Public Health Reports

Vol. 54 • FEBRUARY 17, 1939 • *No. 7*

INFLUENZA PREVALENCE

As the result of press reports of epidemic prevalence of respiratory disease in several localities, in some of which the condition is designated by these reports as influenza, the Public Health Service has received many inquiries indicating a general impression of epidemic prevalence of influenza throughout the country. While it appears from unofficial reports that there are localized epidemics of respiratory infection of varying degrees of severity, most reports indicating a mild type, official reports to the Public Health Service up to February 11, do not indicate an epidemic prevalence of influenza throughout the country. While the incidence reported for the first 4 weeks in January was slightly higher than that for the corresponding period of 1938 and the 5-year median (see p. 246), it subsequently dropped below the median figure. The total number of cases of influenza reported for the country as a whole for the week ended February 11 was 3,802 as compared with 4,310 for the preceding week and with 4,577, the 5-year median for the week. For the first 6 weeks of the year, 20,877 cases were reported as compared with 18,420 for the corresponding period last year. The excess number of deaths from pneumonia is frequently a good index to epidemic influenza prevalence. The number of deaths from pneumonia for a group of cities scattered throughout the country, having an aggregate population of approximately 33,000,000, was 762 for the week ended February 4, as compared with a 5-year average of 992.

PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES

January 1–28, 1939

The accompanying table summarizes the prevalence of eight important communicable diseases, based on weekly telegraphic reports from State health departments. The reports from each State are published weekly in the PUBLIC HEALTH REPORTS under the section "Prevalence of disease." The table gives the number of cases of

these diseases for the 4-week period ending January 28, the number reported for the corresponding period in 1938, and the median number for the years 1934–38.

DISEASES ABOVE MEDIAN PREVALENCE

Influenza.—For the 4 weeks ending January 28 there were reported 12,765 cases of influenza, or about 10 percent in excess of the incidence reported for this period in 1938 as well as the 1934–38 median incidence for this period, which is represented by the 1938 figure (11,628 cases). The South Atlantic and West South Central regions reported rather definite increases over the normal seasonal average incidence in those regions, while the Middle Atlantic and Mountain regions reported minor increases. In other regions the incidence was relatively low.

Number of reported cases of 8 communicable diseases in the United States during the 4-week period Jan. 1–28, 1939, the number for the corresponding period in 1938, and the median number of cases reported for the corresponding period 1934–38 [1]

Division	Diphtheria			Influenza [2]			Measles [3]			Meningococcus meningitis		
	Current period	1938	5-year median	Current period	1938	5-year median	Current period	1938	5-year median	Current period	1938	5-year median
United States [1]	2,491	2,761	3,001	12,765	11,628	11,628	36,655	70,249	51,498	212	377	377
New England	65	50	82	50	77	118	2,994	2,287	3,612	6	11	11
Middle Atlantic	360	368	485	362	122	196	5,143	24,928	7,472	47	62	62
East North Central	517	630	616	398	354	723	3,634	23,201	3,281	22	45	79
West North Central	225	247	360	321	696	919	7,229	6,142	4,890	13	29	31
South Atlantic	514	487	539	5,419	3,146	3,925	5,098	5,826	6,375	46	77	77
East South Central	171	221	360	1,187	2,284	2,284	990	3,098	2,941	36	98	66
West South Central	377	478	478	3,556	3,908	2,900	1,452	989	998	16	25	30
Mountain	110	123	86	761	407	562	2,427	1,579	1,579	17	17	19
Pacific	143	157	180	411	644	644	7,738	600	1,079	9	16	16

Division	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever		
	Current period	1938	5-year median	Current period	1938	5-year median	Current period	1938	5-year median	Current period	1938	5-year median
United States [1]	67	85	98	20,581	23,787	23,787	1,548	2,435	865	458	464	487
New England	1	1	6	1,134	1,816	1,661	0	0	0	13	17	16
Middle Atlantic	2	8	12	4,059	4,828	5,897	0	0	0	82	54	72
East North Central	11	16	12	8,142	8,170	8,129	542	592	154	44	31	53
West North Central	7	6	7	2,593	3,857	3,676	459	918	413	39	71	47
South Atlantic	19	8	9	1,141	1,150	1,226	13	13	11	92	87	91
East South Central	7	13	11	666	612	620	20	224	7	38	30	54
West South Central	9	16	6	734	996	769	178	143	44	104	115	115
Mountain	1	3	2	631	990	750	212	255	128	26	24	24
Pacific	10	14	16	1,491	1,398	1,551	132	376	120	20	35	35

[1] 43 States. Nevada is excluded and the District of Columbia is counted as a State in these reports.
[2] 44 States and New York City.
[3] 46 States. Georgia and Mississippi are excluded.

Smallpox.—Although the incidence of smallpox (1,548 cases) during the current 4-week period was only about 65 percent of last year's figure, it was nearly twice the 1934–38 median for the corresponding period. The incidence was normal in regions along the Atlantic

coast, but all other sections of the country continued to report a relatively high incidence. The disease was unusually prevalent in Indiana (308 cases), Ohio (126), Iowa (117), Kansas and Minnesota (97 cases each), Oklahoma (94), Arizona (83), California (71), Texas (65); more than two-thirds of the total number of cases occurred in these nine States. The West North Central and East South Central regions reported very sharp decreases from the incidence during this period in 1938, and for the regions as a whole the current incidence was only slightly above the seasonal expectancy based on the 5-year median.

DISEASES BELOW MEDIAN PREVALENCE

Diphtheria.—The low level of diphtheria in relation to past years continues. During the first 4 weeks in January, 2,491 cases were reported, which was approximately 90 percent of last year's figure and about 20 percent less than the 1934–38 median. The Mountain region reported a few more cases than might normally be expected, but all other regions maintained a comparatively low level.

Typhoid fever.—The typhoid fever incidence was about normal for this season of the year. The current incidence (458 cases) was approximately the same as the incidence recorded for the corresponding period in 1938 and about 5 percent below the median incidence for recent years. All regions except the Middle Atlantic reported a relatively low incidence.

Poliomyelitis.—During the first 4 weeks of the year 67 cases of poliomyelitis were reported, which was about 30 percent below the preceding 5-year median incidence for this period. While the number of cases reported from the South Atlantic region was not especially large, it was more than twice the normal seasonal incidence in that region; in all other regions the situation was quite favorable.

Scarlet fever.—For scarlet fever also the comparison with recent years was favorable. The number of reported cases (20,581) for the 4 weeks ending January 28 was only about 85 percent of the number reported for the corresponding period in 1938, which number (23,787) also represents the median incidence for this period. In the East South Central region the number of cases was slightly above the 1934–38 median figure, but in all other regions the incidence was comparatively low.

Measles.—The number of cases of measles reported for the current period was 36,655, an increase of approximately 18,000 cases over the preceding 4-week period. All regions of the country contributed to the increase, which is normally expected at this season of the year. The number of cases was only about 50 percent of the number reported for the corresponding period in 1938, but it was approximately twice the number reported in each of the 2 preceding years. Considering

the 5 preceding years, a period which includes years of both high and low measles incidence, with an average of approximately 51,000 cases, the current incidence is relatively low. The disease appears to be most prevalent in the West North Central and Pacific regions. The East North Central, West South Central, and Mountain regions also reported minor increases over the normal seasonal incidence, while in other regions the numbers of cases were considerably below the 1934–38 average incidence.

Meningococcus meningitis.—For the 4 weeks ending January 28 the number of reported cases of meningococcus meningitis was 212, as compared with 377, 542, and 668 for the corresponding period in the years 1938, 1937, and 1936, respectively. The current figure is less than 60 percent of the median incidence (377 cases) for the 5 preceding years. Each section of the country shared in the favorable situation of this disease that now exists. For the country as a whole the incidence is the lowest since 1934, when the cases for the period corresponding to the current one numbered 210.

MORTALITY, ALL CAUSES

The average mortality rate from all causes in large cities for the 4 weeks ending January 28, based on data received from the Bureau of the Census, was 12.3 per 1,000 inhabitants (annual basis). The average rate for this period for the 5 preceding years was 13.5; the current rate is the lowest since 1932, when the rate was 12.0.

THE FORMOL-GEL REACTION IN RHEUMATIC FEVER: AN AID IN THE DIAGNOSIS OF ACTIVE CARDITIS

By MARK P. SCHULTZ, *Surgeon*, and EDYTHE J. ROSE, *Associate Bacteriologist*, *United States Public Health Service*

Various alterations in the properties of blood in disease have been ascribed to coincident hyperglobulinemia. Among these are an increased rate of erythrocyte sedimentation and the formation of an opaque gel in serum upon the addition of formalin (*1*). It has been established that variations in the erythrocyte sedimentation rate in rheumatic fever, studied by a number of observers (summarized by Coburn and Kapp (*2*)), reflect the intensity of the disease. The observations reported here were made with the object of determining the significance of alterations in the formol-gel reaction in febrile diseases, particularly rheumatic fever.

This reaction was first described by Gaté and Papacostas (*3*) in 1920 and has been found positive in kala-azar (*4*), schistosomiasis (*6*), lymphogranuloma inguinale (*1*), and various other pathological conditions (*10*). Reichel et al. (*10*) have recently reviewed the European

literature on this subject, and in the present account only the sources which they have not mentioned are referred to. Under conditions of the test, upon addition of formalin to normal blood serum no change in viscosity or transparency is apparent to the naked eye. In pathological sera, gelation with or without opacity may occur. A positive reaction is invariably associated with hyperglobulinemia, especially with an increase in euglobulin fraction; but an unidentified qualitative change is also thought to be a factor in promoting the development of opacity (*4, 1*).

The observations which have been made in subacute bacterial endocarditis are the most pertinent with respect to the present problem. Reichel et al. (*10*) refer to eight independent observers who have called attention to the great frequency with which the formol-gel reaction is positive in this disease, although their own findings are not in accord. They attribute this discrepancy to the probability that others have included, through error, cases of rheumatic endocarditis in the subacute bacterial endocarditis series, for their own observations, as well as those of another to whom they refer, indicate that positive reactions may be obtained in the former condition. Divergent conclusions in the literature, particularly those pertaining to the incidence of positive results, may also be attributed to variations in technique, for the outcome of the test is dependent upon such factors as the concentration and acidity of the formaldehyde solution, the temperature, and the length of the period of observation. Various investigators report an incidence of from 3 to 10 percent in unselected series of patients. Probably two factors are responsible for the much higher incidence among our patients: (1) Only individuals with febrile illnesses were studied. (2) Reactions of less than ++++ intensity were included.

Methods.—In performing the test, two drops of 40 percent formalin were added, with shaking, to a test tube of 8 mm. bore containing 1.0 cc. of the serum to be examined. The tube was allowed to stand at room temperature and the contents were inspected for gelation and opacity at 5 minutes, 2 hours, and 24 hours (*1*). Strongly positive sera develop alterations in physical state at 2 hours and occasionally at 5 minutes; but the results reported here are exclusively those of the 24-hour reading. The criteria suggested by Gutman and Wise (*1*) were observed in estimating the intensity (+ to ++++) of gelation or opacity. Serum was obtained by allowing venous blood, aseptically drawn from the antecubital region with a minimum of stasis, to clot in paraffin-lined tubes at room temperature. In almost all instances specimens were collected before breakfast in order to obtain clear serum.

For determination of the erythrocyte sedimentation rate and volume percent of red blood cells, 5.0-cc. quantities of blood were collected

in bottles each containing 10.0 mg. of dry potassium oxalate which had been recrystallized and adjusted in pH as recommended by Peters and Van Slyke (*7*). The erythrocyte sedimentation rate was determined at room temperature by observing the descent during 1 hour of the erythrocyte level in a blood column 20.0 cm. in height sustained in a vertical tube of 3.0 mm. internal diameter. In about half the tests, readings were also made at 5-minute intervals during the hour and in conjunction with hematocrit observations (corrected for the shrinkage of cells due to the anticoagulant) (*8*) used in the calculation of corrected erythrocyte sedimentation rates according to the method of Rourke and Ernstine (*9*) These determinations were made within 3 hours after the blood had been collected.

The sera investigated were from febrile hospital or convalescent home patients afflicted with various diseases, including rheumatic fever. Most of those with rheumatic fever, pharyngitis, and scarlet fever were bled at 10-day intervals until convalescence was established. The later observations on these individuals were usually made at their homes. When serial observations were not made during the course of illness, single specimens were collected from patients with well established, active, febrile disease or convalescent therefrom.

The occurrence of both gelation and opacity were observed and recorded, for it has been suggested that the two phenomena are indicative of alterations in serum qualitatively distinct (*1*, *4*). In diseases of the type we have studied, however, opacity very rarely developed in any specimen to a relatively greater degree than gelation, and the former change was seen almost exclusively in sera in which a firm gel formed. In patients observed repeatedly during the course of their illness, the sequence of events (evident, at least in part, in each of the figures presented except Nos. 6 and 9) was usually as follows: As the disease developed, gelation was the first change observed and opacity became evident only when firm gels were being formed. Opacity then increased in intensity with further progress of the disease, and with convalescence it was first to disappear. This was followed by a diminution in firmness of the gels formed until, with recovery, neither phenomenon was present. These observations suggest that, in the diseases studied, the two alterations in physical state are indications of a quantitative change in the serum which must be of greater intensity or extent to result in the development of opacity than is necessary for gelation. For these reasons, although the occurrence of both phenomena is indicated in the figures and tables, only the term "formol-gel" is employed in the text.

Since hyperglobulinemia is an essential factor both for the development of a positive formol-gel reaction and accelerated erythrocyte sedimentation rates, it is of interest to compare the results of the two tests on the same specimens of blood. In table 1, compiled from the

results of 430 examinations in 70 patients with rheumatic fever and 108 controls ill with various other febrile diseases, the incidence of positive formol-gel reactions at various levels of the erythrocyte sedimentation rate is shown. Among the controls there is a rough parallelism between the two tests; in sera from blood sedimenting over 100 mm. in 1 hour, 84.2 percent of the gel reactions were positive, while all were negative when the sedimentation rate was below 20 mm. In the rheumatic fever group, on the other hand, this parallelism is not evident. Although, as in the control group, the incidence of positive formol-gel reactions is reduced when the sedimentation rate is relatively slow, it is also lower in association with the most rapid rates. An explanation of the latter seemingly paradoxical observation will become apparent when the records of individual patients are presented later; for in individuals with rheumatic fever very rapid erythrocyte sedimentation rates are frequently demonstrable at the onset of illness, although positive formol-gel reactions are not elicited until later, coincident with the development of signs of active carditis.

