	-------
Tuburo	C	-------	-------	-------	-------	7	-------
Palas Canton—San Antonio	C	-------	-------	-------	1	1	-------
Indo-China (see also table above)	C	2	1	-------	1	3	-------
	D	2	1	-------	1	1	-------
Madagascar (see also table above):							
Ambositra Province	C	15	1	2	1	-------	-------
	D	15	1	1	1	-------	-------
Antisirabe Province	C	12	13	22	19	-------	-------
	D	12	12	22	19	-------	-------
Miarinarivo Province	C	-------	8	20	14	-------	-------
	D	-------	7	19	12	-------	-------
Madagascar—Continued							
Moramanga Province	C	1	1	3	12	-------	-------
	D	-------	-------	3	11	-------	-------
Tananarive Province	C	10	5	45	65	-------	-------
	D	9	5	44	63	-------	-------
Peru	C	5	3	19	2	-------	-------
	D	1	2	14	2	-------	-------
Senegal:							
Baol [1]	C	-------	27	101	13	6	-------
	D	-------	13	58	8	2	-------
Dakar [1]	C	64	95	194	45	4	-------
	D	56	73	106	31	4	-------
Diourbel [1]	C	-------	-------	-------	13	-------	10
	D	-------	-------	-------	5	-------	5
Louga [1]	C	4	3	2	10	1	14
	D	2	1	1	4	2	8
Rufisque [1]	C	2	34	2	1	7	-------
	D	-------	-------	-------	-------	1	-------
Thies [1]	C	12	16	26	12	7	8
	D	3	7	16	8	5	2
Tivaouane [1]	C	3	3	-------	-------	-------	-------
	D	2	2	-------	-------	-------	-------

[1] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		May 3–30, 1931	May 31–June 27, 1931	June 28–July 25, 1931	July 26–Aug. 22, 1931	Week ended— Aug. 29, 1931	September, 1931 5	12	19	26	October, 1931 3	10	17	24	31	November, 1931 7	14	21	28
Algeria:																			
Algiers	C	1	8	1												1			
Constantine	C	1		1			1												
Belgian Congo	C	47	42																
Bolivia.[1]																			
Brazil: Porto Alegre (alastrim)	C	19	5	41	34	7	13	12	16	12	18		16	7	24				
	D			1	1	2		2			2				3				
British East Africa: Tanganyika	C	13	7	149	19	31	4	6	9	8	2	1,121	53						
	D			17				1	4	4		91	2						
British South Africa:																			
Northern Rhodesia	C			21	26							1							
Southern Rhodesia	C		1	2			1	2											
Canada:																			
Alberta	C			1	1					12				1	2	2	1		
British Columbia	C			2	5		1	1								1	1		
Manitoba	C		4						1									1	
Winnipeg	C							1											
Ontario	C	17	32	35	5	4		2		5	2	1	9		7	3	5	3	
Kingston	C						1												
Ottawa	C		1					1		5	2		1		4	3	5		
Sault Ste. Marie	C	1																	
Toronto	C	1	1																1
Quebec	C			1															
Saskatchewan	C	48	54	42	26	8	8	12	5	1	6	3	1	11	3	1	18	12	
Regina	C	2								1			1						
Chile:																			
Antofagasta	C			1															
Chanaral	C	1																	
Santiago	C													2					
	D													1					
China:																			
Amoy	C	6	4	2	1			1		1			1			1			
	D	3	3	2	1			1		1						1			
Canton	C	3	1	2		1										1	1	6	
Foochow	C	P	P	P	P		P		P		P		P		P				