TABLE 1.—*Positive formol-gel reactions at various erythrocyte sedimentation rate levels*

E. S. R.[1] level	Control group				Rheumatic fever group			
	Number of tests	Percent of tests at each level	Positive[2]		Number of tests	Percent of tests at each level	Positive[2]	
			Number	Percent			Number	Percent
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
100+	19	12.2	16	84.2	36	13.1	13	36.1
70–99	17	11.0	12	70.6	24	8.7	16	66.6
40–69	26	16.8	3	11.5	42	15.3	25	59.2
20–39	36	23.2	7	19.4	63	22.9	23	38.7
10–19	24	15.5	0	0	44	16.0	7	15.9
0–9[3]	32	20.6	0	0	66	24.0	2	3.0
All over 9	123	79.3	38	30.9	209	76.0	84	40.2
All	155	100.0	38	24.5	275	100.0	86	40.2

[1] Erythrocyte sedimentation rate in millimeters per hour.
[2] Formol-gel reaction+ to ++++ intensity.
[3] Normal range.

When all of the observations (or all in which the erythrocyte sedimentation rate was over 9 mm. per hour) in each group are compared (table 1), it is evident that positive formol-gel reactions were more frequently observed in rheumatic fever sera than in control sera, although the severity of illness as reflected by increase in the erythrocyte sedimentation rate was comparable in the two groups (compare columns 3 and 7, table 1). This is due to the occurrence of more positive formol-gel reactions at relatively low erythrocyte sedimentation rates in the rheumatic fever patients. In contrast to the control group, some positive formol-gel reactions appear when the sedimentation rate is less than 20 mm. per hour. The study of individual records will likewise account for these observations, for in patients

with severe carditis the formol-gel reaction may remain positive during recovery when the erythrocyte sedimentation rate has fallen to low levels.

Table 2 indicates the relative number of patients in each group in whom strongly positive formol-gel reactions and maximum erythrocyte sedimentation rates were present. It is apparent that maximum deviations from the normal, as indicated by both tests, were more frequent in the rheumatic fever patients. The two groups, however, are more sharply differentiated by the results of the formol-gel reaction than by differences in the erythrocyte sedimentation rate. (Compare column 3 with columns 5 and 7, table 2.) This is probably to be accounted for by the relatively longer persistence of positive formol-gel reactions during recovery in patients with severe carditis. Table 2 also indicates that there were relatively more patients in the rheumatic-fever group in whom strongly positive gel reactions and very rapid erythrocyte sedimentation rates were demonstrable.

TABLE 2.—*Comparative incidence of patients with strongly positive formol-gel reactions and maximum erythrocyte sedimentation rates in the rheumatic fever and control groups*

	Number patients	++ to ++++ gelation		E. S. R.[1]			
				+100 mm.		+70 mm.	
		Number	Percent	Number	Percent	Number	Percent
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Controls	108	19	17.6	19	17.6	36	33.3
Rheumatic fever	70	33	47.1	27	38.3	38	54.3

[1] Erythrocyte sedimentation rate in millimeters per hour.

The incidence of strongly positive reactions among the controls is indicated in table 3 and the character of infection in such cases in table 4. Gonococcal arthritis, sepsis, tuberculous peritonitis, and scarlet fever accounted for most of the positive reactions. The three cases of rheumatoid arthritis, in which the test was negative, were not in a very active stage. With one exception (case 39, table 4), strongly positive reactions were obtained only from patients extremely ill, with high fever and rapid erythrocyte sedimentation rate. The courses of illness in two control patients (cases 18 and 32) are indicated in figure 1. Case 18 was one of uncomplicated scarlet fever in a female 18 years of age. When the patient was first examined, on the 8th day of illness, rash was still evident and the pharyngitis which was associated with the onset of the illness had not cleared entirely. At this early period the erythrocyte sedimentation rate was very rapid and the formol-gel reaction strongly positive. The latter test became

negative before the sedimentation rate had returned to normal levels. Case 32 is that of a male, 36 years of age, who suffered a mild attack of scarlet fever, during the course of which there occurred only a moderate increase in the erythrocyte sedimentation rate and the formol-gel reaction did not become positive. Following tonsillectomy on the 24th day of illness, however, an extensive cervical cellulitis developed. This was followed by an increase in the erythrocyte sedimentation rate, at which time the formol-gel reaction became positive. The cellulitis did not fulminate until the patient had been

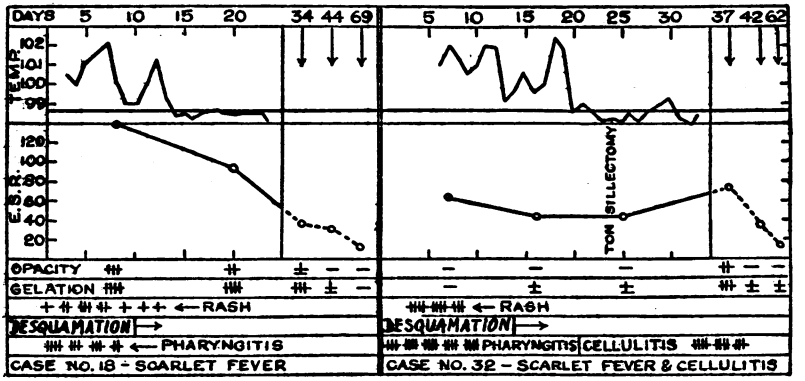

FIGURE 1.—Temp.=rectal temperature, °F.; E. S. R.=erythrocyte sedimentation rate in mm per hour.

discharged from the hospital and no record of the temperature at that time is available.

TABLE 3.—*Distribution of strongly positive formol-gel reactions among the controls*

Diagnosis	Number of patients	Number of patients with ++ to ++++ reaction
Tuberculous peritonitis	2	2
Gonococcal arthritis	6	5
Scarlet fever with complications [1]	2	2
Uncomplicated scarlet fever	16	4
Sepsis	3	2
Pneumonia	12	1
Upper respiratory infections	25	1
Measles	6	1
Pulmonary, glandular, and bone tuberculosis	7	0
Diphtheria	4	0
Rheumatoid arthritis	3	0
Miscellaneous [2]	22	1
Total	108	19

[1] The complications were retropharyngeal abscess and cervical cellulitis.
[2] The positive case was one of osteomyelitis.

TABLE 4.—*The character of infection in control patients with ++ to ++++ formol-gel reactions*

Case No.	Diagnosis	Age	Sex	Days' duration illness	E. S. R.[1]	Formol-gel test	
						Gelation	Opacity
1	Hemol. strep. sepsis	10	M	20	140	++++	++++
82	Scarlet fever plus cellulitis	36	M	37	73	+++	++
50	Scarlet fever plus abscess	26	F	14	68	++++	++++
18	Scarlet fever	18	F	14	132	++++	++
31	Tuberculous peritonitis	9	M	21	79	++++	+++
33	Scarlet fever	12	F	18	70	++++	+++
2	Strep. viridans sepsis	10	M	30	100	+++	+
39	Measles	15	M	19	27	++++	+++
4	Upper respiratory infection	26	M	14	135	+++	+
16	Gonococcal arthritis	20	F	20	103	++++	++
22	do	26	F	49	91	+++	+
10	do	20	F	16	119	++++	−
65	do	19	F	26	129	++	±
77	do	22	F	32	100	++++	++++
51	Scarlet fever	9	F	14	93	+	++
34	Pneumonia	13	F	24	121	+++	++
35	Tuberculous peritonitis	14	F	18	92	+++	++++
36	Scarlet fever	15	M	21	118	+++	+++
8	Osteomyelitis	9	M	43	136	++++	++++

[1] Erythrocyte sedimentation rate in millimeters per hour.

Of the 70 rheumatic-fever patients, 33 developed strongly positive (++ to ++++) formol-gel reactions during the course of observation. These may conveniently be divided into three groups:

1. Sixteen with severe persistent carditis without arthritis, of whom three died and four developed subcutaneous nodules. In other

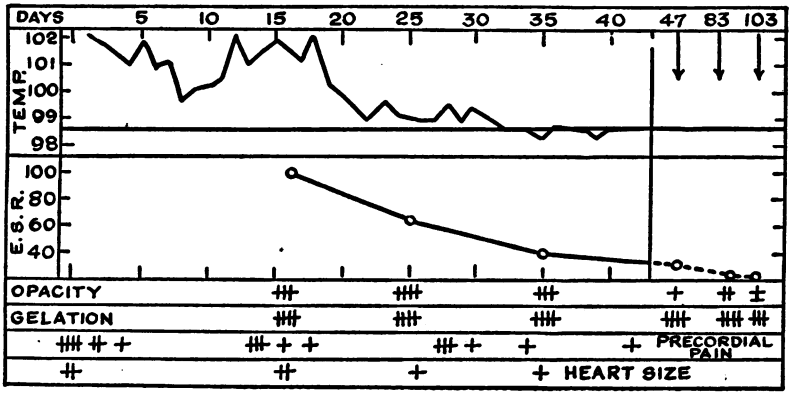

FIGURE 2.

groups, there were no fatalities and no instances of nodule formation.

2. Ten with severe arthritis, all of whom escaped with minimal cardiac damage. Only two patients of this group were under 13 years of age.

3. Seven with definite arthritis and carditis. Neither arthritis nor carditis was of extreme severity; but four developed auscultatory signs of permanent valvular damage.

Examples from each of these groups are shown in the accompanying figures.

GROUP 1

Figure 2 presents the course of illness in a male 21 years of age who had suffered rheumatic fever with arthritis at the age of 14. He entered the hospital complaining of precordial pain and shortness of breath of a few days' duration. At that time signs of aortic valvular insufficiency were demonstrable, and they persisted during the period of observation. Slight dependent edema with hepatic enlargement was present for the first 3 weeks, but evidence of cardiac decompensation disappeared with rest and digitalis. Precordial pain was a persistent complaint even after compensation was established. The temperature did not rise above 102° F., and the erythrocyte sedimentation rate was not observed to exceed 100 mm. fall in 1 hour. The

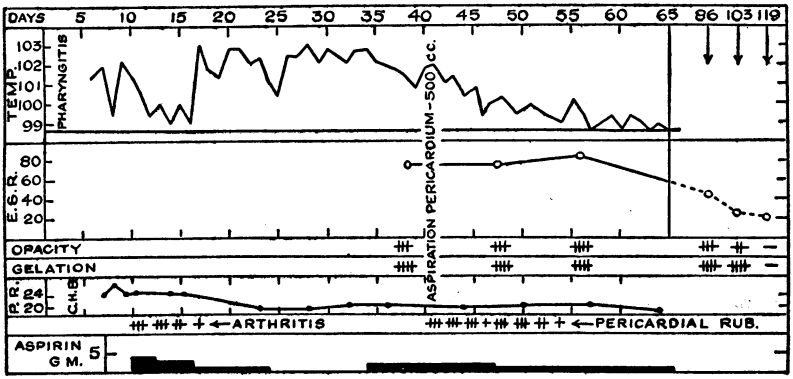

FIGURE 3.—P. R.=P-R interval in 1/100 seconds; C. H. B.=complete heart block.

patient was comfortable except for precordial pain and generally did not appear to be severely ill. The formol-gel reaction remained strongly positive to the 103d day of illness. By this time the erythrocyte sedimentation rate was but slightly above normal and the patient was afebrile and entirely comfortable.

Figure 3 indicates the course of illness in a female 29 years of age who gave no history of previous rheumatic fever. Complete heart block developed suddenly 5 days after the onset of acute pharyngitis, and persisted for 24 hours. Thereafter, the P–R interval showed varying degrees of prolongation until after the 57th day of illness. Serofibrinous pericarditis developed but regressed after the 40th day. A precordial systolic murmur of varying intensity was constantly present. There was moderately severe polyarthritis appearing about the 12th day, but this was promptly relieved by antipyretics. A mild degree of cardiac decompensation was evident, but it was not present after the 45th day. The erythrocyte sedimentation rate did not rise above

85 mm. per hour; and although there was little fever after the first 2 months of illness, the formol-gel reaction was strongly positive for over 100 days.

Figure 4 illustrates the course of events in a female 13 years of age. There was no history of antecedent rheumatic fever when the patient entered the hospital complaining of fever, anorexia, and a cutaneous rash of several weeks' duration. A few days later, rheumatic subcutaneous nodules were identified, with the subsequent appearance of gallop rhythm at the apex, cardiac dilatation, and electrocardiographic changes. There was no arthritis, and the patient remained quite comfortable. The temperature rarely exceeded 100° F., and the erythrocyte sedimentation rate rose above 40 mm. per hour only on one occasion. The formol-gel reactions first became strongly positive after signs of active carditis had appeared and had not become negative

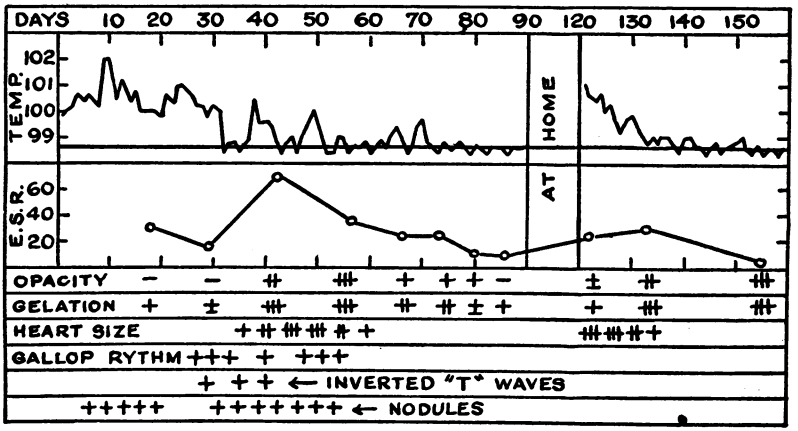

FIGURE 4.

by the 155th day of illness although the erythrocyte sedimentation rate had fallen to within normal limits by that time.

In figure 5 the course of a first attack of rheumatic fever in a male 8 years of age is shown. Following mild arthritis about the 15th day, there was general improvement until the 30th day, when gallop rhythm followed by evidences of pericarditis developed. The sedimentation rate, which had been elevated previously, again rose; but the formol-gel reaction first became positive at this time. Signs of carditis did not persist beyond the 54th day, and the child became subfebrile. A loud, systolic, precordial murmur developed but rapidly diminished in intensity after the 60th day. With signs of improvement, the erythrocyte sedimentation rate remained rapid, but the formol-gel reaction became only questionably positive.

Figure 6 presents the course of events in a male 11 years of age during a stay of 38 weeks in a convalescent home, where he was

admitted while recovering from a first attack of rheumatic fever beginning 6 weeks previously. For the first 7 weeks he gained rapidly in weight and a coarse systolic murmur gradually decreased in intensity. During the 7th week there were anorexia and malaise but no diagnostic symptoms appeared. From that time he remained in bed

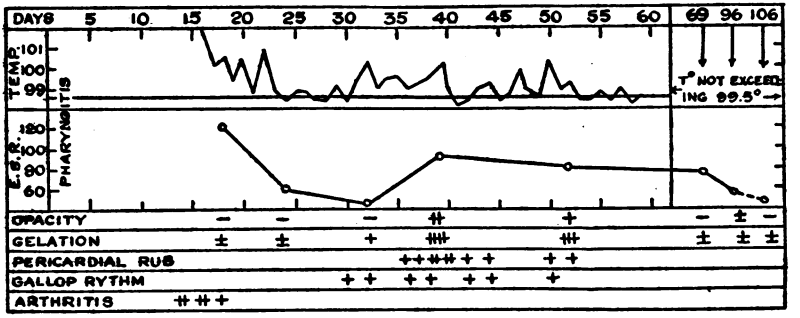

FIGURE 5.

until the 21st week. During this period, there was slight fever, and the precordial murmur increased markedly in intensity. Although no more definite signs of rheumatic activity could be elicited, no other inflammatory process could be found to account for the illness. Unfortunately, facilities for electrocardiographic and roentgenologic

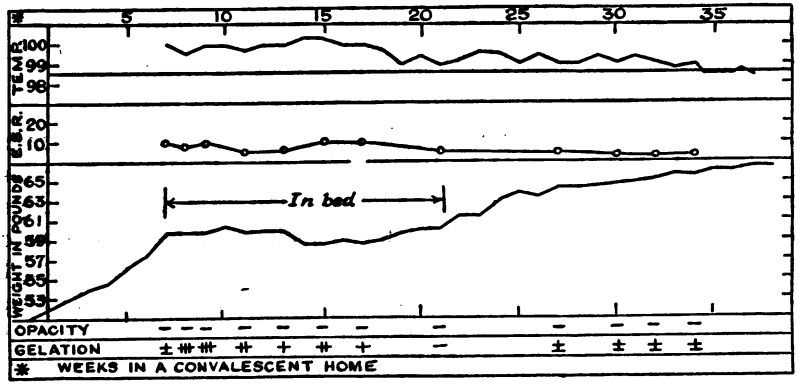

FIGURE 6.

examination were not available. The erythrocyte sedimentation rate did not rise above the normal level, but the formol-gel reaction became positive in the second week of this probable relapse and did not become negative until weight gain was again noticeable. From this point the precordial systolic murmur decreased in intensity and there was less fever. This case constitutes an exception, for it is the only one in which positive formol-gel reactions were obtained although the erythrocyte sedimentation rate remained within normal levels during the entire period of observations. For this reason, and because incon-

trovertible proof of the existence of active carditis could not be obtained, this case was not included in the series of 70 rheumatic-fever patients which were the subject of numerical analysis above.

The examples which have been presented indicate the typical findings in a group of patients with severe carditis. The formol-gel reaction frequently remained negative during early stages of the illness, although the erythrocyte sedimentation rate might become greatly accelerated. Positive reactions were frequently not observed until after evidences of active carditis became apparent. These relationships may explain the relatively low incidence of positive formol-gel reactions at high rates of erythrocyte sedimentation noted for the rheumatic-fever group in table 1. Frequently, with apparent recovery, the formol-gel reaction in this group of patients

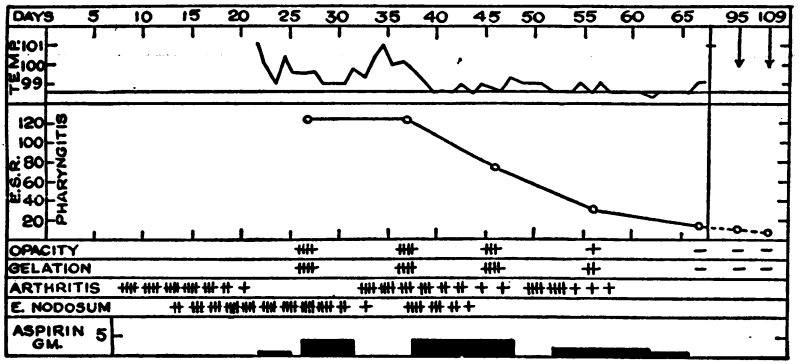

FIGURE 7.—Nodosum=erythema nodosum.

remained strongly positive although the erythrocyte sedimentation rate approached the normal limits, and occasionally the former test remained positive although the sedimentation rate was no longer elevated. This fact may account for the occurrence, noted above, of more positive formol-gel reactions at relatively low erythrocyte sedimentation rates in the rheumatic fever than in the control group.

GROUP 2

In a second group of rheumatic-fever patients, chiefly adults, in which strongly positive formol-gel reactions were observed, there was severe arthritis. One such instance was that of a female 28 years of age (fig. 7) who developed severe and persistent arthritis with recurring erythema nodosum. In this group of cases, as among the controls, a positive formol-gel reaction, when present, developed early in the course of illness but did not persist into convalescence and was never observed when the erythrocyte sedimentation rate had fallen below 30 mm. per hour.

GROUP 3

In a third group of rheumatic-fever patients in whom strongly positive formol-gel reactions were observed both arthritis and carditis were present with moderate severity. In these individuals the reaction sometimes became positive early, especially when arthritis was an outstanding feature. Frequently in children, however, strongly positive tests were first observed coincident with the second rise of the "saddleback" temperature curve not uncommon in rheumatic fever, or after the presence of active carditis had become evident. An example is illustrated in figure 8. This patient, a male 8 years of age, developed in a first attack migratory arthritis of intermediate severity. Upon admission to the hospital with moderate fever and a rapid erythrocyte sedimentation rate, the formol-gel reaction was weakly positive but became strongly positive at the time of a secondary

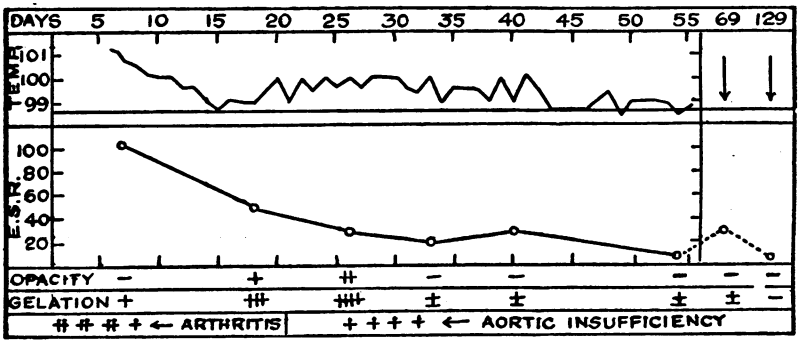

FIGURE 8.

temperature rise, by which time the erythrocyte sedimentation rate had fallen sharply. With continued fall of the erythrocyte sedimentation rate, the formol-gel reaction became questionably positive. After the secondary rise in temperature, signs of aortic valvular insufficiency were present for several days.

GROUP 4

In 37 of the 70 rheumatic-fever patients only negative or faintly positive formol-gel reactions were obtained. These were for the most part mild cases. None of them showed signs of severe carditis and none developed impairment of cardiac reserve. The only persisting sign of cardiac damage in any were precordial systolic murmurs in 19. However, 6 of the patients in this group, all children, suffered rather severe, extensive arthritis. One example is demonstrated in figure 9. This first attack of rheumatic fever developed in a female aged 7, with a very high fever, greatly accelerated erythrocyte sedimentation rate, and persistent arthritis which was incompletely relieved by antipyretics. Many joints were involved and large quantities of exudate

were present in the knee joints. Except for faintly positive formol-gel reactions at the outset, the results of this test were negative.

With over one-half of the observations the red blood cell volume was also determined, which permitted calculation of the erythrocyte sedimentation rate corrected for the degree of anemia. This was done in view of the possibility that a closer correlation might be established between the corrected erythrocyte sedimentation rate and the formol-gel reaction than was observed between the latter and the uncorrected rate. When the findings in this series of cases were compared

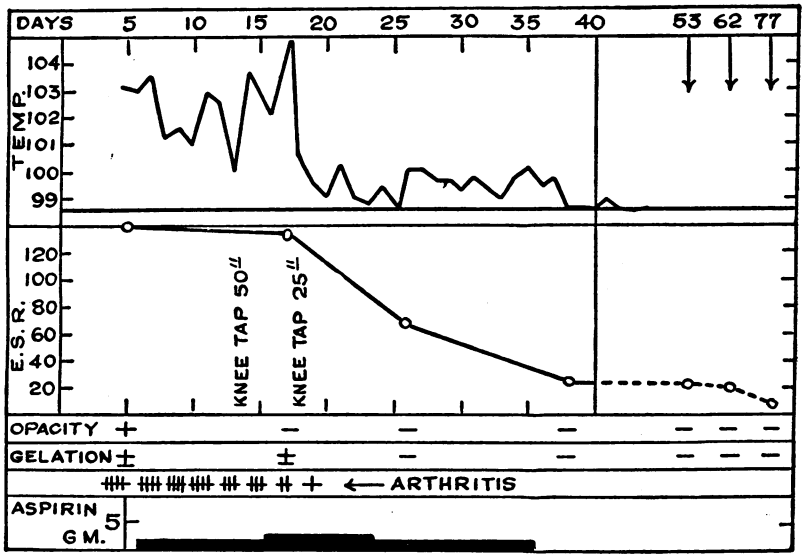

FIGURE 9.

with reference to the corrected erythrocyte sedimentation rate, however, the general conclusions were unchanged. In view of this fact, the results are presented here with relation to the uncorrected sedimentation rate in order to include the maximum number of observations. That in this series of observations the formol-gel reaction should bear approximately the same relationship to both corrected and uncorrected erythrocyte sedimentation rates is probably due to the fact that no severe cases of anemia were included. We have found, indeed, only negative or questionable positive formol-gel reactions in association with very rapid uncorrected erythrocyte sedimentation rates in patients profoundly anemic when corrected rates are within normal limits. Three such samples, two of microcytic and one of macrocytic anemia, are presented in table 5.

TABLE 5.—*The formol-gel reaction in three cases of anemia*

Case No.	R. B. C.[1]	Hb.,[2] Gm. 100 cc.	Volume percent R. B. C.	Uncorrected E. S. R.	Corrected E. S. R.	M. C. V.	M. C. H.	M. C. H. C.	Formol-gel	
									Gel.	Opacity
95	2.84	5.59	17.8	60	0.15	71.7	22.5	31.4	±	−
93	1.7	4.12	12.35	84	0.25	72.6	24.2	33.4	±	±
39	1.52	5.25	16.7	63	*0.35	110.0	34.0	31.0	−	−

The erythrocyte sedimentation rate is indicated, uncorrected for degree of anemia in millimeters per hour, and corrected for the degree of anemia in millimeters per minute.

[1] Erythrocyte count in millions.
[2] Hemoglobin in grams per 100 cubic centimeters by the Newcomer method.
*Upper limit of normal.
M. C. V.=mean corpuscular volume in cubic micra.
M. C. H.=mean corpuscular hemoglobin in micro micrograms.
M. C. H. C.=mean corpuscular hemoglobin concentration in percent.

DISCUSSION

It is evident that, among the control patients ill with various febrile diseases, the formol-gel reaction was positive only in cases of severe illness. In these instances, furthermore, a parallel was demonstrable between the degree of erythrocyte sedimentation rate acceleration and the occurrence of positive formol-gel reactions. The results in adult rheumatic-fever patients severely ill with arthritis were similar. Patients with rheumatic carditis, on the other hand, reacted differently in two particulars: (1) Strongly positive formol-gel reactions were observed in individuals without obvious severe illness, with relatively little fever and with but slightly increased erythrocyte sedimentation rates, and (2) during the course of illness the occurrence of positive formol-gel reactions did not parallel that of most rapid erythrocyte sedimentation rates. In cases of rheumatic carditis the formol-gel reaction frequently became positive as the erythrocyte sedimentation rate was declining but coincident with the development of signs of active carditis. Furthermore, this test remained strongly positive in some instances while the erythrocyte sedimentation rate returned to normal levels.

These findings suggest that observation of the formol-gel reaction in rheumatic fever may prove of value. A strongly positive result in children, or in adults in the absence of arthritis, is suggestive of active carditis even in the presence of a relatively slow erythrocyte sedimentation rate. Upon the basis of the evidence now available, persistently negative reactions, although in association with increased erythrocyte sedimentation rates, indicate that severe carditis is probably not present and may be considered of favorable prognostic import. In some instances this test appears to be a more delicate index of continued rheumatic activity than acceleration of the erythrocyte sedimentation rate because positive reactions may be obtained after the sedimentation rate has returned to normal levels.

Although the formol-gel is not as sensitive in indicating the onset of tissue-irritative processes as the erythrocyte sedimentation rate, it apparently possesses certain peculiar advantages. Whereas the sedimentation rate may be retarded by the presence of cardiac decompensation and, as a result, indicate slow rates which may be misleading, the gel reaction, in the observations previously described, remained strongly positive in several instances after the onset of cardiac decompensation. For the formol-gel reaction, furthermore, only blood serum is required, and the test may be performed several days after the specimen is collected. Under circumstances which preclude the use of anticoagulants in controlled concentration or observations of the sedimentation rate within 3 hours after collection of the blood, therefore, the formol-gel reaction may be of value as a practical substitute. Moreover, unless the red blood-cell volume is determined and the erythrocyte sedimentation rate corrected for the degree of anemia a false interpretation of accelerated rates may be made. We have, however, not found the formol-gel reaction positive in cases of severe anemia with very rapid uncorrected sedimentation rates when the corrected rates were within normal limits.

CONCLUSIONS

1. In various febrile disease processes in which the eythrocyte sedimentation rate is accelerated, treatment of the blood serum with formalin may induce gelation and opacity. Of these two changes in physical state of the serum, gelation is the more sensitive indicator of departures from the normal. On the other hand, opacity appears to develop as an attribute of only the more strongly positive gel reactions.

2. In patients with various febrile diseases of the types investigated here (except rheumatic fever) a parallel is demonstrable between the erythrocyte sedimentation rate and the results of the formol-gel reaction in that the incidence of positive gel reactions varies directly with the degree of erythrocyte sedimentation rate acceleration. Furthermore, in such cases the formol-gel reactions are uniformly negative unless a certain degree of erythrocyte suspension instability is present.