Hankow	C	5	4	3	3					1					5				
Hong Kong	C	1																	
	D	2																	
Manchuria—																			
Harbin (see also table below)	C	3																	
Kwantung—Dairen	C	2	1																
Nanking	C	P			1														
Shanghai—																			
Foreigners only	C	7	11	3						35	29	17	17	1	6	2	12	16	
Including natives	D	7	13	6	1	1			1	5	8					1			
Tientsin	C	2		3															
Chosen (see table below).																			
Columbia:																			
Cali	D	1																	
Santa Marta	D							1											
Dutch East Indies:																			
Batavia and West Java	C	2																	
East Java and Madura	C	1																	
Eritrea	C	3		2		10													
	D					2													
France (see table below).																			
Great Britain:																			
England and Wales	C	570	287	187	91	33		19	45	45	41	34	41	39	42	71	68	55	
Bradford	C	8	5																
Leeds	C	2																	
London	C	183	122	54	26	3	9	5	15	5	17	15	21	20	27	55	27	38	
London and Great Towns	C	403	228	152	69	13	39	11	34	35	31	25	37	31	37	66	45	48	
	D		1	1															
Sheffield	C							1	1										
Greece (see table below).																			
Honduras: Puerto Castilla	C										1						1		
India	C	11,403	7,313	5,359	2,927	483	484	409	329	382	528								
	D	1,849	1,704	1,352	746	144	108	109	72	100	122								
Bassein	C	1																	
Bombay	C	9	6	6	2		1	2	2									1	
	D	4	5	6	1		1											1	
Calcutta	C	89	47	21	13	2	1	2		1				1					
	D	75	41	18	9	2	1	2		1				1					
Cochin	C	3			3					1	1	2	4	3		2			
Karachi	C		2		1									1					
	D		1																
Madras	C	8	2	2	1		1			1	5	6	1	2	2				
	D	6	1									2							
Negapatam	C		3	1	2	3		1			1		1				1		
Rangoon	C	13	6	3	4	1		1			2		1			1		2	
	D	5	2	1	2			1			1	1							
Tuticorin	C					2	1				4			1		4			
	D										1			1					
Vizagapatam	C	6	6	5	5	3	1	1	1	2	4			1					
	D	1	2	1	4	3	1	1	1		1			1					

[1] An epidemic of smallpox was reported on May 18, with 716 cases and 314 deaths since the middle of April, 1931, in Mendes Province, Bolivia.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		May 3–30, 1931	May 31–June 27, 1931	June 28–July 25, 1931	July 26–Aug. 22, 1931	Week ended— Aug. 29, 1931	September, 1931 5	12	19	26	October, 1931 3	10	17	24	31	November, 1931 7	14	21	28
India (French):																			
Chandernagor	C	7	1	3															
	D	5		2															
Karikal	C	4	6	4	7		2	5			5		3			3			
	D	4	6	4	6		2	1			1		3			3			
Pondicherry Province	C	11	7	28	20	1	6	1	18	1	4	14	4	9	18				
	D	11	7	28	20	1	6	1	16	1	4	12	4	9	16				
India (Portuguese)	C	3																	
	D	1																	
Indo-China (see also table below):																			
Pnompenh	C	1	2																
	D	1																	
Saigon and Cholon	C	2		3	2	1		3	2	1	4	1			4	2	1	4	
	D	1		1	1	1		2		1	2				4	1		2	
Iraq:																			
Baghdad	C	3	1					1											1
	D	2																	1
Basra	C	2	1																
Mosul Liwa	C			1	1					5									
Ivory Coast (see table below).																			
Japan: Nagoya	C			1															
Mexico (see also table below):																			
Jalisco (State)—Guadalajara	D	2	1	3	2			1		1	1	2				2		1	
Mexico City and surrounding territory	C	45	25	22	10	2	2	1		2	1	2	2	1	1	1			
	D	11	13	8	2			1	1	1	2		1	1					
Monterrey	C		1												2				
Torreon	C	1	3				1	1			1								1
	D		2					1											
Vera Cruz	C	1																	
Morocco (see table below).																			
Netherlands: Friesland—Opsterland	C													[1] 1					
Nigeria	C									136	318								
	D									39	102								
Poland	C	3	3	18					1						1		1		
Portugal: Lisbon	C	67	48	45	37	10	21	18	17	16	11	6	15	19	16	17	26		
Rumania (see table below).																			