3. In children or in adults with rheumatic carditis, unique results are demonstrable. Early in the course of illness negative formol-gel reactions are frequently associated with very rapid sedimentation rates. Later, upon the development of active carditis, positive gel reactions often appear when the erythrocyte sedimentation rate has fallen from the original high rate. With convalescence, the erythrocyte sedimentation rate usually drops to very low levels while the formol-gel reaction may remain strongly positive.

4. The findings in *adult* rheumatic fever patients with arthritis uncomplicated by severe carditis are similar to those in other febrile diseases. In rheumatic *children*, regardless of the presence of arthritis, strongly positive gel reactions are observed only when severe, active carditis is present.

5. These observations suggest that the formol-gel reaction may be a valuable additional aid in determining the presence of active rheumatic carditis in patients known to be suffering from rheumatic fever. Strongly positive reactions in children or in adults without arthritis suggest the presence of active carditis. Negative results, on the other hand, indicate the absence of severe carditis and are of favorable diagnostic import. In those occasional instances in which positive gel reactions persist longer than elevations in the erythrocyte sedimentation rate, this test may provide the only evidence of continued rheumatic activity warranting continued limitation of physical activity.

6. The formol-gel reaction is apparently not influenced, as is the erythrocyte sedimentation rate, by the presence of cardiac decompensation or anemia.

REFERENCES

(1) Gutman, A. B., and Wise, C. R.: Positive formol-gel reactions associated with hyperglobulinemia in lymphogranuloma inguinale, multiple myeloma and hepatic cirrhosis. Proc. Soc. Exp. Biol. and Med., **35**: 124 (1936).

(2) Coburn, A. F., and Kapp, E. M.: Observations in the development of the high blood sedimentation rate in rheumatic carditis. J. Clin. Inv., **15**: 715 (1936).

(3) Spackman, W. C.: The Gaté Papacostas Reaction. Brit. Med. J., **2**: 266 (1921).

(4) Lloyd, R. B., and Paul, S. N.: Serum changes in kala-azar. Indian J. Med. Research, **16**: 203 (1925).

(5) Gaté and Papacostas: Une nouvelle réaction des serums syphilitiques; formol-gelification. Compt. rend. Soc. biol., **83**: 1432 (1920).

(6) Faust, E. C., and Meleney, H. E.: Studies on Schistosomiasis japonica. Am. J. Hyg. Monograph series No. 3, p. 229 (1924).

(7) Peters, J. P., and Van Slyke, D. D.: Quantitative clinical chemistry, 1st ed., Vol. 2. The Williams and Wilkins Co., Baltimore, 1931.

(8) Wintrobe, M. M.: Macroscopic examination of the blood. Am. J. Med. Sc., **185**: 58 (1933).

(9) Rourke, M. D., and Ernstine, A. C.: A method for correcting the erythrocyte sedimentation rate for variations in the cell volume percentage of blood. J. Clin. Inv., **8**: 545 (1930).

(10) Reichel, H., Bettelheim, F., and Brandt, R.: Formol-Gelifikation des Serums (Reaktion von Gaté und Papacostas). Klin. Woch., **16**: 1058 (1937).

THE CONCENTRATION OF GLUTATHIONE IN THE ERYTHROCYTES OF PATIENTS WITH RHEUMATIC FEVER

By MARK P. SCHULTZ, *Surgeon, United States Public Health Service* [1]

In patients with rheumatoid and osteoarthritis, the cystine content of the fingernails is reduced (*1*, *2*), and the degree of reduction can be correlated with the severity of the disease as indicated by the erythrocyte sedimentation rate (*3*). In view of the many similarities between rheumatoid arthritis and rheumatic fever (*4*), the demonstration (in preliminary investigations) of analogous alterations in the latter disease (*5*) is a compatible finding. The interpretation of these observations is not clear. The occurrence of cystine as an integral component of the tripeptide glutathione, however, suggests that a coincident quantitative alteration with respect to the latter compound might be present. Glutathione is thought to be an essential factor in intracellular oxidative processes (*6*, *7*) and evidence has been presented which indicates that a quantitative sufficiency is necessary for the preservation and utilization of ascorbic acid in the body (*8*, *9*).

Since there is no agreement that an ascorbic-acid deficit is an essential factor in the pathogenesis of rheumatic fever (*10*, *11*, *12*, *13*, *14*, *15*), the fact that such a deficiency mediates the induction of cardiac lesions in guinea pigs which somewhat resemble those of rheumatic fever (*16*, *17*, *18*, *19*, *20*) suggests the possibility of an endogenous abnormality of ascorbic-acid metabolism in this disease. The conceivable significance of glutathione in this connection is evident.

Although no characteristic alterations of the concentration of reduced glutathione in the erythrocytes of patients with chronic arthritis are demonstrable (*21*, *22*), the subject has been considered worthy of investigation in patients with rheumatic fever. The purpose of the present study, therefore, is a comparison of the relative levels of total and oxidized glutathione concentration in the erythrocytes of patients with rheumatic fever with those in patients with other febrile diseases.

In blood all but a trace of the glutathione is contained in the erythrocytes (*6*, *23*, *24*, *25*), and in venous blood during health it is almost entirely in the reduced form (*26*, *27*, *28*). There is agreement that in secondary anemia, although the total glutathione concentration in the whole blood is reduced, it is increased in the erythrocyte fraction (*6*, *23*, *27*, *28*, *29*, *30*, *31*), while the converse is demonstrable in polycythemia (*28*, *30*). In pernicious anemia (*6*), myelogenous leukemia (*28*, *29*), Addison's disease (*29*), and phenylhydrazine poisoning (*6*, *27*), high concentrations of glutathione in the erythrocytes have been reported. In other diseases and conditions, including neoplasms, diabetes, pregnancy, toxemias of pregnancy, nephritis, gallstones,

[1] With the technical assistance of Mr. C. F. Butler.

gout, pulmonary tuberculosis, mental diseases, obesity, pneumonia, cystinuria, myxoedema, hypertension, asthma, liver damage, grippe, and chronic arthritis (*21, 22, 28, 29, 30, 31, 32, 33*), characteristic alterations in the reduced glutathione content of the new blood have usually not been found. Low values have been reported, however, in hyperthyroidism (*22*), diabetes (*31, 34*), and obstructive jaundice (*31*). The levels of glutathione in the blood are very stable (*35, 36*) and but slightly affected by such physiological factors as age (*36*), sex, race (*30*), or the taking of food (*6, 28*), but reduction of oxygen tension of the respired air results in an increase in the reduced glutathione with a decrease in the oxidized fraction (*6, 26, 27*). There are conflicting reports on the effect of exercise (*6, 8, 21, 28*). Usually, it is found that cardiac decompensation is without influence either upon the total amount of glutathione in the erythrocytes or upon the partition between oxidized and reduced fractions (*28, 30, 34*), although characteristic changes (*21, 34, 38*) have been described. Similarly, the presence of a fever is reported as being without effect (*30, 37*) or causing increase in the total glutathione (*39, 40*).

METHODS

Inasmuch as these observations were made in conjunction with other investigations, blood samples were obtained before breakfast, although this precaution is presumably unnecessary (*6, 28*). Total and oxidized glutathione were determined by the method of Woodward and Fry (*28*). The blood was laked and the proteins were precipitated with sulfosalicylic acid at the bedside. Specimens were then kept in a portable refrigerator and examined at the laboratory within 4 hours. According to the originators of this method, samples remain stable under these conditions. Since the glutathione of blood is present almost exclusively in the erythrocytes, the results have been expressed (after the system employed by Senturia (*22*)) in milligrams per 100 cubic centimeters of red cells.

Five-cc. quantities of blood for the determination of the erythrocyte sedimentation rate and the red-cell volume were placed in bottles each containing 10 mg. of dry potassium oxalate recrystallized and adjusted in pH in the manner recommended by Peters and Van Slyke (*41*). The corrected erythrocyte sedimentation rate was determined by the method of Rourke and Ernstine (*42*), and hematocrit readings were adjusted for the shrinkage of cells due to the anticoagulant used (*43*).

Patients with rheumatic fever and other diseases (chiefly febrile) were examined. In order to minimize the influence of incidental factors said to affect the blood glutathione level (*28, 30, 34*), those who had not been at rest in bed for several days or who suffered any degree of cardiac decompensation were excluded from the series.

RESULTS

The results of 46 observations in 19 patients with rheumatic fever and 26 with various other diseases are shown in table 1. Two afebrile patients were included, 1 with pernicious anemia and 1 with myelogenous leukemia, for high blood glutathione values have previously been reported in these conditions (*6*, *28*, *29*). Our findings are in accord (observations 39 and 82, table 1), and further demonstrate, in the patient with pernicious anemia, a drop in both total glutathione and the oxidized fraction (observation 60, table 1) after treatment which induced considerable clinical improvement without causing the red blood-cell volume to reach normal.

TABLE 1.—*Total and oxidized glutathione content of the erythrocytes in various diseases*

Observation No.	Age	Sex	Diagnosis	Days' duration illness	Temperature at the time of observation	Antecedent fever [1]	Corrected erythrocyte sedimentation rate [2]	Volume percent of erythrocytes	Total glutathione (mg. per 100 cc. R.B.C.)	Oxidized glutathione (mg. per 100 cc. R.B.C.)
39	25	F	Pernicious anemia (*cf.* observation No. 60)	(?)	98.6	−	0.50	16.7	148.2	7.3
82	12	F	Myelogenous leukemia	(?)	99.0	+	−	14.5	144.2	[3] 21.5
62	20	F	Rheumatic fever	33	99.0	++	0.60	23.6	127.4	2.6
35	14	F	Tuberculous peritonitis	18	102.0	++++	1.20	29.4	117.3	[3] 9.3
75	20	F	Sepsis	40	104.0	++++	1.00	21.0	117.0	[3] 10.6
41	7	M	Pneumonia	7	102.5	++++	2.10	30.1	116.1	.5
65	19	F	Rheumatic fever (pregnant 8 mo.)	19	99.0	+++	++++	31.9	113.0	11.3
60	25	F	Pernicious anemia after treatment	(?)	98.6	−	1.35	21.0	112.6	3.1
61	20	F	Rheumatoid arthritis	30	99.6	++	.75	29.0	112.6	1.9
71	22	M	Rheumatic fever	39	99.6	+++	2.20	42.7	103.4	2.1
40	15	F	Gonococcal arthritis	30	98.6	++	2.24	40.3	101.2	2.1
52	9	M	Scarlet fever	23	99.5	++	.60	40.7	99.4	12.0
49	11	M	Rheumatic fever	50	98.6	++	1.60	34.9	96.0	.9
51	9	F	Scarlet fever	11	100.0	+++	1.70	40.0	95.3	3.8
29	55	F	Rheumatic fever	90	102.0	++++	1.80	31.2	94.9	[3] 21.7
33	16	M	do	39	98.8	++++	1.95	35.9	94.9	3.5
38	20	F	Acute nephritis	30	99.0	+++	1.20	34.0	94.6	16.0
34	14	F	Pneumonia	24	99.0	++	2.05	30.9	92.9	.5
70	16	F	Rheumatic fever	10	103.2	++++	1.70	30.7	91.3	3.3
42	11	M	do	54	100.0	+++	.97	34.5	90.9	[3] 7.0
74	16	F	do	12	103.0	++++	1.50	30.1	90.6	4.0
26	12	M	do	45	99.2	++++	1.75	34.1	90.4	5.4
44	11	F	do	11	100.8	++	1.72	34.9	90.2	.5
45	20	F	Gonococcal arthritis	14	98.6	++	1.85	34.9	90.0	1.6
43	9	M	Pharyngitis	15	100.0	+++	2.05	35.6	89.4	3.3
66	11	F	Rheumatic fever	20	100.5	++	2.00	33.4	87.1	1.9
23	11	M	do	50	98.6	++	1.50	34.1	83.7	.5
56	9	M	Scarlet fever	14	98.6	++	1.10	39.2	83.3	.5
19	11	F	Pharyngitis	3	99.0	++	1.55	41.0	83.2	6.6
25	5	-----	Pneumonia	2	104.0	++++	2.00	40.3	82.1	.5
76	20	F	Rheumatoid arthritis	35	98.6	++	1.20	36.0	81.7	.9
59	16	M	Rheumatic fever	55	98.8	++++	.65	36.2	81.4	1.6
22	9	M	Upper respiratory infection	28	99.2	+	.50	38.5	79.5	.5
54	6	F	Scarlet fever	2	99.0	++	.50	39.9	80.2	.5
37	6	F	do	12	99.2	++++	1.55	38.1	79.3	8.5
28	16	M	Rheumatic fever	33	98.8	+++	1.90	34.9	79.1	[3] 10.6
64	12	M	do	67	99.1	+++	1.15	38.8	78.3	2.1
46	5	M	Pneumonia	3	104.0	++++	1.70	30.5	78.1	1.9
53	7	M	Scarlet fever	46	98.6	+++	1.02	42.1	74.6	2.8
55	6	M	do	12	98.6	+	1.09	41.4	73.1	.5
58	14	M	Rheumatic fever	107	98.6	+++	1.00	39.9	71.5	.7
21	14	F	Subacute nephritis	87	100.0	++	.60	39.2	69.9	1.4
67	7	M	Rheumatic fever	55	100.5	+++	1.80	36.3	69.6	.5
69	13	M	do	7	99.0	+	.62	40.8	68.4	4.0
24	5	M	Pneumonia	8	101.0	+++	.90	41.8	60.4	.5
68	18	M	Pulmonary tuberculosis	88	98.6	++++	.82	42.8	60.1	4.2

[1] + to ++++, indicating the relative degree of fever.
[2] In millimeters per minute.
[3] Patient died.

In febrile patients, the total glutathione concentration in the erythrocytes varied from 60.1 to 127.4 mg. per 100 cc. No correlation was apparent between the total glutathione level, clinical diagnosis, degree of fever, and the erythrocyte sedimentation rate. The oxidized fraction varied from 0.5 to 21.7 mg. per 100 cc. of erythrocytes, and the results likewise were not susceptible of correlation with the various factors enumerated. Of the 11 patients with an oxidized glutathione fraction of 7.0 mg. percent or over, however, 6 died (over 50 percent), and these constitute the only deaths in this group of patients. Since all the survivors were observed until convalescence was established, a poor prognosis is demonstrably associated with a high concentration of oxidized glutathione in the erythrocytes.

CONCLUSIONS

1. The concentration of glutathione (total and oxidized fraction) in the erythrocytes of patients with various febrile diseases including rheumatic fever was determined.

2. No correlation could be established between the values for total glutathione and the clinical diagnosis or any characteristic of the disease process in these patients.

3. In accord with previous observations, a high concentration of glutathione was found in the erythrocytes of patients with pernicious anemia and myelogenous leukemia.

4. The mortality rate was high from various causes among those patients in whom the oxidized fraction of glutathione in the erythrocytes was greatly increased.

REFERENCES

(1) Sullivan, M. X., and Hess, W. C.: Cystine content of fingernails in arthritis. J. Bone and Joint Surg., **16**: 185 (1934).
(2) Sullivan, M. X.: Sulphur and cystine in relation to arthritis. Med. Ann. Dist. Col., **3**: 233 (1934).
(3) Argy, W. P.: Arthritis; comparison of cystine content of fingernails with sedimentation reaction of blood. J. Am. Med. Assoc., **104**: 631 (1935).
(4) Dawson, M. H., and Tyson, T. L.: The relationship between rheumatic fever and rheumatoid arthritis. J. Lab. and Clin. Med., **21**: 575 (1936).
(5) Sullivan, M. X.: Personal communication.
(6) Gabbs, E.: Über Vorkommen und Bedeutung löslicher Schwefelverbindungen in den Blutkörperchen. Klin. Woch., **8**: 2077 (1929).
(7) Cronheim, G.: Einfluss des reticulo-endothelialen Systems auf Erythrocythenzal Glutathiongehalt und Sauerstoffzehrung des Blutes. Klin. Woch., **12**: 1217 (1933).
(8) Borsook, H., and Jeffreys, C. E. P.: Glutathione and ascorbic acid. Science, **83**: 397 (1936).
(9) Hopkins, F. G., and Morgan, E. J.: Some relations between ascorbic acid and glutathione. Biochem. J., **30**: 1446 (1936).
(10) Sendroy, J., and Schultz, M. P.: I. Quantitative index of ascorbic acid utilization in human beings and its application to the study of rheumatic fever. J. Clin. Inv., **15**: 369 (1936).
(11) Schultz, M. P.: II. Test of prophylactic and therapeutic action of ascorbic acid. J. Clin. Inv., **15**: 385 (1936).
(12) Warner, E. C. and Winterton, F. G.: Dietetic study of cases of juvenile rheumatic disease. Quart. J. Med., **4**: 227 (1935).

(13) Abbasy, M. A., Hill, N. G., and Harris, L. J.: Vitamin C and juvenile rheumatism, with some observations on vitamin C reserves in surgical tuberculosis. Lancet, 2: 1413 (1936).
(14) Perry, C. B.: Rheumatic heart disease and vitamin C. Lancet, 2: 426 (1935).
(15) Rinehart, J. F., Greenberg, L. D., and Christie, A. U.: Reduced ascorbic acid content of blood plasma in rheumatic fever. Proc. Soc. Exp. Biol. and Med., 35: 350 (1936).
(16) Rinehart, J. F., and Mettier, S. R.: Heart valves and muscle in experimental scurvy with superimposed infection, with notes on similarity of lesions. Am. J. Path., 10: 61 (1934).
(17) Stimson, A. M., Hedley, O. F., and Rose, E.: Notes on experimental rheumatic fever. Pub. Health Rep., 49: 361 (1934).
(18) Schultz, M. P.: Cardiovascular and arthritic lesions in guinea pigs with chronic scurvy and hemolytic streptococcic infections. Arch. Path., 21: 472 (1936).
(19) McBroom, J., Sunderland, D. A., and Mote, J. R.: Effect of acute scurvy on guinea pig heart. Arch. Path., 23: 20 (1937).
(20) Taylor, S.: Scurvy and carditis. Lancet, 1: 973 (1937).
(21) Mikhlin, M., and Rakhmolevitch, C. M.: Glutathione of blood in circulatory disorders. Klin. Med., 14: 253 (1936).
(22) Senturia, B. D.: Glutathione content of blood in chronic arthritis and rheumatoid conditions. J. Lab. and Clin. Med., 19: 1151 (1934).
(23) Schultze, M. O., and Elvehjem, C. A.: Studies on glutathione content of blood in nutritional anemia. J. Biol. Chem., 116: 711 (1936).
(24) Schoonover, J. W.: Blood glutathione in human cancer. Am. J. Cancer, 23: 311 (1935).
(25) Schoonover, J. W.: Plasma and erythrocyte glutathione in human cancer. Am. J. Cancer, 23: 315 (1935).
(26) Malkin, S. I., Makarowa, T. A., and Sarbejeiva, W. S.: Über die Dynamik des Glutathione bei Kreislaufkranken. Z. ges. exp. Med., 97: 523 (1936).
(27) Gabbs, E.: Untersuchungen über die Sulfhydrilgruppen der Blutkörperschen. Z. ges. exp. Med., 69: 392 (1930).
(28) Platt, R.: Blood glutathione in disease. Brit. J. Exp. Path., 12: 139 (1931).
(29) Barbaro Forleo, G., and Cattaneo, F.: Determinazioni del glutathione del sangue in stati morbosi vari. Arch. Sc. Med., 59: 949 (1935). Abst. Ber. u. d. ges. Physiol. u. Pharm., 91: 33 (1936).
(30) Bowman, R. D.: Glutathione content of blood. Proc. Soc. Exp. Biol. and Med., 31: 616 (1934).
(31) Varela, K., Apolo, E., and Vilar, J.: Das Glutathion im Blut bei pathologischen Zustanden. Klin. Woch., 9: 1029 (1930).
(32) Oberst, F. W., and Woods, E. B.: Studies in glutathione; total and reduced glutathione, oxygen content and capacity and cell volume of blood in nonpregnant and pregnant women with special reference to toxemias of pregnancy. Am. J. Obst. and Gynec., 30: 232 (1935).
(33) King, E., Baumgartner, L., and Page, I. H.: Glutathiongehalt des Blutes von Geisteskranken. Biochem. Z., 217: 389 (1930).
(34) Companacci, D.: Kohlehydratstoffwechsel und lösliche Schwefelverbindungen in den Erythrocyten und Geweben. Klin. Woch., 9: 1212 (1930).
(35) Malkin, S. J.: Glutathiongehalt bei Kreislaufkranken. Z. ges. exp. Med., 89: 193 (1933).
(36) Paraf, J., Desbordes, J., and Deletang, R.: Glutathionémie et vieillesse; faibles variations de la glutathionémie chez un même individu normal. Compt. rend Soc. biol., 116: 1359 (1934).
(37) Pegararo, C.: Glutatione e febbre. Sperimentale, 88: 404 (1934).
(38) Seria, V., and Nunberg, M.: Untersuchungen über das Verhalten des Schwefels im Blute bei Herzkrankheiten. Z. Kreislaufforsch., 26: 321 (1934).
(39) Wallsch, H., and Weinberger, E.: Glutathionespiegil des Blutes im Fieber. Arch. exp. Path. u. Pharmakol., 169: 625 (1933).
(40) Glukhenkuj, T. T., and Gutman, M. L.: Glutathione in blood of patients with internal disease. Klin. Med., 14: 260 (1936).
(41) Peters, J. P., and Van Slyke, D. D.: Quantitative Clinical Chemistry. Vol. 2. The Williams and Wilkins Co., Baltimore, 1931.
(42) Rourke, M. D., and Ernstine, A. C.: A method for correcting the erythrocyte sedimentation rate for variations in the cell volume percentage of blood. J. Clin. Inv., 8: 545 (1929).
(43) Wintrobe, M. W.: Macroscopic examination of the blood. Am. J. Med. Sci., 185: 58 (1933).

PROVISIONAL MORTALITY AND NATALITY SUMMARY FOR 1938, BY STATES

There is presented in the accompanying tables the first published annual summary of birth, death, and infant mortality data, by States, for 1938, recently issued by the Bureau of the Census.[1] These tables give the total numbers of births, deaths, and infant deaths by the individual States and four cities for 1937 as well as for 1938, and rates based thereon. With respect to these data the Census Bureau presents the following explanation and comment:

These annual totals are based on the reports sent monthly during the year to the Bureau of the Census by the State and city health offices. Reports are made by telegraph on the 25th day of each month. They give the number of birth, death, and infant-death certificates (exclusive of stillbirths) received in the State office since the 25th day of the preceding month. The city reports are for the calendar month. Under the above definition, the tabulated figures include all certificates received during the stated period, without regard to date of occurrence.

For purposes of comparison, the reported number of births, deaths, and infant deaths in 1937, as taken from the final tabulations of the Bureau of the Census, is also shown.

The correct interpretation of the current figures given in this report requires a knowledge of the method of collection. In the various States birth and death certificates are filed with registrars in county and city registration districts. By State law these certificates must be mailed to the proper State office on or before a specified day of each month, generally the 15th. (The cities shown separately in this report are independent registration units and receive certificates daily. They do not send these to the State offices.)

In a registration system reaching down into thousands of local areas, many certificates are not forwarded to the State office promptly. Nevertheless, certificates for the bulk of births or deaths occurring in any month are received by the State offices before the 25th of the following month. For example, death certificates received between December 26, 1938, and January 25, 1939, will include a large majority of the deaths occurring in December. The certificates received will not include some which should have been filed during this period, but will include as a compensating factor a number of delayed certificates for previous months.

[1] Monthly Vital Statistics Bulletin, vol. 1, No. 13, issued by the Bureau of the Census, February 7, 1939.

EVALUATION OF CURRENT DATA

The correspondence between the number of certificates received and currently reported for 1937, and the number of births, deaths, and infant deaths which actually occurred in 1937 can be evaluated by a comparison of the birth, death, and infant-death rates for 1937, computed from the provisional figures, with the same rates as computed on the basis of the final tabulated figures for 1937. (The birth and death rates are based on the population of the United States and of each State, estimated as of July 1, 1937, by the Bureau of the Census. It should also be mentioned that the annual rates for certain States and cities are based on incomplete reports. Illinois reported for 7 months, 1937 and 1938; South Carolina, 8 months, 1938; Pennsylvania, 10 months, 1938; Virginia, 11 months, 1937 and 1938; Louisiana and Minnesota, 10 months, 1937; Alabama, Delaware, District of Columbia, New York, North Dakota, and Oregon, 11 months, 1937; New Orleans and Boston, 10 months, 1937; and Baltimore and New York City, 11 months, 1937.)

Comparison of the provisional and final rates for 1937 indicates that the former figures gave very close approximations to the correct final birth, death, and infant death rates for the entire United States. (The provisional birth and death rates for the United States are based on data from 42 States; the provisional infant death rate is based on data from 40 States.) The final and provisional birth rates were 17.0 and 17.1, respectively; the final and provisional death rates were 11.2 and 11.1, respectively; and the final and provisional infant death rates were 54.4 and 54.2, respectively. Similar comparisons of the 1938 figures are not yet possible, but the 1937 approximations should aid in evaluating the provisional 1938 rates for the United States.

Similar comparisons may be made between the final and provisional 1937 rates for the individual States. In many States the correspondence is very close. For some States, however, the discrepancy between the provisional and the final rates is too large.

There is reason to believe that the provisional figures for 1938 are at least as accurate as those for 1937, and for certain States probably more nearly the final figure. As the current reporting procedures become more familiar, the Bureau of the Census states that it will be able to give, upon a current basis, increasingly accurate birth, death, and infant-death rates for the United States and for the individual States. These current data will be of especial value to persons interested in public health and vital statistics.

Number of deaths (exclusive of stillbirths) and death rates, 1938 and 1937

Area	Number			Rate per 1,000 estimated population		
	Provisional [1]		Final	Provisional [1]		Final
	1938	1937	1937	1938	1937	1937
United States	1,208,438	1,090,010	1,450,427	10.7	11.1	11.2
Alabama	30,316	[2] 28,641	30,843	10.5	10.8	10.7
Arizona	5,554	6,878	6,919	13.5	16.7	16.8
Arkansas	[3]	[3]	18,364	[3]	[3]	9.0
California	76,304	80,314	80,256	12.4	13.1	13.0
Colorado	12,565	13,994	13,833	11.7	13.1	12.9
Connecticut	[3]	[3]	17,892	[3]	[3]	10.3
Delaware	3,147	3,088	3,290	12.1	12.8	12.6
District of Columbia	8,039	7,740	8,727	12.8	13.5	13.9
Florida	20,740	20,820	20,960	12.4	12.5	12.6
Georgia	33,565	33,484	34,446	10.9	10.9	11.2
Idaho	4,573	4,852	4,752	9.3	9.8	9.6
Illinois	[2] 48,116	[2] 47,303	87,739	[2] 10.4	[2] 10.2	11.1
Indiana	38,392	40,692	40,929	11.1	11.7	11.8
Iowa	26,729	26,538	26,485	10.5	10.4	10.4
Kansas	18,594	19,298	19,204	10.0	10.4	10.3
Kentucky	28,514	30,019	30,899	9.8	10.3	10.6
Louisiana	24,604	[2] 20,077	25,010	11.5	[2] 11.2	11.7
Maine	10,319	11,316	11,465	12.1	13.2	13.4
Maryland	20,880	21,814	22,083	12.4	13.0	13.2
Massachusetts	[3]	[3]	52,248	[3]	[3]	11.6
Michigan	50,480	53,325	53,472	10.5	11.0	11.1
Minnesota	26,324	[2] 21,073	26,905	9.9	[2] 9.5	10.1
Mississippi	[3]	[3]	23,856	[3]	[3]	11.3
Missouri	42,907	45,256	44,974	10.8	11.3	11.2
Montana	5,683	6,125	6,128	10.5	11.4	11.4
Nebraska	12,559	13,606	13,199	9.2	10.0	9.7
Nevada	1,262	1,190	1,322	12.5	11.8	13.1
New Hampshire	6,443	6,759	6,528	12.6	13.3	12.8
New Jersey	43,601	44,830	45,003	10.0	10.3	10.4
New Mexico	5,659	6,270	6,422	13.4	14.9	15.3
New York	147,121	[2] 137,837	153,772	11.4	[2] 11.6	11.9
North Carolina	33,765	34,100	33,981	9.7	9.8	9.7
North Dakota	5,138	[2] 4,828	5,440	7.3	[2] 7.5	7.7
Ohio	73,506	77,506	80,189	10.9	11.5	11.9
Oklahoma	20,076	21,663	21,313	7.9	8.5	8.4
Oregon	11,733	[2] 10,907	12,341	11.4	[2] 11.6	12.0
Pennsylvania	[2] 88,373	[3]	114,949	[2] 10.4	[3]	11.3
Rhode Island	8,226	8,320	8,334	12.1	12.2	12.2
South Carolina	[2] 13,635	[3]	20,540	[2] 11.0	[3]	11.0
South Dakota	5,405	6,070	5,959	7.8	8.8	8.6
Tennessee	30,494	[3]	30,232	10.5	[3]	10.5
Texas	60,532	64,587	65,448	9.8	10.5	10.6
Utah	4,766	4,922	4,989	9.2	9.5	9.6
Vermont	4,635	4,886	4,981	12.1	12.8	13.0
Virginia	[2] 26,672	[2] 28,306	31,119	[2] 10.8	[2] 11.4	11.5
Washington	18,562	19,032	19,094	11.2	11.5	11.5
West Virginia	17,408	18,169	19,190	9.3	9.7	10.3
Wisconsin	30,301	31,118	31,973	10.4	10.6	10.9
Wyoming	2,221	2,457	2,430	9.5	10.5	10.3
New Orleans	8,006	[2] 6,578	8,044	[4]	[4]	[4]
Baltimore	11,090	[2] 10,251	11,789	[4]	[4]	[4]
Boston	10,818	[2] 9,109	11,644	[4]	[4]	[4]
New York City	73,775	[2] 68,896	77,206	[4]	[4]	[4]

[1] Based on telegraphic reports.
[2] Incompletely reported; see text.
[3] Data not reported.
[4] Rates not available; no estimated population.