Siam	C	6	5	1				3												
	D	1	1	1																
Spain	C			7																
Straits Settlements	C	2			1															
	D	2																		
Sudan (Anglo-Egyptian)	C	6	1					32												
	D	2						6												
Syria (see table below).																				
Turkey (see table below).																				
Union of Socialist Soviet Republics (see table below).																				
Union of South Africa:																				
Cape Province	C	P																		
Natal	C				P			P												
Orange Free State	C	P	P	P	P	P	P			P	P	P								
Transvaal	C		P	P											P					
Upper Volta	C	88	12	2																
	D	1																		
On vessel:																				
S. S. Taif (pilgrim ship) at Suakin from Jeddah	C				1															
S. S. Talodi at Suakin	C	1																		

Place		April, 1931	May, 1931	June, 1931	July, 1931	August, 1931			September, 1931			October, 1931			Nov. 1-10 1931
						1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31	
Indo-China (see also table above)	C	142	58	47	8	29				7	27	10	11	26	20
	D				4	11				4	8	3	3	10	4
Ivory Coast	C							7							
	D							4							
Syria: Beirut	C			1											

Place		March, 1931	April, 1931	May, 1931	June, 1931	July, 1931	August, 1931	September, 1931
China: Harbin (see also table above)	C	7		13	10			
Chosen	C	11		1	4	2		
	D	3				1		
France	C	15	6	54	9	20		
Greece	C			3	1			
Mexico (see also table above)	D			1	1	2		
Morocco	C	6	7	49	48	23	23	59
Rumania	C	1		1			1	
Turkey	C	1		9	1			
Union of Socialist Soviet Republics	C	1,903	1,516	1,345				

[1] Imported case.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		May 3-30, 1931	May 31-June 27, 1931	June 28-July 25, 1931	July 26-Aug. 22, 1931	Week ended—												
						Aug. 29, 1931	September, 1931				October, 1931					November, 1931			
							5	12	19	26	3	10	17	24	31	7	14	21	28
Algeria:																			
Algiers	C	7	9	2									1		1	1			
Bone	C				2														
Constantine Department	C	22	26	3	1				2		1				11	16	11		
Oran	C	2	2		1		1										1		
Australia, Western	C	1																	
Bulgaria	C	16	30			1								1					
	D	4	6																
Chile:																			
Antofagasta	C														1				
Santiago	C													3					
China:																			
Manchuria—Harbin	C		16			1													
Shanghai	C			3	1					1									
Chosen (see table below).																			
Colombia: Cali	D						1												
Czechoslovakia (see table below).																			
Egypt:																			
Alexandria	C		3					1	1							1			
Beheira	C																		
Cairo	C					1													
Gharbieh	C																1		
	D																1		
Great Britain: Scotland—Fife County	C	1																	
Greece (see table below).																			
Guatemala (see table below).																			
Iraq: Baghdad	C	2																	
	D	2																	
Irish Free State:																			
Cork County—																			
Schull	C			1															
Skibbereen	C		2	1															
Kerry County—																			
Dingle	C	1																	
Listowel	C		1																