Number of births (exclusive of stillbirths) and birth rates, 1938 and 1937

Area	Number			Rate per 1,000 estimated population		
	Provisional [1]		Final	Provisional [1]		Final
	1938	1937	1937	1938	1937	1937
United States	2,024,052	1,682,083	2,203,337	17.9	17.1	17.0
Alabama	63,053	[2] 58,632	61,611	21.8	[2] 22.1	21.3
Arizona	9,882	10,560	10,494	24.0	25.6	25.5
Arkansas	[3]	[3]	35,236	[3]	[3]	17.2
California	101,961	94,580	94,230	16.6	15.4	15.3
Colorado	20,273	20,106	19,610	18.9	18.8	18.3
Connecticut	[3]	[3]	22,774	[3]	[3]	13.1
Delaware	4,363	[2] 3,933	4,355	16.7	[2] 16.3	16.7
District of Columbia	12,891	[2] 11,239	12,343	20.6	[2] 19.6	19.7
Florida	30,383	28,743	29,507	18.2	17.2	17.7
Georgia	62,704	61,825	64,061	20.3	20.0	20.8
Idaho	11,382	10,639	10,369	23.1	21.6	21.0
Illinois	[2] 69,565	[2] 69,199	115,282	[2] 15.1	[2] 15.0	14.6
Indiana	58,212	54,805	56,087	16.8	15.8	16.1
Iowa	43,458	41,290	42,105	17.0	16.2	16.5
Kansas	30,171	30,505	29,325	16.2	16.4	15.7
Kentucky	67,030	58,502	56,163	23.0	20.0	19.2
Louisiana	48,169	[2] 38,197	46,006	22.6	[2] 21.4	21.6
Maine	15,224	15,464	15,246	17.8	18.1	17.8
Maryland	29,917	28,318	27,739	17.8	16.9	16.5
Massachusetts	[3]	[3]	61,736	[3]	[3]	13.9
Michigan	95,455	90,249	91,539	19.8	18.7	19.0
Minnesota	49,900	[2] 38,842	48,036	18.8	[2] 17.5	18.1
Mississippi	[3]	[3]	52,095	[3]	[3]	25.8
Missouri	64,528	58,745	56,951	16.2	14.7	14.3
Montana	10,562	10,208	10,248	19.6	18.9	19.0
Nebraska	22,859	22,674	22,270	16.8	16.6	16.3
Nevada	1,867	1,412	1,742	18.5	14.0	17.2
New Hampshire	7,898	7,820	7,633	15.5	15.3	15.0
New Jersey	55,930	54,475	54,607	12.9	12.5	12.6
New Mexico	14,849	13,742	13,837	35.2	32.6	32.8
New York	189,614	[2] 171,039	185,502	14.6	[2] 14.4	14.3
North Carolina	80,603	80,644	79,080	23.1	23.1	22.6
North Dakota	13,110	[2] 11,947	12,637	18.6	[2] 18.5	17.9
Ohio	106,796	103,627	107,576	15.9	15.4	16.0
Oklahoma	44,932	39,771	41,456	17.6	15.6	16.3
Oregon	16,256	[2] 14,221	15,457	15.8	[2] 15.1	15.1
Pennsylvania	[2] 139,709	[3]	161,288	[2] 16.5	[3]	15.8
Rhode Island	10,299	9,954	10,240	15.1	14.6	15.0
South Carolina	[2] 26,882	[3]	40,643	[2] 21.5	[3]	21.7
South Dakota	18,166	14,876	11,908	26.3	21.5	17.2
Tennessee	61,136	[3]	51,938	21.1	[3]	18.0
Texas	121,678	116,295	116,057	19.7	18.8	18.8
Utah	13,188	12,323	12,693	25.4	23.7	24.5
Vermont	6,467	6,314	6,326	16.9	16.5	16.5
Virginia	[2] 47,211	[2] 47,221	51,950	[2] 19.1	[2] 19.1	19.2
Washington	26,228	24,608	25,036	15.8	14.8	15.1
West Virginia	40,361	38,666	42,240	21.6	20.7	22.6
Wisconsin	54,152	51,238	53,543	18.5	17.5	18.3
Wyoming	4,778	4,635	4,530	20.3	19.7	19.3
New Orleans	9,979	[2] 8,181	9,557	[4]	[4]	[4]
Baltimore	15,545	[2] 13,026	14,255	[4]	[4]	[4]
Boston	14,267	[2] 11,498	15,931	[4]	[4]	[4]
New York City	102,045	[2] 93,440	101,095	[4]	[4]	[4]

[1] Based on telegraphic reports.
[2] Incompletely reported; see text.
[3] Data not reported.
[4] Rates not available; no estimated population.

Number of infant deaths (exclusive of stillbirths) and infant mortality rates, 1938 and 1937

Area	Number			Rate per 1,000 live births		
	Provisional [1]		Final	Provisional [1]		Final
	1938	1937	1937	1938	1937	1937
United States	**93,652**	**82,256**	**119,931**	**50.9**	**54.2**	**54.4**
Alabama	3,821	[2] 3,500	3,844	60.6	[2] 59.7	62.4
Arizona	963	1,247	1,267	97.4	118.1	120.7
Arkansas	[3]	[3]	1,919	[3]	[3]	54.5
California	[3]	[3]	5,670	[3]	[3]	53.8
Colorado	1,161	1,403	1,441	57.3	69.8	73.5
Connecticut	[3]	[3]	921	[3]	[3]	40.4
Delaware	222	243	278	50.9	61.8	63.8
District of Columbia	622	[2] 651	751	48.3	[2] 57.9	60.8
Florida	1,773	1,752	1,765	58.4	61.0	59.8
Georgia	4,202	3,851	3,952	67.0	62.3	61.7
Idaho	509	478	453	44.7	44.9	43.7
Illinois	[3]	[3]	4,967	[3]	[3]	43.1
Indiana	2,465	2,635	2,789	42.3	48.1	49.7
Iowa	1,628	1,773	1,862	37.5	42.9	44.2
Kansas	1,277	1,315	1,302	42.3	43.1	44.4
Kentucky	3,805	3,315	3,321	56.8	56.7	59.1
Louisiana	3,121	[2] 2,402	3,020	64.8	[2] 62.9	65.6
Maine	753	949	996	49.5	61.4	65.3
Maryland	1,581	1,697	1,705	52.8	59.9	61.5
Massachusetts	[3]	[3]	2,723	[3]	[3]	44.1
Michigan	4,306	4,449	4,386	45.1	49.3	47.9
Minnesota	1,962	[2] 1,540	1,961	39.3	[2] 39.6	40.8
Mississippi	[3]	[3]	2,066	[3]	[3]	58.9
Missouri	2,961	3,093	3,219	45.9	52.7	56.5
Montana	462	506	518	43.7	49.6	50.5
Nebraska	750	815	937	32.8	35.9	42.1
Nevada	84	[2] 61	70	45.0	[2] 47.4	40.2
New Hampshire	375	344	367	47.5	44.0	48.1
New Jersey	2,114	2,145	2,154	37.8	39.4	39.4
New Mexico	1,480	1,613	1,711	99.7	117.4	123.7
New York	7,709	[2] 7,534	8,369	40.7	[2] 44.0	45.1
North Carolina	5,473	5,234	5,180	67.9	64.9	65.5
North Dakota	632	[2] 594	662	48.2	[2] 49.7	52.4
Ohio	5,033	5,117	5,332	47.1	49.4	49.6
Oklahoma	1,898	2,334	2,345	42.2	58.7	56.6
Oregon	615	[2] 582	642	37.8	[2] 40.9	41.5
Pennsylvania	[2] 5,545	[3]	8,109	[2] 44.2	[3]	50.3
Rhode Island	457	486	487	44.4	48.8	47.6
South Carolina	[2] 2,243	[3]	3,074	[2] 83.4	[3]	75.6
South Dakota	473	602	608	26.0	40.5	51.1
Tennessee	3,278	[3]	3,171	53.6	[3]	61.1
Texas	7,792	7,999	8,575	64.0	68.8	73.9
Utah	598	507	526	45.3	41.1	41.4
Vermont	298	290	313	46.1	45.9	49.5
Virginia	[2] 3,190	[2] 3,236	3,619	[2] 67.6	[2] 68.5	69.7
Washington	1,009	972	998	38.5	39.5	39.9
West Virginia	2,508	2,495	2,610	62.1	64.5	61.8
Wisconsin	2,246	2,237	2,324	41.5	43.7	43.4
Wyoming	258	260	252	54.0	56.1	55.6
New Orleans	766	[2] 574	750	76.8	[2] 70.2	78.5
Baltimore	816	[2] 738	816	52.5	[2] 56.7	57.2
Boston	705	[2] 607	815	49.4	[2] 52.8	51.2
New York City	3,909	[2] 4,000	4,431	38.3	[2] 42.8	43.8

[1] Based on telegraphic reports. [2] Incompletely reported; see text. [3] Data not reported.

DEATHS DURING WEEK ENDED JANUARY 28, 1939

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

	Week ended Jan. 28, 1939	Corresponding week, 1938
Data from 88 large cities of the United States:		
Total deaths	9,115	[1] 9,152
Average for 3 prior years	[1] 9,812	
Total deaths, first 4 weeks of year	36,362	36,908
Deaths under 1 year of age	523	[1] 536
Average for 3 prior years	[1] 579	
Deaths under 1 year of age, first 4 weeks of year	2,135	2,172
Data from industrial insurance companies:		
Policies in force	68,298,999	69,793,644
Number of death claims	14,854	14,557
Death claims per 1,000 policies in force, annual rate	11.3	10.9
Death claims per 1,000 policies, first 4 weeks of year, annual rate	10.1	10.0

[1] Data for 86 cities.

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.

In these and the following tables, a zero (0) indicates a positive report and has the same significance as any other figure, while leaders (----) represent no report, with the implication that cases or deaths may have occurred but were not reported to the State health officer.

Cases of certain diseases reported by telegraph by State health officers for the week ended Feb. 4, 1939, rates per 100,000 population (annual basis), and comparison with corresponding week of 1938 and 5-year median

Division and State	Diphtheria				Influenza				Measles			
	Feb. 4, 1939, rate	Feb. 4, 1939, cases	Feb. 5, 1938, cases	1934-38, median	Feb. 4, 1939, rate	Feb. 4, 1939, cases	Feb. 5, 1938, cases	1934-38, median	Feb. 4, 1939, rate	Feb. 4, 1939, cases	Feb. 5, 1938, cases	1934-38, median
NEW ENG.												
Maine	6	1	0	2	24	4	4	1	163	27	150	100
New Hampshire	0	0	0	0	----	----	2	----	10	1	79	79
Vermont	13	1	0	0	----	----	----	----	188	14	240	26
Massachusetts	5	4	3	5	----	----	----	----	911	775	136	513
Rhode Island	0	0	0	1	----	----	----	----	145	19	4	34
Connecticut	3	1	4	3	21	7	12	12	1,683	567	11	71
MID. ATL.												
New York	19	26	31	46	[1] 110	[1] 159	[1] 16	[1] 24	363	908	706	717
New Jersey	10	8	19	17	67	56	13	32	32	27	1,315	223
Pennsylvania	30	60	59	51	----	----	----	----	113	222	7,960	1,743
E. NO. CEN.												
Ohio	31	40	21	46	----	----	----	122	17	22	1,266	383
Indiana	45	30	49	40	31	21	----	88	18	12	724	383
Illinois	34	52	49	46	24	36	54	54	24	37	4,747	337
Michigan [2]	6	6	10	10	----	----	6	6	444	420	964	59
Wisconsin	0	0	2	2	119	68	51	73	1,386	789	2,001	808
W. NO. CEN.												
Minnesota	10	5	2	4	----	----	5	3	2,167	1,118	19	151
Iowa	16	8	2	11	2	1	12	15	344	170	45	45
Missouri	8	6	20	25	31	24	203	203	5	4	1,231	468
North Dakota	22	3	1	1	197	27	2	5	3,396	465	19	19
South Dakota	38	5	3	2	8	1	----	----	3,065	408	----	----
Nebraska	8	2	11	11	----	----	----	20	271	71	5	25
Kansas	14	5	19	8	17	6	10	29	31	11	395	52

See footnotes at end of table.

Cases of certain diseases reported by telegraph by State health officers for the week ended Feb. 4, 1939, rates per 100,000 population (annual basis), and comparison with corresponding week of 1938 and 5-year median—Continued

Division and State	Diphtheria				Influenza				Measles			
	Feb. 4, 1939, rate	Feb. 4, 1939, cases	Feb. 5, 1938, cases	1934–38, median	Feb. 4, 1939, rate	Feb. 4, 1939, cases	Feb. 5, 1938, cases	1934–38, median	Feb. 4, 1939, rate	Feb. 4, 1939, cases	Feb. 5, 1938, cases	1934–38, median
SO. ATL.												
Delaware	0	0	0	1								
Maryland [2]	12	4	11	8	188	61	28	42	3,225	1,046	33	92
District of Columbia	24	3	5	13	41	5	2	4	146	18	13	149
Virginia	36	19	25	31	2,062	1,100			79	42	547	13
West Virginia	11	4	13	21	56	21	42	279	54	20	232	547
North Carolina	57	39	36	31	13	9	33	36	833	570	1,241	33
South Carolina [3]	46	17	5	9	2,109	772	636	808	49	18	307	750
Georgia [3]	13	8	7	8	217	131		259	161	97	456	40
Florida	33	11	17	12			10	10	184	61	223	27
E. SO. CEN.												
Kentucky	10	6	8	22	344	198	77	77	109	63	568	159
Tennessee	16	9	13	14	102	58	172	172	74	42	645	25
Alabama [3]	21	12	17	15	456	259	289	301	158	90	215	204
Mississippi [3]	15	6	5	7								
W. SO. CEN.												
Arkansas	22	9	17	5	394	159	242	148	258	104	204	14
Louisiana [3]	19	8	12	17	24	10	24	24	230	95	1	33
Oklahoma	18	9	20	17	326	162	169	190	272	135	43	48
Texas [3]	45	54	80	68	579	699	916	744	76	92	140	155
MOUNTAIN												
Montana	0	0	1	2	234	25		42	5,420	579	9	19
Idaho	0	0	0	0	10	1	6	6	286	28	5	31
Wyoming	0	0	0	0					2,051	94	6	6
Colorado	58	12	5	5	169	35			260	54	89	35
New Mexico	12	1	2	5	74	6	9	9	383	31	163	50
Arizona	25	2	9	2	834	68	117	125	98	8	3	17
Utah [3]	30	3	3	2	199	20			377	38	123	39
PACIFIC												
Washington	9	3	5	5			2	2	561	182	28	146
Oregon	10	2	4	1	124	25	59	59	174	35	19	51
California [3]	28	34	32	39	62	76	100	131	1,602	1,954	311	311
Total	21	538	648	684	204	4,310	3,323	3,323	468	11,583	27,667	19,031
5 weeks	24	3,029	3,409	3,685	161	17,075	14,951	14,951	390	48,238	98,936	61,597

Division and State	Meningitis, meningococcus				Poliomyelitis				Scarlet fever			
	Feb. 4, 1939, rate	Feb. 4, 1939, cases	Feb. 5, 1938, cases	1934–38, median	Feb. 4, 1939, rate	Feb. 4, 1939, cases	Feb. 5, 1938, cases	1934–38, median	Feb. 4, 1939, rate	Feb. 4, 1939, cases	Feb. 5, 1938, cases	1934–38, median
NEW ENG.												
Maine	0	0	0	0	0	0	0	0	109	18	23	19
New Hampshire	10	1	0	0	0	0	1	0	41	4	6	9
Vermont	0	0	0	0	0	0	0	0	13	1	13	21
Massachusetts	0	0	2	2	0	0	0	0	241	205	274	250
Rhode Island	8	1	0	0	0	0	0	0	53	7	21	15
Connecticut	3	1	0	1	0	0	0	0	318	107	93	68
MID. ATL.												
New York	2.8	7	12	12	0.4	1	1	1	196	490	661	726
New Jersey	4	3	1	3	2.4	2	0	0	208	175	143	161
Pennsylvania [4]	5	[4] 10	4	4	0	0	0	0	241	475	653	536

See footnotes at end of table.

Cases of certain diseases reported by telegraph by State health officers for the week ended Feb. 4, 1939, rates per 100,000 population (annual basis), and comparison with corresponding week of 1938 and 5-year median—Continued

Division and State	Meningitis, meningococcus				Poliomyelitis				Scarlet fever			
	Feb. 4, 1939, rate	Feb. 4, 1939, cases	Feb. 5, 1938, cases	1934–38, median	Feb. 4, 1939, rate	Feb. 4, 1939, cases	Feb. 5, 1938, cases	1934–38, median	Feb. 4, 1939, rate	Feb. 4, 1939, cases	Feb. 5, 1938, cases	1934–38, median
E. NO. CEN.												
Ohio	1.5	2	0	7	0	0	0	0	480	624	316	472
Indiana	1.5	1	1	1	0	0	0	0	376	253	211	229
Illinois	2.6	4	3	9	1.3	2	0	1	382	583	714	684
Michigan [2]	0	0	0	1	0	0	1	1	607	574	474	466
Wisconsin	0	0	0	1	0	0	1	0	457	260	185	295
W. NO. CEN.												
Minnesota	0	0	1	1	0	0	0	0	264	136	137	137
Iowa	0	0	1	2	0	0	0	0	263	130	285	186
Missouri	1.3	1	3	7	0	0	1	0	148	115	229	165
North Dakota	15	2	3	0	0	0	0	0	175	24	33	40
South Dakota	8	1	2	1	0	0	0	0	218	29	17	18
Nebraska	4	1	0	0	0	0	0	0	160	42	70	70
Kansas	0	0	0	1	0	0	0	1	536	192	226	226
SO. ATL.												
Delaware	0	0	0	0	0	0	0	0	0	0	6	8
Maryland [2]	0	0	0	1	0	0	1	0	114	37	56	78
Dist. of Col	0	0	0	4	0	0	0	0	154	19	21	16
Virginia	6	3	1	4	1.9	1	0	0	75	40	30	45
West Virginia	8	3	4	4	2.7	1	1	1	134	50	34	46
North Carolina	0	0	4	3	0	0	0	0	79	54	39	39
South Carolina [2]	5	2	0	0	8	3	2	0	44	16	7	8
Georgia [2]	1.7	1	2	3	1.7	1	0	0	45	27	13	13
Florida	3	1	0	0	0	0	0	0	66	22	13	7
E. SO. CEN.												
Kentucky	3	2	16	8	1.7	1	1	1	153	88	76	76
Tennessee	5	3	4	4	0	0	0	0	67	38	40	40
Alabama [2]	9	5	6	1	1.8	1	0	0	51	29	14	19
Mississippi [2]	5	2	0	1	2.5	1	3	1	30	12	4	17
W. SO. CEN.												
Arkansas	2.5	1	1	1	0	0	0	0	52	21	8	9
Louisiana [2]	0	0	3	0	2.4	1	0	0	70	29	15	16
Oklahoma	2	1	2	2	0	0	1	0	135	67	52	34
Texas [2]	0	0	4	4	0	0	0	0	94	113	162	115
MOUNTAIN												
Montana	0	0	0	1	0	0	0	0	271	29	35	60
Idaho	10	1	0	0	0	0	0	0	82	8	17	15
Wyoming	22	1	1	0	0	0	0	0	44	2	27	27
Colorado	5	1	0	1	5	1	0	0	221	46	24	34
New Mexico	0	0	2	0	0	0	0	0	111	9	5	24
Arizona	12	1	0	0	0	0	1	0	86	7	13	22
Utah [2]	0	0	0	0	0	0	0	0	377	38	106	72
PACIFIC												
Washington	0	0	0	1	3	1	1	1	274	89	89	53
Oregon	5	1	1	1	5	1	2	0	234	47	78	58
California [2]	0.8	1	2	5	0	0	3	3	180	220	236	291
Total	2.6	65	86	127	0.7	18	21	21	223	5,601	6,004	6,213
5 weeks	2.2	[4] 275	463	530	0.7	85	106	111	208	26,182	29,791	30,105

See footnotes at end of table.

Cases of certain diseases reported by telegraph by State health officers for the week ended Feb. 4, 1939, rates per 100,000 population (annual basis), and comparison with corresponding week of 1938 and 5-year median—Continued

Division and State	Smallpox				Typhoid and paratyphoid fever				Whooping cough		
	Feb. 4, 1939, rate	Feb. 4, 1939, cases	Feb. 5, 1938, cases	1934–38, median	Feb. 4, 1939, rate	Feb. 4, 1939, cases	Feb. 5, 1938, cases	1934–38, median	Feb. 4, 1939, rate	Feb. 4, 1939, cases	Feb. 5, 1938, cases
NEW ENG.											
Maine	0	0	0	0	0	0	0	1	175	29	71
New Hampshire	0	0	0	0	0	0	0	0	101	10	4
Vermont	0	0	0	0	0	0	0	0	1,206	90	18
Massachusetts	0	0	0	0	1	1	2	2	264	225	111
Rhode Island	0	0	0	0	0	0	0	0	282	37	34
Connecticut	0	0	0	0	0	0	2	0	249	84	67
MID. ATL.											
New York	0	0	0	0	3	8	6	6	158	395	472
New Jersey	0	0	0	0	2	2	1	1	459	386	144
Pennsylvania	0	0	0	0	4	8	20	9	320	630	411
E. NO. CEN.											
Ohio	35	45	1	1	0	0	2	3	131	170	115
Indiana	175	118	69	4	1	1	1	1	34	23	18
Illinois	3	5	44	6	2	3	4	6	231	352	93
Michigan [2]	4	4	19	0	1	1	4	3	245	232	132
Wisconsin	14	8	2	18	2	1	0	2	515	293	129
W. NO. CEN.											
Minnesota	33	17	16	4	0	0	1	1	126	65	33
Iowa	97	48	33	10	0	0	4	3	38	19	42
Missouri	15	12	31	10	0	0	4	3	36	28	108
North Dakota	7	1	29	7	0	0	0	0	241	33	31
South Dakota	83	11	20	11	0	0	0	0	180	24	14
Nebraska	11	3	8	8	0	0	0	0	4	1	8
Kansas	45	16	10	10	0	0	1	1	59	21	113
SO. ATL.											
Delaware	0	0	0	0	0	0	0	0	59	3	21
Maryland [2]	0	0	0	0	0	0	1	3	86	28	64
Dist. of Col	0	0	0	0	8	1	0	0	251	31	9
Virginia	0	0	3	0	9	5	2	6	73	33	97
West Virginia	5	2	0	0	0	0	4	4	81	30	99
North Carolina	0	0	1	1	3	2	4	2	457	313	281
South Carolina [2]	3	1	0	0	3	1	2	2	199	73	57
Georgia [2]	0	0	0	0	5	3	2	3	43	26	59
Florida	0	0	0	0	6	2	4	1	109	36	55
E. SO. CEN.											
Kentucky	5	3	32	0	2	1	2	2	40	23	71
Tennessee	0	0	3	0	2	1	1	6	95	54	46
Alabama [2]	0	0	2	1	11	6	6	4	14	8	14
Mississippi [2]	3	1	17	1	8	3	4	2			
W. SO. CEN.											
Arkansas	2	1	12	2	10	4	4	1	60	24	27
Louisiana [2]	2	1	0	1	22	9	11	7	12	5	2
Oklahoma	109	54	34	0	6	3	2	5	2	1	33
Texas [2]	31	38	62	7	12	14	11	11	94	113	209
MOUNTAIN											
Montana	19	2	9	9	9	1	0	1	131	14	31
Idaho	102	10	14	1	0	0	2	0	31	3	19
Wyoming	0	0	1	5	0	0	0	0	44	2	25
Colorado	29	6	6	5	19	4	1	0	217	45	13
New Mexico	12	1	0	0	0	0	3	3	111	9	35
Arizona	282	23	1	0	12	1	1	0	209	17	37
Utah [2]	0	0	5	0	0	0	0	0	169	17	83
PACIFIC											
Washington	25	8	32	12	15	5	1	3	120	39	122
Oregon	25	5	27	8	0	0	0	0	144	29	30
California [2]	9	11	67	10	4	5	5	5	96	117	261
Total	18	455	610	201	4	96	125	125	172	4,246	4,028
5 weeks	16	2,003	3,019	1,026	4	554	589	611	175	21,705	19,946

[1] New York City only.
[2] Period ended earlier than Saturday.
[3] Typhus fever, week ended Feb. 4, 1939, 25 cases as follows: South Carolina, 10; Georgia, 2; Alabama, 3; Louisiana, 1; Texas, 8; California, 1.
[4] Two cases reported in Pennsylvania as meningococcus meningitis, 1 each for weeks Jan. 14 and 21, and published in the Public Health Reports for Jan. 27 and Feb. 3, pp. 129 and 193, were not meningococcus meningitis according to a corrected report.

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	Meningitis, meningococcus	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid and paratyphoid fever
November 1938										
Puerto Rico	0	36	965	3,564	11	-------	0	0	0	29
December 1938										
Utah	1	2	86	-------	67	-------	0	93	0	0
Virginia	6	199	1,099	-------	172	1	2	193	0	9
Wisconsin	-------	8	209	-------	1,098	-------	0	-------	28	4
January 1939										
Connecticut	2	10	42	-------	1,301	-------	0	303	0	1
Delaware	1	12	-------	-------	14	-------	0	57	0	2
North Carolina	7	136	52	49	2,041	10	3	247	0	9

November 1938

	Cases
Puerto Rico:	
Anthrax	1
Chickenpox	7
Dysentery	6
Mumps	2
Ophthalmia neonatorum	1
Puerperal septicemia	4
Tetanus	8
Tetanus, infantile	4
Whooping cough	113
Yaws	1

December 1938

	Cases
Chickenpox:	
Utah	429
Virginia	260
Wisconsin	2,521
Dysentery:	
Virginia (bacillary)	38
Encephalitis, epidemic or lethargic:	
Wisconsin	1
German measles:	
Utah	2
Wisconsin	21
Mumps:	
Utah	509
Virginia	159
Wisconsin	248

December 1938—Continued.

	Cases
Rocky Mountain spotted fever:	
Virginia	1
Septic sore throat:	
Utah	2
Virginia	105
Wisconsin	5
Trachoma:	
Virginia	5
Tularaemia:	
Virginia	56
Wisconsin	9
Typhus fever:	
Virginia	2
Undulant fever:	
Virginia	1
Wisconsin	10
Whooping cough:	
Utah	60
Virginia	301
Wisconsin	1,253

January 1939

	Cases
Anthrax:	
Delaware	2
Chickenpox:	
Connecticut	643
Delaware	68
North Carolina	497
Dysentery:	
Connecticut (bacillary)	4

January 1939—Continued.