Limerick County—																			
Croom	C									1									
Glin	C							2		1									
Limerick	C			2	1														
Michelstown	C			1															
Rathkeale	C									1									
Mayo County—																			
Belmullet	C	1																	
Castlebar	C				1														
Westport	C				1														
Japan	C		1																
Lithuania (see table below).																			
Mexico:																			
Durango	D			1															
Guadalajara	D				1														
Mexico City, including municipalities in Federal District	C	75	46	53	18	5	1	2	2	4	2	5	3	7	3	1			
	D	33	19	12	10	1	1		2	2	2	2	2	2	2				
San Luis Potosi	D	2		4	1														
Torreon	C			1								1	1		3				
	D			1								1	1		5	1			
Morocco	C	42	101	102	8						1		3		1				
	D	4	6	8															
Palestine	C	4	5	2	11				4	4	1	1		2		1			
Panama Canal Zone—Balboa	C	2																	
Poland	C	298	97	53	31	6	2	1	2	2	8	3	1	2	6	6	6		
	D	18	4	5	2						1				1	2			
Rumania	C	169	80	11	23		4	6	3	1	6	7	4		12				
	D	18	13	5	2				1			2	1		3				
Syria	C	4																	
Tunisia: Tunis	C	29	73	2		1		1	1								3		
	D	3	4																
Turkey (see table below).																			
Union of Socialist Soviet Republics (see table below).																			
Union of South Africa:																			
Cape Province	C	P	P	P	P	P	P	P	P	P	P	P	P	P					
Municipality of East London	C		1		1														
Natal	C	P	P	P	P			1					P						
Orange Free State	C	P	P	12									P	P					
Transvaal	C	P	P	P	P	P	P	P	P	P	P	1	P	P					
Yugoslavia (see table below).																			

Place		April, 1931	May, 1931	June, 1931	July, 1931	August, 1931	September, 1931	October, 1931
Chosen: Seoul	C	4		6	1			
	D	1		1	1			
Czechoslovakia	C	5	11	2				
Greece	C	22	6	9	2	13	9	
	D	3				2	1	
Guatemala	C			33	34	3		
	D			15	5			

Place		April, 1931	May, 1931	June, 1931	July, 1931	August, 1931	September, 1931	October, 1931
Lithuania	C	34	10	13	8	2		
	D	5		2				
Turkey	C	32	13	11	9		16	1
Union of Socialist Soviet Republics	C	1,513	1,324					
Yugoslavia	C	43	14	2	3	1		
	D	5						

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

YELLOW FEVER

[C indicates cases; D, deaths; P, present]

Place		May 3–30, 1931	May 31–June 27, 1931	June 28–July 25, 1931	July 26–Aug. 22, 1931	Week ended— Aug. 29, 1931	September, 1931				October, 1931					November, 1931			
							5	12	19	26	3	10	17	24	31	7	14	21	28
Brazil:																			
Alagoas State	C				3														
	D				2														
Maceio	C															1			
	D																		
Ceara State	C	1	1		1														
	D	1			1														
Minas Geraes State	C	2																	
	D	1																	
Pernambuco Province	C					2													
	D					2													
Recife	C									1									
	D									1									
Rio de Janeiro State	C	2																	
Sergipe State	C		1																
British Cameroons: Mamfe	C	3	2																
	D	2																	
Colombia: Magdalena Province—Near Cienaga	C			4															
Gold Coast:																			
Akuse	C			2															
	D			1															
Dagomba District	C				4														
Kete Krachi	C											1							
Kintampo	C			1															
	D			1															
Oda	C								1										
	D								1										
Salaga	C																		1
	D																		1
Tamale	C			2						2				1					2
	D			2						2									
Wale Wale	C				1														
	D				1														

Ivory Coast:																				
Bobo Dioulasso	C			1																
	D			1																
Grand Bassam	C				4			1												
	D				2			1												
Kong Circle	C			4																
Seguela	C				P															
Tehini	C																1			
Nigeria	C				1										1			1		
	D				1													1		
Senegal:																				
Podor (Hinterland)	C				1															
	D				1															
St. Louis	C									1										
Thies	C									1										
	D									1										
Sudan (French)	C			4																
Macina—Kayo Circle	C																	2		
	D																	2		
Togo (French): Atakpame—Anie Circle	C																1			
	D																1			
Upper Volta:																				
Banfora	C			2						2										
	D			1						1										
Dedougou	C															2				
Diarabakoko	C									2										
	D									1										
Ouagadougou	C					1				1			1							

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