	Cases
German measles:	
Connecticut	24
Delaware	2
North Carolina	12
Mumps:	
Connecticut	285
Delaware	67
Ophthalmia neonatorum:	
North Carolina	1
Rabies in animals:	
Connecticut	4
Rocky Mountain spotted fever:	
North Carolina	1
Septic sore throat:	
Connecticut	17
North Carolina	5
Trichinosis:	
Connecticut	3
Tularaemia:	
North Carolina	12
Typhus fever:	
North Carolina	9
Undulant fever:	
Connecticut	5
Delaware	1
North Carolina	1
Vincent's infection:	
North Carolina	2
Whooping cough:	
Connecticut	463
Delaware	25
North Carolina	1,202

WEEKLY REPORTS FROM CITIES

City reports for week ended Jan. 28, 1939

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Data for 90 cities:											
5-year average	206	1,299	159	3,547	1,019	1,904	32	387	19	1,215	----
Current week	171	311	57	3,680	726	1,432	34	346	21	1,414	----
Maine:											
Portland	1	----	0	0	3	0	0	0	1	5	29
New Hampshire:											
Concord	0	----	0	0	1	0	0	1	0	0	15
Nashua	0	----	0	0	0	0	0	1	0	0	12
Vermont:											
Barre	0	----	0	0	0	0	0	0	0	0	1
Burlington	0	----	0	0	0	0	0	0	0	0	10
Rutland	0	----	0	0	0	0	0	0	0	0	4
Massachusetts:											
Boston	1	----	1	123	7	48	0	9	1	43	248
Fall River	0	----	1	0	3	2	0	0	0	0	32
Springfield	0	----	0	26	1	3	0	0	1	7	50
Worcester	0	----	0	1	11	0	0	0	0	25	53
Rhode Island:											
Pawtucket	0	----	0	0	3	2	0	0	0	0	12
Providence	0	----	0	4	4	10	0	0	0	59	65
Connecticut:											
Bridgeport	0	1	1	2	4	7	0	1	0	4	40
Hartford	0	1	0	265	7	9	0	3	0	10	46
New Haven	0	1	0	16	3	4	0	0	0	9	34
New York:											
Buffalo	0	----	0	61	10	46	0	7	0	13	137
New York	26	155	15	37	176	174	0	86	2	176	1,760
Rochester	0	1	0	69	4	22	0	0	0	6	67
Syracuse	0	----	0	38	7	10	0	1	0	46	56
New Jersey:											
Camden	1	----	1	0	5	7	0	2	0	3	41
Newark	3	5	0	6	6	47	0	9	0	72	99
Trenton	0	----	0	0	3	2	0	0	0	10	51
Pennsylvania:											
Philadelphia	2	9	1	9	30	53	0	25	1	114	565
Pittsburgh	4	----	1	1	13	27	0	5	0	25	184
Reading	0	----	0	1	0	0	0	0	1	0	21
Scranton	1	----	----	4	----	22	0	----	0	11	----
Ohio:											
Cincinnati	7	----	1	1	8	17	1	5	0	2	126
Cleveland	7	12	----	6	23	47	0	12	1	55	187
Columbus	0	----	0	1	6	7	0	2	0	6	77
Toledo	0	----	0	0	3	18	0	5	0	23	79
Indiana:											
Anderson	0	----	0	0	0	8	1	0	0	0	9
Fort Wayne	1	----	0	0	1	7	0	0	0	0	26
Indianapolis	9	----	0	3	14	50	22	4	0	5	101
Muncie	0	----	0	0	0	0	2	0	0	0	13
South Bend	0	----	0	1	2	1	0	0	0	1	14
Terre Haute	0	----	0	2	3	3	0	1	0	0	----
Illinois:											
Alton	0	----	0	1	0	2	0	0	1	0	5
Chicago	27	12	2	17	47	205	0	38	0	247	719
Elgin	0	----	0	1	2	1	0	0	0	0	15
Moline	0	----	0	1	1	1	0	0	0	1	5
Springfield	0	1	0	0	3	0	0	1	0	0	24
Michigan:											
Detroit	5	----	2	10	31	114	0	16	0	114	291
Flint	0	----	1	149	1	28	0	2	0	0	24
Grand Rapids	0	----	0	3	0	24	0	0	0	2	32
Wisconsin:											
Kenosha	0	----	0	0	0	8	0	0	0	14	6
Madison	0	----	0	4	3	11	0	0	0	20	13
Milwaukee	0	2	2	6	11	89	0	1	0	94	98
Racine	0	----	0	24	1	3	0	0	0	7	10
Superior	0	----	0	1	0	0	0	0	0	0	6
Minnesota:											
Duluth	0	----	0	0	1	7	0	0	0	7	21
Minneapolis	1	----	1	366	4	19	0	1	2	32	110
St. Paul	0	----	0	551	8	35	0	1	2	3	62

City reports for week ended Jan. 28, 1939—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Iowa:											
Cedar Rapids	0	----	----	0	----	0	0	----	0	0	----
Davenport	2	----	----	0	----	7	5	----	0	0	----
Des Moines	0	----	0	0	0	15	1	0	0	0	38
Sioux City	0	----	----	31	----	1	0	----	0	2	----
Waterloo	2	----	----	0	----	10	0	----	0	0	----
Missouri:											
Kansas City	1	----	0	0	9	27	0	3	0	3	112
St. Joseph	0	----	0	0	5	1	0	0	0	0	22
St. Louis	6	----	1	0	12	33	1	6	0	19	196
North Dakota:											
Fargo	0	----	1	2	2	3	0	0	0	0	12
Grand Forks	0	----	----	1	----	1	0	----	0	0	----
Minot	0	----	0	40	0	0	0	0	0	0	5
South Dakota:											
Aberdeen	0	----	----	5	----	2	6	----	0	0	----
Nebraska:											
Omaha	0	----	1	3	3	5	0	2	0	0	60
Kansas:											
Lawrence	0	----	0	0	0	1	0	0	0	0	2
Topeka	0	----	0	1	1	3	0	0	0	1	16
Wichita	1	----	0	1	4	5	0	0	0	0	31
Delaware:											
Wilmington	3	----	0	0	3	4	0	1	0	0	38
Maryland:											
Baltimore	1	6	1	784	24	19	0	6	1	22	243
Cumberland	0	----	0	0	1	0	0	0	0	0	14
Frederick	0	----	0	0	0	0	0	0	0	3	2
Dist. of Col.:											
Washington	3	1	1	22	13	13	0	10	0	25	160
Virginia:											
Lynchburg	2	----	0	13	0	0	0	1	0	14	12
Richmond	1	----	2	5	9	1	0	5	0	3	55
Roanoke	0	----	0	0	1	2	0	0	0	1	17
West Virginia:											
Charleston	0	1	0	0	4	0	0	0	0	0	19
Huntington	1	----	----	0	----	0	0	----	0	0	----
Wheeling	0	----	0	0	1	0	0	1	0	2	22
North Carolina:											
Gastonia	0	----	----	0	----	3	0	----	0	0	----
Raleigh	0	----	0	0	0	1	0	0	0	0	9
Wilmington	0	----	0	0	2	1	0	0	0	4	11
Winston-Salem	2	----	0	68	1	1	0	1	0	2	13
South Carolina:											
Charleston	0	44	1	0	3	4	0	3	0	4	26
Florence	0	----	0	0	0	0	0	0	0	0	11
Greenville	1	----	0	1	0	0	0	0	0	5	4
Georgia:											
Atlanta	1	10	1	4	11	7	0	3	0	0	83
Brunswick	0	1	1	2	2	1	0	0	0	0	7
Savannah	0	22	0	1	3	2	0	0	0	6	24
Florida:											
Miami	0	2	0	0	1	3	0	1	1	0	33
Tampa	2	1	1	16	1	2	0	1	0	0	27
Kentucky:											
Ashland	1	----	0	0	1	0	0	0	0	0	9
Covington	0	----	0	0	1	19	0	2	0	0	16
Lexington	0	----	0	0	3	0	0	1	0	0	21
Louisville	0	----	0	0	9	0	0	2	0	0	59
Tennessee:											
Knoxville	3	6	0	0	4	0	0	1	0	1	28
Memphis	0	----	2	3	3	8	0	1	0	9	71
Nashville	0	----	1	0	4	11	0	2	0	3	60
Alabama:											
Birmingham	2	2	2	0	9	3	0	3	0	2	68
Mobile	0	----	1	0	4	0	0	1	0	0	28
Montgomery	0	2	----	0	----	1	0	----	2	0	----
Arkansas:											
Fort Smith	0	3	----	4	----	3	0	----	0	0	----
Little Rock	1	----	0	0	9	4	0	0	0	0	10
Louisiana:											
Lake Charles	0	----	0	7	0	2	0	0	0	0	4
New Orleans	20	3	0	35	16	6	0	8	6	0	152
Shreveport	1	----	0	2	10	3	0	3	0	0	43
Oklahoma:											
Oklahoma City	1	5	1	2	7	14	0	2	0	0	54
Tulsa	0	----	----	5	----	9	0	----	0	0	----

City reports for week ended Jan. 28, 1939—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Texas:											
Dallas	2	2	2	0	5	14	5	3	0	0	68
Fort Worth	0	19	0	1	2	7	0	1	1	0	30
Galveston	2	------	0	0	3	0	0	0	0	0	24
Houston	1	------	0	1	8	7	0	4	1	0	75
San Antonio	0	------	4	0	8	0	0	11	0	0	81
Montana:											
Billings	0	------	0	58	1	1	0	0	0	0	5
Great Falls	0	------	0	0	0	1	0	0	0	0	5
Helena	0	------	0	31	0	0	0	0	0	0	1
Missoula	0	1	0	10	1	0	1	0	0	0	11
Idaho:											
Boise	0	------	0	0	3	0	0	0	0	0	10
Colorado:											
Colorado Springs	1	------	0	9	3	4	0	2	0	11	16
Denver	12	------	2	10	5	3	0	2	1	28	86
Pueblo	0	------	0	0	5	7	0	1	0	4	10
New Mexico:											
Albuquerque	0	1	0	0	2	2	0	1	0	0	9
Utah:											
Salt Lake City	0		0	4	6	6	0	0	0	8	42
Washington:											
Seattle	1	------	0	12	7	8	0	3	0	5	119
Spokane	0	------	0	13	1	2	0	0	0	0	25
Tacoma	0	------	0	2	1	2	0	0	0	0	41
Oregon:											
Portland	0	2	0	0	4	8	0	1	0	1	75
Salem	0	------	--------	0	-------	0	0	-------	0	0	--------
California:											
Los Angeles	10	14	2	52	23	53	0	14	0	26	365
Sacramento	0	------	0	6	5	1	4	3	0	0	31
San Francisco	1	3	0	719	7	22	0	11	0	4	173

State and city	Meningitis, meningococcus		Poliomyelitis cases	State and city	Meningitis, meningococcus		Poliomyelitis cases
	Cases	Deaths			Cases	Deaths	
New Hampshire:				South Carolina:			
Nashua	0	1	0	Charleston	0	0	1
Massachusetts:				Georgia:			
Worcester	2	0	0	Savannah	0	0	1
New York:				Florida:			
Buffalo	1	1	0	Tampa	0	0	1
New York	3	0	0	Tennessee:			
Rochester	0	1	0	Knoxville	0	1	0
Pennsylvania:				Louisiana:			
Philadelphia	1	0	0	Lake Charles	1	0	0
Pittsburgh	1	1	0	New Orleans	1	0	0
Illinois:				Shreveport	0	4	0
Chicago	0	1	0	Montana:			
Minnesota:				Great Falls	0	0	1
Minneapolis	1	0	0	Colorado:			
Maryland:				Denver	1	0	0
Baltimore	1	0	0	California:			
District of Columbia:				Los Angeles	1	1	0
Washington	1	0	0				

Encephalitis, epidemic or lethargic.—Cases: New York, 7; San Francisco, 1.
Pellagra.—Cases: Savannah, 5; Fort Smith, 1; Los Angeles, 1.
Typhus fever.—Cases: Memphis, 1; Los Angeles, 1.

FOREIGN AND INSULAR

JAMAICA

Communicable diseases—4 weeks ended January 21, 1939.—During the 4 weeks ended January 21, 1939, cases of certain communicable diseases were reported in Kingston, Jamaica, and in the island outside of Kingston, as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Chickenpox		21	Lethargic encephalitis		1
Diphtheria	4	1	Puerperal fever		2
Dysentery	2		Scarlet fever		1
Erysipelas		1	Tuberculosis	33	79
Leprosy		2	Typhoid fever	1	39

PANAMA CANAL ZONE

Notifiable diseases—October–December 1938.—During the months of October, November, and December 1938, certain notifiable diseases, including imported cases, were reported in the Panama Canal Zone and terminal cities as follows:

Disease	October		November		December	
	Cases	Deaths	Cases	Deaths	Cases	Deaths
Chickenpox	13		15		22	
Diphtheria	16	1	17		9	
Dysentery (amoebic)	6		11		20	1
Dysentery (bacillary)	2	1	4	3	5	3
Leprosy	2		2	2		1
Malaria	74	1	57	3	37	
Measles	5		5		5	
Mumps	6		3			
Paratyphoid fever	1				1	
Pneumonia		30		24		23
Relapsing fever			1			
Tuberculosis		37		33		33
Typhoid fever	4	1	1		1	

YUGOSLAVIA

Communicable diseases—4 weeks ended January 1, 1939.—During the 4 weeks ended January 1, 1939, certain communicable diseases were reported in Yugoslavia as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	24		Paratyphoid fever	13	2
Cerebrospinal meningitis	15	8	Poliomyelitis	7	
Diphtheria and croup	783	72	Scarlet fever	367	11
Dysentery	82	2	Sepsis	7	3
Erysipelas	164	2	Tetanus	25	7
Favus	10		Typhoid fever	415	35
Measles	1	1	Typhus fever	23	

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

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for January 27, 1939, pages 137–148. A similar cumulative table will appear in future issues of the PUBLIC HEALTH REPORTS for the last Friday of each month.

Plague

Brazil.—During the month of November 1938, plague was reported in Brazil as follows: Pernambuco State, 17 cases, 8 deaths; Rio de Janeiro State, 11 cases, 6 deaths.

Egypt—Asyut Province—Manfalut.—During the week ended January 28, 1939, 1 case of bubonic plague was reported in Manfalut, Asyut Province, Egypt.

Hawaii Territory—Island of Hawaii—Hamakua District—Kukaiau.—One rat found on January 4, one rat found on January 5, and one rat found on January 19, 1939, in Kukaiau, Hamakua District, Island of Hawaii, Hawaii Territory, have been proved positive for plague.

Peru.—During the month of December 1938, plague was reported in Peru as follows: Lambayeque Department, 1 case; Libertad Department, 2 cases; Lima Department, 4 cases, 2 deaths, and 1 suspected case.

Siam—Svargalok Province.—During the week ended January 28, 1939, 11 cases of plague were reported in Svargalok Province, Siam.

Smallpox

Portugal—Lisbon.—According to information received under date of February 4, 1939, from the American Consulate at Lisbon, Portugal, a mild epidemic of smallpox was reported in Lisbon, with 25 cases and 1 death occurring in the latest week for which reports were available as compared with 12 cases and 1 death for the preceding week.

Typhus Fever

Libya—Suani Benaden.—During the week ended January 14, 1939, 3 cases of typhus fever were reported in Suani Benaden, Libya.

Yellow Fever

French Equatorial Africa—Chad—Fort Lamy—Correction.—One death from yellow fever has been reported at Fort Lamy, Chad, French Equatorial Africa. (This death, stated as suspected to be from yellow fever, was erroneously reported under Nigeria in the PUBLIC HEALTH REPORTS for February 3, 1939, p. 204.)

×